Geotechnical investigation for the Proposed Cato Ridge Township Development Prefeasibility Study – Interpretive Report

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Document prepared by:

Aurecon South Africa (Pty) Ltd
Reg No 1977/003711/07
Aurecon Centre
Lynnwood Bridge Office Park
4 Daventry Street
Lynnwood Manor 0081
PO Box 74381
Lynnwood Ridge 0040
South Africa

T +27 12 427 2000
F +27 86 556 0521
E tshwane@aurecongroup.com
W aurecongroup.com

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Approval			
Author signature		Approver signature	
Name	N Khanyile Pr Sci Nat	Name	S Naidoo Pr Sci.Nat
Title	Engineering geologist	Title	Technical Director

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Executive summary

Aurecon have been appointed by Assmang Limited (Cato Ridge Land Development Committee) to conduct a prefeasibility study (PFS) for the Cato Ridge Land Development Project. As part of the PFS, a geotechnical investigation was conducted for the proposed township development. The information will also be used to facilitate the planned zoning of the site into respective residential, commercial, industrial and / or mixed-use areas. It is understood that commercial, industrial and / or mixed-use, including a shopping centre is planned the site portion located to the north of the N3 highway (referenced as the northern portion). The site to the south of the N3 highway (referenced as the southern portion) is to be developed as a residential area.

A total of two hundred and twenty-eight (228 No), test pits were excavated, details, one hundred and fourteen (114 No) test pits (C-TP01-C-TP114) were excavated at the southern portion and one hundred and fourteen (114 No) test pit (C-TP121-C-TP135) within the northern portion. Representative samples were collected and submitted to a laboratory for foundation indicator, compaction (Mod AASHTO and CBR), chemical (pH and conductivity), standard consolidation and lump testing.

The site is underlain by tillite (Dwyka Group) which is in turn overlain by the shales and siltstones of the Pietermaritzburg Formation which are underlain by sandstones of the Vryheid Formation.

In the northern portion, groundwater seepage was encountered at six (6 No) of the investigated positions (C-TP122, C-TP123, C-TP143, C-TP144, C-TP169 and C-TP184) located in the low-lying areas or floodplains. According to the information recorded during fieldwork the water table depths range between 1.0m and 2.8m.

Groundwater was only found to occur in test pit C-TP105 in the southern portion. However, it should be noted that test pits C-TP16, C-TP17 and C-TP33 were excavated in the vicinity of a wetland.

The foundation indicator results indicate that the transported material, residuum and bedrock are low in plasticity and characterised by low and occasionally moderate potential expansiveness.

The material occurring within the southern portion is generally not suitable for use as construction material. Also, a limited volume of suitable material will be available from the northern portion. It is recommended that construction materials be sourced commercially.

The fill, transported material (alluvium, colluvium and hillwash), residuum (tillite, siltstone and sandstone) and very soft rock tillite and siltstone bedrock classify as ‘Soft Excavation’, according to the SANS 1200D guidelines. Cobbles and boulders of up 1200mm were occasionally encountered in the hillwash, residual tillite and residual sandstone. These may be classified as ‘Boulder Excavation’. TLB refusal was recorded on hardpan ferricrete, medium to hard rock tillite and hard rock siltstone and sandstone at the site. According to the SABS 1200D (1988) guidelines, the classification of the bedrock may vary from ‘Intermediate Excavation’ or ‘Hard Excavation’. An excavator and / or power tools may be required for the excavation of Intermediate material. Blasting will be required to excavate trenches where materials are classified as Hard Excavation.

For foundation pressures not exceeding 50 kPa, modified strip footings are proposed in areas underlain by deep residual and / completely weathered tillite and siltstone horizons. Typically, the hard rock siltstone and sandstone bedrock provides a competent founding horizon. The proposed buildings can be founded on hard rock bedrock using conventional strip footings and pad footings.

It is understood that commercial, industrial and / or mixed-use (including a shopping centre) developments are planned in the northern portion. At the time of reporting details about the magnitude and loads of the proposed structures were not available.

The Phase 1 investigation must be followed at the appropriate time by a Phase 2 investigation. Both are required in terms of the GFSH-2 specification mentioned in this report. The Phase 2 investigation forms part of the National Home Builder’s Registration Council (NHBRC) requirements for enrolment of residential dwellings in their warranty scheme and will require that a competent person inspect services trenches (sewerage and water) as they are excavated. The reason for the inspections is to refine the geotechnical zoning so that a stand-by-stand soil classification and founding recommendation is made possible.

It is assumed that the detailed (Phase 2) investigations for the planned structures will be conducted at a later stage.

1 Introduction

Aurecon South Africa (Pty) Ltd was appointed by Assmang Limited (Cato Ridge Land Development Committee) to conduct a prefeasibility study (PFS) for the Cato Ridge Land Development Project. As part of the PFS, a geotechnical investigation was conducted for the proposed township development. The information will also be used to facilitate the planned zoning of the site into respective residential, commercial, industrial and / or mixed-use areas. It is understood that commercial, industrial and / or mixed-use, including a shopping centre is planned the site portion located to the north of the N3 highway (referenced as the northern portion). The site to the south of the N3 highway (referenced as the southern portion) is to be developed as a residential area.

The site is approximately 1728ha in extent. At the time of the investigation, it was uncertain which sections would be developed for commercial and residential use. Aurecon implemented the SAICE Site Investigation code of practice, and GFSH-2 to scope the investigations.

The objectives of the investigation were:

- To provide an overview and suitability of the land for the proposed development;
- Brief description of the regional geology;
- Obtain a description and variability of the geotechnical conditions and characterising the site;
- Discussion of geotechnical factors which would impact the development, such as foundation conditions, excavatability, stability of service trenches, corrosivity of in situ materials and suitability of in-situ materials for use;
- To identify constraints that may influence the proposed developments;
- To provide generic geotechnical related recommendations including recommendations for additional geotechnical investigations;
- Provide site zoning in accordance to the National Home Builders Registration Council (NHBRC) guidelines.

The field work was carried out in August and September 2019 by an engineering geologist from Aurecon (Ms Nombuso Khanyile) and two laboratory technicians from SGS Matro laboratory.

2 Available information

The available information comprised:

- The 1:250 000 scale geological map (Sheet 2930 Durban, Council for Geoscience, 1986).
- Aurecon *Master Planning Desktop Study* dated 28 September 2018.
- An electronic file (KMZ) showing the envisaged site layout showing steep and wetland areas to be excluded from the study.
- Aurecon report titled, *1:50 and 1:100 Flood Lines Study* dated 14 October 2019.

3 Site location and description

This site is located to the north and south portion of the N3 highway and the old main road (R103). The total site area is about 1728ha with the northern and southern portion covering area of 1293ha and 435ha, respectively.

The site is characterised by a gentle to slightly undulating terrain (see Figure 1). Steep areas forming the boundary of the southern portion were excluded from the study area. The low-lying areas are typically characterised wetlands. The Umgeni River and the associated tributaries in the northern portion and Umlaas River along the southern boundary traverses the site.

Vegetation characterising the site comprises reeds (wetlands), grassland with widely scattered trees and isolated dense bushes.

A golf course is situated within the southern portion. Some abandoned buildings were noted over parts of the northern portion, along with dumps of mine waste and animal carcass, which are believed to be from the nearby abattoir. A significant portion of the northern portion has also been affected by illegal sand mining.



Figure 1: Gentle to slightly undulating terrain as observed on site

4 Geology

According to the 1:250 000 scale geological map of the Durban Sheet 2930 (CGS, 1988), the Cato Ridge area comprises shales and siltstones of the Pietermaritzburg Formation of the Ecca Group. The shales are underlain by sandstones of the Vryheid Formation of the Ecca Group. The Dwyka Group is the oldest and lowermost deposit in the Karoo Supergroup Sequence and comprises tillite with subordinate varved shale and boulder shale. The first sedimentary sequence deposited on the new basement was the Cambrian to Ordovician Natal Group sandstones (Figure 2, refers). The area also include granites and gneiss of the Natal Metamorphic Province.

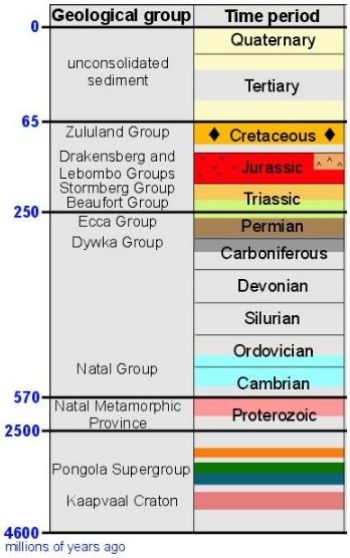


Figure 2: Stratigraphic representation of the site geology

4.1 Natal Group:

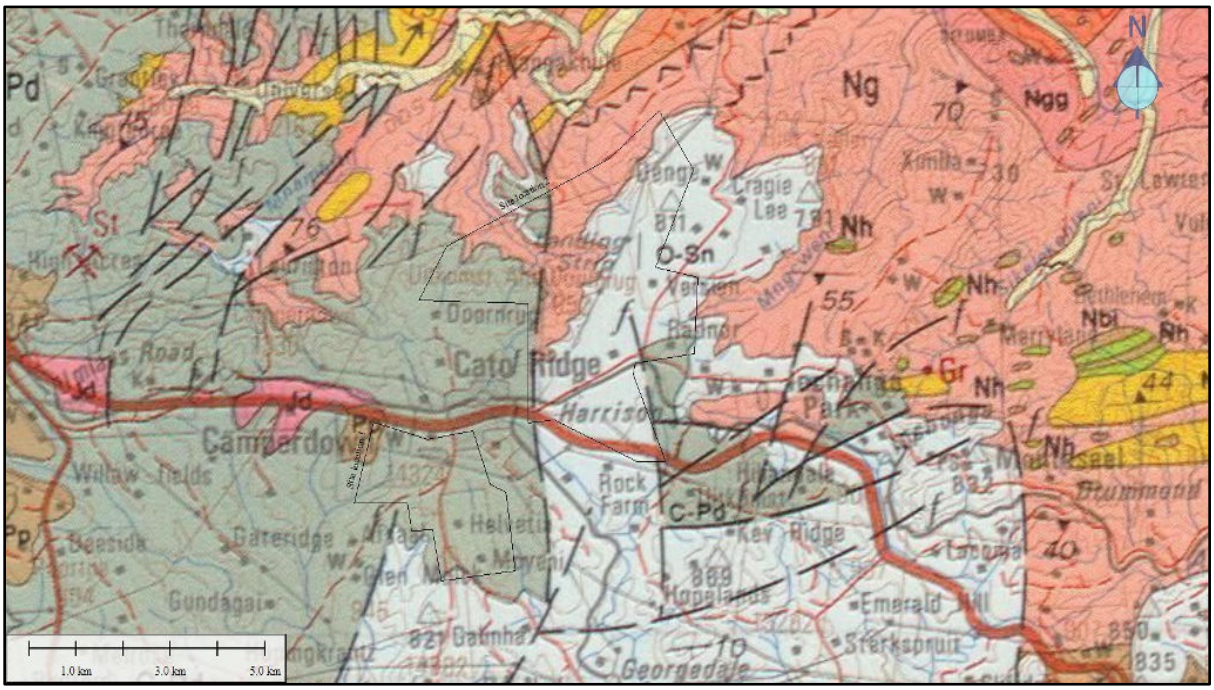
The Natal Group comprises red-brown coarse-grained arkosic to subarkosic Sandstone, quartz arenite, micaceious sandstone, small pebble conglomerate, with subordinate siltstone and mudstone (1:250 000 scale geological map (2930 Durban), 1988). The Palaeozoic Natal Group underlies the Dwyka Group and overlies the Archaean and Proterozoic basement granites in Kwazulu-Natal. Fluvial activity and debris flow processes led to the deposition of the conglomerates, and braided rivers deposited the arenaceous and minor argillaceous sediments. The erosional regime was later replaced by conditions of deposition of the sediments derived from the mountains of southern Mozambique. The sandstone and interbedded mudstone and siltstone was formed shortly after the deposition of the conglomerates (M. R. Johnson, 2006, pp. 433-441).

4.2 Dwyka Formation:

This formation comprise diamictite, tillite, subordinate varved shale and boulder shale horizons (1:250 000 scale geological map (2930 Durban), 1988), Figure 3.

4.3 Weinert Climatic N-value

According to Weinert's climatic N-value [2], the site falls in an area where the N-value is less than 5, indicating that the area is associated with more humid regions where chemical weathering is the predominant rock weathering mode.



Legend:

C-Pd — Diamictite; subordinate varved shale and boulder shale

O-Sn — Red-brown coarse-grained arkosic to subarkosic sandstone; quartz arenite;

Micaceous sandstone; small pebble conglomerate; subordinate siltstone and mudstone

Ng — Megacrystic biotite granite

Figure 3 Geology Map of Cato Ridge ((Source: Council for Geoscience, 1988).

4.4 Soil cover

Soils developed in this region are generally shallow and, because of the prevailing topographic conditions which are very conducive to erosion, they are characteristically young soils which reflect dominance of parent material as a soil forming factor (Brink, 1981, pp. 224-242). The weathering is deep with ferricrete formation forming deep pallid zones, especially in Karoo dolerites (Brink, 1983, pp. 33-44).

5 Seismicity

On the published seismic hazard map of South Africa (SANS 10160-4:2011), the seismic hazard is defined in terms of peak ground acceleration. According to this map, the value for the peak ground acceleration of the site falls in an area with a value of 0.1g indicating low expected seismic hazard levels (Figure 4).

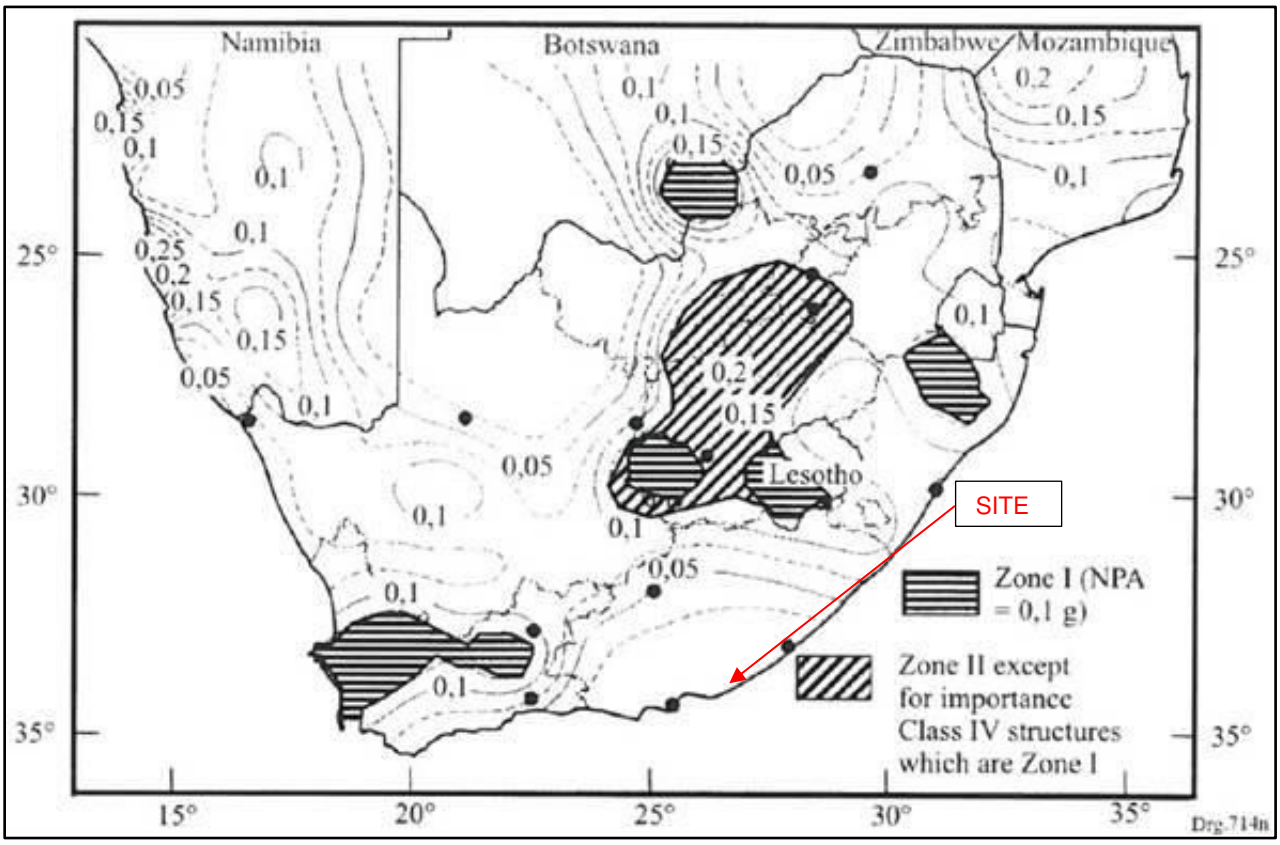


Figure 4: Seismic hazard map showing peak ground acceleration (g) with 10% probability of being exceeded in a 50 year period (after SANS 10160-4:2011).

6 Site investigation methodology

The test pit locations were determined by considering topography, geological variability, site coverage and in accordance with the prescribed requirements in line with SAICE Site Investigation and GFSH-2.

A total of two hundred and twenty-eight (228 No) test pits were excavated (see details below in Table 1). One hundred and fourteen (114 No) test pits (C-TP01-C-TP114) were excavated at the southern portion and one hundred and fourteen (114 No) test pit (C-TP121-C-TP135) within the northern portion. Six (6 No) test pits C-TP115 – C-TP120 were allocated on Portion Rem 29 which was not part of the investigation area and therefore not excavated.

All test pits were excavated using a JCB 3DX light tractor-loader backhoe (TLB) to refusal on hard material or to the maximum reach of the TLB (varying between 3.0 and 3.8m depth). A three-person team carried out the test pit profiling in order to comply with accepted safety requirements as reflected in the South African Code of Practice (SAICE, 2007). The test pits were profiled in accordance with South African standards (Jennings, Brink and Williams (1973), and were backfilled after profiling. The test pit co-ordinates were set out on-site using a hand-held GPS with a nominal accuracy of 5 m to 8 m.

The information obtained from the test pits is summarised in Table 2 below and the detailed profile descriptions are presented in Appendix B.

Table 1 : Summary of test pit positions

Test Pit No.	SA Lo 31 WGS84		Depth (m)
	Y	X	
Southern Portion			
C-TP1	-39580	-3293401	3.00
C-TP2	-39360	-3293375	3.20

Test Pit No.	SA Lo 31 WGS84		Depth (m)
	Y	X	
C-TP3	-39470	-3293259	3.00
C-TP4	-39726	-3291634	2.60
C-TP5	-39578	-3293084	3.00
C-TP6	-39387	-3293101	3.10
C-TP7	-39667	-3292958	3.00
C-TP8	-39095	-3292993	1.00
C-TP9	-38950	-3292995	3.00
C-TP10	-39098	-3292786	3.20
C-TP11	-39099	-3292589	3.00
C-TP12	-39178	-3292411	3.20
C-TP13	-39097	-3292281	3.00
C-TP14	-39055	-3291989	3.10
C-TP15	-39488	-3292705	1.50
C-TP16	-39628	-3292567	3.10
C-TP17	-39771	-3292441	1.40
C-TP18	-39499	-3292474	3.10
C-TP19	-39621	-3292385	3.00
C-TP20	-39799	-3292225	3.20
C-TP21	-39616	-3292228	3.10
C-TP22	-39426	-3292156	3.10
C-TP23	-39638	-3292102	3.60
C-TP24	-39512	-3292012	3.20
C-TP25	-39408	-3291938	3.00
C-TP26	-39465	-3291756	3.00
C-TP27	-39722	-3291960	3.20
C-TP28	-39797	-3292041	3.30
C-TP29	-39942	-3292001	3.40
C-TP30	-39744	-3291846	3.60
C-TP31	-39878	-3291838	1.00
C-TP32	-40034	-3291903	1.30
C-TP33	-40139	-3291802	3.00

Test Pit No.	SA Lo 31 WGS84		Depth (m)
	Y	X	
C-TP34	-40141	-3291999	3.10
C-TP35	-40450	-3292111	3.20
C-TP36	-40334	-3292003	3.20
C-TP37	-40270	-3291854	3.00
C-TP38	-40319	-3291694	3.10
C-TP39	-39836	-3291702	3.10
C-TP40	-39726	-3291634	2.00
C-TP41	-39613	-3291517	3.10
C-TP42	-39649	-3291424	3.10
C-TP43	-39746	-3291308	3.00
C-TP44	-39845	-3291403	3.00
C-TP45	-39944	-3291499	3.10
C-TP46	-39965	-3291678	3.20
C-TP47	-40132	-3291601	3.10
C-TP48	-40135	-3291499	3.10
C-TP49	-40041	-3291401	3.20
C-TP50	-40235	-3291402	3.20
C-TP51	-40549	-3292003	3.00
C-TP52	-40549	-3292102	3.00
C-TP53	-40678	-3292148	3.20
C-TP54	-40744	-3292299	3.20
C-TP55	-40609	-3292515	3.20
C-TP56	-40825	-3292405	3.20
C-TP57	-40975	-3292553	3.10
C-TP58	-40941	-3292297	3.20
C-TP59	-40941	-3292146	3.40
C-TP60	-40743	-3292001	3.10
C-TP61	-40741	-3291807	3.40
C-TP62	-40843	-3291706	3.30
C-TP63	-40851	-3291903	3.30
C-TP64	-40948	-3291805	3.40

Test Pit No.	SA Lo 31 WGS84		Depth (m)
	Y	X	
C-TP65	-41009	-3292008	3.30
C-TP66	-41146	-3291999	3.50
C-TP67	-41133	-3291808	3.10
C-TP68	-41037	-3291651	3.10
C-TP69	-41282	-3291532	3.10
C-TP70	-41337	-3292003	3.30
C-TP71	-41434	-3291902	3.00
C-TP72	-41530	-3292004	3.20
C-TP73	-41925	-3291996	3.30
C-TP74	-41921	-3291799	3.20
C-TP75	-41724	-3291798	3.30
C-TP76	-41521	-3291650	3.30
C-TP77	-41736	-3291650	3.10
C-TP78	-41667	-3291468	3.20
C-TP79	-41527	-3291496	3.40
C-TP80	-41530	-3291302	3.20
C-TP81	-41737	-3291296	3.30
C-TP82	-41788	-3291075	3.10
C-TP83	-41629	-3290800	3.10
C-TP84	-41479	-3290624	3.10
C-TP85	-41441	-3290799	3.40
C-TP86	-41437	-3291006	3.40
C-TP87	-41296	-3291350	3.10
C-TP88	-41294	-3291199	3.20
C-TP89	-41141	-3291103	3.30
C-TP90	-41292	-3291002	3.20
C-TP91	-41290	-3290805	3.10
C-TP92	-41231	-3290697	3.10
C-TP93	-41145	-3290900	3.00
C-TP94	-41043	-3290798	3.00
C-TP95	-40906	-3290850	3.00

Test Pit No.	SA Lo 31 WGS84		Depth (m)
	Y	X	
C-TP96	-40841	-3291004	3.10
C-TP97	-40983	-3291097	3.20
C-TP98	-40840	-3291198	3.00
C-TP99	-40998	-3291303	3.10
C-TP100	-41143	-3291353	1.80
C-TP101	-40637	-3291603	3.00
C-TP102	-40542	-3291695	3.30
C-TP103	-40443	-3291797	3.20
C-TP104	-40644	-3291231	3.10
C-TP105	-40439	-3291199	3.20
C-TP106	-40470	-3291061	3.10
C-TP107	-40628	-3290981	2.40
C-TP108	-40454	-3290867	2.20
C-TP109	-40597	-3290849	2.50
C-TP110	-40029	-3290896	2.20
C-TP111	-39903	-3290868	2.30
C-TP112	-39748	-3290806	3.20
C-TP113	-39298	-3291060	3.20
C-TP114	-39155	-3291222	3.20
Northern Portion			
C-TP115	Not excavated – location outside site boundary		
C-TP116	Not excavated – location outside site boundary		
C-TP117	Not excavated – location outside site boundary		
C-TP118	Not excavated – location outside site boundary		
C-TP119	Not excavated – location outside site boundary		
C-TP120	Not excavated – location outside site boundary		
C-TP121	-37538	-3290114	0.60
C-TP122	-37829	-3289888	2.70
C-TP123	-38015	-3289888	1.40
C-TP124	-38013	-3289688	0.90
C-TP125	-37827	-3289691	2.10

Test Pit No.	SA Lo 31 WGS84		Depth (m)
	Y	X	
C-TP126	-37539	-3289779	2.65
C-TP127	-37540	-3289600	2.80
C-TP128	-37530	-3289406	1.15
C-TP129	-37344	-3289402	0.95
C-TP130	-37344	-3289587	1.10
C-TP131	-37153	-3289500	1.10
C-TP132	-37140	-3289306	2.60
C-TP133	-36963	-3289306	2.70
C-TP134	-37146	-3289109	3.40
C-TP135	-36937	-3289130	3.10
C-TP135A	-36946	-3288884	3.40
C-TP136	-36838	-3288827	2.00
C-TP137	-36755	-3288902	1.00
C-TP138	-36761	-3288686	2.20
C-TP139	-36952	-3288591	1.50
C-TP140	-36845	-3288499	1.50
C-TP141	-36659	-3288501	1.00
C-TP142	-36859	-3288302	1.60
C-TP143	-36668	-3288298	3.30
C-TP144	-36466	-3288297	1.90
C-TP145	-36666	-3288110	1.50
C-TP146	-36851	-3288101	1.20
C-TP147	-36852	-3287914	3.00
C-TP148	-36672	-3287913	1.40
C-TP149	-36459	-3287986	3.40
C-TP150	-36341	-3287899	3.10
C-TP151	-36611	-3287790	2.00
C-TP152	-36745	-3287685	1.30
C-TP153	-36724	-3287501	2.10
C-TP154	-36539	-3287491	3.20
C-TP155	-36381	-3287497	1.60

Test Pit No.	SA Lo 31 WGS84		Depth (m)
	Y	X	
C-TP156	-36149	-3287499	3.20
C-TP157	-36150	-3287302	3.00
C-TP158	-36349	-3287299	2.50
C-TP159	-36717	-3287304	1.50
C-TP160	-36905	-3287298	1.70
C-TP161	-37080	-3287299	1.20
C-TP162	-37091	-3287108	0.60
C-TP163	-36914	-3287113	1.50
C-TP164	-36712	-3287106	1.10
C-TP165	-36527	-3287106	3.20
C-TP166	-36341	-3287111	3.20
C-TP167	-36142	-3287114	3.10
C-TP168	-36333	-3286840	3.30
C-TP169	-36530	-3286921	3.20
C-TP170	-36726	-3286919	2.80
C-TP171	-36912	-3286925	1.00
C-TP172	-37084	-3286892	0.80
C-TP173	-36907	-3286725	1.30
C-TP174	-36719	-3286712	1.40
C-TP175	-36528	-3286715	1.80
C-TP176	-36722	-3286531	0.80
C-TP177	-36913	-3286528	1.90
C-TP178	-36916	-3286328	1.00
C-TP179	-36717	-3286331	1.00
C-TP180	-36820	-3286152	1.00
C-TP181	-36606	-3285930	0.90
C-TP182	-36599	-3286152	1.00
C-TP183	-36516	-3286348	1.80
C-TP184	-36490	-3286519	2.40
C-TP185	-36318	-3286717	3.20
C-TP186	-36322	-3286532	2.90

Test Pit No.	SA Lo 31 WGS84		Depth (m)
	Y	X	
C-TP187	-36322	-3286345	3.00
C-TP188	-36315	-3286163	1.50
C-TP189	-36326	-3285923	0.30
C-TP190	-36504	-3285736	0.60
C-TP191	-36319	-3285732	2.30
C-TP192	-36332	-3285550	1.10
C-TP193	-36164	-3285303	1.70
C-TP194	-36145	-3285522	0.50
C-TP195	-36141	-3285731	1.70
C-TP196	-36141	-3285925	2.00
C-TP197	-36129	-3286153	1.70
C-TP198	-36126	-3286350	1.30
C-TP199	-36125	-3286529	2.00
C-TP200	-36125	-3286720	3.30
C-TP201	-36119	-3286923	3.80
C-TP202	-35919	-3287304	3.10
C-TP203	-35935	-3287119	3.30
C-TP204	-35931	-3286913	3.20
C-TP205	-35926	-3286710	3.30
C-TP206	-35929	-3286537	1.50
C-TP207	-35941	-3286343	1.00
C-TP208	-35930	-3286143	1.10
C-TP209	-35939	-3285928	1.50
C-TP210	-35910	-3285798	1.70
C-TP211	-35919	-3285601	1.90
C-TP212	-35922	-3285401	3.10
C-TP213	-35950	-3285170	2.80
C-TP214	-35769	-3285342	0.80
C-TP215	-35666	-3285520	1.00
C-TP216	-35684	-3285754	0.80
C-TP217	-35467	-3285714	0.60

Test Pit No.	SA Lo 31 WGS84		Depth (m)
	Y	X	
C-TP218	-35630	-3285954	1.10
C-TP219	-35458	-3285957	1.30
C-TP220	-35759	-3286120	1.10
C-TP221	-35543	-3286105	0.50
C-TP222	-35758	-3286346	0.80
C-TP224	-35545	-3286536	2.10
C-TP225	-35740	-3286706	2.60
C-TP226	-36220	-3288109	2.60
C-TP227	-35999	-3288089	1.50
C-TP228	-35985	-3288308	1.10
C-TP229	-36203	-3288312	2.70
C-TP230	-36423	-3288514	1.10
C-TP231	-36199	-3288493	1.80
C-TP232	-35969	-3288483	0.70
C-TP233	-36183	-3288657	0.40
C-TP234	-36398	-3288728	1.40
C-TP235	-36577	-3288873	1.40

Representative samples were taken from the test pits and submitted to SGS - Matrolab (Pty) Ltd testing laboratory. Tests included:

- Foundation Indicator tests, comprising grading analyses (sieve and hydrometer) and Atterberg Limits (71 No);
- Maximum Dry Density (MDD), Optimum Moisture Content (OMC) and California Bearing Ratio (CBR) tests (35 No);
- pH and conductivity tests (21 No);
- Standard consolidation tests (6 No); and
- Lump tests (2 No).

7 Investigation results

The general soil/rock profile at the northern and southern portions comprises the following layers:

- Fill
- Transported (alluvium / colluvium / hillwash);
- Pedogenic material - ferricrete
- Residual - (tillite / sandstone/ siltstone); and
- Bedrock – (tillite / sandstone / siltstone).

The information from the test pits within the southern portion and northern portions are summarised below in Table 2 and **Error! Reference source not found.**, respectively. Detailed descriptions of the respective geological horizons are presented below.

7.1 Southern Portion

Detailed descriptions of the respective geological horizons encountered within the southern portion are presented below.

Table 2: Test pit profile summary – Southern Portion

Test Pit ID	Transported (m)			Ferricrete (m)	Ferruginised Residual tillite soil (m)	Residual tillite soil (m)	Tillite Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Colluvium	Alluvium	Hillwash				Completely weathered	Completely to highly weathered	Highly weathered			
C-TP01			0-0.30	0.30-0.70	0.70-2.80	2.80-3.00						
C-TP02			0-0.20	0.20-1.10	1.10-2.80			2.80-3.20				
C-TP03			0-0.40	0.40-0.80	0.80-1.40			1.40-2.40	2.40-3.00			
C-TP04			0-0.30	0.30-1.00	1.00-1.20			1.20-1.90	1.90-2.60	2.60+	Refusal on medium hard to hard rock tillite	
C-TP05			0-0.40	0.40-0.70	0.70-1.20			1.20-2.20	2.20-3.00			
C-TP06			0-0.20	0.20-1.10	1.10-3.10							
C-TP07			0-0.50	0.50-0.90	0.90-2.50	2.50-3.00						
C-TP08	0-0.40			0.40-0.80					0.80-1.00	1.00+	Refusal on medium hard to hard rock tillite	
C-TP09	0-0.60			0.60-1.10	1.10-3.00							
C-TP10	0-0.50			0.50-1.50	1.50-3.20							
C-TP11	0-0.60			0.60-0.90	0.90-3.00							
C-TP12	0-0.40			0.40-1.00	1.00-3.20							
C-TP13	0-0.60			0.60-1.10	1.10-3.00							
C-TP14	0-0.45			0.45-0.90	0.90-3.10							
C-TP15	0-0.40			0.40-0.70		0.70-1.00		1.00-1.50		1.50+	Refusal on medium hard to hard rock tillite	Excavated near wetland but no seepage encountered
C-TP16		0-0.40		0.40-0.60	0.60-3.10							

Test Pit ID	Transported (m)			Ferricrete (m)	Ferruginised Residual tillite soil (m)	Residual tillite soil (m)	Tillite Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Colluvium	Alluvium	Hillwash				Completely weathered	Completely to highly weathered	Highly weathered			
C-TP17		0-0.70		0.70-1.40						1.40+	Refusal on hardpan ferricrete	Excavated near wetland but no seepage encountered
C-TP18	0-0.30			0.30-0.50	0.50-1.00			1.00-3.10				
C-TP19	0-0.40			0.40-0.60	0.60-1.30			1.30-3.00				
C-TP20	0-0.40			0.40-0.80	0.80-3.00			3.00-3.20				
C-TP21	0-0.40			0.40-0.60	0.60-2.90			2.90-3.10				
C-TP22	0-0.30			0.30-0.60	0.60-3.10							
C-TP23	0-0.40			0.40-0.60	0.60-2.90			2.90-3.60				
C-TP24	0-0.60			0.60-1.00	1.00-2.30			2.30-3.20				
C-TP25	0-0.50			0.50-1.00	1.00-2.20			2.20-3.00				
C-TP26	0-0.40			0.40-0.90	0.90-2.10			2.10-3.00				
C-TP27	0-0.60			0.60-1.00	1.00-3.10			3.10-3.20				
C-TP28	0-0.50			0.50-0.90	0.90-3.30							
C-TP29		0-1.00			1.00-3.40							
C-TP30	0-0.40			0.40-0.80	0.80-3.20			3.20-3.60				
C-TP31	0-0.70			0.70-1.00						1.00+	Refusal on hardpan ferricrete	
C-TP32		0-1.00		1.00-1.30						1.30+	Refusal on hardpan ferricrete	
C-TP33	0-0.60			0.60-1.50	1.50-3.00							Excavated near wetland but no seepage encountered
C-TP34	0-0.60				0.60-2.80			2.80-3.10				
C-TP35	0-0.30			0.30-1.00	1.00-3.00			3.00-3.20				

Test Pit ID	Transported (m)			Ferricrete (m)	Ferruginised Residual tillite soil (m)	Residual tillite soil (m)	Tillite Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Colluvium	Alluvium	Hillwash				Completely weathered	Completely to highly weathered	Highly weathered			
C-TP36	0-0.60			0.60-1.20	1.20-3.20							
C-TP37	0-0.30			0.30-1.10	1.10-1.40			1.40-3.00				
C-TP38	0-0.30			0.30-1.00	1.00-1.70			1.70-3.10				
C-TP39	0-0.40			0.40-0.70	0.70-3.10							
C-TP40	0-1.00			1.00-2.00						2.00+	Refusal on hardpan ferricrete	
C-TP41	0-0.70			0.70-1.00	1.00-3.10							
C-TP42	0-0.50			0.50-1.00	1.00-2.70	2.70-3.10						
C-TP43	0-0.40			0.40-0.80	0.80-1.00			1.00-3.00				
C-TP44	0-0.30			0.30-1.00	1.00-1.50			1.50-2.60	2.60-3.00			
C-TP45	0-0.50			0.50-0.80	0.80-1.40			1.40-3.10				
C-TP46	0-0.20			0.20-1.10	1.10-1.60			1.60-3.20				
C-TP47	0-0.90				0.90-3.10							
C-TP48	0-0.60			0.60-1.30	1.30-3.10							
C-TP49	0-0.60			0.60-1.00	1.00-3.00			3.00-3.20				
C-TP50	0-0.90			0.90-1.50	1.50-3.20							
C-TP51			0-0.40	0.40-0.80		0.80-2.30		2.30-3.00				
C-TP52			0-0.30	0.30-1.00		1.00-2.30		2.30-3.00				
C-TP53			0-0.40	0.40-1.00		1.00-3.20						
C-TP54			0-0.30	0.30-1.20	1.20-2.00	2.00-3.20						
C-TP55			0-0.30	0.30-1.20	1.20-2.0	2.00-3.20						
C-TP56			0-0.30	0.30-1.00	1.00-2.60	2.60-3.20						
C-TP57			0-0.30	0.30-0.70	0.70-1.00	1.00-2.90		2.90-3.10				
C-TP58			0-0.40	0.40-1.00	1.00-3.20							
C-TP59			0-0.40	0.40-0.90	0.90-2.20			2.20-3.40				

Test Pit ID	Transported (m)			Ferricrete (m)	Ferruginised Residual tillite soil (m)	Residual tillite soil (m)	Tillite Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Colluvium	Alluvium	Hillwash				Completely weathered	Completely to highly weathered	Highly weathered			
C-TP60			0-0.30	0.30-1.00	1.00-1.60	1.60-2.80		2.80-3.10				
C-TP61			0-0.50	0.50-2.00	2.00-3.40							
C-TP62			0-0.30	0.30-0.90		0.90-1.60		1.60-3.30				
C-TP63			0-0.50	0.50-0.90	0.90-3.30							
C-TP64			0-0.50	0.50-1.50	1.50-3.40							
C-TP65			0-0.40	0.40-0.80		0.80-1.40		1.40-3.30				
C-TP66			0-0.50	0.50-1.40	1.40-3.50							
C-TP67			0-0.40	0.40-0.80	0.80-1.70			1.70-3.10				
C-TP68			0-0.40	0.40-0.80		0.80-2.00		2.00-3.10				
C-TP69			0-0.40	0.40-0.80		0.80-2.10		2.10-3.10				
C-TP70			0-0.40	0.40-0.80		0.80-1.60			1.60-3.30			
C-TP71			0.-0.40	0.40-0.70		0.70-1.30			1.30-3.00			
C-TP72			0-0.40	0.40-0.80	0.80-1.40				1.40-3.20			
C-TP73			0-0.20	0.20-0.50	0.50-0.80	0.80-3.30						
C-TP74			0-0.30	0.30-0.70	0.70-0.90	0.90-1.30		1.30-3.20				
C-TP75	0-0.40			0.40-1.30	1.30-2.10	2.10-3.30						
C-TP76			0-0.40	0.40-0.90	0.90-2.10	2.10-2.70		2.70-3.30				
C-TP77			0-0.30	0.30-0.70	0.70-1.90			1.90-3.10				
C-TP78			0-0.20	0.20-0.70	0.70-1.40	1.40-3.20						
C-TP79			0-0.30	0.30-1.40	1.40-2.50	2.50-3.40						
C-TP80			0-0.30	0.30-0.70	0.70-1.00	1.00-3.20						
C-TP81			0-0.40	0.40-1.30	1.30-2.20				2.20-3.30			
C-TP82			0-0.30	0.30-1.00	1.00-1.90				1.90-3.10			
C-TP83			0-0.20	0.20-0.90	0.90-1.20				1.20-3.10			
C-TP84			0-0.40	0.40-1.20	1.20-2.80			2.80-3.10				

Test Pit ID	Transported (m)			Ferricrete (m)	Ferruginised Residual tillite soil (m)	Residual tillite soil (m)	Tillite Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Colluvium	Alluvium	Hillwash				Completely weathered	Completely to highly weathered	Highly weathered			
C-TP85			0-0.40	0.40-1.20	1.20-2.80			2.80-3.40				
C-TP86			0-0.50	0.50-2.40	2.40-3.40							
C-TP87			0-0.30	0.30-0.60		0.60-2.10		2.10-3.10				
C-TP88			0-0.50	0.50-1.40	1.40-3.00			3.00-3.20				
C-TP89			0-0.40	0.40-2.00	2.00-3.00	3.00-3.30						
C-TP90			0-0.30	0.30-0.50		0.50-1.50		1.50-3.20				
C-TP91			0-0.50	0.50-1.40	1.40-3.10							
C-TP92			0-0.20	0.20-1.50	1.50-3.10							
C-TP93			0-0.50	0.50-0.80		0.80-1.40		1.40-3.00				
C-TP94			0-0.20	0.20-0.60	0.60-1.20			1.20-3.00				
C-TP95			0-0.30	0.30-0.70	0.70-1.20			1.20-3.00				
C-TP96			0-0.30	0.30-0.70	0.70-1.20			1.20-3.10				
C-TP97			0-0.70	0.70-1.30	1.30-2.90			2.90-3.20				
C-TP98			0-1.10		1.10-3.00							
C-TP99			0-0.20	0.20-0.60	0.60-2.60			2.60-3.10				
C-TP100			0-0.20	0.20-0.60	0.60-1.20				1.20-1.80	1.80+	Refusal on medium hard to hard rock tillite	
C-TP101			0-0.30	0.30-0.80	0.80-2.10			2.10-3.00				
C-TP102			0-0.30	0.30-0.80	0.80-1.50	1.50-2.80		2.80-3.30				
C-TP103			0-0.30	0.30-0.80	0.80-1.40			1.40-3.20				
C-TP104		0-0.60		0.60-1.10	1.10-1.60			1.60-3.10				
C-TP105		0-0.90			0.90-3.20							1.10; 1.40 and 2.70
C-TP106			0-0.30	0.30-1.50	1.50-2.00			2.00-3.10				

Test Pit ID	Transported (m)			Ferricrete (m)	Ferruginised Residual tillite soil (m)	Residual tillite soil (m)	Tillite Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Colluvium	Alluvium	Hillwash				Completely weathered	Completely to highly weathered	Highly weathered			
C-TP107			0-0.30	0.30-1.00	1.00-1.70				1.70-2.40	2.40+	Refusal on medium hard to hard rock tillite	
C-TP108			0-0.30	0.30-0.80		0.80-1.80			1.80-2.20	2.20+	Refusal on medium hard to hard rock tillite	
C-TP109			0-0.30	0.30-0.70	0.70-1.60				1.60-2.50	2.50+	Refusal on medium hard to hard rock tillite	
C-TP110			0-0.50	0.50-0.80				0.80-1.20	1.20-2.20	2.20+	Refusal on medium hard to hard rock tillite	
C-TP111			0-0.40	0.40-0.70				0.70-1.10	1.10-2.30	2.30+	Refusal on medium hard to hard rock tillite	
C-TP112			0-0.40	0.40-0.70	0.70-1.30			1.30-3.20				
C-TP113			0-0.40	0.40-0.80	0.80-1.50			1.50-3.20				
C-TP114	0-0.20			0.20-0.60	0.60-2.40			2.40-3.20				

7.1.1 Transported Material

A transported layer consisting of either alluvium, colluvium or hillwash was encountered from surface at all the investigated positions.

Alluvium

The alluvial layer was intersected at positions C-TP16, C-TP17, C-TP29, C-TP32, C-TP104 and C-TP105 located on the floodplains of streams / wetlands traversed along the southern portion of the site. The alluvium was found to occur as slightly moist to dry, dark brown to black, stiff and occasionally soft to stiff, micro-shattered to shattered, sandy silty clay or sandy clay containing roots and gravel in places. The alluvium horizon thickness varies from a minimum of 0.4m (C-TP16) to a maximum of 1m at test pits C-TP29 and C-TP32. The average thickness is 0.8m.

Colluvium

The colluvium was encountered at a total of forty-one (41 No) of the excavated positions (C-TP08 - C-TP15, C-TP18 – C-TP28, C-TP30 – C-TP31, CTP33 – C-TP50, C-TP75 and C-TP114) located along the flat to slightly undulating slopes. The colluvial material was described as slightly moist to moist or dry, grey brown to dark grey brown and black, soft to stiff, micro-shattered to shattered, sandy silty clay, fine sandy clay or gravelly sandy clay with roots. The layer thickness varies from a minimum of 0.2m in test pits C-TP46 and C-TP114 to a maximum of 1m at test pit C-TP40, with an average thickness of 0.5m.

Hillwash

The hillwash layer was found to be more widespread (between test pits C-TP01-C-TP07 and C-TP51-C-TP113) and was encountered at sixty-seven (67 No) of the investigated positions (Table 2, refers) which are located on gentle to undulating slopes characterising the western limits of the southern portion. This layer generally occurs as slightly moist to dry, light grey brown to grey brown and brown, loose to dense, intact, silty fine sand and over limited areas occurs as clayey silty sand, gravelly clayey sand or gravelly silty sand with roots. The layer thickness varies from a minimum of 0.2m (C-TP02, C-TP06, C-TP73, C-TP78, C-TP83, C-TP92, C-TP94 and C-TP99) to a maximum of 1.1m at test pit C-TP98, with an average thickness of 0.4m.

7.1.2 Pedogenic horizon – ferricrete

The pedogenic horizon (ferricrete) was encountered at most of the test pits (except for test pits C-TP29, C-TP34, C-TP47 and C-TP105) excavated within the southern portion. It was found to underlie the transported soils and generally overlying residual tillite except for test pits C-TP08, C-TP110 and C-TP111 where it overlies tillite bedrock. This pedogenic horizon was encountered as three types of layers. The most common of these layers is loosely packed black, sub-angular to sub-rounded, ferruginised gravel in a slightly moist, light grey brown, grey brown or brown, silty sand and occasionally sandy clay matrix (30% - 50%). The overall consistency is generally loose.

The second layer occurs as tightly packed, brown, orange to red brown and black, sub-angular to sub-rounded, ferruginised, fine to coarse grained gravel occasionally contains cobbles of up to (200mm in diameter) in a slightly moist to dry, grey brown to orange to red brown, clayey sand or sandy clay matrix (10%-20%). The overall consistency is medium dense to dense.

At test pit C-TP16 (layer 3), the ferricrete occurs as slightly moist, dark brown to black, soft to firm, sandy silty clay with abundant ferruginised gravel and roots.

At test pits C-TP17, C-TP31, C-TP32 and C-TP40, refusal of TLB was noted on hardpan ferricrete. The refusal varies between1.00m (C-TP31) and 2.00m (C-TP40).

This horizon occurs from a minimum depth of 0.2 m at test pits C-TP16, C-TP18, C-TP19, C-TP21, C-TP23 and C-TP90 to a maximum depth of 1.9 m at test pit C-TP86, with an average thickness of 0.6 m.

7.1.3 Residual tillite

Residual tillite was generally found to occur below the ferricrete except for position C-TP47, which is located in the centre of the site, where it occurs below colluvium. The horizon was found to occur as the upper (ferruginised) layer and the lower (un-ferruginised) layer. The upper residual occurs as slightly moist to moist,

orange to red brown stained black, firm to stiff, intact, sandy silty clay or sandy clayey silt, in places containing some very soft to soft rock tillite rock fragments. Material contains some ferruginised gravel and is weakly to strongly ferruginised.

The lower residual generally underlies the upper layer except for 14 No. positions (C-TP15, C-TP51, C-TP52, C-TP53, C-TP62, C-TP65, C-TP68, C-TP69, C-TP70, C-TP71, C-TP87, C-TP90, C-TP3 and C-TP108) where material occurs directly below the pedogenic horizon. The horizon comprises slightly moist to moist, yellow and orange brown or grey and red brown, firm to stiff, intact, sandy silty clay containing some very soft to soft rock tillite rock fragments.

This horizon is generally thick (more than 1m) but occurs from a minimum depth of 0.2 m at test pits C-TP04 and C-TP43 (located on the eastern portion of the site) to a maximum depth of 2.8 m at test pit C-TP73 along the south-western boundary of the site. The average thickness of 1.4 m.

7.1.4 Tillite bedrock

Tillite bedrock was encountered at 69 No. the investigated positions, as listed in Table 2 above. The horizon was generally found underlying the upper and / or lower residual an in places along the south east (C-PT08) and the north east portions (C-TP110 and C-TP111) below the pedogenic horizon, Figure 5, refers. Tillite bedrock is described as yellow to orange brown, grey brown and olive brown stained black or red brown, completely to highly weathered, very soft to soft rock and occasionally medium hard rock, fine grained tillite. The bedrock was excavated as gravels and cobbles.

Bedrock was encountered from a minimum depth of 0.7 m at position C-TP111 located along the north western limits of the southern portion and to the maximum reach of TLB (3-3.6m), see Table 2. TLB refusal on soft to medium hard or medium to hard rock was recorded at test pits C-TP04, C-TP08, C-TP15, C-TP100, C-TP107 and C-TP108 – C-TP111. The refusal depth varies between 1m (C-TP08) and 2.5m (C-TP109).



Figure 5: Profile showing hillwash, loosely packed ferricrete and residual tillite overlying highly to completely weathered tillite bedrock

7.2 Northern Portion

The information from the test pits excavated in the northern portion is summarised in **Error! Reference source not found.** below and detailed descriptions of the respective geological horizons are presented below.

Table 3: Test pit profile summary – Northern Portion

Test Pit ID	Transported (m)			Ferricrete (m)	Residual soil (m)			Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Fill / Made ground (m)	Colluvium	Hillwash		Residual tillite	Residual sandstone	Residual siltstone	Sandstone	Siltstone	Tillite			
C-TP121			0-0.40	0.40-0.60							0.60+	Refusal on boulders / hard rock sandstone	
C-TP122			0-1.25			1.25-2.70					2.70+	Refusal on hard rock sandstone	2.70
C-TP123			0-1.00			1.00-1.40					1.40+	Refusal on boulders / hard rock sandstone	1.10
C-TP124			0-0.85	0.85-0.90							0.90+	Refusal on hard rock sandstone	
C-TP125			0-0.70	0.70-1.10	1.10-1.70					1.70-2.10	2.10+	Refusal on medium hard to hard rock tillite	
C-TP126		0.50-0.70	0-0.50	0.70-1.00	1.00-2.50					2.50-2.65	2.65+	Refusal on soft rock tillite	
C-TP127		0-0.60		0.60-1.40	1.40-2.40					2.40-2.80	2.80+	Refusal on soft rock tillite	
C-TP128		0.50-0.80	0-0.50	0.70-1.10				1.10-1.15			1.15+	Refusal on hard rock sandstone	
C-TP129			0-0.50	0.50-0.90				0.90-0.95+			0.95+	Refusal on hard rock sandstone	

Test Pit ID	Transported (m)			Ferricrete (m)	Residual soil (m)			Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Fill / Made ground (m)	Colluvium	Hillwash		Residual tillite	Residual sandstone	Residual siltstone	Sandstone	Siltstone	Tillite			
C-TP130			0-0.40	0.40-1.10				1.10+			1.10+	Refusal on hard rock sandstone	
C-TP131			0-1.00	1.00-1.10				1.10+			1.10+	Refusal on hard rock sandstone	
C-TP132			0-0.90				0.90-2.60		2.60+		2.60+	Refusal on hard rock siltstone	
C-TP133			0-0.80				0.80-2.70		2.70+		2.70+	Refusal on hard rock siltstone	
C-TP134			0-1.10				1.10-3.40						
C-TP135			0-0.60				0.60-3.10						
C-TP135A			0-1.10			1.10-3.40						Partial refusal on hard rock sandstone boulders	
C-TP136			0-1.20			1.20-2.00		2.00+			2.00+	Refusal on hard rock sandstone	
C-TP137			0-0.70					0.70-1.00+			1.00+	Refusal on hard rock sandstone	
C-TP138			0-1.20					1.20-2.20+			2.20+	Refusal on hard rock sandstone	
C-TP139			0-0.85	0.85-0.90		0.90-1.50					1.50+	Refusal on hard rock sandstone	

Test Pit ID	Transported (m)			Ferricrete (m)	Residual soil (m)			Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Fill / Made ground (m)	Colluvium	Hillwash		Residual tillite	Residual sandstone	Residual siltstone	Sandstone	Siltstone	Tillite			
C-TP140			0-1.10	1.10-1.50							1.50+	Refusal on hard rock sandstone	
C-TP141			0-0.60					0.60-1.00			1.00+	Refusal on hard rock sandstone	
C-TP142	0-0.30		0.30-1.00					1.00-1.60			1.60+	Refusal on hard rock sandstone	
C-TP143			0-1.00				1.00-3.30						1.20
C-TP144			0-1.30					1.30-1.90+			1.90+	Refusal on hard rock sandstone	1.10
C-TP145			0-0.90				0.90-1.50		1.50+		1.50+	Refusal on hard rock sandstone / siltstone	
C-TP146			0-0.80					0.80-1.20+			1.20+	Refusal on hard rock sandstone	
C-TP147			0-0.70				0.70-3.00						
C-TP148			0-1.10	1.10-1.40					1.40+		1.40+	Refusal on hard rock sandstone	
C-TP149			0-1.70				1.70-3.40						
C-TP150			0-0.40				0.40-3.10						
C-TP151			0-0.80				0.80-2.00		2.00+		2.00+	Refusal on hard rock siltstone	
C-TP152		0.80-1.10	0-0.80	1.10-1.30				1.30+			1.30+	Refusal on hard rock sandstone	

Test Pit ID	Transported (m)			Ferricrete (m)	Residual soil (m)			Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Fill / Made ground (m)	Colluvium	Hillwash		Residual tillite	Residual sandstone	Residual siltstone	Sandstone	Siltstone	Tillite			
C-TP153			0-1.05			1.05-2.10	1.05-2.10	2.10+	2.10+		2.10+	Refusal on hard rock siltstone	
C-TP154			0-1.50			1.50-2.10	2.10-3.20						
C-TP155			0-0.90				0.90-1.20		1.20-1.60+		1.60+	Refusal on hard rock siltstone	
C-TP156			0-0.90			0.90-2.00	2.00-3.20						
C-TP157			0-1.00			1.00-2.00	2.00-3.00						
C-TP158			0-0.90				0.90-2.50		2.50+		2.50+	Refusal on hard rock siltstone	
C-TP159			0-1.10					1.10-1.50+			1.50	Refusal on hard rock sandstone	
C-TP160			0-1.20			1.20-1.70		1.70+			1.70+	Refusal on hard rock sandstone	
C-TP161			0-0.70					0.70-1.20+			1.20+	Refusal on hard rock sandstone	
C-TP162			0-0.40					0.4-0.60+			0.60+	Refusal on hard rock sandstone	
C-TP163			0-1.10			1.10-1.50		1.50+			1.50+	Refusal on hard rock sandstone	
C-TP164			0-0.90				0.90-1.10	1.10+			1.10	Refusal on hard rock sandstone	
C-TP165			0-0.80				0.80-3.20						
C-TP166			0-0.70				0.70-3.20						

Test Pit ID	Transported (m)			Ferricrete (m)	Residual soil (m)			Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Fill / Made ground (m)	Colluvium	Hillwash		Residual tillite	Residual sandstone	Residual siltstone	Sandstone	Siltstone	Tillite			
C-TP167			0-0.90				0.90-3.10						
C-TP168			0-1.10				1.10-3.30						
C-TP169			0-0.60				0.60-3.20						2.80
C-TP170			0-1.40			2.10-2.80	1.40-2.10	2.80+			2.80+	Refusal on hard rock sandstone	
C-TP171			0-0.30					0.30-1.00+			1.00+	Refusal on hard rock sandstone	
C-TP172			0-0.40					0.40-0.80+			0.80+	Refusal on hard rock sandstone	
C-TP173			0-0.60	0.60-1.30+							1.30+	Refusal on hardpan ferricrete / hard rock sandstone	
C-TP174			0-1.10					1.10-1.40+			1.40+	Refusal on hard rock sandstone	
C-TP175			0-1.20			1.20-1.80		1.80+			1.80+	Refusal on hard rock sandstone	
C-TP176			0-0.3					0.30-0.80+			0.80+	Refusal on hard rock sandstone	
C-TP177			0-0.90					0.90-1.90+			1.90+	Refusal on hard rock sandstone	
C-TP178			0-0.50					0.50-1.00+			1.00+	Refusal on hard rock sandstone	

Test Pit ID	Transported (m)			Ferricrete (m)	Residual soil (m)			Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Fill / Made ground (m)	Colluvium	Hillwash		Residual tillite	Residual sandstone	Residual siltstone	Sandstone	Siltstone	Tillite			
C-TP179			0-0.60					0.60-1.00+			1.00+	Refusal on hard rock sandstone	
C-TP180			0-0.60					0.60+			1.00+	Refusal on hard rock sandstone	
C-TP181			0-0.40					0.40-0.90+			0.90+	Refusal on hard rock sandstone	
C-TP182			0-0.50					0.50-1.00+			1.00+	Refusal on hard rock sandstone	
C-TP183			0-0.30			0.30-0.90	0.90-1.80		1.80+		1.80+	Refusal on hard rock siltstone	
C-TP184			0-0.70	0.70-1.00		1.00-1.30	1.30-2.40		2.40+		2.40+	Refusal on hard rock siltstone	1.90
C-TP185			0-0.70	0.70-1.00	1.00-3.20								
C-TP186		0-0.70		0.70-0.90	0.90-2.90						2.90+	Refusal on soft rock tillite	
C-TP187			0-0.40	0.40-0.70		0.70-2.10	2.10-3.00						
C-TP188			0-0.50	0.50-1.00		1.00-1.50		1.50+			1.50+	Refusal on hard rock sandstone / siltstone	
C-TP189			0-0.20					0.20-0.30+			0.30+	Refusal on hard rock sandstone	
C-TP190			0-0.40					0.40-0.60+			0.60+	Refusal on hard rock sandstone	

Test Pit ID	Transported (m)			Ferricrete (m)	Residual soil (m)			Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Fill / Made ground (m)	Colluvium	Hillwash		Residual tillite	Residual sandstone	Residual siltstone	Sandstone	Siltstone	Tillite			
C-TP191			0-1.10			1.10-2.30		2.30+			2.30+	Refusal on hard rock sandstone	
C-TP192			0-0.60	0.60-1.10				1.10+			1.10+	Refusal on hard rock sandstone	
C-TP193			0-0.70	0.70-1.20				1.20-1.70+			1.70+	Refusal on hard rock sandstone	
C-TP194			0-0.20	0.20-0.30				0.30-0.50+			0.50+	Refusal on hard rock sandstone	
C-TP195			0-0.30					0.30-1.70+			1.70+	Refusal on hard rock sandstone	
C-TP196			0-0.30	0.30-0.60			0.60-1.50	1.50-2.00+			2.00+	Refusal on hard rock sandstone	
C-TP197			0-0.80	0.80-1.10			1.10-1.40	1.40-1.70+			1.70+	Refusal on hard rock sandstone	
C-TP198			0-0.80	0.80-1.30				1.30+			1.30+	Refusal on hard rock sandstone	
C-TP199		0-1.20		1.20-1.50			1.50-2.00		2.00+		2.00+	Refusal on hard rock siltstone	
C-TP200			0-1.00				1.00-3.30						
C-TP201			0-0.80				0.80-3.80						
C-TP202	0-0.90	0.90-1.20					1.20-3.10						
C-TP203		0.50-0.90	0-0.50				0.90-3.30						
C-TP204		0.90-1.20	0-0.90				1.20-3.20						

Test Pit ID	Transported (m)			Ferricrete (m)	Residual soil (m)			Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Fill / Made ground (m)	Colluvium	Hillwash		Residual tillite	Residual sandstone	Residual siltstone	Sandstone	Siltstone	Tillite			
C-TP205			0-0.90				0.90-3.30						
C-TP206			0-1.00	1.00-1.50				1.50+			1.50+	Refusal on hard rock sandstone	
C-TP207		0-0.40		0.40-0.80		0.80-1.00		1.00+			1.00+	Refusal on hard rock sandstone	
C-TP208		0-0.50		0.50-0.70				0.70-1.10+			1.10-+	Refusal on hard rock sandstone	
C-TP209			0-0.90			0.90-1.50		1.50+			1.50+	Refusal on hard rock sandstone	
C-TP210			0-1.10			1.10-1.50		1.50-1.70+			1.70+	Refusal on hard rock sandstone	
C-TP211			0-1.10	1.60-1.90				1.90+			1.90+	Refusal on hard rock sandstone	
C-TP212			0-0.90			0.90-3.10							
C-TP213			0-0.60			0.60-2.80		2.80+			2.80+	Refusal on hard rock sandstone	
C-TP214			0-0.60	0-0.80				0.80+			0.80+	Refusal on hard rock sandstone	
C-TP215			0-0.30	0.30-0.70				0.70-1.00+			1.00+	Refusal on hard rock sandstone	
C-TP216			0-0.60	0.60-0.80				0.80+			0.80+	Refusal on hard rock sandstone	

Test Pit ID	Transported (m)			Ferricrete (m)	Residual soil (m)			Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Fill / Made ground (m)	Colluvium	Hillwash		Residual tillite	Residual sandstone	Residual siltstone	Sandstone	Siltstone	Tillite			
C-TP217			0-0.40	0.40-0.60				0.60+			0.60+	Refusal on hard rock sandstone	
C-TP218			0-0.90			0.90-1.10		1.10+			1.10+	Refusal on hard rock sandstone	
C-TP219			0-0.50	0.50-1.00				1.00-1.30+			1.30+	Refusal on hard rock sandstone	
C-TP220			0-0.80	0.80-1.10				1.10+			1.10+	Refusal on hard rock sandstone	
C-TP221			0-0.20	0.20-0.30				0.30-0.50+			0.50+	Refusal on hard rock sandstone	
C-TP222			0-0.40	0.40-0.70				0.70-0.80+			0.80+	Refusal on hard rock sandstone	
C-TP224			0-0.80	0.80-1.50		1.50-1.70		1.70-2.10+			2.10+	Refusal on hard rock sandstone	
C-TP225			0-0.90	0.90-1.20			1.20-2.60		2.60+		2.60+	Refusal on hard rock siltstone	
C-TP226			00.90	0.90-1.10				2.60+			2.60+	Refusal on hard rock sandstone	
C-TP227			0-0.90	0.90-1.30				1.30-1.50+			1.50+	Refusal on hard rock sandstone	
C-TP228			0-0.60	0.60-1.10				1.10+			1.10+	Refusal on hard rock sandstone	

Test Pit ID	Transported (m)			Ferricrete (m)	Residual soil (m)			Bedrock (m)			Refusal (m)	Refusal material	Seepage (m)
	Fill / Made ground (m)	Colluvium	Hillwash		Residual tillite	Residual sandstone	Residual siltstone	Sandstone	Siltstone	Tillite			
C-TP229			0-1.40			1.40-2.10			2.10-2.70+		2.70+	Refusal on hard rock sandstone	
C-TP230			0-0.70	0.70-1.10				1.10+			1.10+	Refusal on hard rock sandstone	
C-TP231			0-1.20	1.20-1.50				1.50-1.80+			1.80+	Refusal on hard rock sandstone	
C-TP232			0-0.30	0.30-0.70					0.70+		0.70+	Refusal on hard rock sandstone	
C-TP233			0-0.40					0.40+			0.40+	Refusal on hard rock sandstone	
C-TP234		0-0.80		0.80-1.00				1.00-1.40+			1.40+	Refusal on hard rock sandstone	
C-TP235			0-0.40					0.40-1.40+			1.40+	Refusal on hard rock sandstone	

7.2.1 Concrete slabs

A 0.2m thick concrete slab was encountered at test pit C-TP142. Although the concrete slab was only encountered at one test position, it should be noted that this horizon may be more widespread as a number of abandoned floor slabs and or delipidated building structures were observed on site.

7.2.2 Fill

Fill material was encountered at test pit C-TP202 located on the eastern boundary. The fill is presumably associated with dumping of waste in the vicinity of the test pit. This material occurs from surface as dry, light grey brown, dense, silty fine sand with roots and contains boulders and rubble. Several dumps comprising mine waste and animal carcass, which is believed to be from the nearby abattoir, occur in the northern portion of the site.

7.2.3 Transported material

A transported layer consisting of either colluvium or hillwash was encountered from surface (or below the fill material) at all the investigated positions.

Colluvium

The colluvium was encountered at twelve (12 No) of the excavated positions (C-TP126 - C-TP128, C-TP152, C-TP186, C-TP199, C-TP202 – C-TP204, C-TP207 - C-TP208 and C-TP235 located along the flat to slightly undulating slopes. The colluvial material was described as slightly moist, grey, dark brown to black or yellow brown, soft to stiff, micro-shattered to shattered and intact in places, sandy silty clay, silty clay or sandy clay with roots. The layer thickness varies from a minimum of 0.2m test pits C-TP46 and C-TP114 to a maximum of 1.0m at test pit C-TP40, with an average thickness of 0.5m.

Hillwash

Hillwash was found to be widespread across the northern portion and was encountered at one hundred and eight (108 No) of the investigated positions (Table 2, refers) which are located on gentle to undulating slopes characterising most of the northern portion. This layer generally occurs as slightly moist to dry, brown, light grey brown to grey brown and orange brown, loose to dense, intact, silty fine sand with roots. In places, the hillwash contains some sub-rounded to sub-angular, hard rock sandstone cobbles and boulders of up to 1200mm. At test pit C-TP180 located on the northern limits of the site, the hillwash was found to occurs as tightly packed, light reddish brown and grey brown, sub-angular, hard rock, cobbles and boulders in a slightly moist, orange brown, loose, silty fine sand matrix (±30%). The overall consistency is dense. The layer thickness varies from a minimum of 0.2m (C-TP189) to a maximum of 1.7m at test pit C-TP149, with an average thickness of 0.8m.

7.2.4 Pedogenic horizon – ferricrete

The pedogenic horizon (ferricrete) was encountered in forty-seven (47 No.) of the test pits (except for test pits C-TP29, C-TP34, C-TP47 and C-TP105) excavated within the southern portion. It was found to underlie the alluvium, colluvium or hillwash and generally overlying residual tillite except for test pits C-TP08, C-TP110 and C-TP111 where it overlies tillite bedrock. This pedogenic horizon was encountered as three types of layers. The most common of these layers is loosely packed, brown and orange brown, sub-rounded to sub-angular, ferruginised gravel and occasionally cobbles in a matrix (30% - 50%) of slightly moist, dark brown, sandy silty clay. The overall consistency is dense (Figure 6).

The second layer is described as tightly packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, sandy clay matrix. Overall consistency is dense.



Figure 6: Tightly packed ferricrete as seen at test pit C-TP06

The third layer was encountered at test pit C-TP185 as moist, black stained red brown, stiff, intact, sandy silty clay, material is ferruginised.

At test pits C-TP173, refusal of TLB was noted on hardpan ferricrete at 1.3m.

This horizon occurs from a minimum depth of 0.05 m at test pits C-TP139 to a maximum depth of 0.8 m at test pit C-TP127, with an average thickness of 0.4 m.

7.2.5 Residual soil

Residual tillite soil

Residual tillite was only encountered at five (5 No) positions as small patches along the south west (C-TP125, C-TP126 and C-TP127) and the northern area (C-TP185 and C-TP186). This horizon was found to occur below the pedogenic horizon as slightly moist to moist, yellow brown stained black or dark red brown blotched grey and orange brown, firm to stiff, intact, sandy silty clay containing some very soft to soft rock tillite rock fragments.

This horizon occurs from a minimum depth of 0.6 m at test pits C-TP125 to a maximum depth of 2.2 m at test pit C-TP185, with an average thickness of 1.5 m.

Residual sandstone

Residual sandstone was intersected below hillwash or pedogenic material (only at test pits C-TP139, C-TP187, C-TP188, C-TP207 and C-TP224) within 29 No. test pits widespread across the centre and the north-eastern limits. The residual sandstone generally occurs as slightly moist to moist, orange to red brown blotched grey in places, loose to dense, intact, silty sand containing some very soft to soft sandstone fragments. In places, these sandstone fragments are hard rock and cobble to boulder sized, up to 1000mm in diameter. At test pits C-TP209 to C-TP211, material is tightly packed, yellow brown stained red brown, fine to coarse, sub-angular, ferruginised gravel in a slightly moist, yellow brown, silty sand or clayey sand matrix. Overall consistency is dense. The residual sandstone is slightly to strongly ferruginised. The layer thickness varies from a minimum of 0.2m (C-TP207, C-TP218 and C-TP224) to a maximum of 2.3m (C-TP135A), with an average thickness of 1m.

7.2.6 Residual siltstone

Residual siltstone was found to occur below either the hillwash, ferricrete and / or residual sandstone at a total of 35 No positions, see Table 3. The horizon comprises slightly moist to moist, orange brown, dark red to dark red brown and grey in places stained black, firm to stiff, intact, sandy clayey silt and contains some very soft to soft rock fragments (Figure 7). At tests pits C-TP154, C-TP156, C-TP157, C-TP170, C-TP183, C-TP184 and C-TP187, the residual sandstone and siltstone is interbedded. The interbedded residual siltstone contains pockets of medium dense silty sand (residual sandstone. The material is ferruginised in places. This horizon was found to occurs from a minimum depth of 0.6 m and 0.85m at test pits P-TP01 and P-TP03, respectively., with an average thickness of 1.4 m.



Figure 7: Hillwash overlying residual siltstone (C-TP147)

7.2.7 Bedrock

Tillite, siltstone and sandstone bedrock were encountered at 4 No, 11 No and 60 No test positions, respectively (see Table 3). The encountered bedrock is described in detail below.

Tillite bedrock

The horizon occurs below the residual tillite horizon at test pits C-TP125, C-TP126, C-TP127 (located on the southern portion) and C-TP186 (central portion). Tillite bedrock is described as highly weathered, yellow brown, very soft rock to soft rock, fine grained tillite. Bedrock was encountered from a minimum depth of 1.7m at position C-TP125. The refusal depth on soft rock tillite varies between 2.1m (C-TP125) and 2.90m (C-TP186).

Siltstone bedrock

Siltstone bedrock was generally encountered below residual siltstone except for test pit C-TP229 located on the western portion where it underlies residual sandstone. Bedrock occurs as highly to completely weathered,

orange and yellow brown streaked black, very soft rock, fine grained siltstone. In places bedrock was recovered as hard rock cobbles and boulders of up to 600mm in diameter pockets of black clay. At C-TP229, the completely weathered material was encountered as slightly moist, orange brown stained red brown, stiff, intact, sandy silt. The completely weathered material displays the remnant bedding and is ferruginised in places.

Bedrock was encountered from a minimum depth of 1.2 m at position C-TP155 and TLB refusal on hard rock siltstone was recorded at all 11 No test pits (see Table 3). The refusal depth varies between 0.7m (C-TP232) and 2.7m at C-TP133 and TP229.

Sandstone bedrock

Sandstone bedrock was encountered either below the hillwash, ferricrete or residual sandstone. The bedrock is described as highly weathered, yellow brown, pinkish brown or light brown and light grey brown stained orange brown and black, very soft rock to hard rock, bedded, fine grained sandstone. Highly to completely weathered, orange to red brown, very soft to soft rock, sandstone with pockets of slightly moist, red brown, loose, silty sand. In places (C-TP146), material is strongly ferruginised.



Figure 8: Shallow refusal on hard rock sandstone at C-TP180

Bedrock was encountered from a minimum depth of 0.2m at position C-TP189 located along the northern limits of the site. The refusal depth varies between 0.3m (C-TP189) and 2.80m at C-TP170 and TP213 (Figure 8). Outcropping rock was also seen on surface in areas underlain by shallow sandstone bedrock, Figure 8, refers.



Figure 9: Rock outcrop near C-TP180

7.3 Groundwater or seepage

Along the northern portion, groundwater seepage was encountered at six (6 No) of the test pits (C-TP122, C-TP123, C-TP143, C-TP144, C-TP169 and C-TP184), which are located in the low-lying areas. According to the information recorded during fieldwork the water table depths range between 1.0m and 2.8m (Table 3, refers).

Groundwater was only found to occur at test pits C-TP105 along the southern portion. However, it should be noted that test pits C-TP16, C-TP17 and C-TP33 were excavated near a wetland. The ground seepage was encountered at 1.1, 1.4 and 2.7m within the same pit.

The ubiquitous presence of pedogenic material (ferricrete) and partly to strongly ferruginised residuum across the site can be attributed to the seasonal fluctuation of groundwater or the presence of shallow water table in the geological history. The investigation was conducted at the end of the dry season and it is therefore expected that the perched water levels are likely to be shallower and become more widespread during the rainy season.

8 Laboratory test results

8.1 Laboratory test results - southern portion

8.1.1 Foundation Indicator Tests – Southern Portion

Representative samples of the various soil horizons were taken and submitted for foundation indicator tests (grading and Atterberg Limit tests). The test results (Table 4) can be summarised as follows (see Appendix C for detail results):

Table 4: **Foundation indicator test results – southern portion**

Sample Id	Depth (m)	Soil composition (%)				Atterberg limits			GM	Activity	USCS Classification
		Clay	Silt	Sand	Gravel	LL	WPI	LS			
TRANSPORTED											
Colluvium											
C-TP09/1-1	600-1100	17.5	20.7	42.6	19.2	27	3	2.5	1.41	Low	SM
C-TP48/1	0-600	18.2	27.3	50.8	3.7	0	0	1.0	0.88	Low	SC
Alluvium											
C-TP16/1	0-400	12.6	52.4	32.8	2.3	0	2	1.5	0.58	Low	CL
C-TP32/1	400-1000	23.0	33.6	43.4	0.0	0	3	1.5	0.52	Low	CL
C-TP91/1	0-500	23.5	53.5	23.0	0	0	0	1.5	0.30	Low	CL
Hillwash											
C-TP58/1	0-400	15.0	18.6	61.2	5.2	24	2	1.5	1.36	Low	SM
C-TP104/1	0-600	22.1	12.2	60.6	5.1	24	2	1.5	1.16	Low	SM
C-TP108/1	0-300	23.5	21.3	55.1	0	0	0	1.0	0.92	Low	SC
C-TP111/1	0-400	15.6	18.1	64.0	2.4	0	0	1.0	0.93	Low	SC
Ferricrete											
C-TP19/1-1	400-600	9.2	16.1	57.3	17.4	0	0	0.5	1.83	Low	SC
C-TP61/1	900-2000	21.5	18.8	50.3	9.4	33	5	4.5	1.38	Low	SM
C-TP86/1	500-1700	11.3	18.0	42.3	28.5	26	2	2.0	1.72	Low	SM
C-TP106/1	300-700	7.5	9.7	57.5	25.3	0	0	1.0	2.17	Low	SC
RESIDUAL SOIL											
Ferruginised residual tillite											
C-TP13/1	1100-2300	42.2	32.2	23.9	1.7	37	11	6.5	0.46	Low	ML
C-TP28/1	2500-3100	45.8	34.7	17.3	2.1	39	13	7.0	0.32	Low	ML
C-TP39/1	700-2300	11.0	7.20	38.4	43.4	32	2	4.0	2.19	Low	SM
C-TP88/1	1400-3000	37.7	39.2	22.1	1.1	35	10	5.5	0.39	Low	ML
C-TP102/1	1000-1500	29.8	24.0	41.9	4.3	32	7	4.5	0.85	Low	ML
C-TP103/1	800-1400	22.8	35.8	40.0	1.4	27	5	2.5	0.54	Low	ML
C-TP104/2	1100-1600	28.3	36.1	35.7	0.0	32	8	4.5	0.49	Low	ML
C-TP105/1	2200-3500	32.1	11.4	43.6	12.9	38	7	6.5	1.36	Low	SM
C-TP109/1	700-1600	13.2	21.4	40.9	24.5	29	3	3.0	1.58	Low	SM
C-TP114/1	600-2400	25.8	26.5	36.2	12.4	33	8	4.5	0.76	Low	ML
Residual tillite											
C-TP42/1-2	2700-3100	28.3	47.3	23.3	1.1	30	6	3.5	0.41	Low	ML

TILLITE BEDROCK											
Completely to highly weathered tillite											
C-TP15/1	1500-2000	17.4	54.5	25.8	2.3	32	7	4.5	0.51	Low	ML
C-TP22/1	1000-3100	46.4	31.1	22.3	0.2	43	15	8.5	0.39	Low	ML
C-TP62/1	1600-3300	23.6	32.9	40.4	3.1	31	7	4.0	0.66	Low	ML
C-TP74/1	1300-3200	11.8	23.4	55.1	9.8	29	4	3.5	1.24	Low	SM
C-TP83/1	1200-3100	47.6	17.4	27.1	7.9	36	9	6.0	0.71	Low	ML
C-TP104/4	1600-3100	14.7	23.0	58.6	3.7	29	4	3.0	1.06	Low	SM
C-TP113/1	1500-3200	14.8	24.7	54.0	6.5	30	5	3.5	1.10	Low	SM
Highly weathered tillite											
C-TP03/1 -1	2400-3000	17.5	27.0	48.0	7.5	30	6	3.5	0.92	Low	SM
C-TP100/1	1200-1800	9.2	14.0	51.8	25.0	29	3	3.5	1.72	Low	SM

Legend:
GM = Grading modulus
LL = Liquid Limit
WPI = Weighted plasticity index
LS = Linear shrinkage
Activity = Expansiveness of the soil according to Van der Merwe's method

From the results in Table 4 it is evident that:

The **colluvium** material is characterised by sand (42.6% to 50.8%) with the clay (17.5% to 18.2%) and silt (20.7% to 27.3%) components. The gravel is content low to moderate with up to 19.2% present. This material has a high to very high grading modulus ranging between 0.88 and 1.41. The liquid limit (LL), weighted plasticity index (WPI) and linear shrinkage (LS) indicate that this material is slightly plastic with a low potentially expansiveness, after Van der Merwe, 1964.

The **alluvium** material predominantly comprise silt (33.6% to 53.5%) and sand (23.0% to 43.4%%). The clay content (12.6% to 23.0%) is moderate and the gravel content is low (≤2.3%). This material has a moderate to very high grading modulus ranging between 0.73 and 1.96. The liquid limit (LL), weighted plasticity index (WPI) and linear shrinkage (LS) indicate that this material is slightly plastic with a low potentially expansiveness, after Van der Merwe, 1964.

The transported **hillwash** comprise sand (≥55.1%) and the gravel (0% to 5.2%). The clay (15.0% to 23.5%) and silt (12.2% to 21.3%) contents are moderate. This grading modulus is generally high to very high (0.92 to 1.36) and occasionally low (about 0.30). The liquid limit (LL), weighted plasticity index (WPI) and linear shrinkage (LS) indicate that this material is non-plastic with a low potentially expansiveness, after Van der Merwe, 1964.

The samples taken from loosely to tightly packed **ferricrete (pedogenic horizon)** comprisessand (up to 57.5%). The clay (7.5% to 21.5%), silt (9.7% to 18.8%) and gravel (9.4% to 28.5%) content is low to moderate. This horizon is typically characterised by a very high grading modulus of up to 2.17. The weighted plasticity index (WPI) is very low to low (≤7%) indicating a material is non-plastic to slightly plastic with a low potentially expansiveness, after Van der Merwe, 1964.

The **residual tillite** horizon mostly comprises clay (up to 45.8%), silt (up to 47.3%) and sand ranging between 17.3% and 43.6%). The gravel content is generally low to high with up to 43.4% present. The high gravel component is attributed to the presence of ferruginised gravel and / or weakly to strongly ferruginised material. This horizon has a low to very high grading modulus ranging between 0.32 and 2.19. The moderate liquid limit (LL), very low to moderate weighted plasticity index (WPI) and low to moderate linear shrinkage (LS) indicate that this material is slightly plastic with a low to moderate potential for expansiveness, after Van der Merwe, 1964.

The **tillite bedrock** horizon is generally characterised by a high to very high grading modulus (0.92 to 1.72), in places the grading modulus is low to moderate (0.39 to 0.66). This material is characterised by sand of up to 55.1%. The silt content is moderate to high (14.0% to 54.5%). The clay (9.2% to 17.5%) and gravel (4.2% to 38.8%) contents are low to moderate. This bedrock displays low activity and the low to moderate weighted plasticity (≤2.2%) indicate that this material is slightly plastic with a low potential for expansiveness, after Van der Merwe, 1964.

8.1.2 Compaction tests - Southern Portion

To determine the suitability of the in-situ soils for use as construction material in layerworks, e.g. in pavements, ground improvement or engineered fill applications, samples were taken and subjected to compaction testing. The compaction test results are summarised in Table 5 below and the detailed laboratory test results are included in Appendix C.

Table 5: Compaction test results - southern portion

Sample Id	Depth (m)	OMC (%)	MDD (kg/m3)	Swell (%)	CBR at various densities (Mod AASHTO)				TRH14 Classification
					90%	93%	95%	98%	
TRANSPORTED									
Colluvium									
C-TP09/1-1	600-1100	10.4	2105	0.00	6.0	9.8	14	16	G9
Hillwash									
C-TP108/1	0-300	8.9	2016	0.80	2.7	4.0	5.3	7.2	G10
C-TP111/1	0-400	6.4	2093	0.00	11	18	26	43	G7
Ferricrete									
C-TP19/1-1	400-600	8.7	2235	0.00	13	19	25	35	G7
C-TP61/1	900-2000	12.5	2023	0.30	5.4	8.0	10	14	G9
C-TP106/1	300-700	9.1	2275	0.00	18	25	31	42	G6
Residual soil									
Ferruginised residual tillite									
C-TP39/1	700-2300	11.7	2108	0.00	18	24	30	40	G7
Tillite bedrock									
Completely to highly weathered tillite									
C-TP74/1	1300-3200	12.6	1840	1.30	2.9	4.2	5.3	6.7	G10
C-TP83/1	1200-3100	15.7	1699	2.90	1.2	2.1	2.9	4.5	G10+
C-TP113/1	1500-3200	12.2	1897	2.30	1.7	2.7	3.6	5.5	G10+
Highly weathered tillite									
C-TP03/1 -1	2400-3000	11.8	1896	1.60	1.8	3.9	6.2	11	G10+
C-TP100/1	1200-1800	8.9	1999	1.30	1.6	4.6	8.0	13	G10

Legend OMC = Optimum moisture content
MDD = Maximum dry density (Mod AASHTO)
Swell = Soaked at 100% Mod AASHTO compaction

From the results in Table 5 it is evident that:

The **colluvium** is characterised by a moderate optimum moisture content of 10.4% and high maximum dry density value of 2105 kg/m^3. The CBR swell value (0%) is very low and the tests yielded low CBR values at densities typically specified in the field (93% to 95%). The material classifies as G9 material according to the TRH14 guidelines (National Institute for Transport and Road Research, 1987). The material (G9) considered to be suitable for the construction of an engineered fill of low stiffness.

The **hillwash** is characterised by a low to moderate optimum moisture content (≤8.9%) and a high maximum dry density value of ≥2016 kg/m^3. The CBR swell values of up to 0.27 are very low and the tests yielded very low to moderate CBR values at densities typically specified in the field (93% to 95%). The material classifies as G7 to G10 material according to the TRH14 guidelines (National Institute for Transport and Road Research, 1987). The G7 material is considered to be suitable for the construction of an engineered fill of low to moderate stiffness and G10 is only suitable for landscaping purposes.

The **pedogenic horizon (ferricrete)** is characterised by moderate to high optimum moisture contents (8.7% to 12.5%) and high to very high maximum dry density values (2023 kg/m^3 to 2275 kg/m^3). The CBR swell values of up to 0.3% are very low to low and yielded low to high CBR values (8% to 31%) at densities typically specified in the field (93% to 95%). The material classifies as G6 to G9 material according to the TRH14

guidelines (National Institute for Transport and Road Research, 1987). The material is considered to be suitable for the construction of an engineered fill of low to moderate stiffness.

The **ferruginised residual tillite** is characterised by a moderate optimum moisture content of 11.7% and high maximum dry density value of 2108 kg/m^3. The CBR swell value (0%) is very low and the tests yielded moderate CBR values at densities typically specified in the field (93% to 95%). The material classifies as G7 material according to the TRH14 guidelines (National Institute for Transport and Road Research, 1987). The material (G9) considered to be suitable for the construction of an engineered fill of moderate stiffness.

The **tillite bedrock** is characterised by a low to high maximum dry density ranging from 1699 kg/m^3 to 1999 kg/m^3 and moderate to high optimum moisture content values (ranging from 8.9% to 15.7%). The CBR swell values are high to very high (1.3% to 2.9%). The material is generally classified as being worse than G10 quality and classified as a G10 at best. This material is thus unsuitable for construction according to the TRH 14 guidelines (National Institute for Transport and Road Research, 1987).

8.1.3 Corrosivity (pH and conductivity) - southern portion

The conductivity of the soil has a profound influence on the rate of corrosion of buried metallic objects. Based on significance of soil resistivity on corrosivity, Duligal (1996) provides the following table for evaluation of the conductivity of soil (Table 6).

Table 6: Guideline values for interpretation of soil conductivity (Duligal, 1996)

Soil conductivity		
Soil conductivity (mS/m)	**Soil resistivity (Ohm.cm)**	**Corrosivity classification**
More than 50	0 – 2000	Extremely corrosive
25 – 50	2000 – 4000	Very corrosive
20 – 25	4000 – 5000	Corrosive
10 – 20	5000 – 10000	Mildly corrosive
Less than 10	>10000	Not generally corrosive

Disturbed samples of the transported material (colluvium, alluvium and hillwash), residual tillite and tillite bedrock horizons were taken and subjected to chemical (pH and conductivity) tests. The test results are summarised as follows. Based on Evans guideline (1977) a soil pH less than 6 indicates serious corrosion potential.

Table 7: Summarised chemical test results – southern portion

Chemical tests				
Hole No	**Depth (m)**	**Layer**	**pH**	**Conductivity (mS/m)**
C-TP03/1 -1	2400-3000	Tillite	6.99	42.4
C-TP16/1	0-400	Alluvium	4.89	30.1
C-TP28/1	2500-3100	Residual tillite	6.70	27.3
C-TP48/1	0-600	Colluvium	5.72	62.2
C-TP88/1	1400-3000	Residual tillite	6.29	47.1
C-TP106/1	300-700	Ferricrete	5.75	10.8
C-TP111/1	0-400	Hillwash	6.10	17.4
C-TP114/1	600-2400	Residual tillite	5.55	108.3

The results indicate that the material occurring on site are potentially corrosive. It is recommended that more specialised chemical testing be conducted during construction to determine the actual potential for corrosion as the pH and conductivity of soil are generally determined to get an indication of the potential corrosiveness of the soil.

8.1.4 One-dimensional consolidation (oedometer) test – Southern Portion

Undisturbed samples of the residual tillite were taken and subjected to a one-dimensional consolidation (oedometer) test. The test results are summarised in

Table 8 below and the detail laboratory results are included in Appendix C.

Table 8: Oedometer tests results - southern portion

Sample Id	Depth (mm)	Material description	DD (kg/m3)	MC (%)	ei	E (MPa)		
						50 - 100 kPa	100 - 200 kPa	200 - 400 kPa
C-TP102/2	1000-1500	Ferruginised residual tillite	1723	15.1	0547	3.8	5.1	7.4
C-TP105/2	2200-3500	Residual tillite	1686	17.9	0.597	1.8	2.6	5.0

Legend
DD = In situ dry density
MC = In situ moisture content
e_i = Initial void ratio
E = Young's modulus

The aim of the oedometer test was to determine the stiffness of the soil sample subjected to different loads. The tested material displayed low stiffness characteristics as indicated by the low Young's moduli for loads of up to 200 kPa. Low to moderate stiffness characteristics are indicated by the Young's moduli values for loads ranging from 200 - 400 kPa.The residuum is therefore expected to compress significantly when subjected to the expected foundation loads. The soil samples displayed minimal swell when initially soaked

8.1.5 Lump Test – Southern Portion

The lump test involves determination of dry density and the corresponding moisture content of samples that have been allowed to dry out or wet up for different periods of time. The 'volume characteristic' (relationship between the dry density and the moisture content) of the soil can be determined from the test results. This can then be used to calculate the potential one and three-dimensional swell of the soil.

Before the volumetric change of the soil can be determined a choice of the initial and final moisture content must be made. These should correspond to the limiting values of suction or moisture content likely to occur in situ for the particular soil. The test results from a residual tillite sample can be summarised (see Table 9) as follows:

Table 9: Lump test results – southern portion

Sample no	Depth (mm)	Material type	Moisture Content (%)		Expected swell (%)	
			Estimated Initial	Estimated Final	One dimensional	Three dimensional
C-TP104/3	1100-1600	Residual tillite	6.7	20.5	1	0

Based on the results it is evident that the expected swell (≤1%) is low to negligible.

8.2 Laboratory test results - northern portion

8.2.1 Foundation Indicator Tests – Northern Portion

Representative samples of the various soil horizons were taken and submitted for foundation indicator tests (grading and Atterberg Limit tests). The test results (Table 10) can be summarised as follows (see Appendix C for detail results):

Table 10: **Foundation indicator test results – northern portion**

Sample Id	Depth (m)	Soil composition (%)				Atterberg limits			GM	Activity	USCS Classification
		Clay	Silt	Sand	Gravel	LL	WPI	LS			
TRANSPORTED											
Colluvium											
TP199/1	0.0-0.90	26.8	41.9	31.3	0	25	3	2.0	0.42	Low	ML
Hillwash											
TP124/1	0-0.85	17.4	9.4	72.6	0.6	0.5	0	0.5	0.75	Low	SC
TP145/1	0-0.90	18.2	11.8	69.2	0.8		0	1.0	0.92	Low	SC
TP153	0.8-1.05	39.1	32.1	28.8	0.0	25	3	2.0	0.35	Low	ML
TP175/1	0.0-1.2	39.5	7.5	53.0	0.0	25	4	2.0	0.60	Low	SM
TP196/1	0.0-0.3	10.8	2.7	84.3	2.3		0	0.0	1.21	Low	SC
TP213/1	0.0-0.60	14.0	3.4	82.6	0.0		0	1.0	1.05	Low	SC
TP229/1	0.0-1.4	15.2	15.9	68.9	0.0		0	0	0.90	Low	SC
Ferricrete											
TP130/1	0.7-1.1	10.3	11.9	64.9	12.9		0	1.0	1.84	Low	SC
TP140/1	1.1-1.3	5.4	5.0	50.8	38.8		0	0.0	2.12	Low	SC
TP173/1	0.6-1.3	10.8	1.4	45.6	42.2		0	0.0	1.97	Low	SC
TP192/1	0.6-1.1	4.2	4.1	56.3	35.4		0	0	2.17	Low	SC
TP198/1	0.8-1.3	5.1	1.7	60.2	33.1		0	2.0	2.15	Low	SP-SC
RESIDUAL SOIL											
Residual tillite											
TP127/1	1.5-2.5	14.7	37.3	34.9	13.1	31	5	4.0	1.06	Low	ML
TP185/1	1.0-2.5	54.1	20.9	24.4	0.6	39	12	7.0	0.41	Low	ML
Residual sandstone											
TP122/1	1.5-2.7	21.6	10.2	62.7	5.5	1.5	2	24	0.98	Low	SM
TP136/1	1.2-2.0	24.9	9.5	62.8	2.7		0	1.0	0.90	Low	SC
TP138/1	1.7-2.2	13.5	11.6	68.5	6.5		2	1.5	1.13	Low	SC
TP160/1	1.2-1.70	21.4	9.8	65.2	3.6		0	1.5	0.95	Low	SC
TP170/2	2.1-2.8	21.7	12.3	63.9	2.1	29	5	3.0	0.94	Low	ML
TP191/1	1.1-2.3	19.7	20.9	50.9	8.4		0	1.5	0.96	Low	SC
TP207/1	0.8-1.0	6.0	1.3	78.4	14.4		0	0	1.61	Low	SP-SC
TP212/1	2.1-3.1	28.6	7.0	56.1	8.3	25	3	2.0	1.01	Low	SM
TP218/1	0.9-1.1	9.0	6.3	45.2	39.5		0	0.0	1.94	Low	SC
Residual siltstone											
TP135/1	2.9-3.1	40.2	28.6	31.1	0.0	30	6	3.5	0.42	Low	ML
TP143/1	1.0-1.80	45.6	12.4	42.0	0.0	34	9	5.0	0.55	Low	ML

TP150/1	0.5-2.0	48.1	12.7	37.3	2.0	40	12	7.5	0.67	Low	ML
TP154/1	2.1-3.2	32.1	11.9	48.2	7.8	30	5	3.5	0.97	Low	SM
TP164/1	0.9-1.1	29.7	31.8	38.5	0.0	26	4	2.5	0.57	Low	ML
TP168/1	2.0-3.3	45.6	30.2	24.2	0.2	33	9	5	0.30	Low	ML
TP170/1	1.4-2.1	51.0	10.3	37.4	1.4	40	12	7.0	0.64	Low	ML
TP183/1	0.9-1.8	43.5	11.6	42.5	2.4	41	13	7.5	0.63	Low	ML
TP200/1	1.0-2.0	52.4	26.5	21.1	0.0	38	13	6.5	0.24	Low	ML
TP201/1	3.0-3.8	40.4	39.9	19.6	0.0	29	6	3.5	0.31	Low	ML
TP202/1	1.7-3.1	13.4	18.2	57.7	10.6	27	3	2.5	1.23	Low	SM
TP225/1	1.2-2.6	17.4	10.6	51.5	20.5	31	5	4.0	1.45	Low	SM
BEDROCK											
Sandstone											
TP172/1	0.6-0.8	7.4	0.1	71.8	20.3		0	0.0	1.75	Low	SP-SC
TP234/1	1.0-1.40	7.2	7.4	66.6	18.8		0	0	1.68	Low	SC

Legend:
GM = Grading modulus
LL = Liquid Limit
WPI = Weighted plasticity index
LS = Linear shrinkage
Activity = Expansiveness of the soil according to Van der Merwe's method

From the results in Table 10 it is evident that:

The **colluvium** material is characterised by silt (41.9%) sand (31.3%) and clay (26.8%). The gravel is negligible, and the colluvium is characterised by a low grading modulus of 0.42. The liquid limit (LL), weighted plasticity index (WPI) and linear shrinkage (LS) indicate that this material is slightly plastic with a low potentially expansiveness, after Van der Merwe, 1964.

The transported **hillwash** has a high sand component (28.8% to 84.3%) and the gravel fraction (0% to 2.3%) is low. It should be noted that only the fine fraction was sampled, cobbles and boulders of up to 1200mm were found to occur in places. The clay (10.8% to 39.5%) and silt (2.7% to 32.1%) contents are low to moderate. This grading modulus is generally moderate to high (0.60 to 1.21) and occasionally low (0.35). The liquid limit (LL), weighted plasticity index (WPI) and linear shrinkage (LS) indicate that this material is non-plastic to slightly plastic with a low potentially expansiveness, after Van der Merwe, 1964.

The samples taken from loosely to tightly packed **ferricrete (pedogenic horizon)** comprises sand (45.6% to 64.9%) and gravel (up to 42.2%). The clay (4.2% to 10.8%) and silt (1.4% to 11.9%) contents are low to moderate. This horizon is characterised by a very high grading modulus of up to 2.17. The weighted plasticity index (WPI) is very low (0%) indicating a material is non-plastic with a low potentially expansiveness, after Van der Merwe, 1964.

The **residual tillite** horizon mostly comprises clay (14.7% to 54.1%), silt (20.9% to 37.3%) and sand (24.4% and 34.9%). The gravel content is low to moderate, 0.6% to 13.1%. This horizon has a low to high grading modulus ranging between 0.41 and 1.06. The moderate liquid limit (LL), low to moderate weighted plasticity index (WPI) and low to moderate linear shrinkage (LS) indicate that this material is slightly plastic with a low to moderate potential for expansiveness, after Van der Merwe, 1964.

The **residual sandstone** horizon mainly comprises sand (up to 78.4%). The gravel fraction is generally up to 39.5%. The clay (9.0% to 28.6%) and silt (1.3% to 20.9%) are contents are low to moderate. This horizon is characterised by a high to very high grading modulus ranging between 0.90 and 1.90. The weighted plasticity index (WPI) is very low (≤5%) indicating a material is non-plastic to slightly plastic with a low potentially expansiveness, after Van der Merwe, 1964.

The **residual siltstone** horizon mostly comprises moderate to high clay (up to 52.4%), silt (10.3% to 39.9%) and sand (19.6% and 57.7%). The gravel content is low to moderate, 0% to 20.5% is present. This horizon has a low to very high grading modulus ranging between 0.24 and 1.45. The moderate liquid limit (LL), very low to moderate weighted plasticity index (WPI) and low to moderate linear shrinkage (LS) indicate that this material is slightly plastic with a low to moderate potential for expansiveness, after Van der Merwe, 1964.

The **sandstone bedrock** horizon is characterised by a very high grading modulus (≥1.68). This material is characterised by high sand (66.6% to 71.8%) and the gravel content is moderate (18.8% to 20.3%). The clay (≤7.4%) and silt (≤7.4%) contents are low. This bedrock displays low activity and the very low weighted

plasticity (0%) indicate that this material is non-plastic with a low potential for expansiveness, after Van der Merwe, 1964.

8.2.2 Compaction tests – Northern Portion

To determine the suitability of the in-situ soils for use as construction material in layerworks, e.g. in pavements, ground improvement or engineered fill applications, samples were taken and subjected to compaction testing. The compaction test results are summarised in Table 11 below and the detailed laboratory test results are included in Appendix E.

Table 11: Compaction test results – northern portion

Hole no.	Depth (m)	OMC (%)	MDD (kg/m3)	Swell (%)	CBR at various densities (Mod AASHTO)				TRH14 Classification
					90%	93%	95%	98%	
TRANSPORTED									
Hillwash									
C-TP124/1	0-850	7.6	2067	0.30	19	25	30	45	G6
C-TP145/1	0-900	7.7	2056	0.20	7.1	10	13	16	G8
C-TP175/1	0-1200	10.4	1975	0.70	6.4	9.2	12	14	G9
C-TP196/1	0-300	8.4	2043	0.10	22	27	32	55	G6
C-TP213/1	0-600	10.4	1984	0.10	14	17	20	35	G7
C-TP229/1	0-1400	5.4	2125	0.00	11	15	18	25	G7
Ferricrete									
C-TP130/1	700-1100	11.4	2032	0.10	10	15	21	33	G7
C-TP140/1	1100-1300	8.9	2266	0.00	62	71	78	98	G5
C-TP173/1	600-1300	9.1	2125	0.10	18	28	37	51	G6
C-TP192/1	600-1100	10.9	2089	0.00	18	34	50	81	G5
C-TP198/1	800-1300	12.1	2020	0.10	18	26	34	48	G6
Residual soil									
Residual sandstone									
C-TP122/1	1500-2700	8.2	2079	1.20	3.4	5.7	8.0	13.0	G10
C-TP136/1	1200-2000	6.9	2105	0.20	14	19	24	35	G7
C-TP160/1	1200-1700	6.9	2116	0.80	2.4	3.5	4.4	6.9	G10
C-TP170/2	2100-2800	9.8	2028	1.40	1.6	3.1	4.7	5.9	G10
C-TP191/1	1100-2300	7.1	1775	0.10	15	20	24	34	G7
C-TP207/1	800-1000	7.1	1786	0.10	10	17	24	27	G7
C-TP218/1	900-1100	8.0	2212	0.00	17	23	28	37	G7
Residual siltstone									
C-TP154/1	2100-3200	13.7	1869	1.40	1.1	1.6	2.0	2.4	G10+
C-TP225/1	1200-2600	12.8	1935	0.50	3.2	4.7	6.0	11	G10
Bedrock									
Sandstone									
C-TP138/1	1700-2200	8.5	2048	0.10	7.5	21	36	47	G7
C-TP172/1	600-800	9.1	1936	0.00	21	27	32	56	G6
C-TP234/1	1000-1400	7.5	2112	0.00	31	45	57	85	G5

Legend OMC = Optimum moisture content
MDD = Maximum dry density (Mod AASHTO)
Swell = Soaked at 100% Mod AASHTO compaction

From the results in Table 11 it is evident that:

The **hillwash** is characterised by a low to moderate optimum moisture content (≤5.4% to 10.4%) and high maximum dry density values ranging between 1975 kg/m^3 to 2125 kg/m^3. The CBR swell values are generally very low to low (≤0.3%) and occasionally moderate (0.70%). The tests yielded low to high CBR values at densities typically specified in the field (93% to 95%). The material classifies as G6 to G9 material according to the TRH14 guidelines (National Institute for Transport and Road Research, 1987). This material is considered to be suitable for the construction of an engineered fill of low to moderate stiffness.

The **pedogenic horizon (ferricrete)** is characterised by moderate to high optimum moisture contents (9.1% to 12.1%) and high to very high maximum dry density values of 2020 kg/m3 to 2266 kg/m3. The CBR swell values of up to 0.1% are very low and yielded moderate to very high CBR values (15% to 78%) at densities typically specified in the field (93% to 95%). The material classifies as G5 to G7 material according to the TRH14 guidelines (National Institute for Transport and Road Research, 1987). The material is considered to be suitable for the construction of an engineered fill of moderate to high stiffness.

The **residual sandstone** has a low to very high density (1775 kg/m^3 to 2212 kg/m^3) and low to moderate moisture content value of ≤9.8%. The CBR swell values are very low to high (0% to 1.4%). The material is classified as G7 and G10 according to the TRH 14 guidelines (National Institute for Transport and Road Research, 1987). The G7 material is considered to be suitable for the construction of an engineered fill of low to moderate stiffness and G10 is only suitable for landscaping purposes.

The **residual siltstone** is characterised by a high optimum moisture content of ≥12.8% and high maximum dry density value of ≥1869 kg/m^3. The CBR swell values are low to high (0.50% to 1.40%). The tests yielded very low CBR values at densities typically specified in the field (93% to 95%). The material is generally classified as being worse than G10 quality and classified as a G10 at best. This material is thus unsuitable for construction according to the TRH 14 guidelines (National Institute for Transport and Road Research, 1987).

The **sandstone bedrock** is characterised by a moderate to high maximum dry density of 1936 kg/m^3 to 2112 kg/m^3 and a low to moderate optimum moisture content value of ≤9.1%. The CBR swell values are very low. The material classifies as G5 to G7 material according to the TRH14 guidelines (National Institute for Transport and Road Research, 1987). The material is considered to be suitable for the construction of an engineered fill of moderate to high stiffness.

8.2.3 Corrosivity - pH and conductivity – Northern Portion

The conductivity of the soil has a profound influence on the rate of corrosion of buried metallic objects. Based on significance of soil resistivity on corrosivity, Duligal (1996) provides the following table for evaluation of the conductivity of soil (Table 12).

Table 12: Guideline values for interpretation of soil conductivity (Duligal, 1996)

Soil conductivity		
Soil conductivity (mS/m)	**Soil resistivity (Ohm.cm)**	**Corrosivity classification**
More than 50	0 – 2000	Extremely corrosive
25 – 50	2000 – 4000	Very corrosive
20 – 25	4000 – 5000	Corrosive
10 – 20	5000 – 10000	Mildly corrosive
Less than 10	>10000	Not generally corrosive

Disturbed samples of the transported material (colluvium, alluvium and hillwash), residual tillite and tillite bedrock horizons were taken and subjected to chemical (pH and conductivity) tests. The test results are summarised as follows in Table 13. Based on Evans guideline (1977) a soil pH less than 6 indicates serious corrosion potential.

Table 13: Summarised chemical test results – northern portion

Chemical tests				
Hole No	**Depth (m)**	**Layer**	**pH**	**Conductivity (mS/m)**

C-TP122/1	1500-2700	Residual sandstone	5.66	20.7
C-TP138/1	1700-2200	Sandstone	5.49	10.4
C-TP140/1	1100-1300	Ferricrete	6.32	3.3
C-TP150/1	500-2000	Residual siltstone	4.97	108.3
C-TP154/1	2100-3200	Residual siltstone/completely weathered	5.81	11.8
C-TP164/1	900-1100	Residual/ferricrete	5.57	103.6
C-TP175/1	0-1200	Hillwash	5.26	4.7
C-TP185/1	1000-2500	Residual tillite	5.38	80.1
C-TP198/1	800-1300	Ferricrete	5.60	11.3
C-TP199/1	0-900	Colluvium/Hillwash	4.77	59.3
C-TP201/1	3000-3800	Residual siltstone	5.51	65.0
C-TP207/1	800-1000	Residual sandstone	6.87	9.4
C-TP234/1	1000-1400	Sandstone	5.04	12.7

The results indicate that the material occurring on site are potentially corrosive. It is recommended that more specialised chemical testing be conducted during construction to determine the actual potential for corrosion as the pH and conductivity of soil are generally determined to get an indication of the potential corrosiveness of the soil.

The pH values (4.77 – 6.87) are relatively low with is also indicative of potentially corrosive conditions.

8.2.4 One-dimensional consolidation (oedometer) test – Northern Portion

A total of 4 No undisturbed samples of the residual siltstone and one sample of residual tillite were taken and subjected to a one-dimensional consolidation (oedometer) test. The test results are summarised in Table 14 below and the detail laboratory results are included in Appendix C.

Table 14: Oedometer tests results – northern portion

Test pit No.	Depth (mm)	Material description	DD (kg-/m3)	MC (%)	ei	E (MPa)		
						50 - 100 kPa	100 - 200 kPa	200 - 400 kPa
C-TP135/2	2900-3100	Residual siltstone	1739	21.0	0.530	4.0	4.3	4.9
C-TP168/2	2000-3300	Residual siltstone	1652	18.2	0.620	2.3	2.9	5.2
C-TP185/2	1000-2500	Residual tillite	1515	24.2	0.811	2.9	3.8	5.8
C-TP201/2	3000-3800	Residual siltstone	1804	15.9	0.498	3.3	5.8	8.0

Legend
DD = In situ dry density
MC = In situ moisture content
e_i = Initial void ratio
E = Young's modulus

The aim of the oedometer test was to determine the stiffness of the soil sample subjected to different loads. The tested material displayed low stiffness characteristics as indicated by the low Young's moduli for loads of up to 200 kPa. Generally low (≤5.8) and occasionally moderate (about 8.0) stiffness characteristics are indicated by the Young's moduli values for loads ranging from 200 - 400 kPa.The residuum can therefore

beexpected to compress significantly when subjected to the excepted foundation loads. The soil samples displayed minimal swell when initially soaked

8.2.5 Lump Test – Northern Portion

The lump test involves determination of dry density and the corresponding moisture content of samples that have been allowed to dry out or wet up for different periods of time. The 'volume characteristic' (relationship between the dry density and the moisture content) of the soil can be determined from the test results. This can then be used to calculate the potential one and three-dimensional swell of the soil.

Before the volumetric change of the soil can be determined a choice of the initial and final moisture content must be made. These should correspond to the limiting values of suction or moisture content likely to occur in situ for the particular soil. The test results from a residual siltstone sample can be summarised (see Table 9) as follows:

Table 15: Lump test results northern portion-

Sample no	Depth (mm)	Material type	Moisture Content (%)		Expected swell (%)	
			Estimated Initial	Estimated Final	One dimensional	Three dimensional
C-TP170/1	1400-2100	Residual siltstone	6.8	22.5	1	0

Based on the results it is evident that the expected swell (≤1%) is low to negligible.

9 Geotechnical considerations

In addition to characterization of the soil/rock profile and on-site conditions, the purpose of the investigation was to consider various geotechnical factors at the site which could have some influence on the proposed development. Such factors include the following;

- The occurrence of expansive soils
- The occurrence of collapsible soils
- Groundwater conditions, seepage and drainage as well as the occurrence of areas susceptible to flooding
- Excavatability
- Undermined areas
- Stability of excavation side walls
- Slope stability
- The suitability of the local soil horizons in layer works

Each of the above factors is discussed in the sections that follow.

9.1 The occurrence of expansive soils

The foundation indicator results (see Section 8.1.1 and 8.2.1) indicate that the transported material, residuum and bedrock are low in plasticity and characterised by very low to low and occasionally moderate potential expansiveness.

9.2 The occurrence of collapsible / compressible soils

Hillwash and residual sandstone occurring as loose to dense, silty sand was found to occur on site. Typically, loose silty sand is expected to be potentially compressible under structural loads. However, the hillwash and residual sandstone does not display a collapsible/compressible (pin-holed structure), therefore not expected to compress significantly when subjected to the excepted foundation loads.

9.3 Occurrence of areas susceptible to flooding

The areas bordering the floodplains / marshy area associated with the Umgeni River (northern portion) and the Umlaas River (southern portion) traversing the site are expected to be regularly inundated in the rainy season. A 1:50 and 1:100 flood line study has been carried out by Aurecon and comprises the delineation of these areas (Aurecon report titled, 1:50 and 1:100 Flood Lines Study dated 14 October 2019, refers). Development within the floodline areas must be avoided.

9.4 Excavatability

The fill, transported material (alluvium, colluvium and hillwash), residuum (tillite, siltstone and sandstone) and very soft rock tillite and siltstone bedrock classify as 'Soft Excavation', according to SANS 1200D. Cobbles and boulders of up 1200mm were occasionally encountered within the hillwash and residual tillite and residual sandstone, these may be classified as 'Boulder Excavation'. TLB refusal was recorded on hardpan ferricrete, medium to hard rock tillite (refusal depth range 1.0-2.5m) and hard rock siltstone (refusal depth range 0.7-2.7m) and sandstone at refusal depths ranging between 0.3-2.8m (Table 2 and Table 3, refer). According to SANS 1200D (1988), the classification of the bedrock may vary from 'Intermediate Excavation' or 'Hard Excavation'. An excavator and / or power tools may be required for the excavation of Intermediate material. Blasting may be required to excavate trenches where materials are classified as Hard Excavation.

9.5 Steep / unstable natural slopes

The investigated areas are characterised by a gentle to slightly undulating terrain. The steep areas on the boundary of the southern portion were excluded from the study area.

9.6 Undermined areas

Apart from limited sand mining from surface, it is understood that no underground mining has taken place within the proposed site and / or in the vicinity.

9.7 Stability of excavation side walls

The fill, transported material and residuum will require battering or shoring. It is recommended that all excavations are evaluated by a competent person to determine appropriate measures to ensure stability of excavations. Care should be taken to ensure that berms are constructed around excavations preventing storm water ingress during this period.

9.8 The suitability of the local soil horizons in layer works

The residual siltstone, residual tillite and completely to highly weathered tillite bedrock classifies as G10 or worse (G10+) and is characterised places characterised by high swell values of up to 2.90 and therefore not suitable for use during construction. The colluvium (G9) is only suitable for use as for the construction of an engineered fill of low stiffness. The hillwash and residual sandstone classify as G6 to G10 and G7 to G10, respectively. The hillwash and residual sandstone are therefore considered to be suitable for the construction of an engineered fill of low to moderate stiffness. The ferricrete and sandstone bedrock classify as G5 to G7 material which is considered to be suitable for the construction of an engineered fill of moderate to high stiffness.

It should be noted that cobbles and boulders of up to 1200mm occur within the hillwash (northern portion), ferricrete and residual sandstone horizons. These may negatively affect the compaction and will need to be removed.

10 Geotechnical zoning of the site

Housing is planned for the southern portion of the site; the available information has been used to conduct zoning of the site in accordance with the NHBRC's Home Building Manual (NHBRC, 2015). The site has been delineated into three geotechnical zones, as defined below.

Table 16: Geotechnical zoning of the site according to NHBRC's Home Building Manual

Zone	Constraint	Site class designation
Zone 1	Expansive soil	H
Zone 2	Marshy areas	P
Zone 3	Stable (Shallow rock and outcrops)	R

The descriptions of the zones are as follows:

Zone H: Generally, the proposed site is zoned as Residential Site Class Designation H. This zone is characterised by fine grained soils with very low to low and occasionally moderate plasticity (sandy silty clay or clayey silty sand (residual tillite).

Zone P (marshy conditions): A zone in the comprising the wetlands and floodplains associated with the two rivers traversing the western and eastern portions of the site. This zone characterises wetlands and areas within the 1:50 and 1:100 flood lines therefore development within these areas is not encouraged.

Zone R (Shallow rock and outcrops): A zone characterised by areas underlain by shallow tillite bedrock and hardpan ferricrete.

11 Recommendations

The site is considered suitable for the proposed development, but the following geotechnical recommendations are to be taken into consideration.

11.1 Founding of structures

11.1.1 Founding of structures in the southern portion

Soils with a very low to moderate potential expansiveness were up to a depth of 3.8 m below surface level. To avoid differential settlement attributable to heave of light structures (founded on conventional strip footings), the following options are recommended depending on costs and available labour skills.

Zone 1 – H

For foundation pressures not exceeding 50 kPa, modified strip footings are proposed. The following needs to be implemented.

- Reinforced strip footings
- Articulation joints at some internal and all external doors
- Light masonry reinforcement

Alternatively, a soil raft can be constructed as follows:

- Remove the in situ material in an area of 1 m wider than the footprint of the structures to a depth of 1.5 m below the existing ground level.
- Compact the base of the excavation to 90% Mod AASHTO density to a minimum depth of 150 mm.
- Backfill the excavation with G7 quality material (or better) in 150 mm thick layers, compacted to 93% Mod AASHTO density.

- The structures can then be founded by means of conventional strip footings at a shallow depth in the soil raft.

In addition, it is recommended that precautionary site drainage measures be implemented as detailed in section 11.2 below.

Zone 2 - P(marsh)

This zone characterises wetlands and areas within the 1:50 and 1:100 flood lines therefore development within these areas is not encouraged.

Zone 3 - R(Rock)

The proposed buildings can be founded on hard rock bedrock or hardpan ferricrete using conventional strip footings and pad footings.

11.1.2 Founding of structures in the northern portion

It is understood that commercial, industrial and / or mixed-use, including a shopping centre is planned the northern portion. At the time of reporting details about the magnitude and loads of the proposed structures were not available. It is assumed that the detailed (Phase 2) investigations for the planned structures will be conducted at a later stage.

For foundation pressures not exceeding 50 kPa, modified strip footings (as in section 11.1.1 above) are proposed in areas underlain by deep residual and / completely weathered tillite and siltstone horizons.

Typically, the hard rock siltstone and sandstone bedrock provides a competent founding horizon. The proposed buildings can be founded on hard rock bedrock using conventional strip footings and pad footings.

Where heavy loaded structures are envisaged further analysis will be undertaken as outlined in Section 11.4 below.

11.2 Drainage

The following drainage measures must be implemented for residential structures:

- In all cases precaution should be taken to ensure that water does not pond adjacent to foundations or structures.
- A 1,5 m wide apron should be constructed around all structures designed to shed water away from walls and foundations.

11.3 Construction materials

The material occurring at the site is generally not suitable for use as construction material. It is recommended that suitable construction material be sourced commercially.

11.4 Phase 2 investigations

The Phase 1 investigation must be followed at the appropriate time by a Phase 2 investigation. Both are required in terms of the GFSH-2 specification mentioned in this report. The Phase 2 investigation forms part of the National Home Builder's Registration Council (NHBRC) requirements for enrolment of residential dwellings in their warranty scheme and will require that a competent person inspect services trenches (sewerage and water) as they are excavated. The reason for the inspections is to refine the geotechnical zoning so that a stand-by-stand soil classification and founding recommendation is made possible.

Failure to attend to the Phase Two investigation and accompanying documentation will result in difficulties of enrolment of residential structures.

It is important to realise that this aspect of the work will require that the contractor and Competent Person work closely together so that adequate inspections are made before services trenches are backfilled. It is therefore

incumbent upon the developer to appoint a competent person who is accredited with the NHBRC to conduct the Phase 2 investigation and reporting.
As noted, it is understood that commercial, industrial and / or mixed-use, including a shopping centre is planned for the northern portion. When information design information including the expected loads, footprint etc. is provided further geotechnical studies must be undertaken. These studies will include drilling, conducting bearing capacity and settlement analysis in order to provide detailed design recommendations and / foundation designs, if required.

12 Limitations of report

1. The Aurecon Tshwane Ground Engineering Group has prepared this report for the use of our Client, Assmang Limited. The report has not been prepared for use by parties other than the Client, and the Client's respective consulting advisors.
2. This report has been written with the express intent of providing enough information as part of the project environmental impact assessment. The phase 1 investigation has been conducted in accordance with generally accepted engineering practice, and the opinions and conclusions expressed in the report are made in good faith based on the information available to Aurecon at the time of preparing this report.
3. There are always some variations in subsurface conditions across a site due to geological conditions that cannot be defined fully even by exhaustive investigation. Hence, it is possible that the measurements and values obtained from sampling and testing during the investigation may not represent the extremes of conditions which exist within the site. The precision with which subsurface conditions are identified depends on the method of excavation, the frequency and recovery of samples, the method of sampling, and the uniformity of the subsurface conditions. Subsurface conditions at other than the test pit positions may vary from the conditions encountered in the test pit locations.
4. Further, subsurface conditions, including groundwater levels can change over time. The groundwater conditions described in this report refer only to those observed at the place and time of observation noted in the report. These conditions may vary seasonally or as a consequence of construction activities in the area. This should be borne in mind, particularly if the report is used after a protracted delay or a period of protracted climatic conditions.
5. Should conditions exposed at the site during subsequent investigation or construction works vary significantly from those provided in this report, we request that the Aurecon Tshwane Ground Engineering Group be informed and have the opportunity to review any of the findings or conclusions of this report. It is highly recommended that during construction the site conditions be inspected by a representative of Aurecon to confirm the geotechnical interpretations in this report.
6. Unless otherwise stated, this report does not address potential environmental hazards, or groundwater contamination that may be present. In addition to soil variability, fill material of variable physical and chemical composition can be present over portions of the site or on adjacent properties
7. The test pit logs represent the subsurface conditions at the specific test location only. Boundaries between zones on the logs are not often distinct, but rather are transitional and have been interpreted. The soil descriptions in this report are based on commonly accepted methods of classification and identification employed in geotechnical practice, as stated in this report. Classification and identification of soil involves judgement, and Aurecon infers accuracy in the classification and identification methods to the extent that is common in current geotechnical practice, and within the limitations of the ground investigation that was performed.
8. It is recommended that further geotechnical input from Aurecon should be sought as the project moves into the next phase to confirm that the geotechnical assumptions made in this report are compatible with the structural performance requirements and are being applied appropriately.

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Appendix A:
Summary of soil and rock profile description terminology

STANDARD DESCRIPTIONS USED IN SOIL PROFILING

1. MOISTURE CONDITION

Term	Description
Dry	
Slightly moist	Requires addition of water to reach optimum moisture content for compaction
Moist	Near optimum content
Very Moist	Requires drying to attain optimum content
Wet	Fully saturated and generally below water table

2. COLOUR

The Predominant colours or colour combinations are described including secondary coloration described as banded, streaked, blotched, mottled, speckled or stained.

3. CONSISTENCY

3.1 Non-Cohesive Soils

Term	Description
Very Loose	Crumbles very easily when scraped with geological pick
Loose	Small resistance to penetration by sharp end of geological pick
Medium Dense	Considerable resistance to penetration by sharp end of geological pick
Dense	Very high resistance to penetration to sharp end of geological pick. Requires many blows of hand pick for excavation.
Very Dense	High resistance to repeated blows of geological pick. Requires power tools for excavation

3.2 Cohesive Soils

Term	Description
Very soft	Easily penetrated by thumb. Sharp end of pick can be pushed in 30 - 40mm. Easily moulded by fingers.
Soft	Pick head can easily be pushed into the shaft of handle. Moulded by fingers with some pressure.
Firm	Indented by thumb with effort. Sharp end of pick can be pushed in up to 10mm. Can just be penetrated with an ordinary spade.
Stiff	Penetrated by thumbnail. Slight indentation produced by pushing pick point into soil. Cannot be moulded by fingers. Requires hand pick for excavation.
Very Stiff	Indented by thumbnail. Slight indentation produced by blow of pick point. Requires power tools for excavation.

4. STRUCTURE

Term	Description
Intact	Absence of fissures or joints
Fissured	Presence of closed joints
Shattered	Presence of closely spaced air filled joints giving cubical fragments
Micro-shattered	Small scale shattering with shattered fragments the size of sand grains
Slickensided	Polished planar surfaces representing shear movement in soil
Bedded Folitated	Many residual soils show structures of parent rock.

5. SOIL TYPE

5.1 Particle Size

Term	Size (mm)
Boulder	>200
Pebbles	60 – 200
Gravel	60 – 2
Sand	2 – 0,06
Silt	0,06 – 0,002
Clay	<0,002

6. ORIGIN

6.1 Transported Soils

Term	Agency of Transportation
Colluvium	Gravity deposits
Talus	Scree or coarse colluvium
Hillwash	Fine colluvium
Alluvial	River deposits
Aeolian	Wind deposits
Litoral	Beach deposits
Estuarine	Tidal – river deposits
Lacustine	Lake deposits

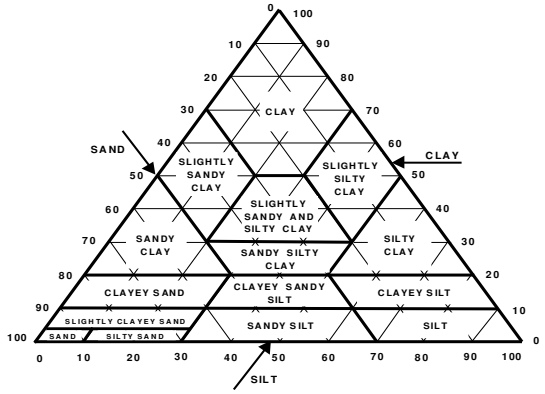
6.2 Residual soils

These are products of in-situ weathering of rocks and are described as e.g. Residual Shale

6.3 Pedocretes

Formed in transported and residual soils etc. calcrete, silcrete, manganocrete and ferricrete.

5.2 Soil Classification



SUMMARY OF DESCRIPTIONS USED IN ROCK CORE LOGGING

1. WEATHERING

Term	Symbol	Diagnostic Features
Residual Soil	W5	Rock is discoloured and completely changed to a soil in which original rock fabric is completely destroyed. There is a large change in volume.
Completely Weathered	W5	Rock is discoloured and changed to a soil but original fabric is mainly preserved. There may be occasional small corestones.
Highly Weathered	W4	Rock is discoloured, discontinuities may be open and have discoloured surfaces, and the original fabric of the rock near the discontinuities may be altered; alternation penetrates deeply inwards, but corestones are still present.
Moderately Weathered	W3	Rock is discoloured, discontinuities may be open and will have discoloured surfaces with alteration starting to penetrate inwards, intact rock is noticeably weaker than the fresh rock.
Slightly Weathered	W2	Rock may be slightly discoloured, particularly adjacent to discontinuities, which may be open and will have slightly discoloured surfaces, the intact rock is not noticeably weaker than the fresh rock.
Unweathered	W1	Parent rock showing no discolouration, loss of strength or any other weathering effects.

2. HARDNESS

Classification	Field Test	Compressive Strength Range MPa
Very Soft Rock	Can be peeled with a knife. Material crumbles under firm blows with the sharp end of a geological pick.	1 to 3
Soft Rock	Can be scraped with a knife, indentation of 2 to 4 mm with firm blows of the pick point.	3 to 10
Medium Hard Rock	Cannot be scraped or peeled with a knife. Hand held specimen breaks with firm blows of the pick.	10 to 25
Hard Rock	Point load tests must be carried out in order to distinguish between these classifications	25 - 70
Very Hard Rock	These results may be verified by uniaxial compressive strength tests on selected samples.	70 - 200
Extremely Hard Rock		>200

3. COLOUR

The predominant colours or colour combination are described including secondary colouration described as banded, streaked, blotched, mottled, speckled or stained.

4. FABRIC

4.1 Grain Size		4.2 Discontinuity Spacing		
Term	Size (mm)	Description for: Bedding, foliation, laminations	Spacing (mm)	Descriptions for joints, faults, etc.
Very Coarse	>2,0	Very Thickly Bedded	> 2000	Very Widely
Coarse	0,6 – 2,0	Thickly Bedded	600 – 2000	Widely
Medium	0,2 – 0,6	Medium Bedded	200 – 600	Medium
Fine	0,06 – 0,2	Thinly Bedded	20 – 200	Closely
Very Fine	< 0,06	Laminated	6 – 20	Very closely
		Thinly Laminated	<6	

5. ROCK NAME

Classified in terms of origin:	
IGNEOUS	Granite, Diorite, Gabbro, Syenite, Diabase, Dolerite, Trachyte, Andesite, Basalt.
METAMORPHIC	Slate, Quartzite, Gneiss, Schist,
SEDIMENTARY	Shale, Mudstone, Siltstone, Sandstone, Dolomite, Conglomerate, Tillite, Quartzite, Limestone.

6. STRATIGRAPHIC HORIZON

Identification of rock type in terms of stratigraphic horizons.

Appendix B:
Test pit profiles

Appendix C:

Laboratory results

Appendix D:

NHBRC reference tables

Table 4. RESIDENTIAL SITE CLASS DESIGNATIONS (SAICE, 1995)

TYPICAL FOUNDATION MATERIAL	CHARACTER OF FOUNDING MATERIAL	EXPECTED RANGE OF TOTAL SOIL MOVEMENTS (mm)	ASSUMED DIFFERENTIAL MOVEMENT (% OF TOTAL)	SITE CLASS
Rock (excluding mud rocks which exhibit swelling to some depth)	STABLE	NEGLIGIBLE	-	R
Fine-grained soils with moderate to very high plasticity (clays, silty clays, clayey silts and sandy clays)	EXPANSIVE SOILS	< 7,5 7,5 – 15 15 – 30 > 30	50% 50% 50% 50%	H H1 H2 H3
Silty sands, sands, sandy and gravelly soils	COMPRESSIBLE AND POTENTIALLY COLLAPSIBLE SOILS	< 5,0 5,0 – 10 > 10	75% 75% 75%	C C1 C2
Fine-grained soils (clayey silts and clayey sands of low plasticity), sands, sandy and gravelly soils	COMPRESSIBLE SOIL	< 10 10 – 20 > 20	50% 50% 50%	S S1 S2
Contaminated soils Controlled fill Dolomitic areas Land fill Marshy areas Mine waste fill Mining subsidence Reclaimed areas Very soft silt/silty clays Uncontrolled fill	VARIABLE	VARIABLE		P

NOTES:

1. The classifications C, H, R and S are not intended for dolomitic area sites unless specific investigations are carried out to assess the stability (risk of sinkholes and doline formation) of the dolomites. Where this risk is found to be acceptable, the site shall be designated as Class P (dolomitic areas).
2. Site classes are based on the assumption that differential movements, experienced by single-storey residential buildings, expressed as a percentage of the total movements are equal to about 50% for soils that exhibit expansive or compressive characteristics and 75% for soils that exhibit both compressible and collapse characteristics. Where this assumption is incorrect or inappropriate, the total soil movements must be adjusted so that the resultant different movements implied by the table is equal to that which is expected in the field.
3. In some instances, it may be more appropriate to use a composite description to describe a site mote fully e.g. C1/H2 or S1 and/or H2. Composite Site Classes may lead to higher differential movements and result in design solutions appropriate to a higher range of differential movement e.g. a Class R/C1 site. Alternatively, a further site investigation may be necessary since the final design solution may depend on the location of the building on a particular site.
4. Where it is not possible to provide a single site designation and a composite description is inappropriate, sites may be given multiple descriptions to indicate the range of possible conditions e.g. H-H1-H2 or C1-C2.
5. Soft silts and clays usually exhibit high consolidation and low bearing characteristics. Structures founded on these horizons may experience high settlements and such sites should be designated as being Class S1 or S2 as relevant and appropriate.
6. Sites containing contaminated soils include those associated with reclaimed mine land, land down-slope of mine tailings and old land fills.
7. Where a site is designated as Class P, full particulars relating to the founding conditions on the site must be provided.
8. Where sites are designated as being Class P, the reason for such classification shall be placed in brackets immediately after the suffix – i.e. P(contaminated soils). Under certain circumstances, composite description may be more appropriate – e.g. P(dolomite areas)-C1.
9. Certain fills may contain contaminates which present a health risk. The nature of such fill should be evaluated and should be clearly demarcated as such.

Table 5. FOUNDATION DESIGN, BUILDING PROCEDURES AND PRECAUTIONARY MEASURES FOR SINGLE-STOREY RESIDENTIAL BUILDINGS FOUNDED ON HORIZONS SUBJECT TO BOTH CONSOLIDATION AND COLLAPSE SETTLEMENT (SAICE, 1995)

SITE CLASS	ESTIMATED TOTAL SETTLEMENT (mm)	CONSTRUCTION TYPE	FOUNDATION DESIGN AND BUILDING PROCEDURES
C	<5	Normal	- Normal construction (strip footing or slab-on-the-ground foundations) - Good site drainage
C1	5 – 10	Modified normal	- Reinforced strip footings - Articulation joints at some internal and all external doors - Light reinforcement in masonry - Site drainage and service/plumbing precautions - Foundation pressure not to exceed 50 kPa
		Compaction of in situ soils below individual footings	- Remove in situ material below foundations to a depth and width of 1,5 times the foundation width or to a competent horizon and replace with material compacted to 93% MOD AASHTO density at –1% to +2% of optimum moisture content. - Normal construction with lightly reinforced strip foundations and light reinforcement in masonry.
		Deep strip foundations	- Normal construction with drainage requirements. - Founding on a competent horizon below the problem horizon
		Soil raft	- Remove in situ material to 1,0m beyond perimeter of building to a depth and width of 1,5 times the widest foundation or to a competent horizon and replace with material compacted to 93% MOD AASHTO density at –1% to +2% of optimum moisture content. - Normal construction with lightly reinforced strip footings and light reinforcement in masonry.
C2	>10	Stiffened strip footings, stiffened or cellular raft	- Stiffened strip footing or stiffened or cellular raft with articulation joints or solid lightly reinforced masonry. - Bearing pressure not to exceed 50kPa. - Fabric reinforcement in floor slabs. - Site drainage and service/plumbing precautions.
		Deep strip foundations	- As for C1 but with fabric reinforcement in floor slabs
		Compaction of in situ soils below individual footings	- As for C1.
		Piled or pier foundations	- Reinforced concrete ground beams or solid slabs on piled or pier foundations. - Ground slabs with fabric reinforcement. - Good site drainage.
		Soil raft	- As for C1.

NOTES:

1. Differential settlement assumed to equal 75% of total settlement
2. The relaxation of some of these requirements, e.g. the reduction or omission of steel or articulation joints, may result in a Category 2 level of expected damage.

Appendix E:

Drawings

Document prepared by

Aurecon South Africa (Pty) Ltd
Reg No 1977/003711/07

Aurecon Centre
Lynnwood Bridge Office Park
4 Daventry Street
Lynnwood Manor 0081

PO Box 74381
Lynnwood Ridge 0040
South Africa

T +27 12 427 2000
F +27 86 556 0521
E tshwane@aurecongroup.com
W aurecongroup.com

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Angola, Australia, Botswana, China,
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a SANAS Accredited Testing Laboratory, No. T 0239

60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 02.11.2019

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

SAMPLE NO.	10260			
HOLE NO.	TP 03/1-1			
ROAD NO.	N/A			
DEPTH	2400 - 3000mm			
CHAINAGE	TP 03/1-1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Tillite			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm	100			
14.0 mm	95			
5.0 mm	92			
2.0 mm	88			
0.425 mm	76			
0.075 mm	44			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	14			
FINE SAND <0.425mm >0.075mm	36			
MATERIAL <0.075mm	50			
CONSTANTS				
GRADING MODULUS	0,92			
PRA CLASSIFICATION	A-4(2)			
COLTO CLASSIFICATION	---			
TRH Class.(INSITU |93%|90%|)	- | -			
LIQUID LIMIT (%)	30			
PLASTICITY INDEX (0.425mm)	7			
LINEAR SHRINKAGE (%)	3,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	1896			
OPTIMUM MOISTURE CONTENT(%)	11,8			
MOULDING MOISTURE (%)	12,1			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	16			
CBR-UCS @ 98% MOD AASHTO	11			
CBR-UCS @ 97% MOD AASHTO	9,0			
CBR-UCS @ 95% MOD AASHTO	6,2			
CBR-UCS @ 93% MOD AASHTO	3,9			
CBR-UCS @ 90% MOD AASHTO	1,8			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	1,60	2,30	2,50										

Remarks :

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R. Bhikam

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60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

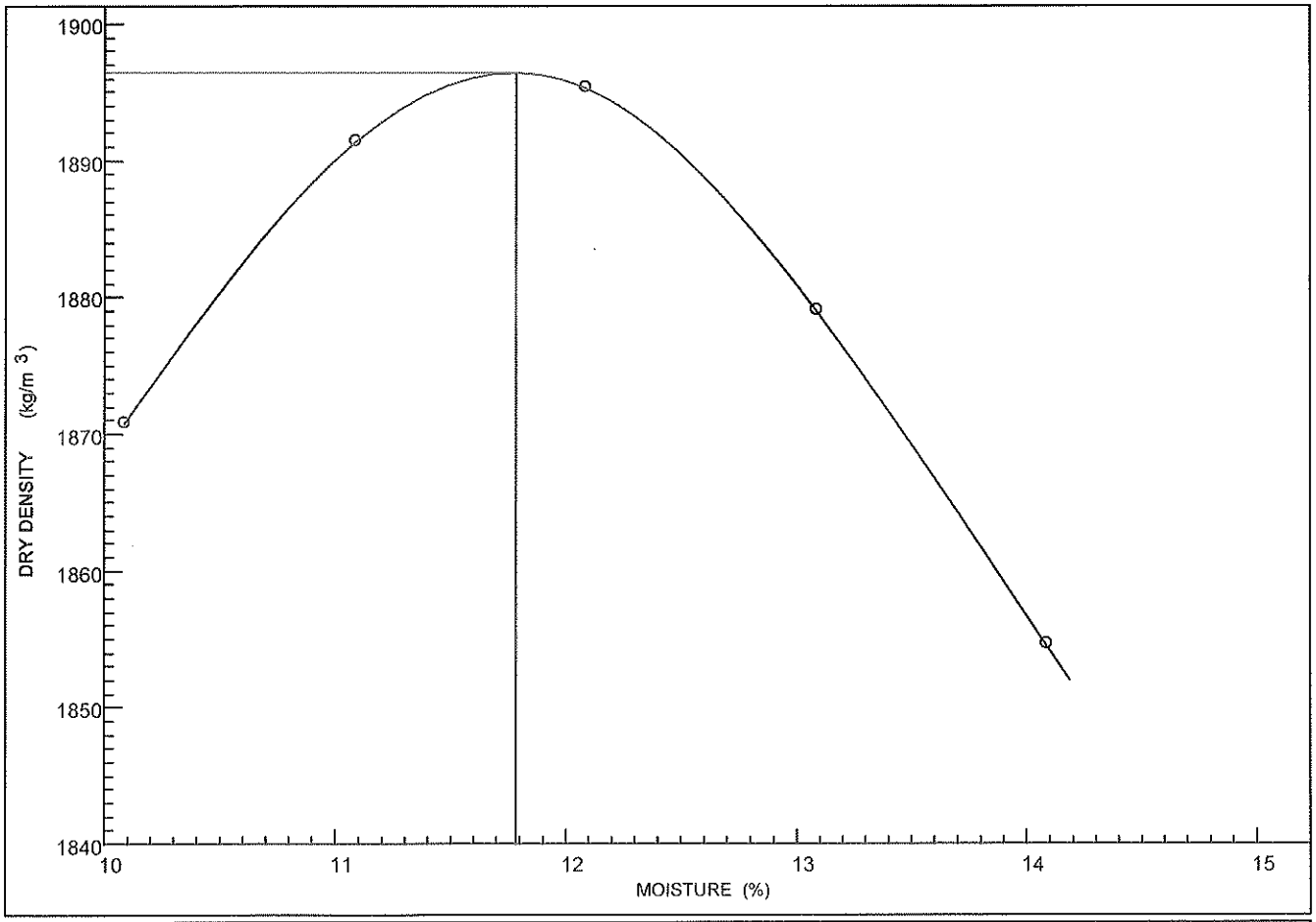
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10260	Hole No. : TP 03/1-1	Depth (mm) : 2400 - 3000mm
Origin : TP 03/1-1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Tillite		

Optimum Moisture Content (%) : 11,8

Maximum Dry Density (kg/m^3): 1896

Point No.	1	2	3	4	5			
Moisture (%)	10,1	11,1	12,1	13,1	14,1			
Density (kg/m^3)	1871	1891	1895	1879	1855			



Remarks :

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a SANAS Accredited Testing Laboratory, No. T 0239

60 Columbine Place, Glen Anil, Durban North, 4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

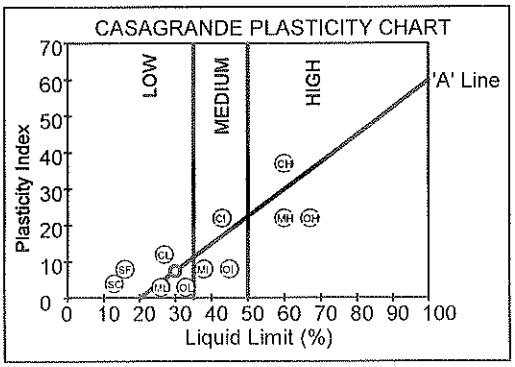
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Our Ref : 7686
Date Reported : 31.10.2019

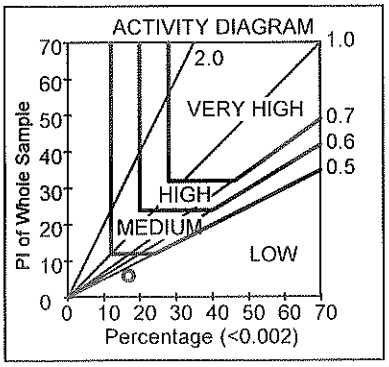
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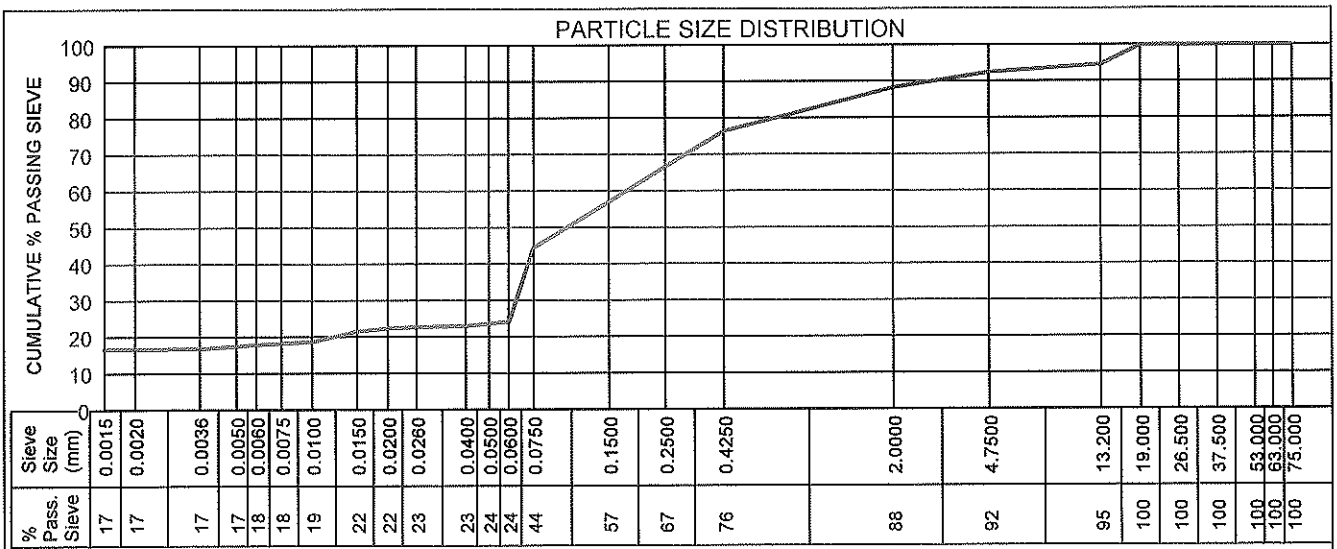
Sample No.	: 10260
Hole No.	: TP 03/1
Depth	: 2400 - 3000mm
Liquid Limit (%)	: 30
Plasticity Index	: 7
Linear Shrinkage (%)	: 3,5
PI of Whole Sample	: 6
P.R.A. Classification	: A-4(2)
Unified Soil Classificati	: SM
Activity	: 0,35
Heave Classification	: LOW
Grading Modulus	: 0,92
Percentage (<0.002)	: 17,0
Moisture Content (%)	: 7,8

Material Description : (Tillite) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	17,5	6,1	64,7	11,6	SILTY SAND
Astm	17,5	27,0	48,0	7,5	SILTY SAND
British Standard	16,7	7,5	64,1	11,6	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	17	17	17	17	18	18	19	22	22	23	23	24	24	44	57	67	76	88	92	95	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL	
ASTM	CLAY		SILT		FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

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a SANAS Accredited Testing Laboratory, No. T 0239

60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/B
Date Reported : 02.11.2019

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

SAMPLE NO.	10261			
HOLE NO.	TP 09/1-1			
ROAD NO.	N/A			
DEPTH	600 - 1100mm			
CHAINAGE	TP 09/1-1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Colluvium			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm	100			
14.0 mm	95			
5.0 mm	81			
2.0 mm	65			
0.425 mm	56			
0.075 mm	38			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	14			
FINE SAND <0.425mm >0.075mm	28			
MATERIAL <0.075mm	58			
CONSTANTS				
GRADING MODULUS	1,41			
PRA CLASSIFICATION	A-4(1)			
COLTO CLASSIFICATION	G9			
TRH Class.(INSITU |93%|90%|)	G9|G10			
LIQUID LIMIT (%)	27			
PLASTICITY INDEX (0.425mm)	5			
LINEAR SHRINKAGE (%)	2,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2015			
OPTIMUM MOISTURE CONTENT(%)	10,4			
MOULDING MOISTURE (%)	10,3			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	18			
CBR-UCS @ 98% MOD AASHTO	16			
CBR-UCS @ 97% MOD AASHTO	15			
CBR-UCS @ 95% MOD AASHTO	14			
CBR-UCS @ 93% MOD AASHTO	9,8			
CBR-UCS @ 90% MOD AASHTO	6,0			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,20	0,40										

Remarks :

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60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 02.11.2019

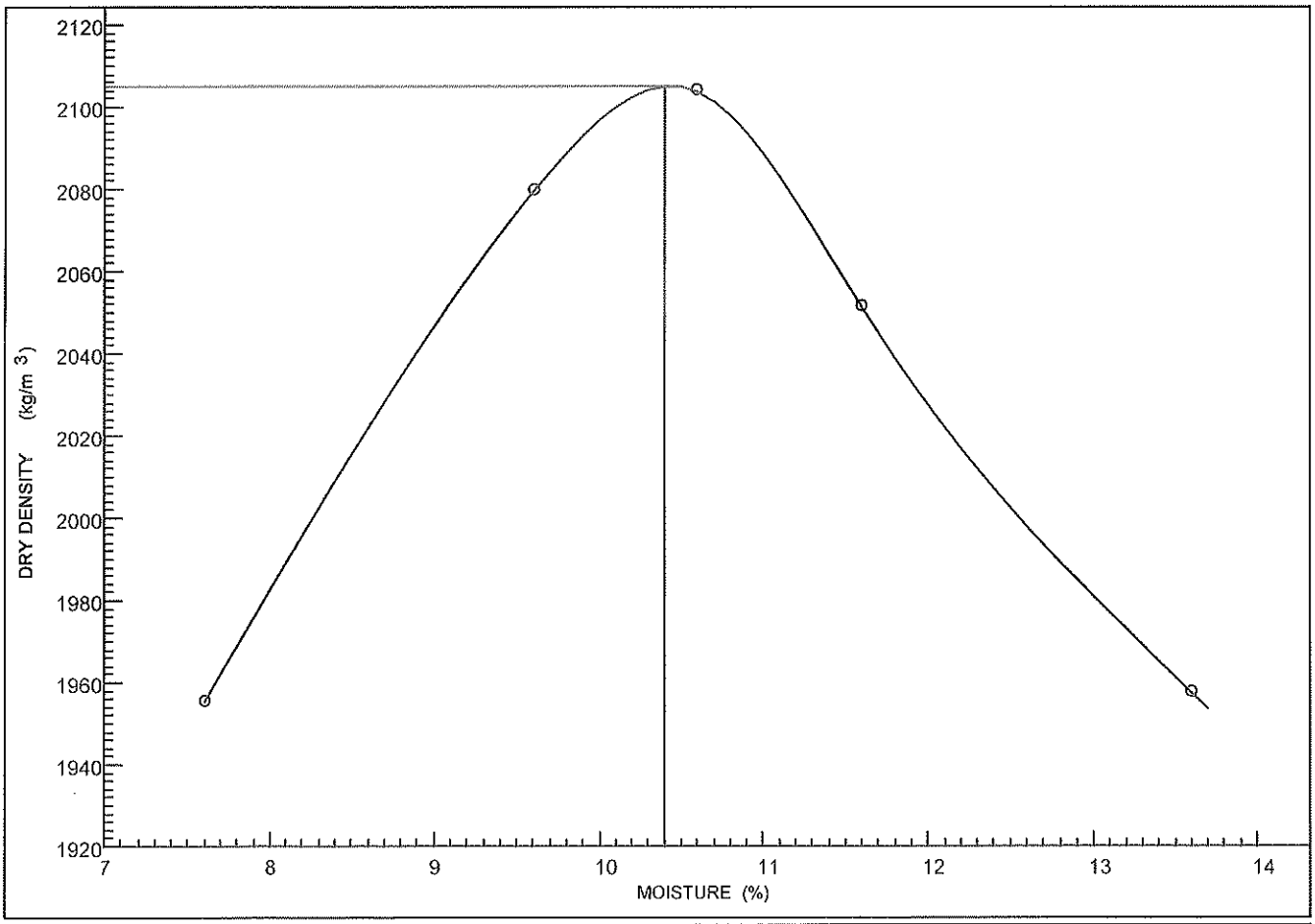
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10261	Hole No. : TP 09/1-1	Depth (mm) : 600 - 1100mm
Origin : TP 09/1-1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Colluvium		

Optimum Moisture Content (%) : 10,4

Maximum Dry Density (kg/m^3): 2105

Point No.	1	2	3	4	5			
Moisture (%)	7,6	9,6	10,6	11,6	13,6			
Density (kg/m^3)	1955	2080	2104	2051	1958			



Remarks :

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60 Columbine Place, Glen Anil, Durban North, 4051

Tel. : (031) 579 1220/1
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Aurecon SA
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Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

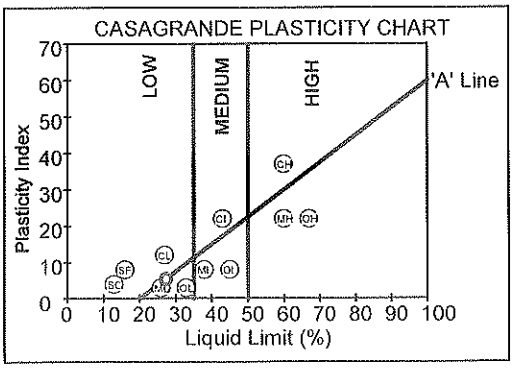
Your Ref : 505788
Our Ref : 7686
Date Reported : 11.11.2019

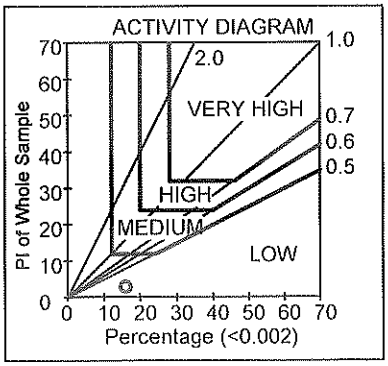
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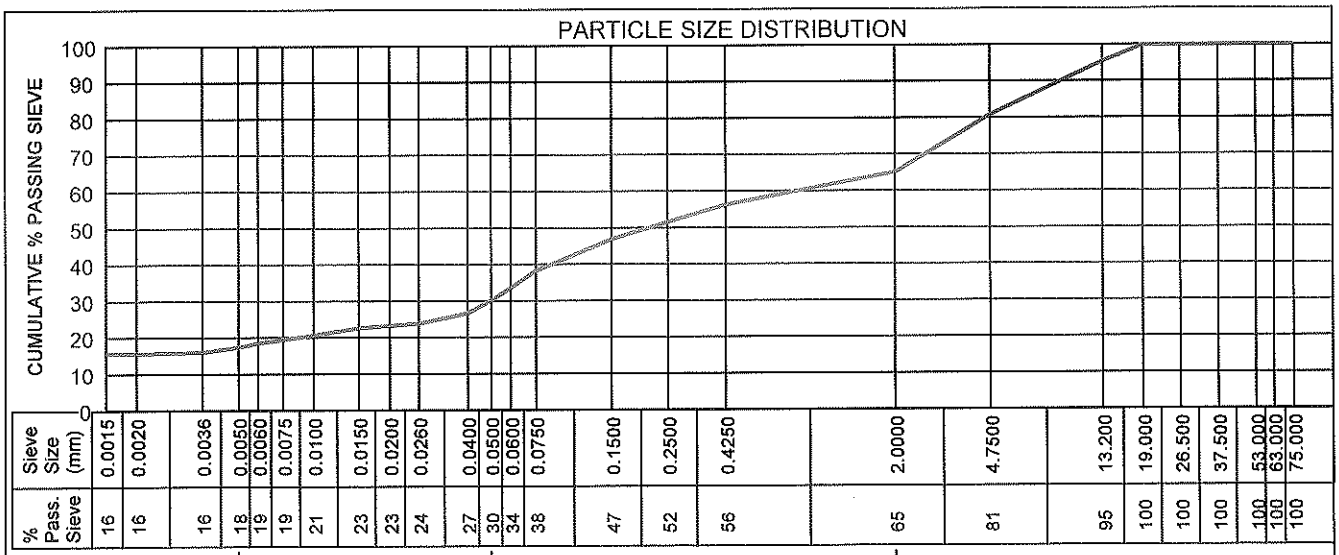
Sample No.	: 10261
Hole No.	: TP 09/1-1
Depth	: 600 - 1100mm
Liquid Limit (%)	: 27
Plasticity Index	: 5
Linear Shrinkage (%)	: 2,5
PI of Whole Sample	: 3
P.R.A. Classification	: A-4(1)
Unified Soil Classificati	: SM
Activity	: 0,19
Heave Classification	: LOW
Grading Modulus	: 1,41
Percentage (<0.002)	: 16,0
Moisture Content (%)	: 7,5

Material Description : (Colluvium) CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	17,5	12,6	35,1	34,8	CLAYEY SAND
Astm	17,5	20,7	42,6	19,2	CLAYEY SAND
British Standard	15,7	18,0	31,6	34,8	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	16	16	16	18	19	19	21	23	23	24	27	30	34	38	47	52	56	65	81	95	100	100	100	100	100	100

JENN	CLAY		SILT			SAND				GRAVEL	
ASTM	CLAY		SILT			FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL	

Remarks :

FORM: A6

A & R. Bhikam

Technical Signatory : Rasalis Bhikam

4.4.0(SGS)(2016.08.31)

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

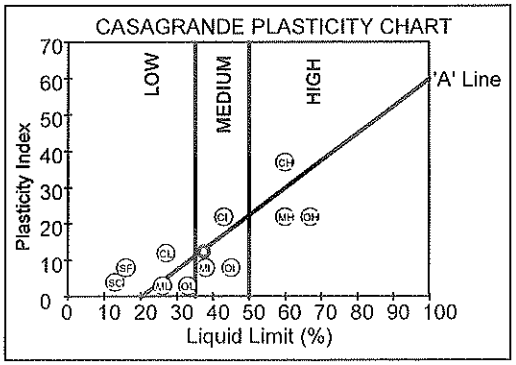
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

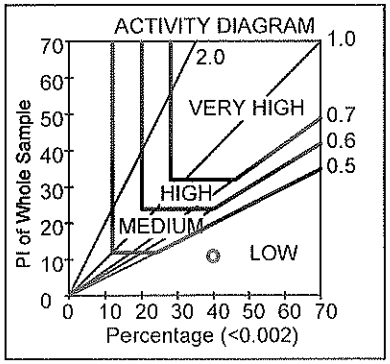
FOUNDATION INDICATOR (ASTM: D422)

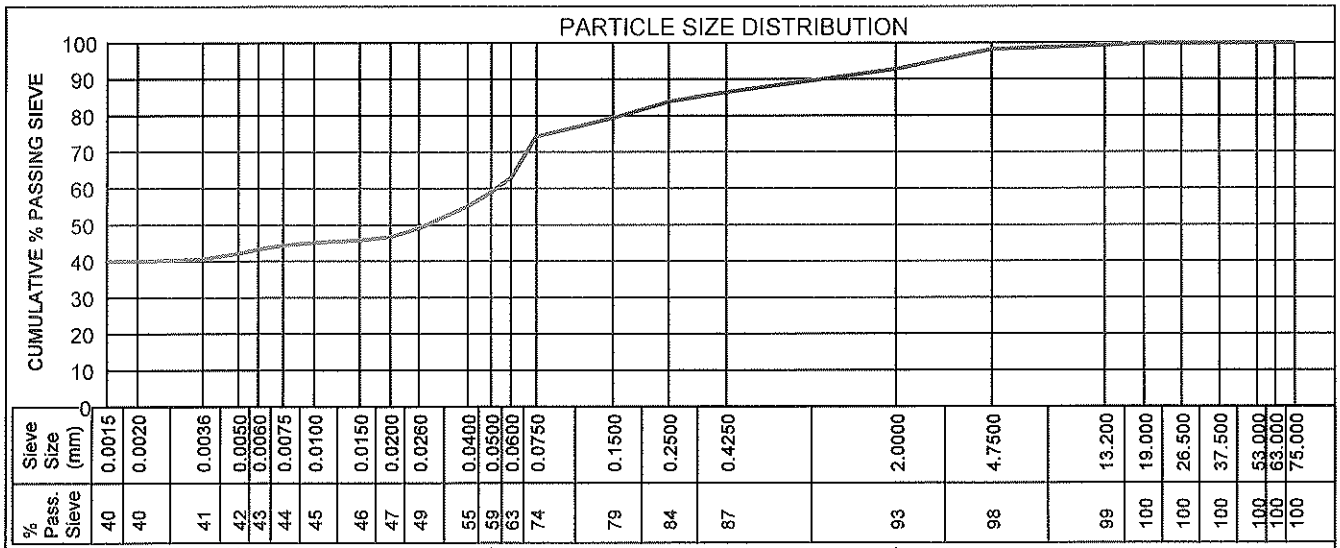
Sample No.	: 10262
Hole No.	: TP 13/1
Depth	: 1100 - 2300mm
Liquid Limit (%)	: 37
Plasticity Index	: 13
Linear Shrinkage (%)	: 6,5
PI of Whole Sample	: 11
P.R.A. Classification	: A-6(9)
Unified Soil Classificati:	ML
Activity	: 0,28
Heave Classification	: LOW
Grading Modulus	: 0,46
Percentage (<0.002)	: 40,0
Moisture Content (%)	: 20,6

Material Description : (Residual Tillite) SILTY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	42,2	16,9	33,8	7,0	SANDY CLAY
Astm	42,2	32,2	23,9	1,7	SILTY CLAY
British Standard	40,0	23,1	29,8	7,0	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	40	40	41	42	43	44	45	46	47	49	55	59	63	74	79	84	87	93	98	99	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL	

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

A B R. Bhikam

Technical Signatory : Rasalis Bhikam

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Fax : (031) 579 1344
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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

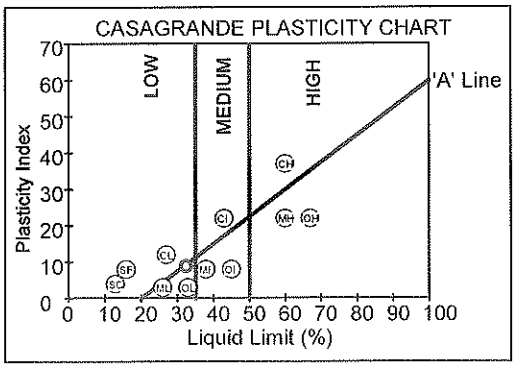
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

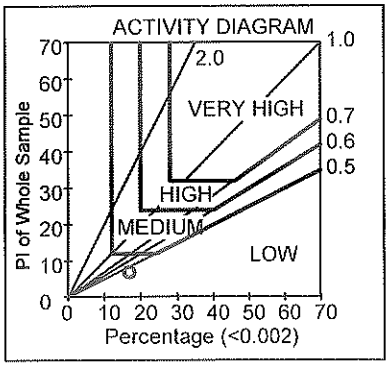
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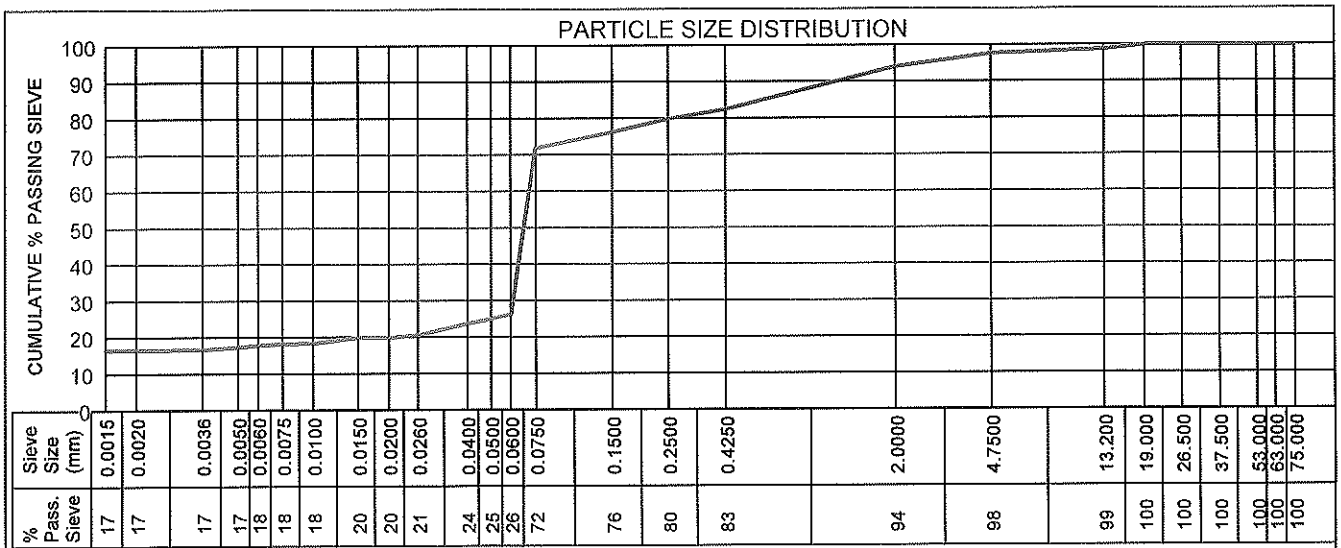
Sample No.	: 10263
Hole No.	: TP 15/1
Depth	: 1500 - 2000mm
Liquid Limit (%)	: 32
Plasticity Index	: 9
Linear Shrinkage (%)	: 4,5
PI of Whole Sample	: 7
P.R.A. Classification	: A-4(7)
Unified Soil Classificati	: ML
Activity	: 0,41
Heave Classification	: LOW
Grading Modulus	: 0,51
Percentage (<0.002)	: 17,0
Moisture Content (%)	: 12,2

Material Description : (Tillite) SANDY SILT

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	17,4	7,6	69,1	5,9	SILTY SAND
Astm	17,4	54,5	25,8	2,3	SANDY SILT
British Standard	16,6	9,7	67,8	5,9	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	17	17	17	17	18	18	18	20	20	21	24	25	26	72	76	80	83	94	98	99	100	100	100	100	100	100

JENN	CLAY	SILT	SAND	GRAVEL

ASTM	CLAY	SILT	FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL

BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

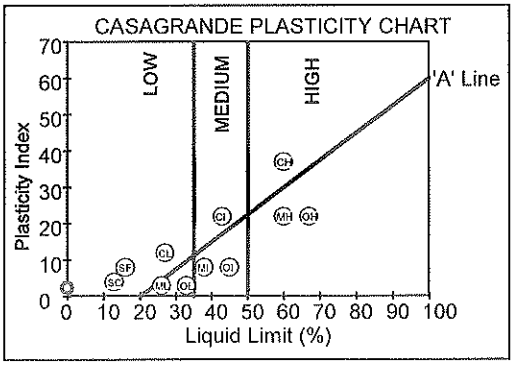
Your Ref : 505788
Our Ref : 7686
Date Reported : 01.11.2019

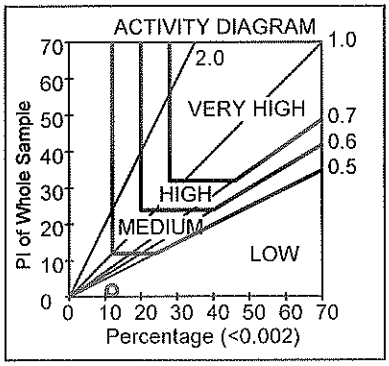
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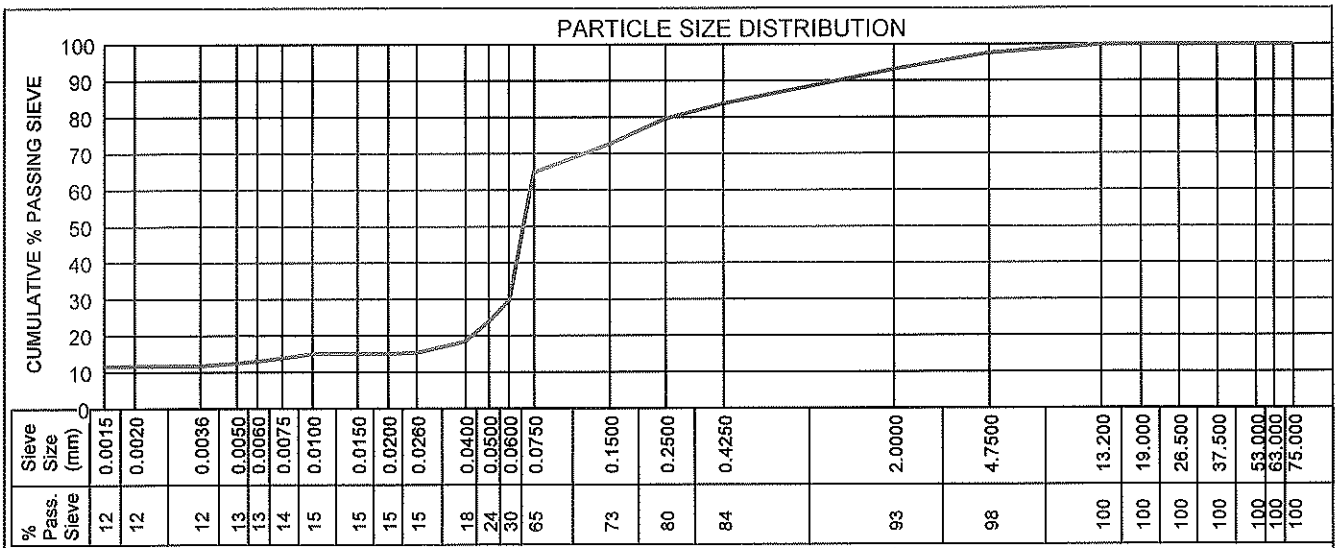
Sample No.	: 10264
Hole No.	: TP 16/1
Depth	: 0 - 400mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,5
PI of Whole Sample	: 2
P.R.A. Classification	: A-4(6)
Unified Soil Classificati:	CL
Activity	: 0,17
Heave Classification	: LOW
Grading Modulus	: 0,58
Percentage (<0.002)	: 12,0
Moisture Content (%)	: 7,5

Material Description : (Alluvium) SANDY SILT

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	12,6	11,5	69,2	6,7	SILTY SAND
Astm	12,6	52,4	32,8	2,3	SANDY SILT
British Standard	11,8	17,9	63,6	6,7	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	12	12	12	13	13	14	15	15	15	15	18	24	30	65	73	80	84	93	98	100	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT		FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

A B R. Bhikam

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/C
Date Reported : 02.11.2019

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

SAMPLE NO.	10265			
HOLE NO.	TP 19/1-1			
ROAD NO.	N/A			
DEPTH	400 - 600mm			
CHAINAGE	TP 19/1-1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Ferricrete			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm	100			
20.0 mm	93			
14.0 mm	93			
5.0 mm	83			
2.0 mm	50			
0.425 mm	42			
0.075 mm	25			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	16			
FINE SAND <0.425mm >0.075mm	34			
MATERIAL <0.075mm	50			
CONSTANTS				
GRADING MODULUS	1,83			
PRA CLASSIFICATION	A-1-b(0)			
COLTO CLASSIFICATION	G6			
TRH CLASSIFICATION	G7			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	SP			
LINEAR SHRINKAGE (%)	0,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2235			
OPTIMUM MOISTURE CONTENT(%)	8,7			
MOULDING MOISTURE (%)	8,4			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	44			
CBR-UCS @ 98% MOD AASHTO	35			
CBR-UCS @ 97% MOD AASHTO	32			
CBR-UCS @ 95% MOD AASHTO	25			
CBR-UCS @ 93% MOD AASHTO	19			
CBR-UCS @ 90% MOD AASHTO	13			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,10	0,10										

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

A B R. Bhikam

Technical Signatory : Rasalis Bhikam

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 02.11.2019

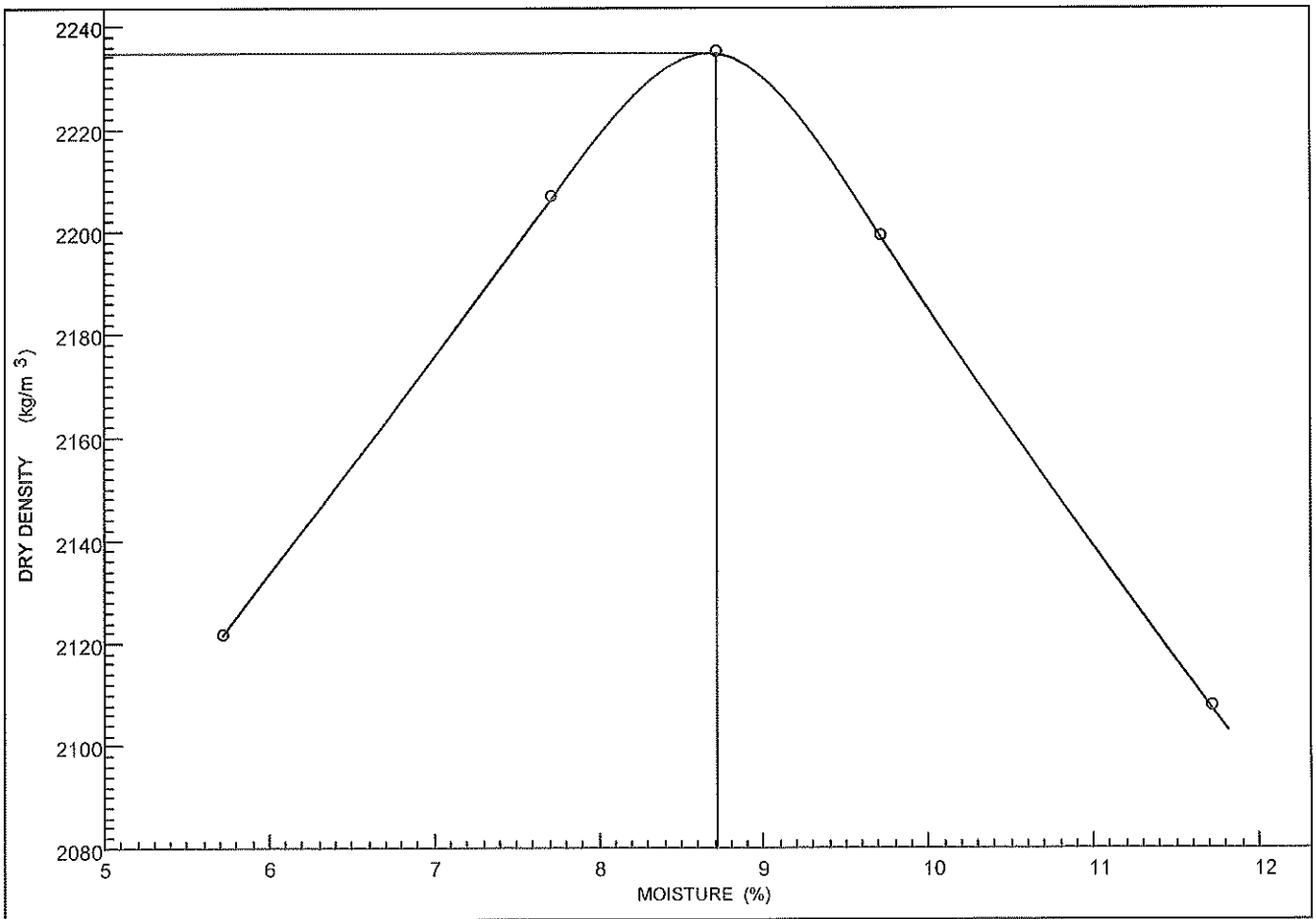
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10265	Hole No. : TP 19/1-1	Depth (mm) : 400 - 600mm
Origin : TP 19/1-1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Ferricrete		

Optimum Moisture Content (%) : 8,7

Maximum Dry Density (kg/m^3): 2235

Point No.	1	2	3	4	5			
Moisture (%)	5,7	7,7	8,7	9,7	11,7			
Density (kg/m^3)	2122	2207	2235	2199	2107			



Remarks :

FORM: A7

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TEST RESULTS

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Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

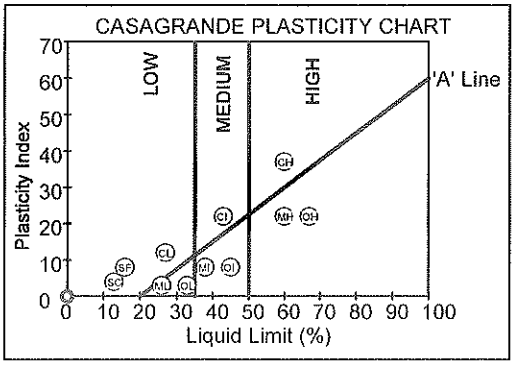
Your Ref : 505788
Our Ref : 7686
Date Reported : 11.11.2019

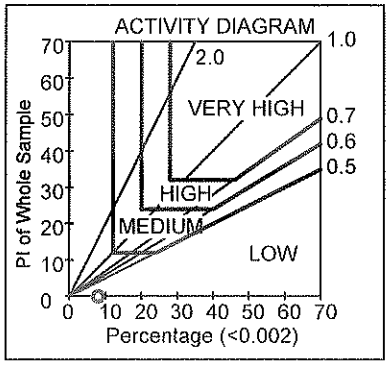
FOUNDATION INDICATOR (ASTM: D422)

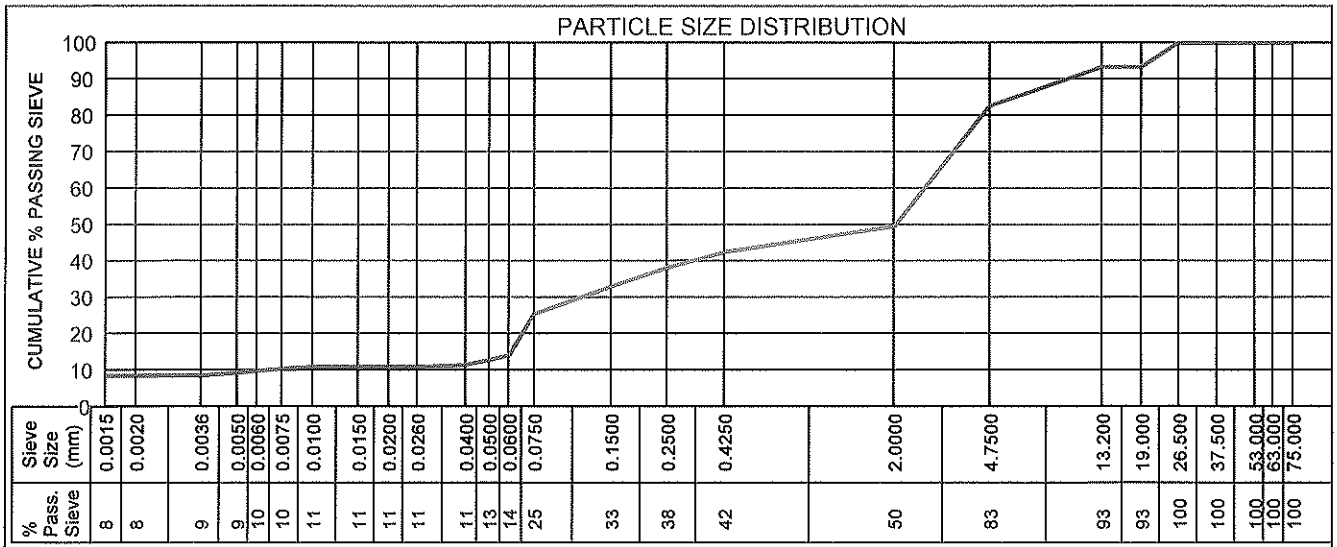
Sample No.	: 10265
Hole No.	: TP 19/1-1
Depth	: 400 - 600mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 0,5
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-b(0)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 1,83
Percentage (<0.002)	: 8,0
Moisture Content (%)	: 5,8

Material Description : (Ferricrete) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	9,2	3,5	36,8	50,5	SILTY SAND
Astm	9,2	16,1	57,3	17,4	SILTY SAND
British Standard	8,4	5,7	35,4	50,5	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	8	8	9	9	10	10	11	11	11	11	11	13	14	25	33	38	42	50	83	93	93	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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A B. Bhikam

Technical Signatory : Rasalis Bhikam

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Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587
a SANAS Accredited Testing Laboratory, No. T 0239

60 Columbine Place, Glen Anil, Durban North, 4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

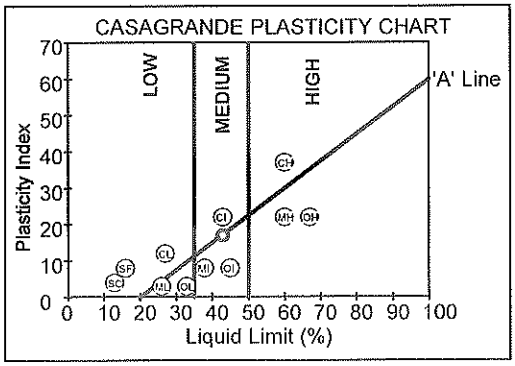
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Our Ref : 7686
Date Reported : 01.11.2019

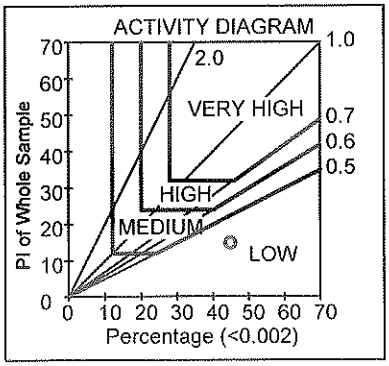
FOUNDATION INDICATOR (ASTM: D422)

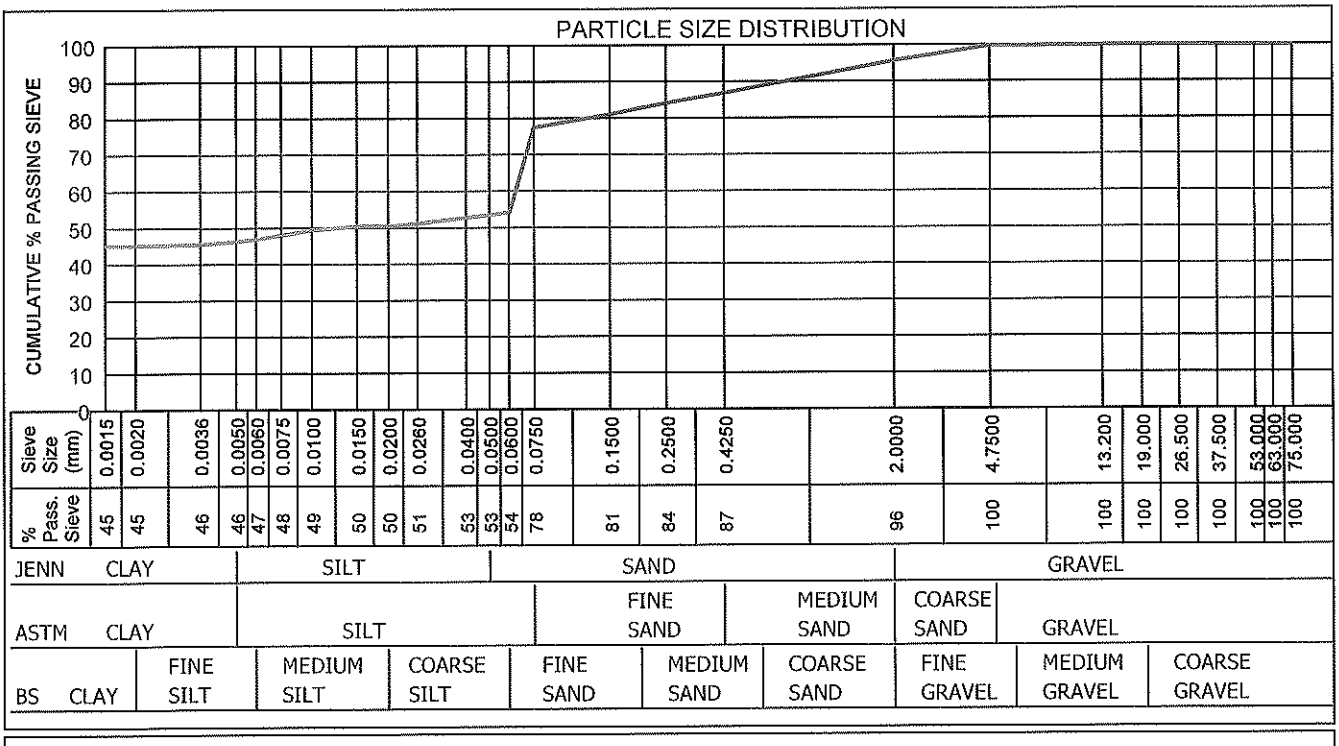
Sample No.	: 10266
Hole No.	: TP 22/1
Depth	: 1000 - 3100mm
Liquid Limit (%)	: 43
Plasticity Index	: 17
Linear Shrinkage (%)	: 8,5
PI of Whole Sample	: 15
P.R.A. Classification	: A-7-6(11)
Unified Soil Classificati	: ML
Activity	: 0,33
Heave Classification	: LOW
Grading Modulus	: 0,39
Percentage (<0.002)	: 45,0
Moisture Content (%)	: 25,0

Material Description : (Tillite) SILTY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	46,4	7,1	42,3	4,2	SANDY CLAY
Astm	46,4	31,1	22,3	0,2	SILTY CLAY
British Standard	45,2	9,0	41,5	4,2	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	45	45	46	46	47	48	49	50	50	51	53	53	54	78	81	84	87	96	100	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

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Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

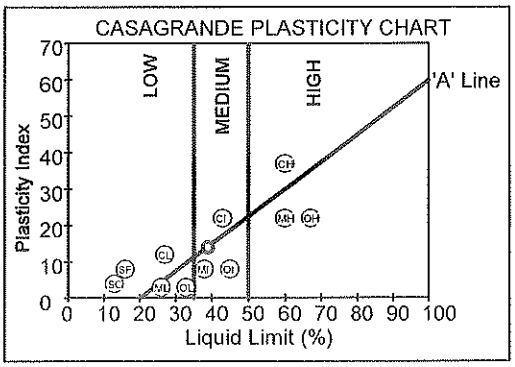
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

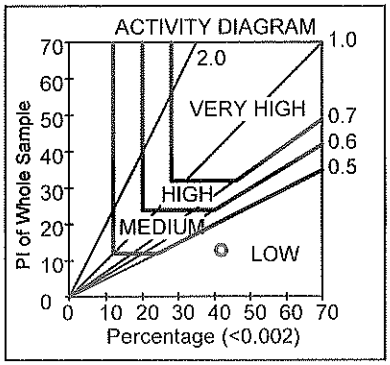
FOUNDATION INDICATOR (ASTM: D422)

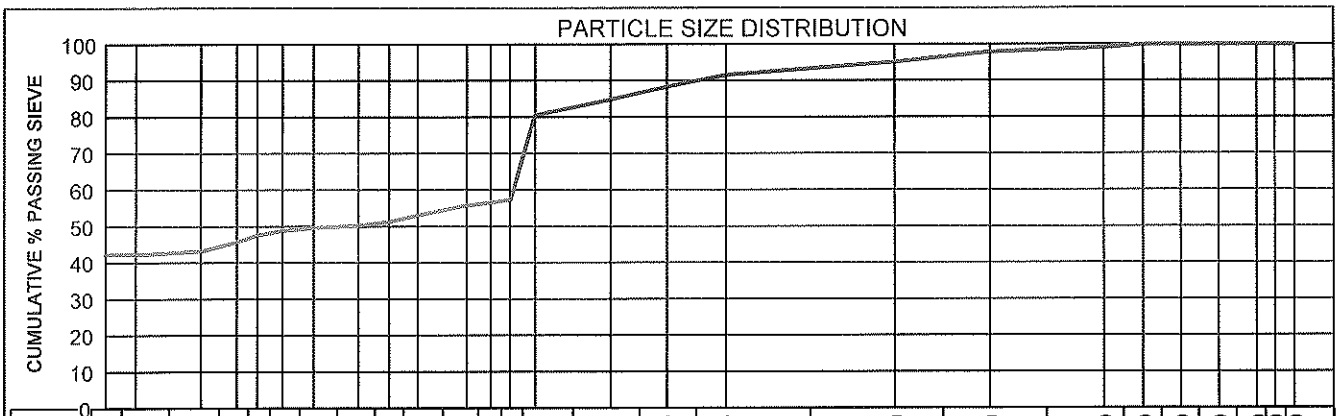
Sample No.	: 10267
Hole No.	: TP 28/1
Depth	: 2500 - 3100mm
Liquid Limit (%)	: 39
Plasticity Index	: 14
Linear Shrinkage (%)	: 7,0
PI of Whole Sample	: 13
P.R.A. Classification	: A-6(10)
Unified Soil Classificati	: ML
Activity	: 0,31
Heave Classification	: LOW
Grading Modulus	: 0,32
Percentage (<0.002)	: 42,0
Moisture Content (%)	: 20,9

Material Description : (Residual Tillite) SILTY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	45,8	10,7	38,7	4,7	SANDY CLAY
Astm	45,8	34,7	17,3	2,1	SILTY CLAY
British Standard	42,3	15,0	37,9	4,7	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	42	42	43	46	48	49	50	50	51	53	56	57	57	81	85	88	92	95	98	99	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL	
ASTM	CLAY		SILT		FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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TEST RESULTS

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Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

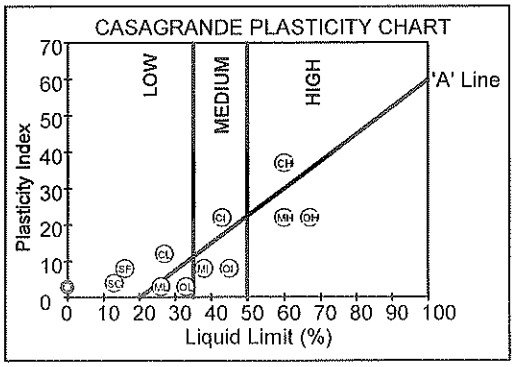
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

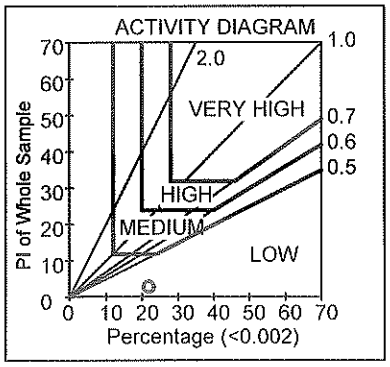
FOUNDATION INDICATOR (ASTM: D422)

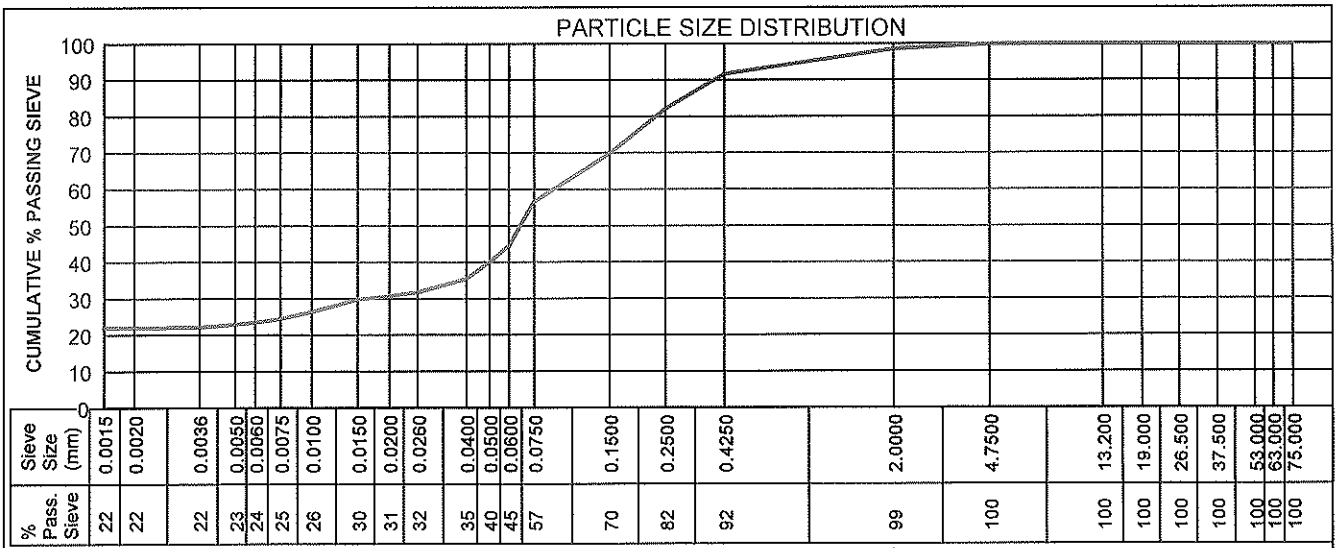
Sample No.	: 10268
Hole No.	: TP 32/1
Depth	: 400 - 1000mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,5
PI of Whole Sample	: 3
P.R.A. Classification	: A-4(4)
Unified Soil Classificati	: CL
Activity	: 0,14
Heave Classification	: LOW
Grading Modulus	: 0,52
Percentage (<0.002)	: 22,0
Moisture Content (%)	: 3,1

Material Description : (Alluvium) CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	23,0	17,0	58,6	1,4	CLAYEY SAND
Astm	23,0	33,6	43,4	0,0	CLAYEY SAND
British Standard	22,1	22,6	53,9	1,4	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	22	22	22	23	24	25	26	30	31	32	35	40	45	57	70	82	92	99	100	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/D Date Reported : 02.11.2019

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

SAMPLE NO.	10269			
HOLE NO.	TP 39/1			
ROAD NO.	N/A			
DEPTH	700 - 2300mm			
CHAINAGE	TP 39/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Residual Tillite			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm	100			
28.0 mm	90			
20.0 mm	90			
14.0 mm	84			
5.0 mm	57			
2.0 mm	35			
0.425 mm	28			
0.075 mm	18			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	20			
FINE SAND <0.425mm >0.075mm	29			
MATERIAL <0.075mm	51			
CONSTANTS				
GRADING MODULUS	2,19			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	G6			
TRH CLASSIFICATION	G7			
LIQUID LIMIT (%)	32			
PLASTICITY INDEX (0.425mm)	8			
LINEAR SHRINKAGE (%)	4,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2108			
OPTIMUM MOISTURE CONTENT(%)	11,7			
MOULDING MOISTURE (%)	11,4			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	49			
CBR-UCS @ 98% MOD AASHTO	40			
CBR-UCS @ 97% MOD AASHTO	37			
CBR-UCS @ 95% MOD AASHTO	30			
CBR-UCS @ 93% MOD AASHTO	24			
CBR-UCS @ 90% MOD AASHTO	18			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,10	0,20									

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

A. B. Bhikam

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 02.11.2019

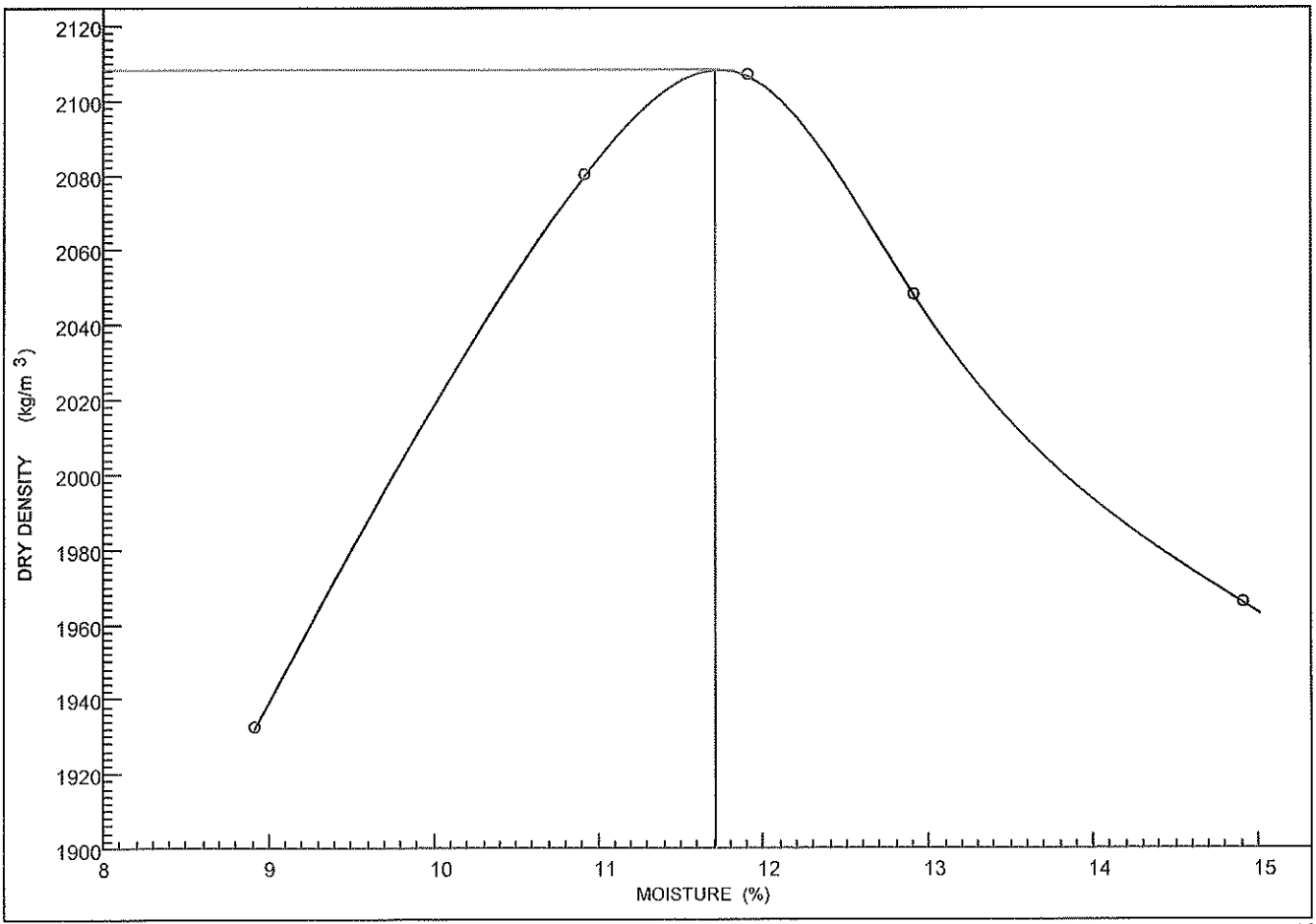
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10269	Hole No. : TP 39/1	Depth (mm) : 700 - 2300mm
Origin : TP 39/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Residual Tillite		

Optimum Moisture Content (%) : 11,7

Maximum Dry Density (kg/m^3): 2108

Point No.	1	2	3	4	5			
Moisture (%)	8,9	10,9	11,9	12,9	14,9			
Density (kg/m^3)	1932	2080	2107	2048	1966			



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

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Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

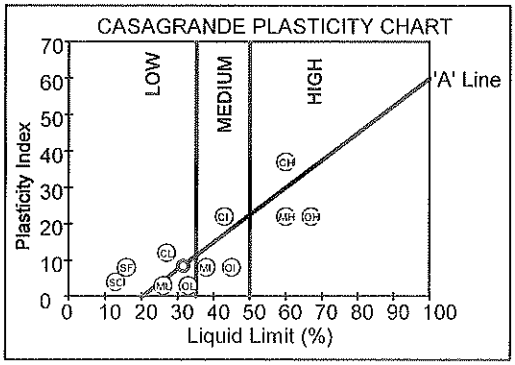
Your Ref : 505788
Our Ref : 7686
Date Reported : 11.11.2019

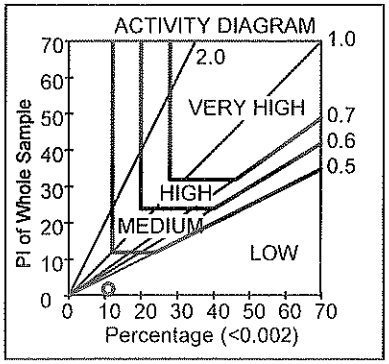
FOUNDATION INDICATOR (ASTM: D422)

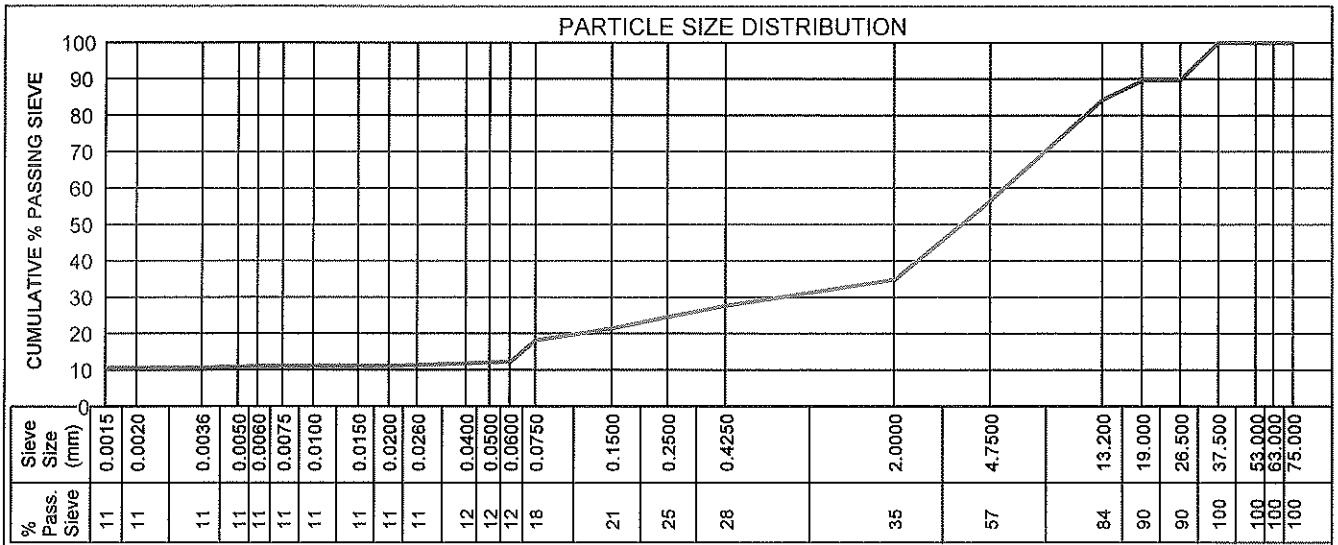
Sample No.	: 10269
Hole No.	: TP 39/1
Depth	: 700 - 2300mm
Liquid Limit (%)	: 32
Plasticity Index	: 8
Linear Shrinkage (%)	: 4,0
PI of Whole Sample	: 2
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SM
Activity	: 0,18
Heave Classification	: LOW
Grading Modulus	: 2,19
Percentage (<0.002)	: 11,0
Moisture Content (%)	: 7,8

Material Description : (Residual Tillite) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	11,0	1,1	22,8	65,1	SANDY CLAY
Astm	11,0	7,2	38,4	43,4	SILTY SAND
British Standard	10,6	1,7	22,5	65,1	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	11	11	11	11	11	11	11	11	11	11	12	12	12	18	21	25	28	35	57	84	90	90	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

A B O. Bhikam

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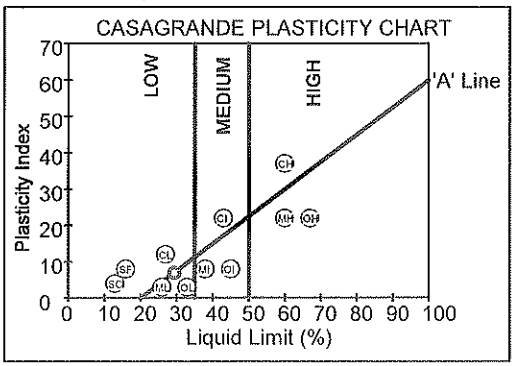
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

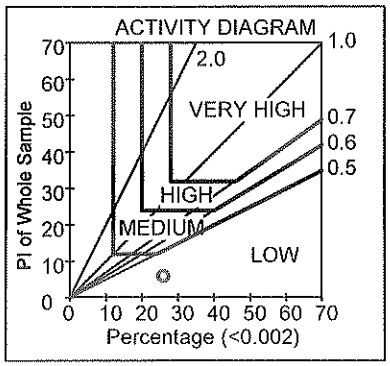
FOUNDATION INDICATOR (ASTM: D422)

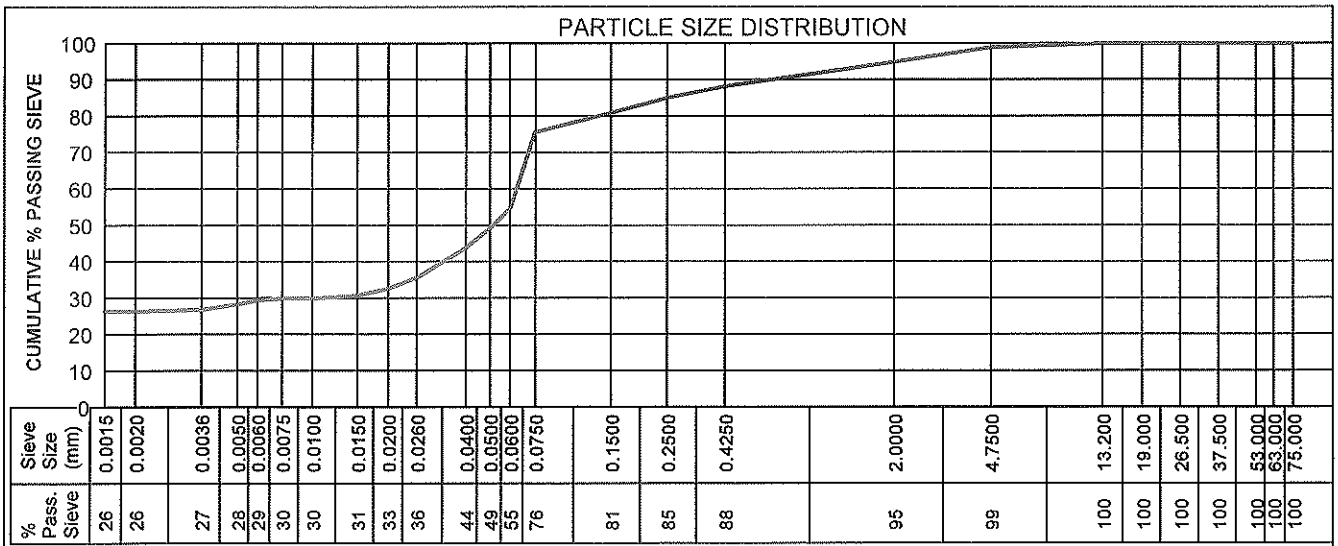
Sample No.	: 10270
Hole No.	: TP 42/1-2
Depth	: 2700 - 3100mm
Liquid Limit (%)	: 30
Plasticity Index	: 7
Linear Shrinkage (%)	: 3,5
PI of Whole Sample	: 6
P.R.A. Classification	: A-4(8)
Unified Soil Classificati:	ML
Activity	: 0,23
Heave Classification	: LOW
Grading Modulus	: 0,41
Percentage (<0.002)	: 26,0
Moisture Content (%)	: 25,8

Material Description : (Residual Tillite) CLAYEY SILT

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	28,3	20,9	45,7	5,1	CLAYEY SAND
Astm	28,3	47,3	23,3	1,1	CLAYEY SILT
British Standard	26,4	28,4	40,2	5,1	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	26	26	27	28	29	30	30	31	33	36	44	49	55	76	81	85	88	95	99	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL			
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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60 Columbine Place, Glen Anil, Durban North, 4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

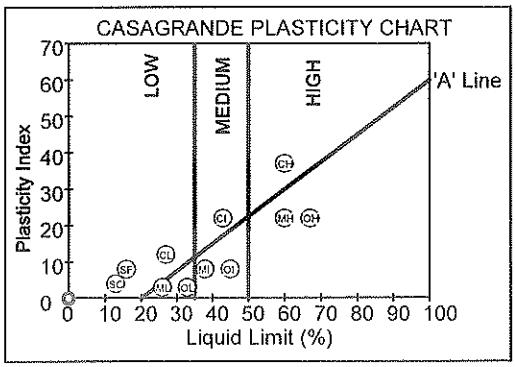
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

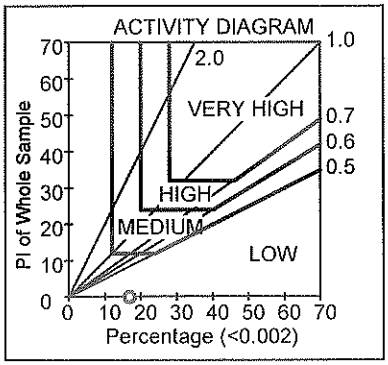
FOUNDATION INDICATOR (ASTM: D422)

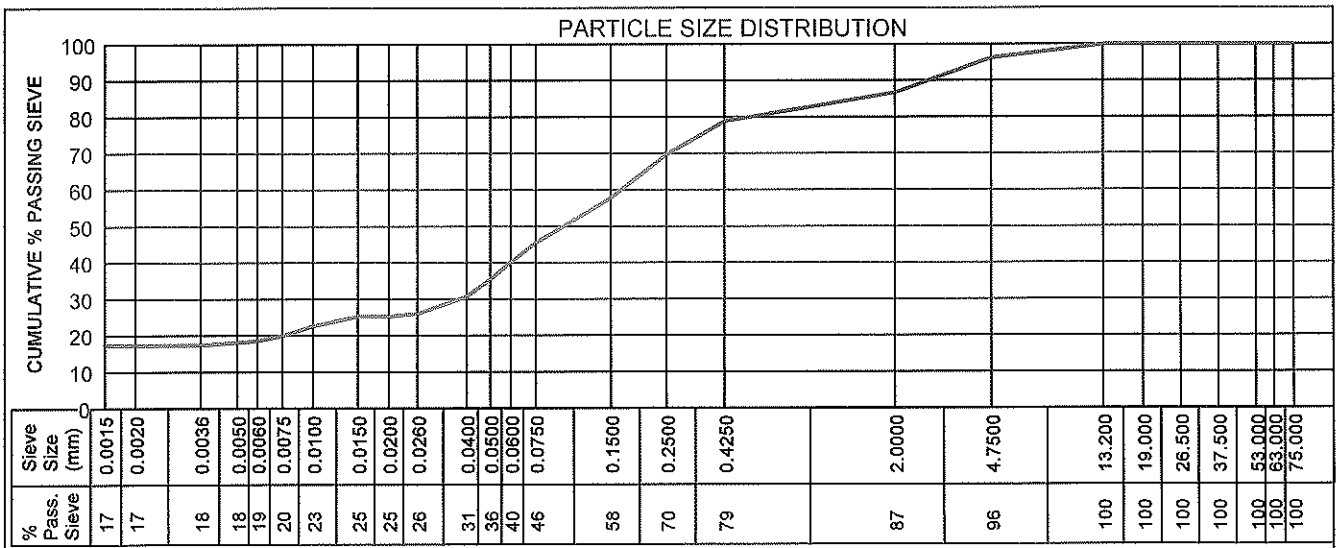
Sample No.	: 10271
Hole No.	: TP48/1
Depth	: 0 - 600mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-4(2)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 0,88
Percentage (<0.002)	: 17,0
Moisture Content (%)	: 4,4

Material Description : (Colluvium) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	18,2	17,3	51,2	13,3	CLAYEY SAND
Astm	18,2	27,3	50,8	3,7	SILTY SAND
British Standard	17,4	22,9	46,5	13,3	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	17	17	18	18	19	20	23	25	25	26	31	36	40	46	58	70	79	87	96	100	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL	
ASTM	CLAY		SILT		FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

A B. Bhikam

Technical Signatory : Rasalis Bhikam

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

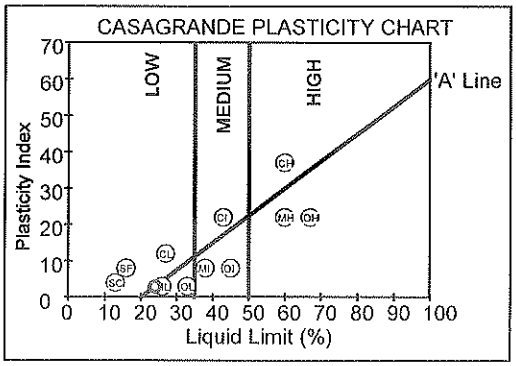
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

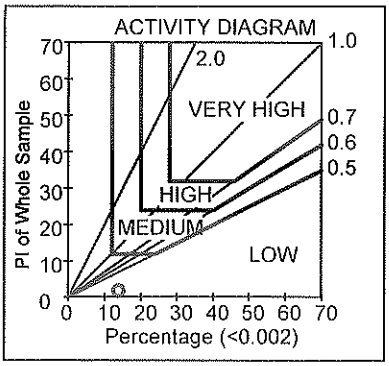
FOUNDATION INDICATOR (ASTM: D422)

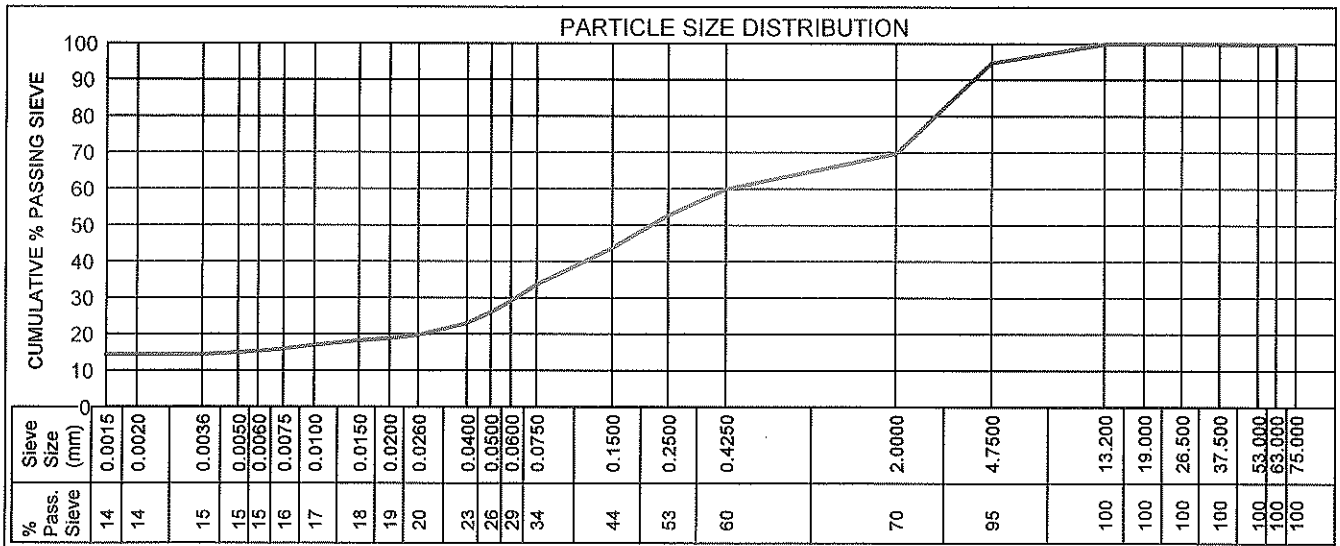
Sample No.	: 10272
Hole No.	: TP 58/1
Depth	: 0 - 400mm
Liquid Limit (%)	: 24
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,5
PI of Whole Sample	: 2
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SM
Activity	: 0,14
Heave Classification	: LOW
Grading Modulus	: 1,36
Percentage (<0.002)	: 14,0
Moisture Content (%)	: 26,0

Material Description : Hillwash SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	15,0	11,1	43,8	30,1	CLAYEY SAND
Astm	15,0	18,6	61,2	5,2	SILTY SAND
British Standard	14,4	14,7	40,7	30,1	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	14	14	15	15	15	16	17	18	19	20	23	26	29	34	44	53	60	70	95	100	100	100	100	100	100	100

JENN	CLAY	SILT		SAND			GRAVEL			
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

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60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/E Date Reported : 02.11.2019

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

SAMPLE NO.	10273			
HOLE NO.	TP 61/1			
ROAD NO.	N/A			
DEPTH	900 - 2000mm			
CHAINAGE	TP 61/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Ferricrete			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm				
14.0 mm	100			
5.0 mm	91			
2.0 mm	67			
0.425 mm	55			
0.075 mm	40			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	18			
FINE SAND <0.425mm >0.075mm	22			
MATERIAL <0.075mm	60			
CONSTANTS				
GRADING MODULUS	1,38			
PRA CLASSIFICATION	A-4(1)			
COLTO CLASSIFICATION	G9			
TRH Class.(INSITU |93%|90%|)	G9|G10			
LIQUID LIMIT (%)	33			
PLASTICITY INDEX (0.425mm)	9			
LINEAR SHRINKAGE (%)	4,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2023			
OPTIMUM MOISTURE CONTENT(%)	12,5			
MOULDING MOISTURE (%)	12,3			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	17			
CBR-UCS @ 98% MOD AASHTO	14			
CBR-UCS @ 97% MOD AASHTO	13			
CBR-UCS @ 95% MOD AASHTO	10			
CBR-UCS @ 93% MOD AASHTO	8,0			
CBR-UCS @ 90% MOD AASHTO	5,4			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,30	0,40	0,50										

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

A S R Bhikam

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

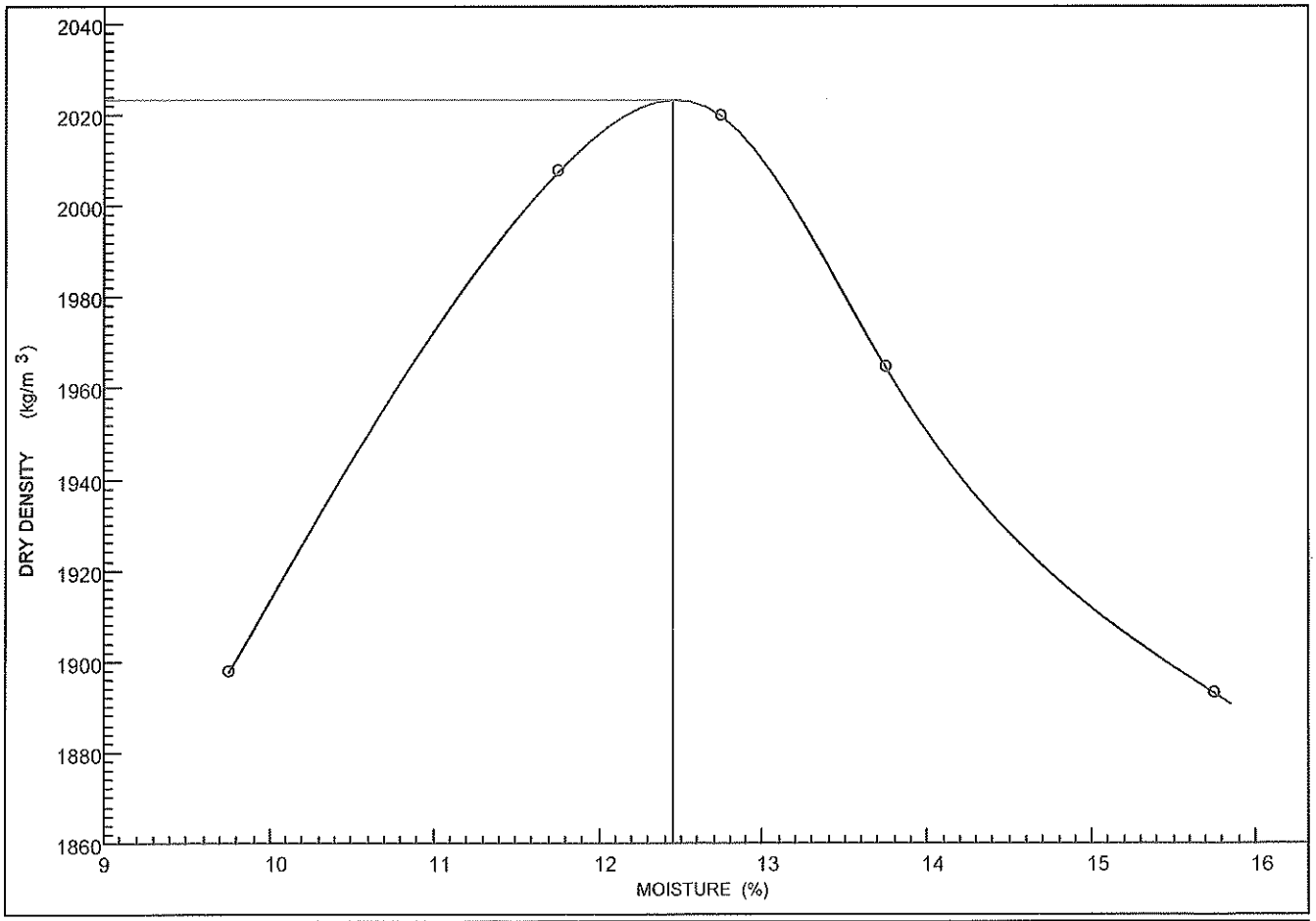
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10273	Hole No. : TP 61/1	Depth (mm) : 900 - 2000mm
Origin : TP 61/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Ferricrete		

Optimum Moisture Content (%) : 12,5

Maximum Dry Density (kg/m^3): 2023

Point No.	1	2	3	4	5			
Moisture (%)	9,8	11,8	12,8	13,8	15,8			
Density (kg/m^3)	1898	2007	2020	1964	1893			



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

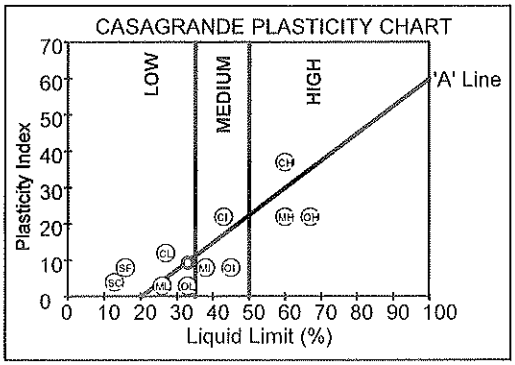
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

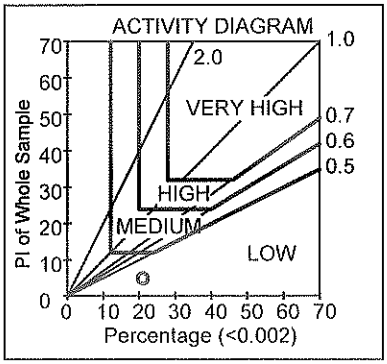
FOUNDATION INDICATOR (ASTM: D422)

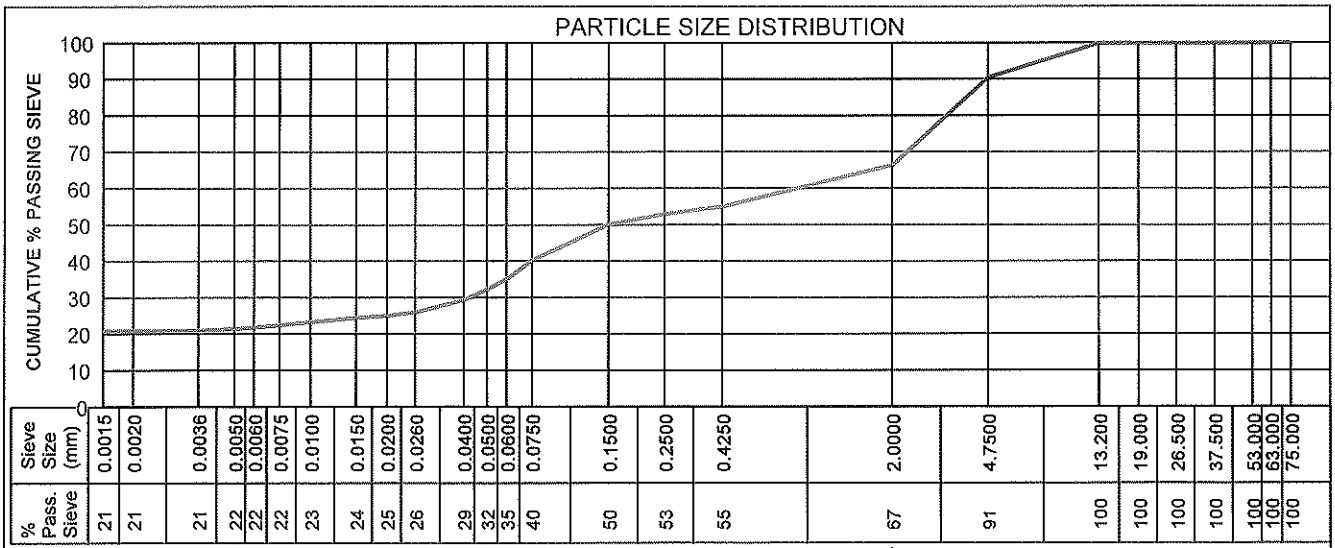
Sample No.	: 10273
Hole No.	: TP 61/1
Depth	: 900 - 2000mm
Liquid Limit (%)	: 33
Plasticity Index	: 9
Linear Shrinkage (%)	: 4,5
PI of Whole Sample	: 5
P.R.A. Classification	: A-4(1)
Unified Soil Classificati	: SM
Activity	: 0,24
Heave Classification	: LOW
Grading Modulus	: 1,38
Percentage (<0.002)	: 21,0
Moisture Content (%)	: 8,4

Material Description : Ferricrete CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	21,5	10,8	34,2	33,5	SANDY CLAY
Astm	21,5	18,8	50,3	9,4	CLAYEY SAND
British Standard	20,9	14,4	31,2	33,5	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	21	21	21	22	22	22	23	24	25	26	29	32	35	40	50	53	55	67	91	100	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL	
ASTM	CLAY		SILT		FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

A B R. Bhikam

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

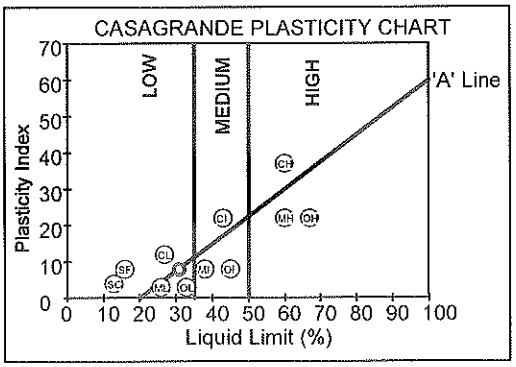
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

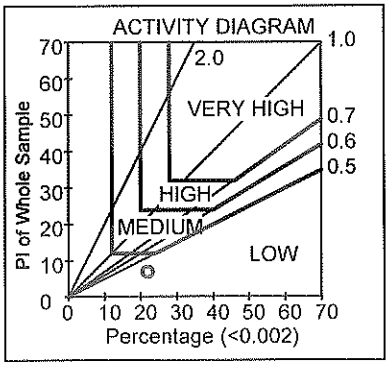
FOUNDATION INDICATOR (ASTM: D422)

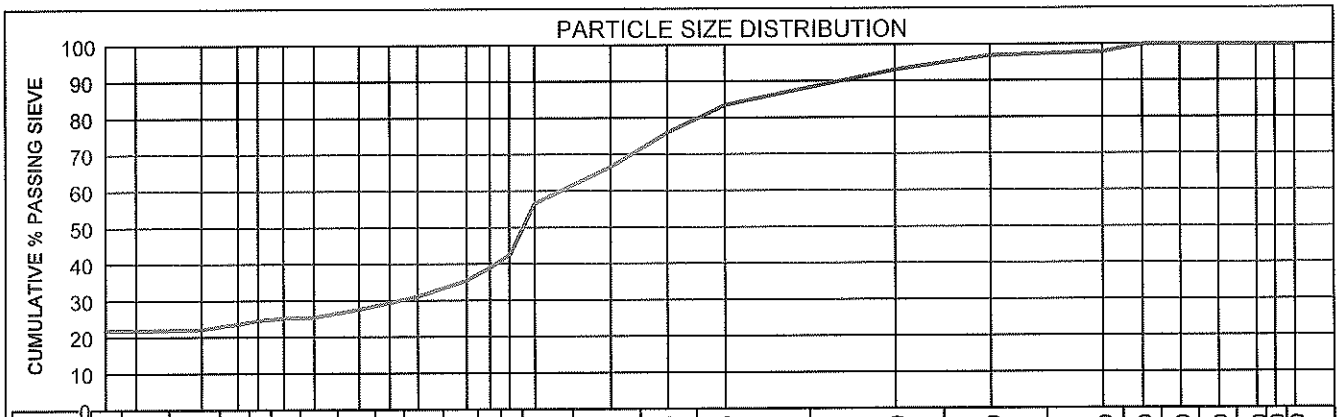
Sample No.	: 10274
Hole No.	: TP62/1
Depth	: 1600 - 3300mm
Liquid Limit (%)	: 31
Plasticity Index	: 8
Linear Shrinkage (%)	: 4,0
PI of Whole Sample	: 7
P.R.A. Classification	: A-4(4)
Unified Soil Classificati	: ML
Activity	: 0,32
Heave Classification	: LOW
Grading Modulus	: 0,66
Percentage (<0.002)	: 22,0
Moisture Content (%)	: 7,3

Material Description : (Tillite) CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	23,6	15,4	54,2	6,8	CLAYEY SAND
Astm	23,6	32,9	40,4	3,1	CLAYEY SAND
British Standard	21,8	20,7	50,6	6,8	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	22	22	22	24	25	25	26	28	29	31	35	39	43	57	67	76	84	93	97	98	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

A & R. Bhikam

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/F Date Reported : 02.11.2019

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

SAMPLE NO.	10275			
HOLE NO.	TP 74/1			
ROAD NO.	N/A			
DEPTH	1300 - 3200mm			
CHAINAGE	TP 74/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Residual Tillite			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm	100			
14.0 mm	97			
5.0 mm	90			
2.0 mm	79			
0.425 mm	62			
0.075 mm	35			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	22			
FINE SAND <0.425mm >0.075mm	34			
MATERIAL <0.075mm	44			
CONSTANTS				
GRADING MODULUS	1,24			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	---			
TRH Class.(INSITU |93%|90%|)	G10| -			
LIQUID LIMIT (%)	29			
PLASTICITY INDEX (0.425mm)	7			
LINEAR SHRINKAGE (%)	3,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	1840			
OPTIMUM MOISTURE CONTENT(%)	12,6			
MOULDING MOISTURE (%)	12,3			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	7,8			
CBR-UCS @ 98% MOD AASHTO	6,7			
CBR-UCS @ 97% MOD AASHTO	6,2			
CBR-UCS @ 95% MOD AASHTO	5,3			
CBR-UCS @ 93% MOD AASHTO	4,2			
CBR-UCS @ 90% MOD AASHTO	2,9			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	1,30	1,50	1,70										

Remarks :

FORM: A1

A B L. Bhikam

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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a SANAS Accredited Testing Laboratory, No. T 0239

60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

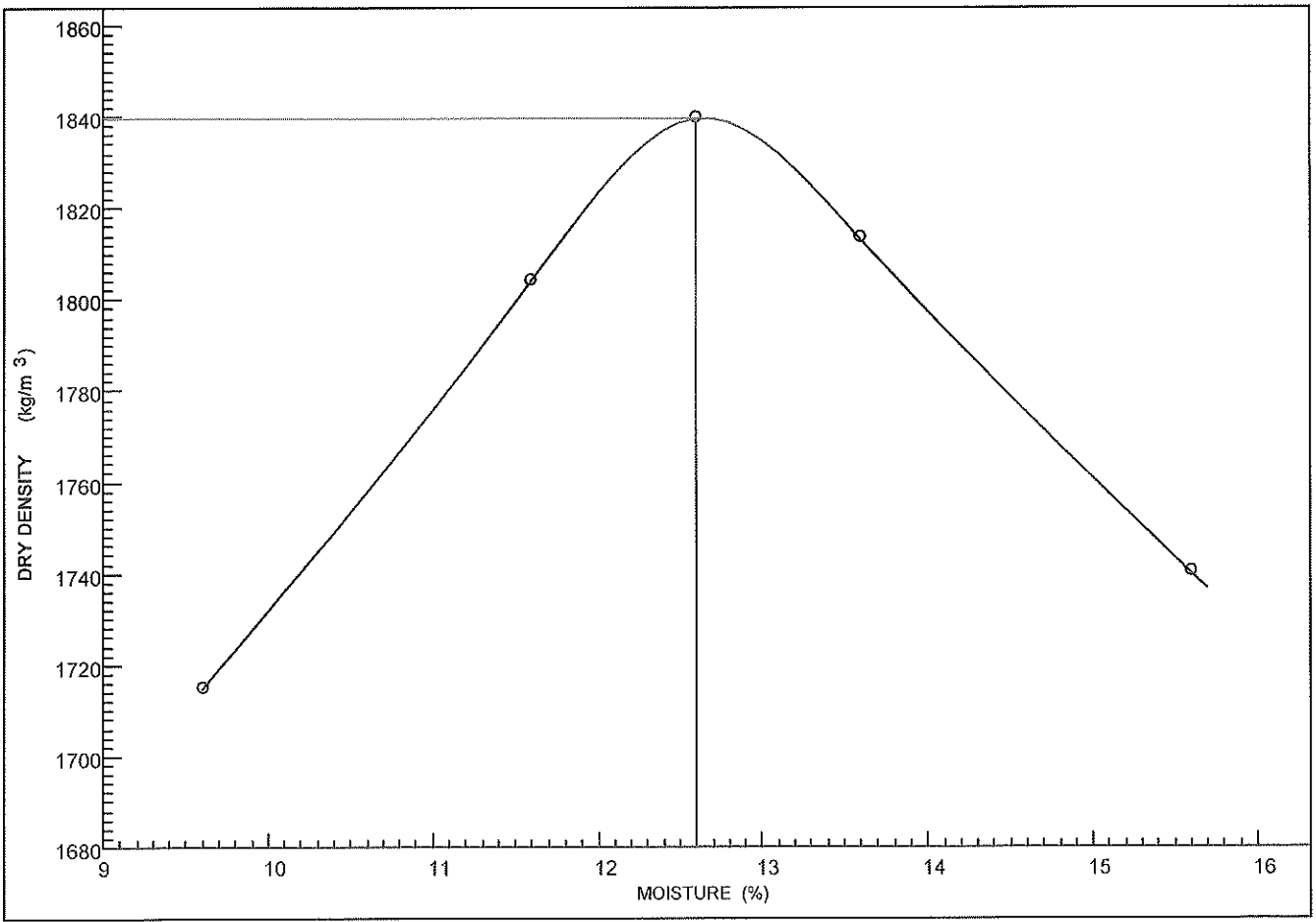
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10275	Hole No. : TP 74/1	Depth (mm) : 1300 - 3200mm
Origin : TP 74/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Residual Tillite		

Optimum Moisture Content (%) : 12,6

Maximum Dry Density (kg/m^3): 1840

Point No.	1	2	3	4	5			
Moisture (%)	9,6	11,6	12,6	13,6	15,6			
Density (kg/m^3)	1715	1804	1840	1813	1740			



Remarks :

FORM: A7

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TEST RESULTS

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Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

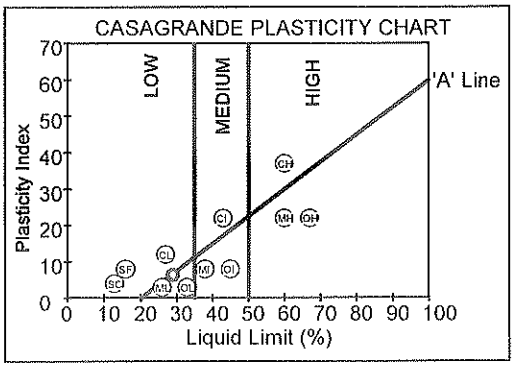
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

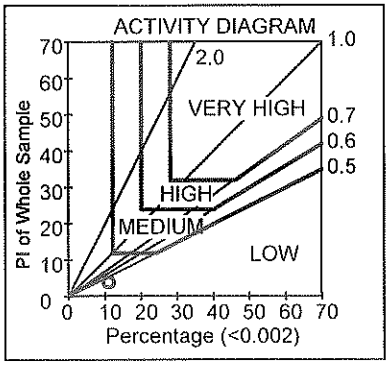
FOUNDATION INDICATOR (ASTM: D422)

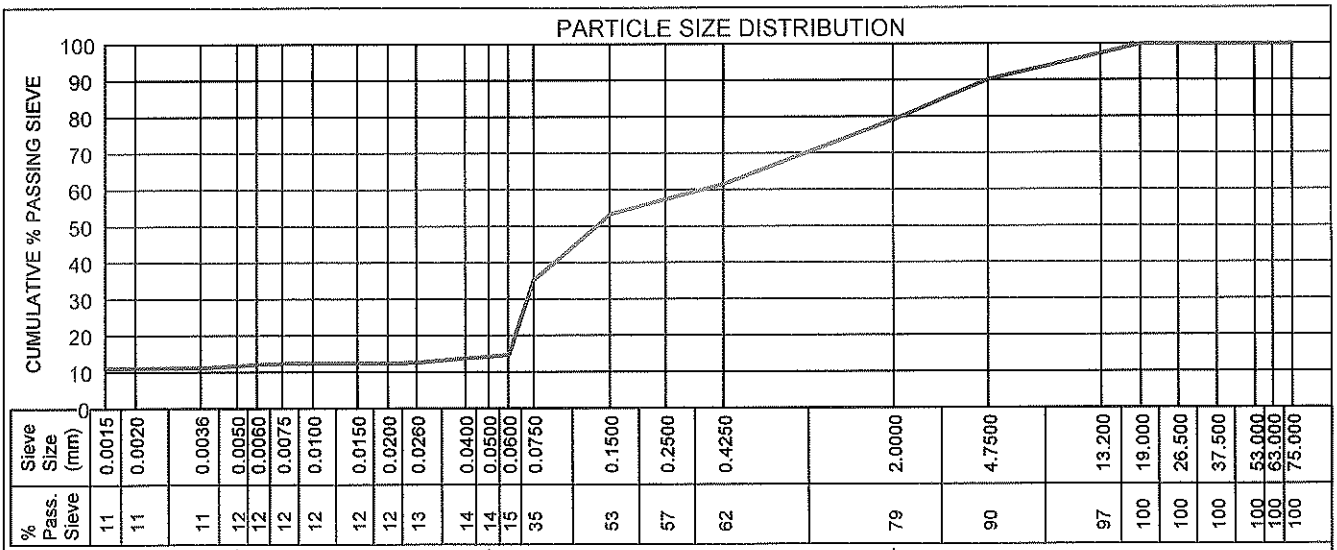
Sample No. : 10275
Hole No. : TP 74/1
Depth : 1300 - 3200mm
Liquid Limit (%) : 29
Plasticity Index : 7
Linear Shrinkage (%) : 3,5
PI of Whole Sample : 4
P.R.A. Classification : A-2-4(0)
Unified Soil Classificati: SM
Activity : 0,36
Heave Classification : LOW
Grading Modulus : 1,24
Percentage (<0.002) : 11,0
Moisture Content (%) : 5,2

Material Description : (Residual Tillite) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	11,8	2,5	65,0	20,7	SAND
Astm	11,8	23,4	55,1	9,8	SILTY SAND
British Standard	11,2	3,6	64,6	20,7	SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	11	11	11	12	12	12	12	12	12	13	14	14	15	35	53	57	62	79	90	97	100	100	100	100	100	100

JENN	CLAY	SILT		SAND			GRAVEL			
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

A B. Bhikam

4.4.0(SGS)(2016.08.31)

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Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/G
Date Reported : 02.11.2019

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

SAMPLE NO.	10276			
HOLE NO.	TP 83/1			
ROAD NO.	N/A			
DEPTH	1200 - 3100mm			
CHAINAGE	TP 83/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Tillite			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm	100			
14.0 mm	98			
5.0 mm	92			
2.0 mm	86			
0.425 mm	78			
0.075 mm	65			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	9			
FINE SAND <0.425mm >0.075mm	15			
MATERIAL <0.075mm	76			
CONSTANTS				
GRADING MODULUS	0,71			
PRA CLASSIFICATION	A-6(7)			
COLTO CLASSIFICATION	---			
TRH Class.(INSITU |93%|90%|)	- | -			
LIQUID LIMIT (%)	36			
PLASTICITY INDEX (0.425mm)	12			
LINEAR SHRINKAGE (%)	6,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	1699			
OPTIMUM MOISTURE CONTENT(%)	15,7			
MOULDING MOISTURE (%)	16,0			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	5,9			
CBR-UCS @ 98% MOD AASHTO	4,5			
CBR-UCS @ 97% MOD AASHTO	3,9			
CBR-UCS @ 95% MOD AASHTO	2,9			
CBR-UCS @ 93% MOD AASHTO	2,1			
CBR-UCS @ 90% MOD AASHTO	1,2			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	2,90	3,30	3,50									

Remarks :

FORM: A1

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

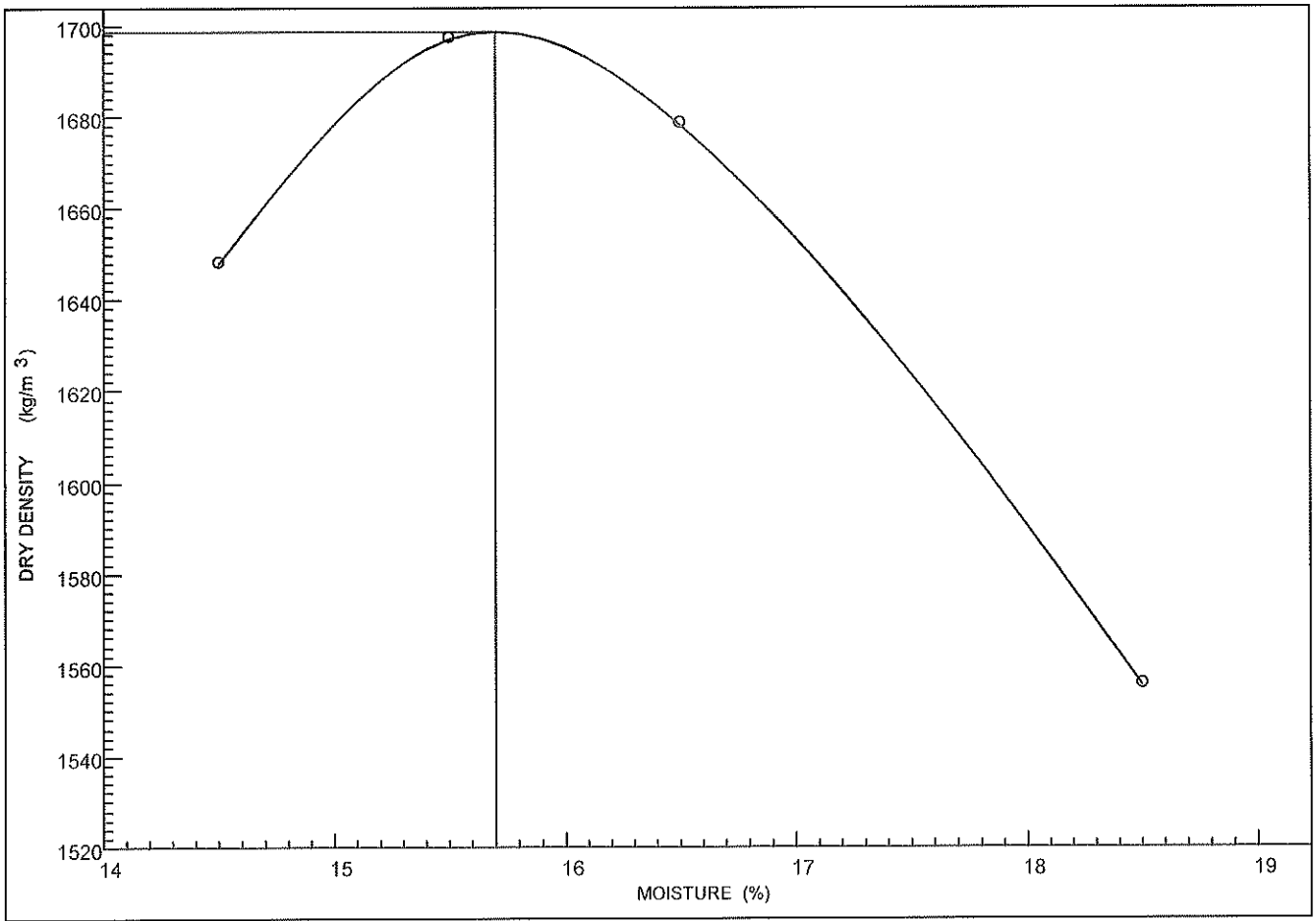
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No: 10276	Hole No. : TP 83/1	Depth (mm) : 1200 - 3100mm
Origin : TP 83/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Tillite		

Optimum Moisture Content (%) : 15,7

Maximum Dry Density (kg/m^3): 1699

Point No.	1	2	3	4				
Moisture (%)	14,5	15,5	16,5	18,5				
Density (kg/m^3)	1648	1697	1678	1556				



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

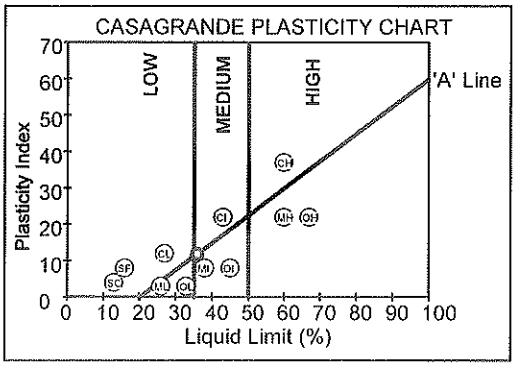
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

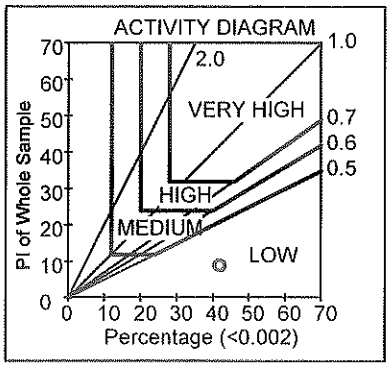
FOUNDATION INDICATOR (ASTM: D422)

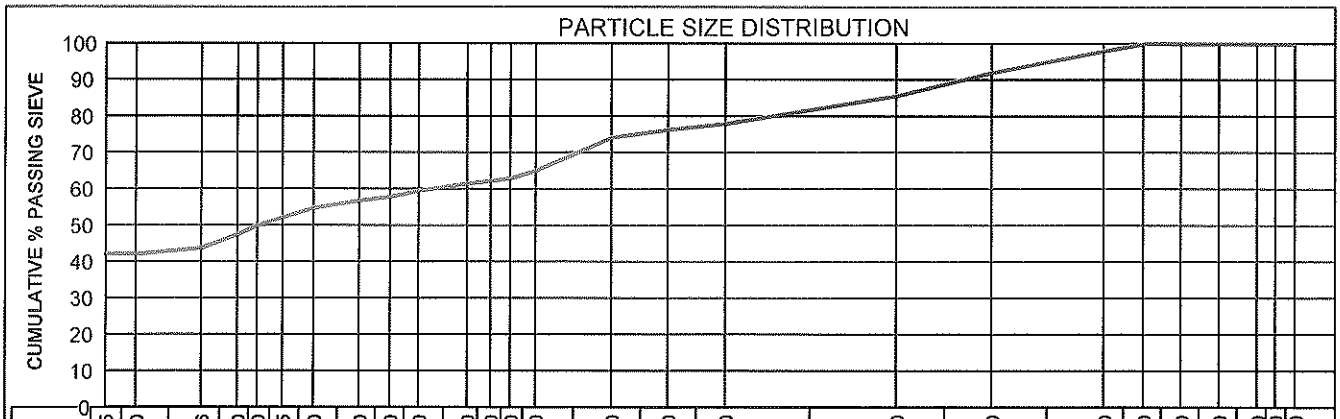
Sample No.	: 10276
Hole No.	: TP 83/1
Depth	: 1200 - 3100mm
Liquid Limit (%)	: 36
Plasticity Index	: 12
Linear Shrinkage (%)	: 6,0
PI of Whole Sample	: 9
P.R.A. Classification	: A-6(7)
Unified Soil Classificati	: ML
Activity	: 0,21
Heave Classification	: LOW
Grading Modulus	: 0,71
Percentage (<0.002)	: 42,0
Moisture Content (%)	: 12,8

Material Description : (Tillite) CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	47,6	14,7	23,4	14,3	CLAY
Astm	47,6	17,4	27,1	7,9	CLAY
British Standard	42,1	20,9	22,7	14,3	SILTY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	42	42	44	48	50	52	55	57	58	60	62	62	63	65	74	76	78	86	92	98	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL	
ASTM	CLAY		SILT		FINE SAND		MEDIUM SAND	COARSE SAND		GRAVEL
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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TEST RESULTS

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Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

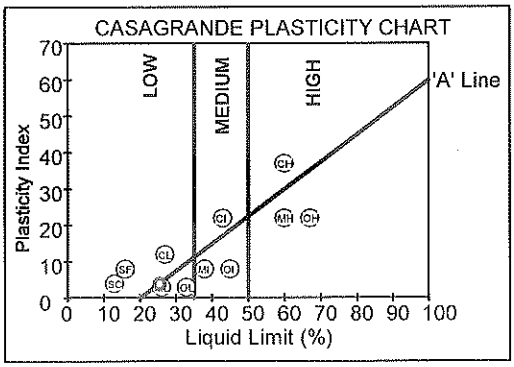
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

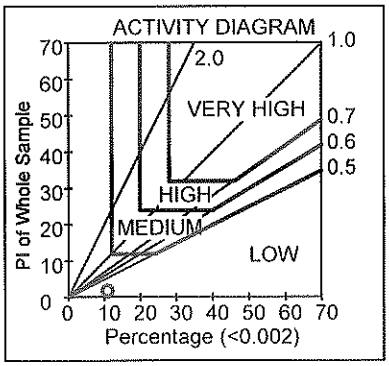
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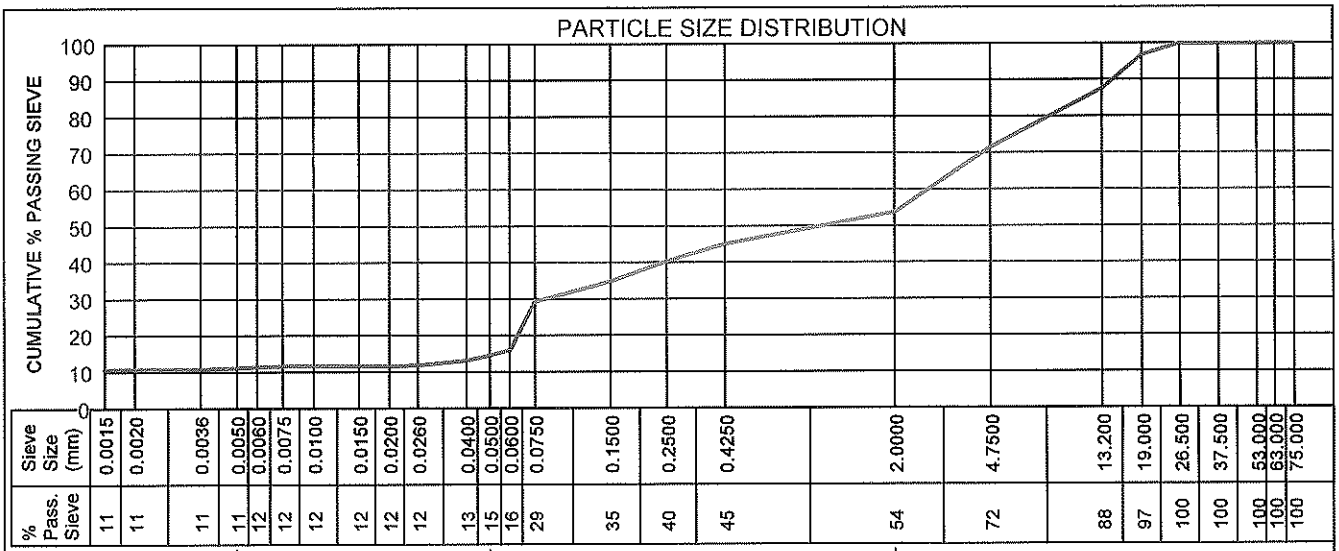
Sample No.	: 10277
Hole No.	: TP 86/1
Depth	: 500 - 1700mm
Liquid Limit (%)	: 26
Plasticity Index	: 4
Linear Shrinkage (%)	: 2,0
PI of Whole Sample	: 2
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SM
Activity	: 0,18
Heave Classification	: LOW
Grading Modulus	: 1,72
Percentage (<0.002)	: 11,0
Moisture Content (%)	: 8,5

Material Description : (Ferricrete) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	11,3	3,3	39,2	46,2	CLAYEY SAND
Astm	11,3	18,0	42,3	28,5	SILTY SAND
British Standard	10,8	5,3	37,7	46,2	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	11	11	11	11	12	12	12	12	12	12	13	15	16	29	35	40	45	54	72	88	97	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL	

Remarks :

FORM: A6

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Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

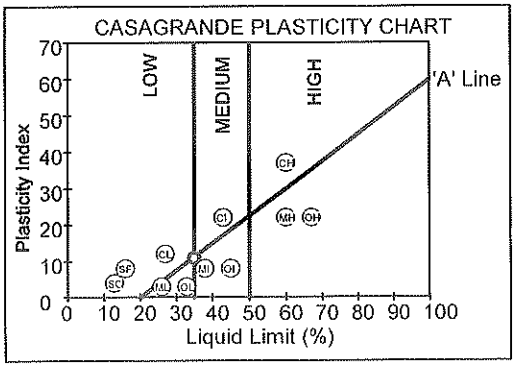
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

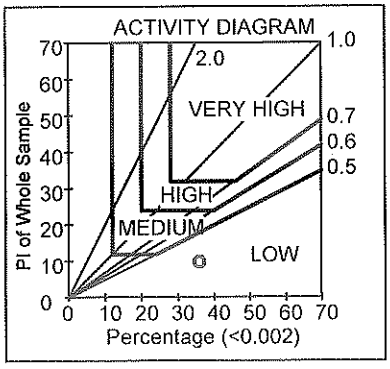
FOUNDATION INDICATOR (ASTM: D422)

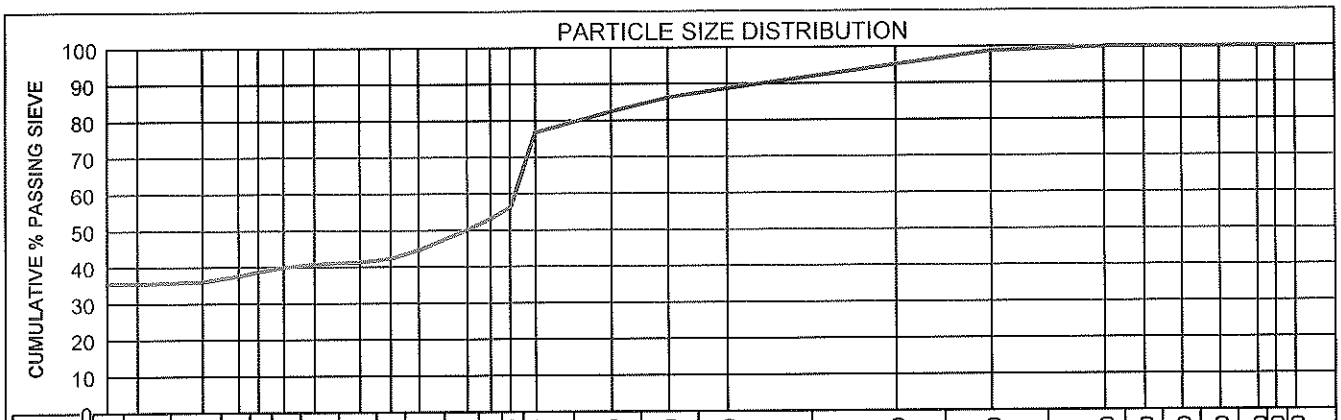
Sample No.	: 10278
Hole No.	: TP 88/1
Depth	: 1400 - 3000mm
Liquid Limit (%)	: 35
Plasticity Index	: 11
Linear Shrinkage (%)	: 5,5
PI of Whole Sample	: 10
P.R.A. Classification	: A-6(8)
Unified Soil Classificati	: ML
Activity	: 0,28
Heave Classification	: LOW
Grading Modulus	: 0,39
Percentage (<0.002)	: 36,0
Moisture Content (%)	: 18,6

Material Description : (Residual Tillite) SILTY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	37,7	15,6	42,0	4,7	SANDY CLAY
Astm	37,7	39,2	22,1	1,1	SILTY CLAY
British Standard	35,6	20,9	38,9	4,7	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	36	36	36	38	39	40	41	41	42	45	50	53	56	77	83	86	89	95	99	100	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT		FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

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Attention: Ms Numbuso Khanyile

Project : Cato Ridge Township Development

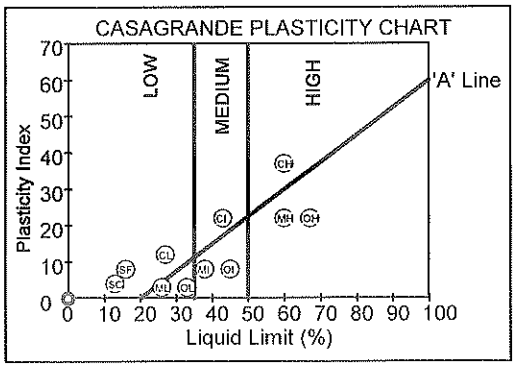
Your Ref : 505788
Our Ref : 7686
Date Reported : 30.10.2019

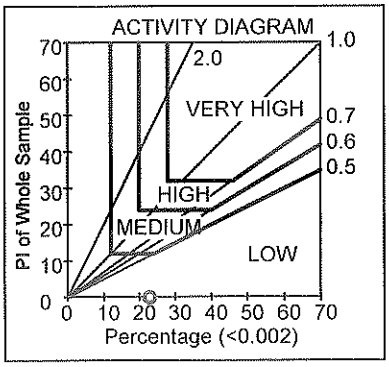
FOUNDATION INDICATOR (ASTM: D422)

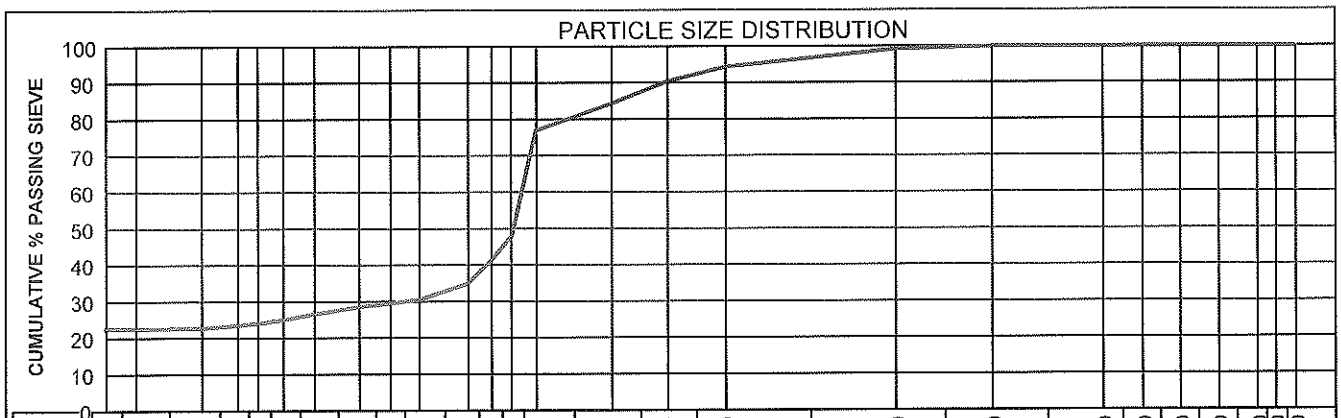
Sample No.	: 10279
Hole No.	: TP 91/1
Depth	: 0 - 500mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,5
PI of Whole Sample	: 0
P.R.A. Classification	: A-4(8)
Unified Soil Classificati	: CL
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 0,30
Percentage (<0.002)	: 23,0
Moisture Content (%)	: 10,6

Material Description : (Hillwash) CLAYEY SILT

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	23,5	18,0	57,8	0,7	CLAYEY SAND
Astm	23,5	53,5	23,0	0,0	CLAYEY SILT
British Standard	22,6	25,5	51,2	0,7	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	23	23	23	24	24	25	27	29	30	31	35	42	48	77	84	90	94	99	100	100	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL	

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/H Date Reported : 02.11.2019

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

SAMPLE NO.	10280			
HOLE NO.	TP 100/1			
ROAD NO.	N/A			
DEPTH	1200 - 1800mm			
CHAINAGE	TP 100/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Tillite			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm	100			
28.0 mm	98			
20.0 mm	91			
14.0 mm	89			
5.0 mm	75			
2.0 mm	61			
0.425 mm	44			
0.075 mm	23			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	28			
FINE SAND <0.425mm >0.075mm	34			
MATERIAL <0.075mm	38			
CONSTANTS				
GRADING MODULUS	1,72			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	---			
TRH Class.(INSITU |93%|90%|)	G10| -			
LIQUID LIMIT (%)	29			
PLASTICITY INDEX (0.425mm)	7			
LINEAR SHRINKAGE (%)	3,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	1999			
OPTIMUM MOISTURE CONTENT(%)	8,9			
MOULDING MOISTURE (%)	8,6			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	19			
CBR-UCS @ 98% MOD AASHTO	13			
CBR-UCS @ 97% MOD AASHTO	11			
CBR-UCS @ 95% MOD AASHTO	8,0			
CBR-UCS @ 93% MOD AASHTO	4,6			
CBR-UCS @ 90% MOD AASHTO	1,6			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	1,30	1,40	1,80										

Remarks :

FORM: A1

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

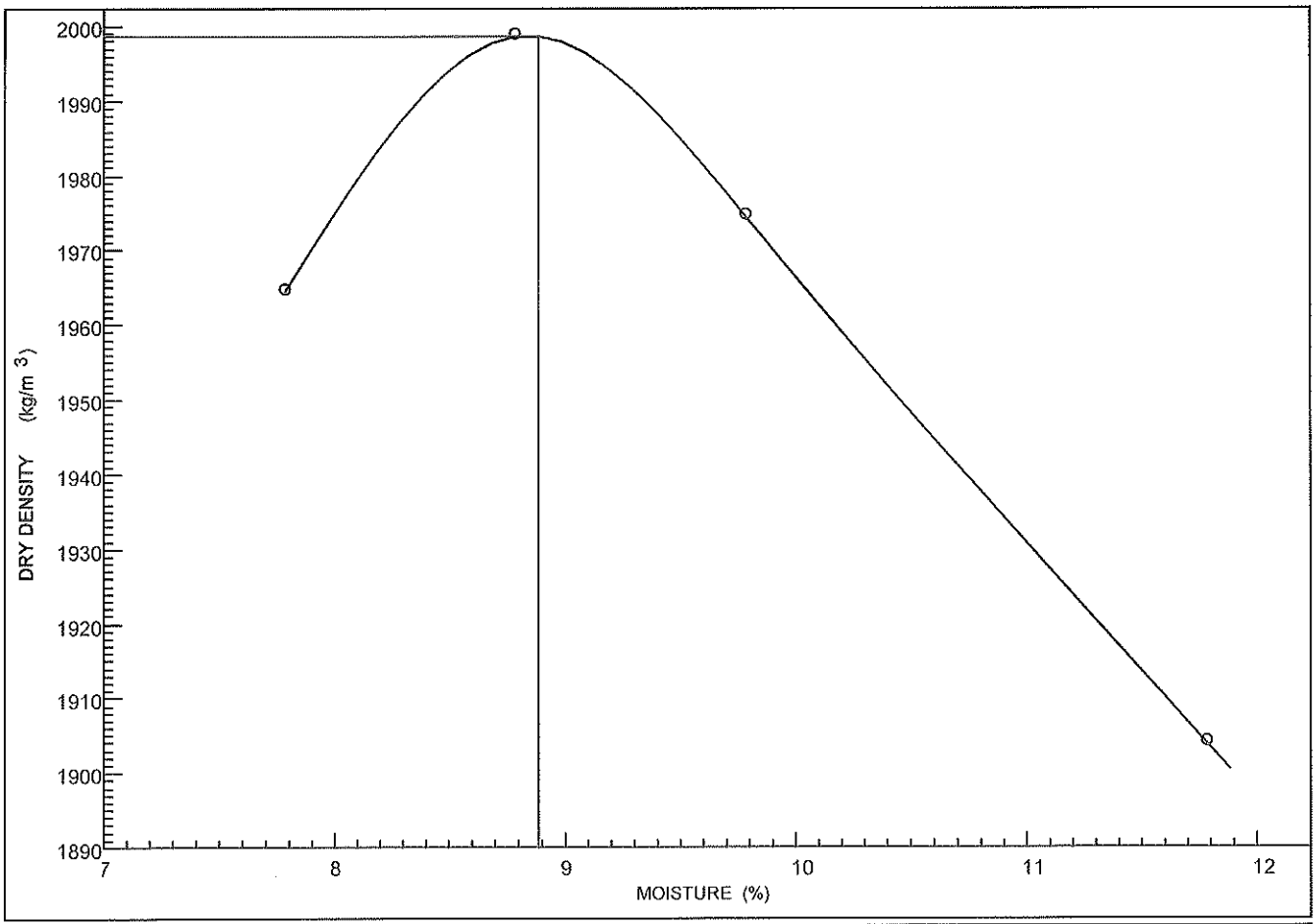
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10280	Hole No. : TP 100/1	Depth (mm) : 1200 - 1800mm
Origin : TP 100/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Tillite		

Optimum Moisture Content (%) : 8,9

Maximum Dry Density (kg/m^3): 1999

Point No.	1	2	3	4				
Moisture (%)	7,8	8,8	9,8	11,8				
Density (kg/m^3)	1965	1999	1975	1904				



Remarks :

FORM: A7

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Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

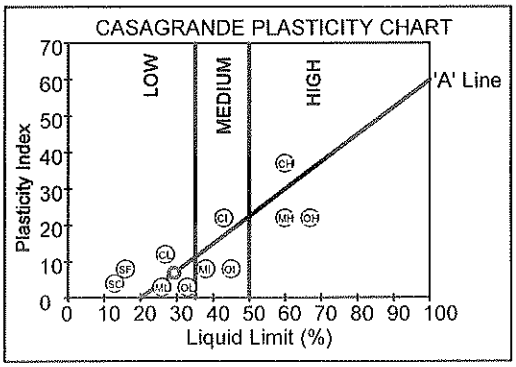
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

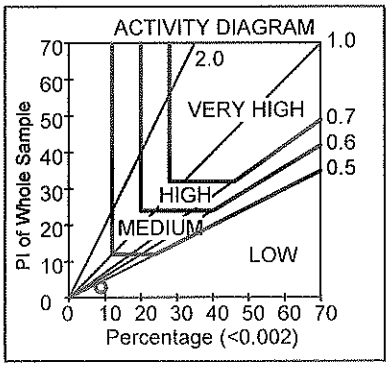
FOUNDATION INDICATOR (ASTM: D422)

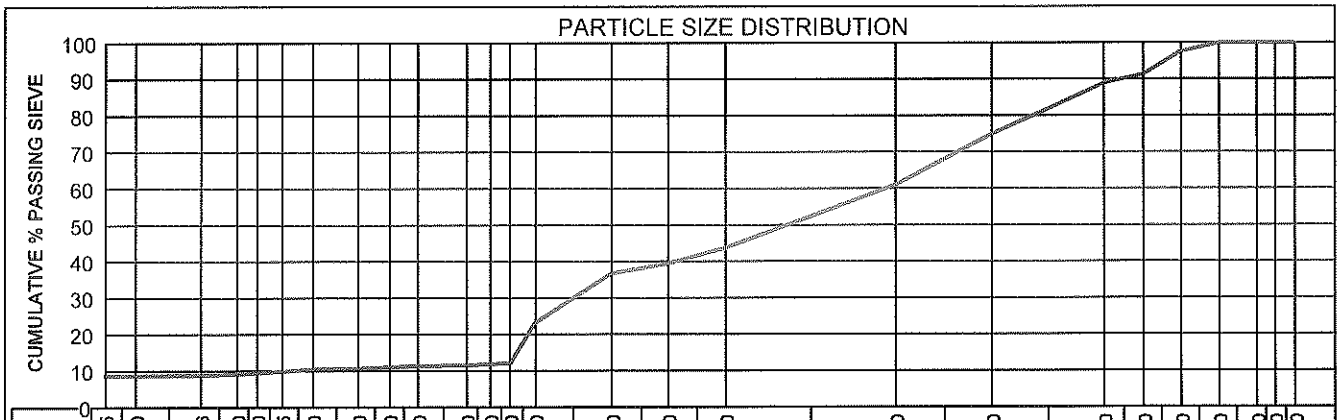
Sample No.	: 10280
Hole No.	: TP 100/1
Depth	: 1200 - 1800mm
Liquid Limit (%)	: 29
Plasticity Index	: 7
Linear Shrinkage (%)	: 3,5
PI of Whole Sample	: 3
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SM
Activity	: 0,33
Heave Classification	: LOW
Grading Modulus	: 1,72
Percentage (<0.002)	: 9,0
Moisture Content (%)	: 4,1

Material Description : (Tillite) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	9,2	2,7	49,3	38,8	SAND
Astm	9,2	14,0	51,8	25,0	SILTY SAND
British Standard	8,8	3,4	48,9	38,8	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	9	9	9	9	9	10	11	11	11	11	12	12	12	23	37	39	44	61	75	89	91	98	100	100	100	100

JENN	CLAY		SILT		SAND				GRAVEL		
ASTM	CLAY		SILT			FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND		FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

A & R. Bhikam

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/I Date Reported : 02.11.2019

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

SAMPLE NO.	10281			
HOLE NO.	TP 101/1			
ROAD NO.	N/A			
DEPTH	300 - 800mm			
CHAINAGE	TP 101/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Ferricrete			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm	100			
14.0 mm	98			
5.0 mm	96			
2.0 mm	93			
0.425 mm	82			
0.075 mm	78			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	12			
FINE SAND <0.425mm >0.075mm	4			
MATERIAL <0.075mm	84			
CONSTANTS				
GRADING MODULUS	0,47			
PRA CLASSIFICATION	A-4(8)			
COLTO CLASSIFICATION	---			
TRH Class.(INSITU |93%|90%|)	- | -			
LIQUID LIMIT (%)	31			
PLASTICITY INDEX (0.425mm)	8			
LINEAR SHRINKAGE (%)	4,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2225			
OPTIMUM MOISTURE CONTENT(%)	8,7			
MOULDING MOISTURE (%)	8,5			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	5,2			
CBR-UCS @ 98% MOD AASHTO	3,5			
CBR-UCS @ 97% MOD AASHTO	2,9			
CBR-UCS @ 95% MOD AASHTO	2,0			
CBR-UCS @ 93% MOD AASHTO	1,4			
CBR-UCS @ 90% MOD AASHTO	0,8			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,20	0,40	0,60									

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 04.11.2019

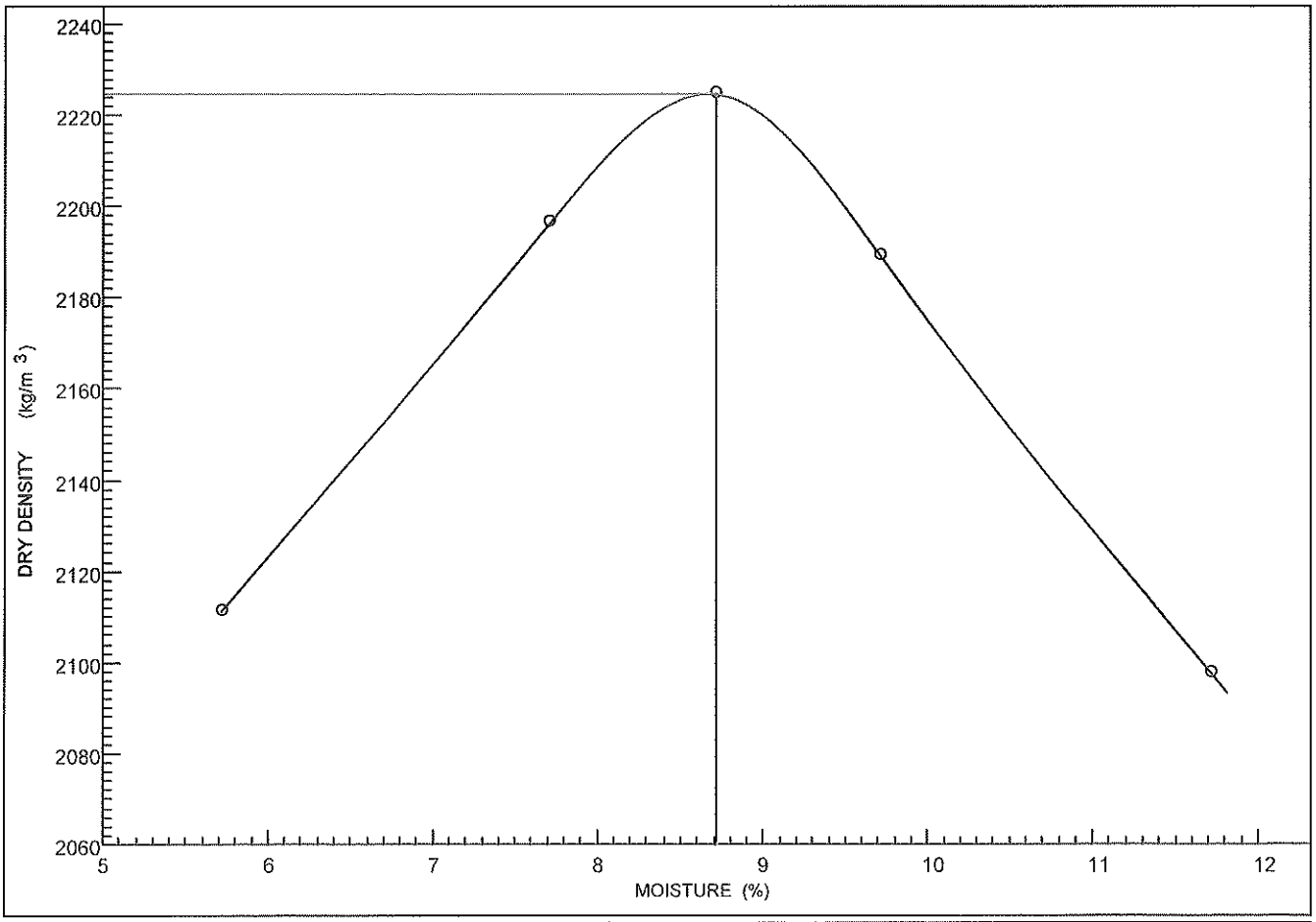
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10281	Hole No. : TP 101/1	Depth (mm) : 300 - 800mm
Origin : TP 101/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Ferricrete		

Optimum Moisture Content (%) : 8,7

Maximum Dry Density (kg/m^3): 2225

Point No.	1	2	3	4	5			
Moisture (%)	5,7	7,7	8,7	9,7	11,7			
Density (kg/m^3)	2111	2196	2225	2189	2098			



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

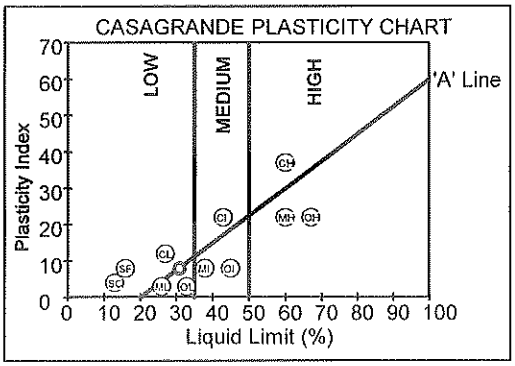
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

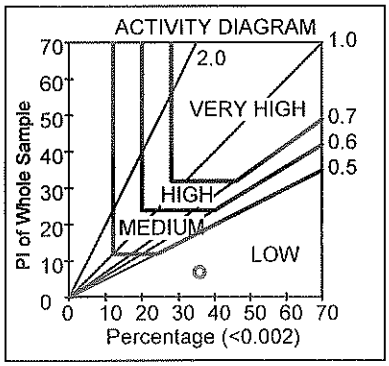
FOUNDATION INDICATOR (ASTM: D422)

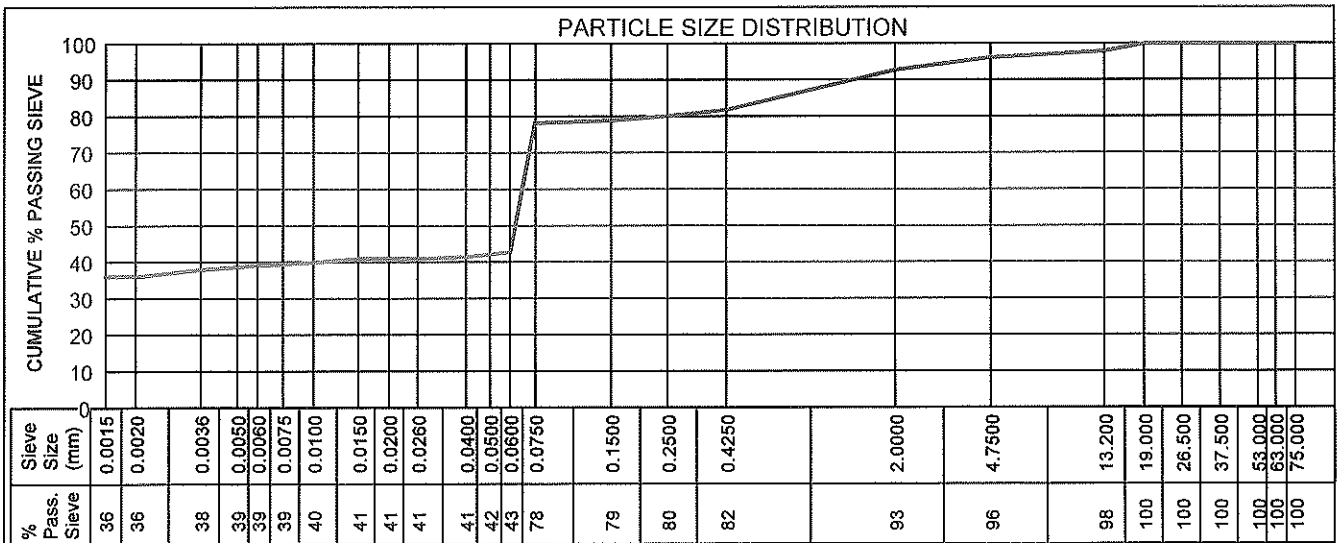
Sample No.	: 10281
Hole No.	: TP 101/1
Depth	: 300 - 800mm
Liquid Limit (%)	: 31
Plasticity Index	: 8
Linear Shrinkage (%)	: 4,0
PI of Whole Sample	: 7
P.R.A. Classification	: A-4(8)
Unified Soil Classificati	: ML
Activity	: 0,19
Heave Classification	: LOW
Grading Modulus	: 0,47
Percentage (<0.002)	: 36,0
Moisture Content (%)	: 5,5

Material Description : (Ferricrete) SILTY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	38,7	3,4	50,7	7,2	SANDY CLAY
Astm	38,7	39,5	17,9	3,8	SILTY CLAY
British Standard	36,1	6,7	50,0	7,2	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	36	36	38	39	39	39	40	41	41	41	41	42	43	78	79	80	82	93	96	98	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

A B R. Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

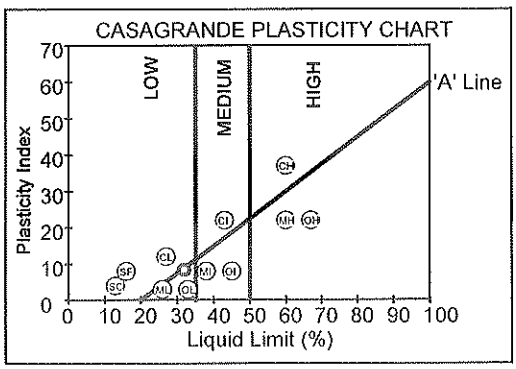
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

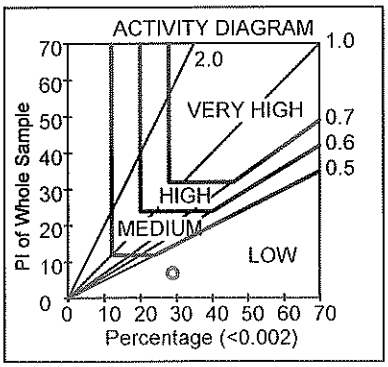
FOUNDATION INDICATOR (ASTM: D422)

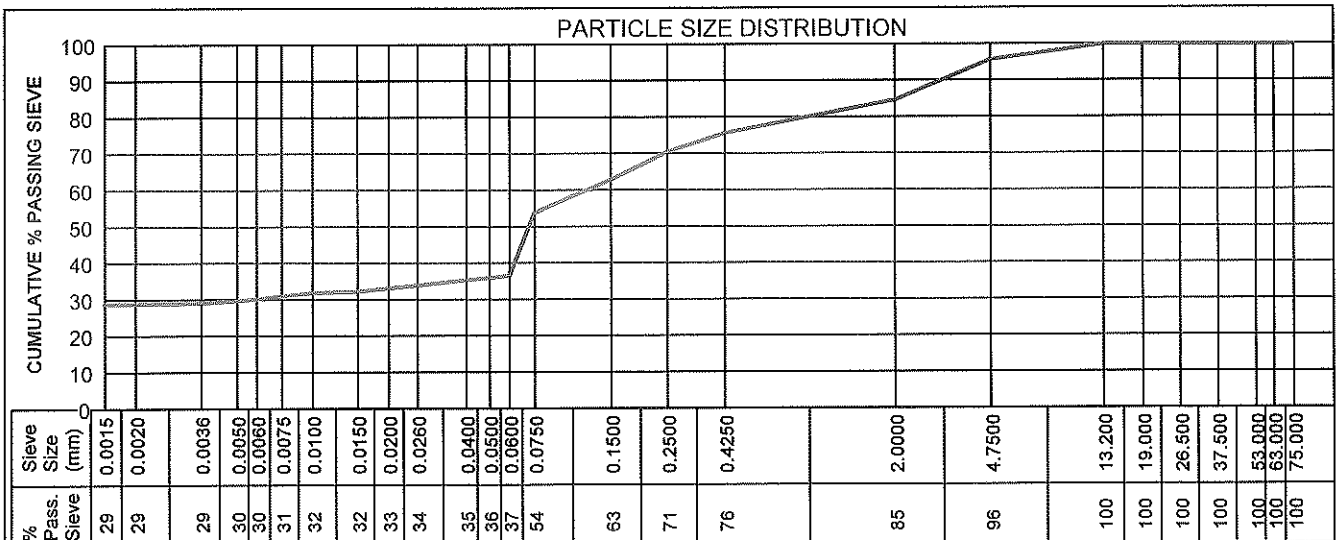
Sample No.	: 10282
Hole No.	: TP 102/1
Depth	: 1000 - 1500mm
Liquid Limit (%)	: 32
Plasticity Index	: 9
Linear Shrinkage (%)	: 4,5
PI of Whole Sample	: 7
P.R.A. Classification	: A-4(4)
Unified Soil Classificati	: ML
Activity	: 0,24
Heave Classification	: LOW
Grading Modulus	: 0,85
Percentage (<0.002)	: 29,0
Moisture Content (%)	: 18,5

Material Description : (Residual Tillite) SANDY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	29,8	6,2	48,8	15,3	SANDY CLAY
Astm	29,8	24,0	41,9	4,3	SANDY CLAY
British Standard	28,9	7,7	48,2	15,3	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	29	29	29	30	30	31	32	32	33	34	35	36	37	54	63	71	76	85	96	100	100	100	100	100	100	100

JENN	CLAY	SILT		SAND			GRAVEL			
ASTM	CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL			
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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a SANAS Accredited Testing Laboratory, No. T 0239

60 Columbine Place, Glen Anil, Durban North, 4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

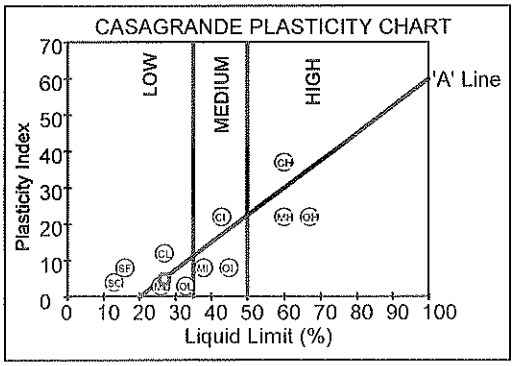
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

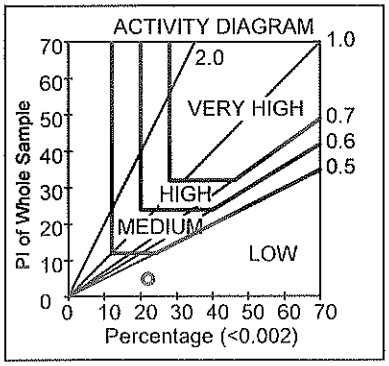
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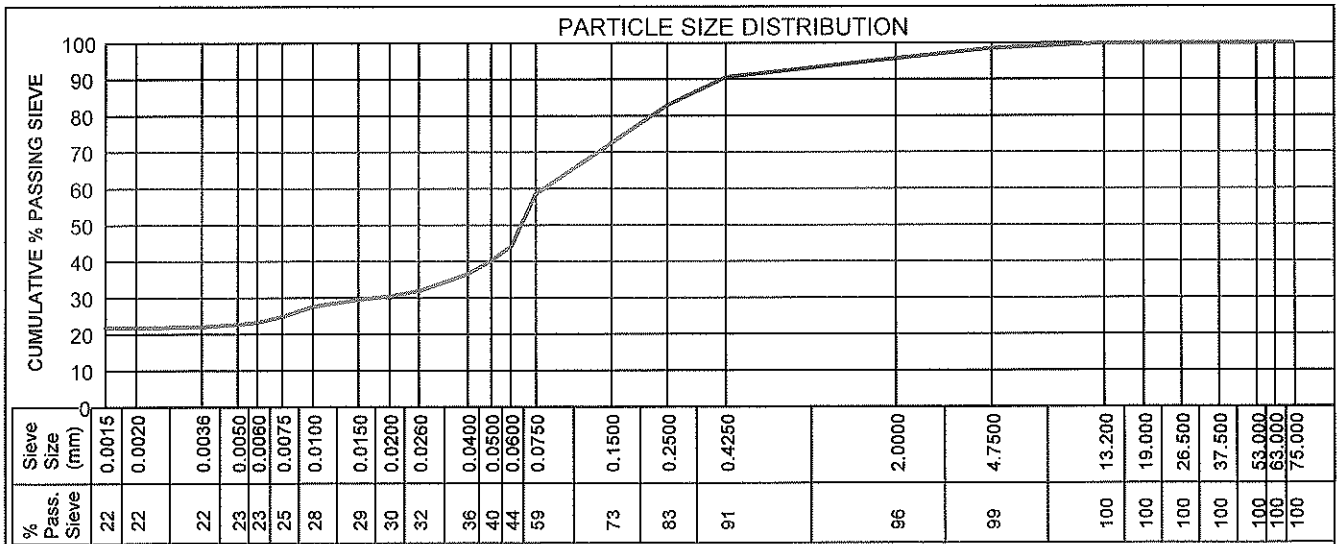
Sample No.	: 10284
Hole No.	: TP 103/1
Depth	: 800 - 1400mm
Liquid Limit (%)	: 27
Plasticity Index	: 5
Linear Shrinkage (%)	: 2,5
PI of Whole Sample	: 5
P.R.A. Classification	: A-4(5)
Unified Soil Classificati	: ML
Activity	: 0,23
Heave Classification	: LOW
Grading Modulus	: 0,54
Percentage (<0.002)	: 22,0
Moisture Content (%)	: 8,2

Material Description : (Residual Tillite) CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	22,8	17,5	55,5	4,2	CLAYEY SAND
Astm	22,8	35,8	40,0	1,4	CLAYEY SAND
British Standard	21,8	22,3	51,7	4,2	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	22	22	22	23	23	25	28	29	30	32	36	40	44	59	73	83	91	96	99	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL			
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

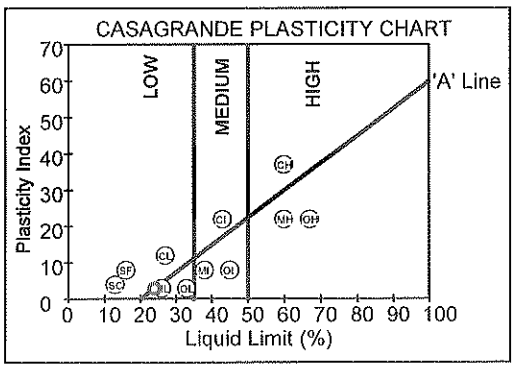
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

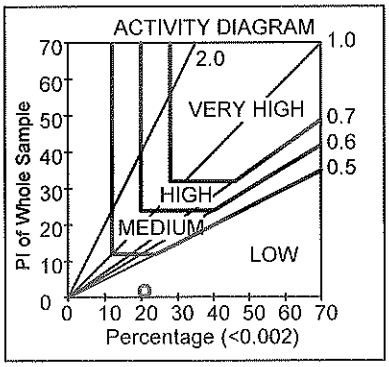
FOUNDATION INDICATOR (ASTM: D422)

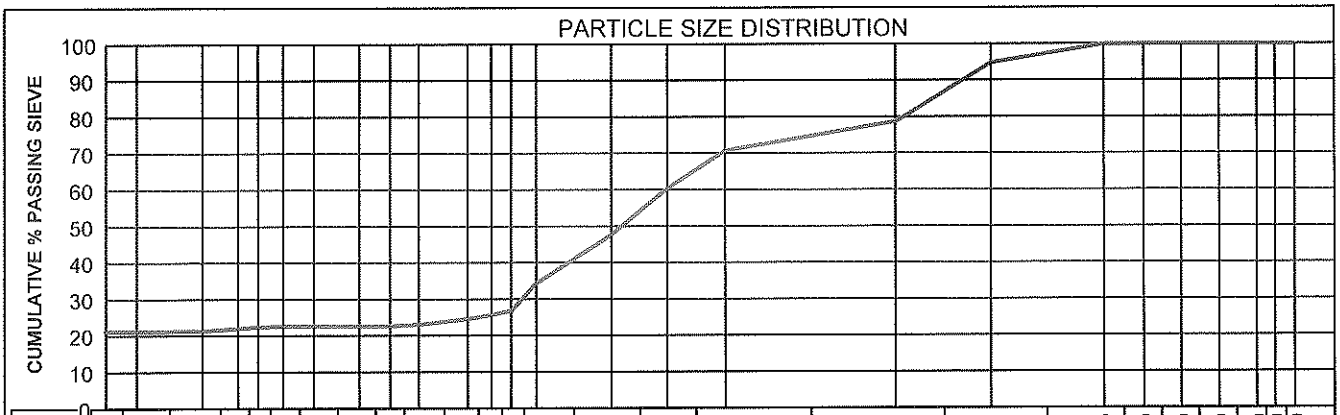
Sample No.	: 10285
Hole No.	: TP 104/1
Depth	: 0 - 600mm
Liquid Limit (%)	: 24
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,5
PI of Whole Sample	: 2
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SM
Activity	: 0,10
Heave Classification	: LOW
Grading Modulus	: 1,16
Percentage (<0.002)	: 21,0
Moisture Content (%)	: 7,1

Material Description : Hillwash CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	22,1	3,7	53,1	21,1	CLAYEY SAND
Astm	22,1	12,2	60,6	5,1	CLAYEY SAND
British Standard	21,3	5,6	52,0	21,1	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	21	21	21	22	22	23	23	23	23	23	25	26	27	34	48	60	71	79	95	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL			
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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TEST RESULTS

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Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

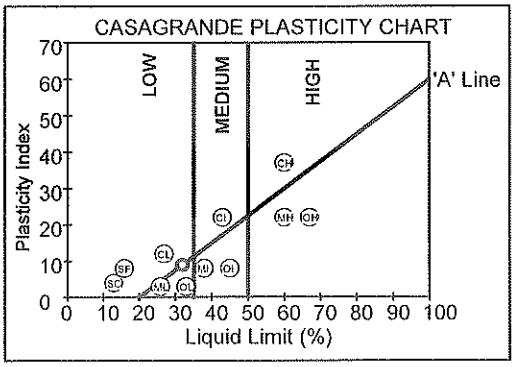
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

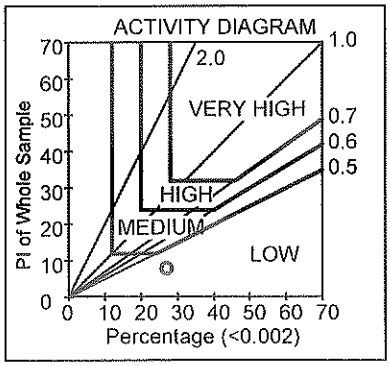
FOUNDATION INDICATOR (ASTM: D422)

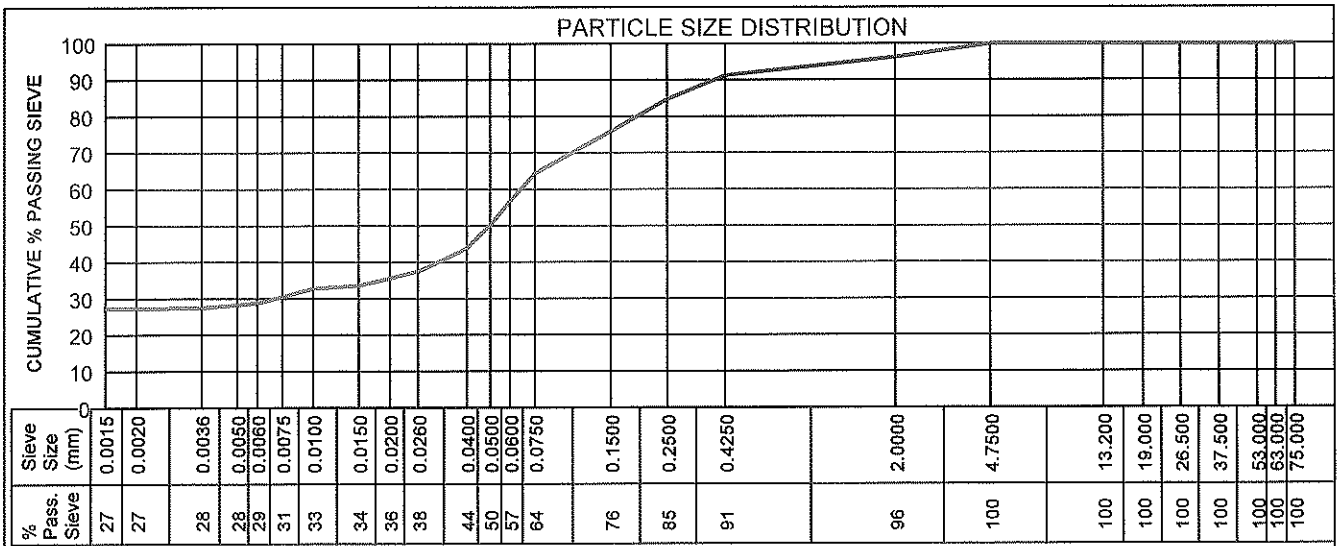
Sample No.	: 10286
Hole No.	: TP 104/2
Depth	: 1100 - 1600mm
Liquid Limit (%)	: 32
Plasticity Index	: 9
Linear Shrinkage (%)	: 4,5
PI of Whole Sample	: 8
P.R.A. Classification	: A-4(6)
Unified Soil Classificati	: ML
Activity	: 0,30
Heave Classification	: LOW
Grading Modulus	: 0,49
Percentage (<0.002)	: 27,0
Moisture Content (%)	: 13,1

Material Description : (Residual Tillite) CLAYEY SILT

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	28,3	22,1	46,0	3,6	CLAYEY SAND
Astm	28,3	36,1	35,7	0,0	CLAYEY SILT
British Standard	27,3	29,7	39,4	3,6	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	27	27	28	28	29	31	33	34	36	38	44	50	57	64	76	85	91	96	100	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

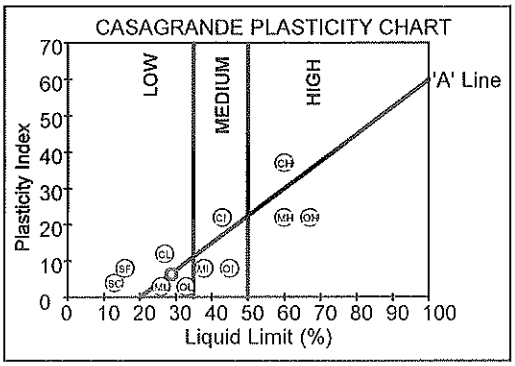
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

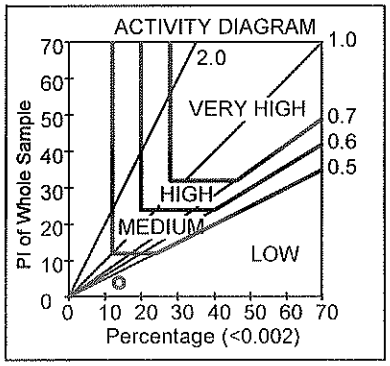
FOUNDATION INDICATOR (ASTM: D422)

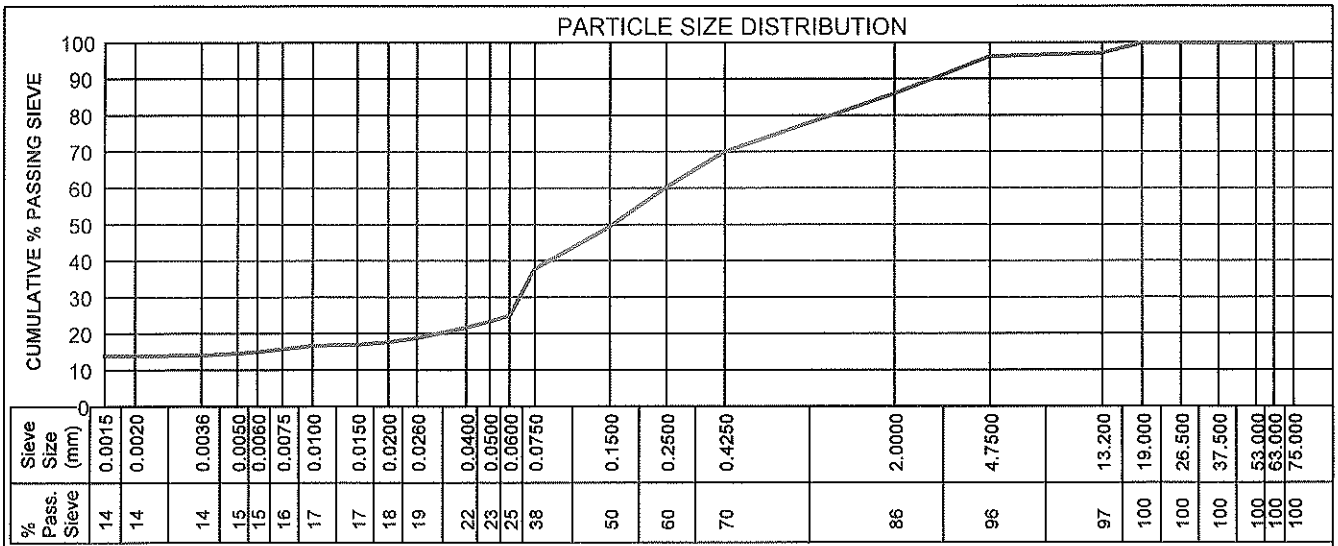
Sample No. : 10288
Hole No. : TP 104/4
Depth : 1600 - 3100mm
Liquid Limit (%) : 29
Plasticity Index : 6
Linear Shrinkage (%) : 3,0
PI of Whole Sample : 4
P.R.A. Classification : A-4(1)
Unified Soil Classificati: SM
Activity : 0,29
Heave Classification : LOW
Grading Modulus : 1,06
Percentage (<0.002) : 14,0
Moisture Content (%) : 13,5

Material Description : (Tillite) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	14,7	8,7	62,8	13,8	SILTY SAND
Astm	14,7	23,0	58,6	3,7	SILTY SAND
British Standard	14,0	11,0	61,1	13,8	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	14	14	14	15	15	16	17	17	18	19	22	23	25	38	50	60	70	86	96	97	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

A B R. Bhikam

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Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

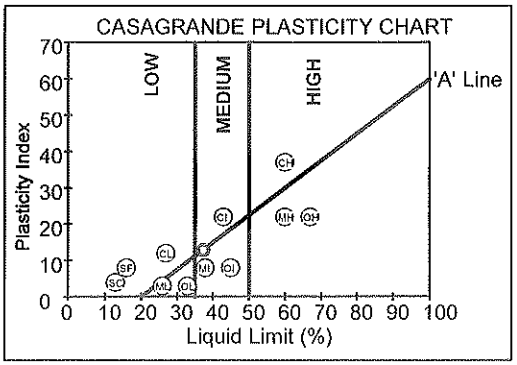
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

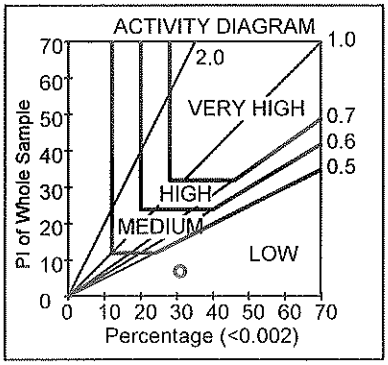
FOUNDATION INDICATOR (ASTM: D422)

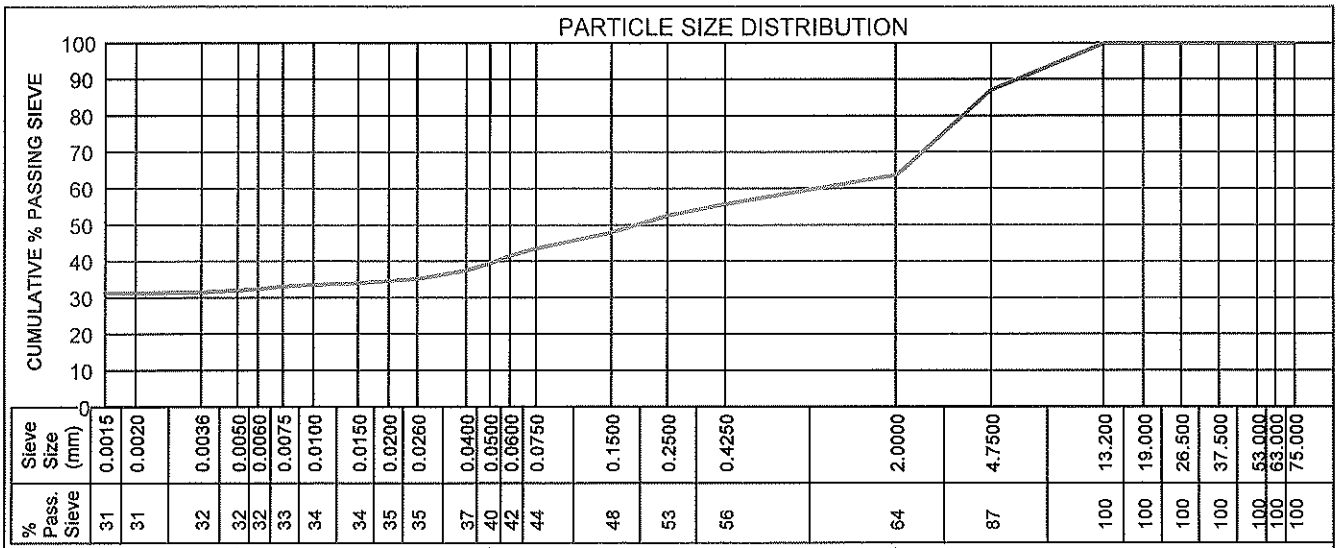
Sample No.	: 10289
Hole No.	: TP 105/1
Depth	: 2200 - 3500mm
Liquid Limit (%)	: 38
Plasticity Index	: 13
Linear Shrinkage (%)	: 6,5
PI of Whole Sample	: 7
P.R.A. Classification	: A-6(3)
Unified Soil Classificati	: SM
Activity	: 0,23
Heave Classification	: LOW
Grading Modulus	: 1,36
Percentage (<0.002)	: 31,0
Moisture Content (%)	: 15,7

Material Description : (Residual Tillite) SANDY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	32,1	7,4	24,2	36,2	CLAY
Astm	32,1	11,4	43,6	12,9	SANDY CLAY
British Standard	31,4	10,2	22,2	36,2	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	31	31	32	32	32	33	34	34	35	35	37	40	42	44	48	53	56	64	87	100	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL	
ASTM	CLAY		SILT		FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/J Date Reported : 02.11.2019

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

SAMPLE NO.	10291			
HOLE NO.	TP 106/1			
ROAD NO.	N/A			
DEPTH	300 - 700mm			
CHAINAGE	TP 106/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Ferricrete			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm	100			
14.0 mm	95			
5.0 mm	75			
2.0 mm	36			
0.425 mm	30			
0.075 mm	17			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	17			
FINE SAND <0.425mm >0.075mm	36			
MATERIAL <0.075mm	47			
CONSTANTS				
GRADING MODULUS	2,17			
PRA CLASSIFICATION	A-1-b(0)			
COLTO CLASSIFICATION	G6			
TRH CLASSIFICATION	G6			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	SP			
LINEAR SHRINKAGE (%)	1,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2275			
OPTIMUM MOISTURE CONTENT(%)	9,1			
MOULDING MOISTURE (%)	8,8			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	52			
CBR-UCS @ 98% MOD AASHTO	42			
CBR-UCS @ 97% MOD AASHTO	38			
CBR-UCS @ 95% MOD AASHTO	31			
CBR-UCS @ 93% MOD AASHTO	25			
CBR-UCS @ 90% MOD AASHTO	18			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,00	0,00										

Remarks :

FORM: A1

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Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587
a SANAS Accredited Testing Laboratory, No. T 0239

60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 02.11.2019

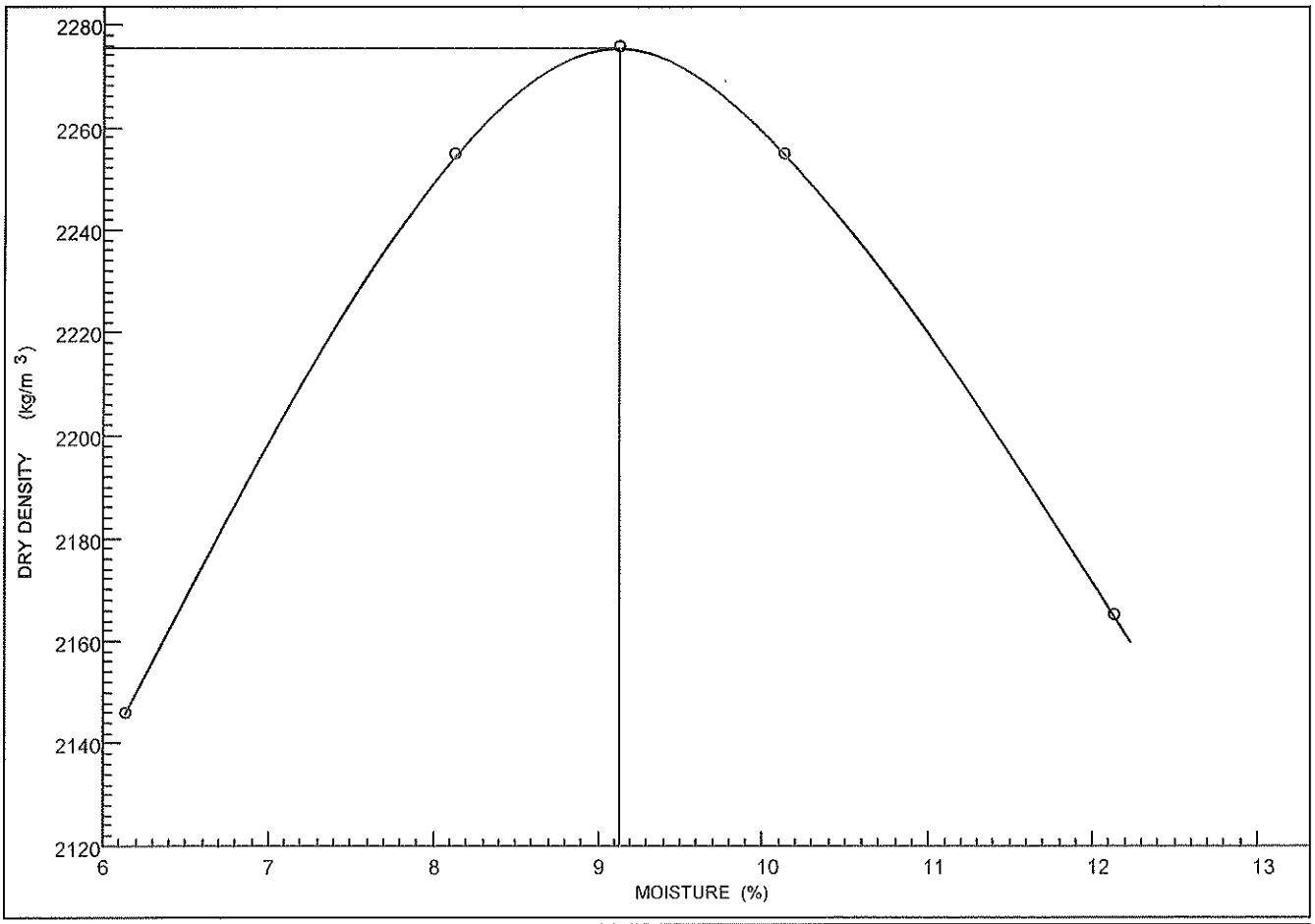
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10291	Hole No. : TP 106/1	Depth (mm) : 300 - 700mm
Origin : TP 106/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Ferricrete		

Optimum Moisture Content (%) : 9,1

Maximum Dry Density (kg/m^3): 2275

Point No.	1	2	3	4	5			
Moisture (%)	6,1	8,1	9,1	10,1	12,1			
Density (kg/m^3)	2146	2255	2275	2255	2165			



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

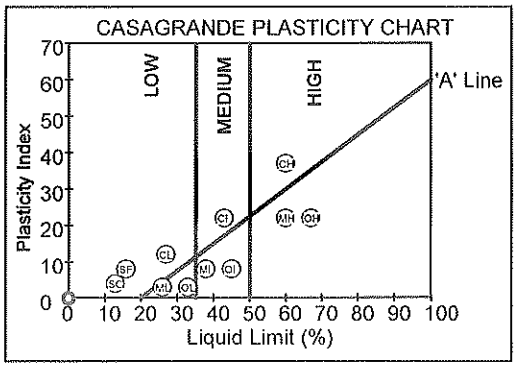
Your Ref : 505788
Our Ref : 7686
Date Reported : 08.11.2019

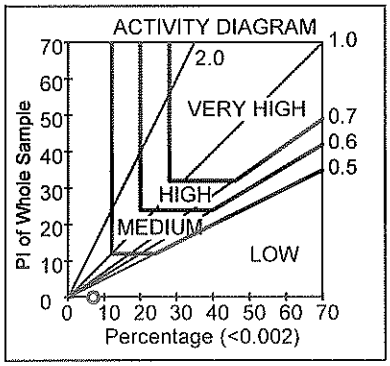
FOUNDATION INDICATOR (ASTM: D422)

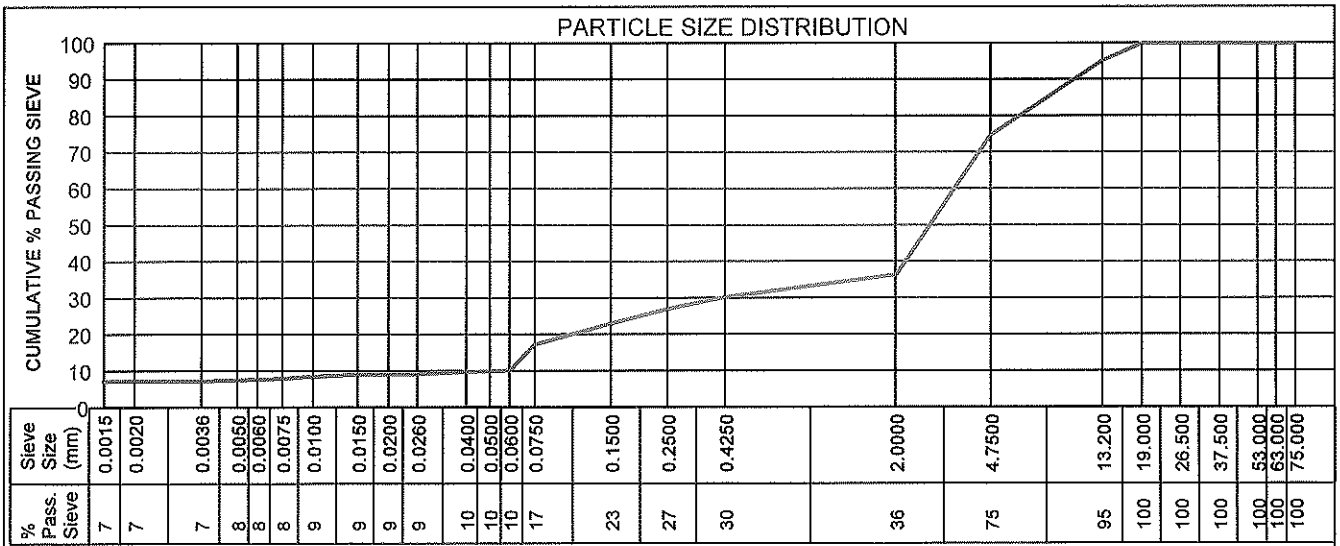
Sample No.	: 10291
Hole No.	: TP 106/1
Depth	: 300 - 700mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-b(0)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 2,17
Percentage (<0.002)	: 7,0
Moisture Content (%)	: 5,1

Material Description : (Ferricrete) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	7,5	2,4	26,5	63,6	CLAYEY SAND
Astm	7,5	9,7	57,5	25,3	SILTY SAND
British Standard	7,2	3,0	26,2	63,6	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	7	7	7	8	8	8	9	9	9	9	10	10	10	17	23	27	30	36	75	95	100	100	100	100	100	100

JENN	CLAY		SILT		SAND				GRAVEL		
ASTM	CLAY		SILT			FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND		FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/K Date Reported : 02.11.2019

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

SAMPLE NO.	10292			
HOLE NO.	TP 108/1			
ROAD NO.	N/A			
DEPTH	0 - 300mm			
CHAINAGE	TP 108/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Hillwash			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm				
14.0 mm				
5.0 mm	100			
2.0 mm	85			
0.425 mm	78			
0.075 mm	45			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	8			
FINE SAND <0.425mm >0.075mm	39			
MATERIAL <0.075mm	53			
CONSTANTS				
GRADING MODULUS	0,92			
PRA CLASSIFICATION	A-4(2)			
COLTO CLASSIFICATION	---			
TRH Class.(INSITU |93%|90%|)	G10| -			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	SP			
LINEAR SHRINKAGE (%)	1,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2016			
OPTIMUM MOISTURE CONTENT(%)	8,9			
MOULDING MOISTURE (%)	8,7			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	8,8			
CBR-UCS @ 98% MOD AASHTO	7,2			
CBR-UCS @ 97% MOD AASHTO	6,5			
CBR-UCS @ 95% MOD AASHTO	5,3			
CBR-UCS @ 93% MOD AASHTO	4,0			
CBR-UCS @ 90% MOD AASHTO	2,7			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,80	0,90	0,90										

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

A L R. Bhikam

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 02.11.2019

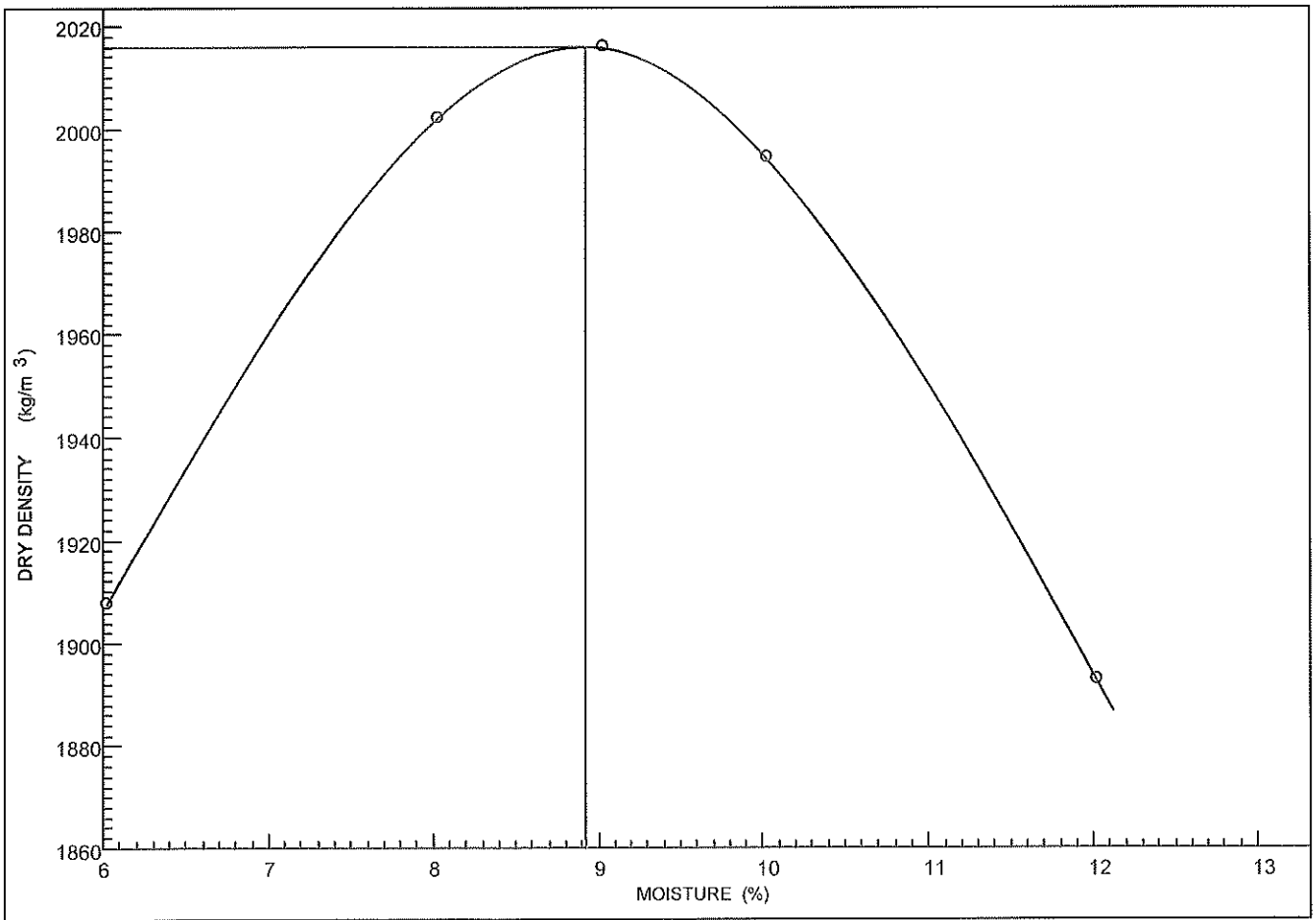
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10292	Hole No. : TP 108/1	Depth (mm) : 0 - 300mm
Origin : TP 108/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Hillwash		

Optimum Moisture Content (%) : 8,9

Maximum Dry Density (kg/m^3): 2016

Point No.	1	2	3	4	5			
Moisture (%)	6,0	8,0	9,0	10,0	12,0			
Density (kg/m^3)	1908	2002	2016	1994	1893			



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

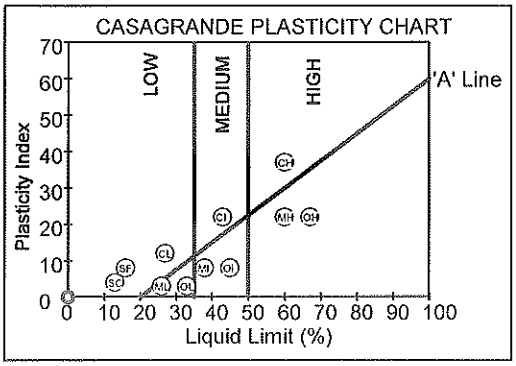
Your Ref : 505788
Our Ref : 7686
Date Reported : 11.11.2019

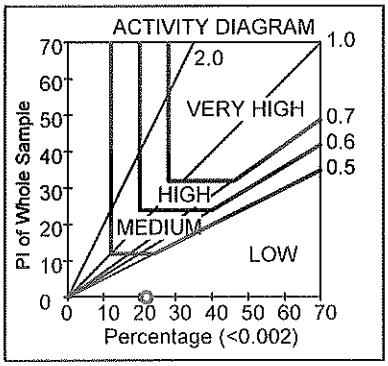
FOUNDATION INDICATOR (ASTM: D422)

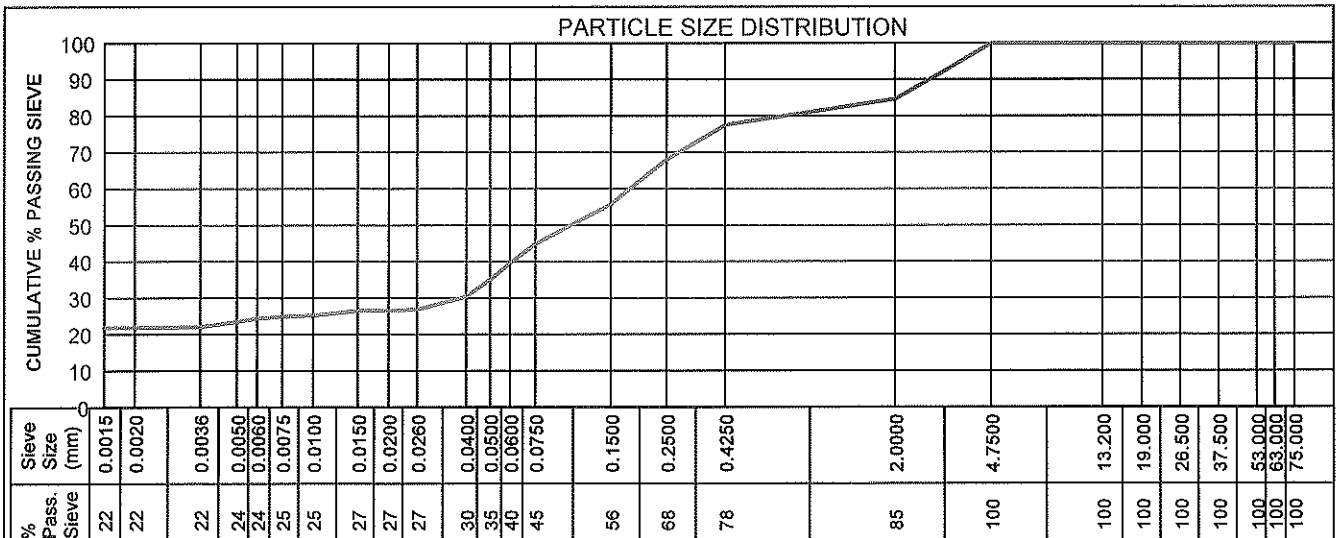
Sample No.	: 10292
Hole No.	: TP 108/1
Depth	: 0 - 300mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-4(2)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 0,92
Percentage (<0.002)	: 22,0
Moisture Content (%)	: 3,4

Material Description : (Hillwash) CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	23,5	11,5	49,7	15,3	CLAYEY SAND
Astm	23,5	21,3	55,1	0,0	CLAYEY SAND
British Standard	21,8	17,9	45,0	15,3	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	22	22	22	24	24	25	25	27	27	27	30	35	40	45	56	68	78	85	100	100	100	100	100	100	100	100

JENN	CLAY	SILT		SAND			GRAVEL			
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

A & R. Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

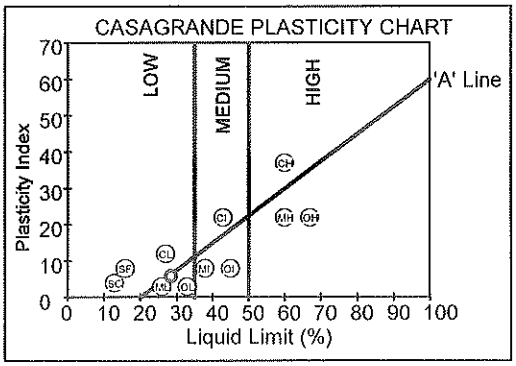
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

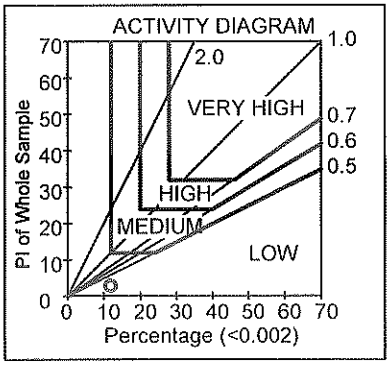
FOUNDATION INDICATOR (ASTM: D422)

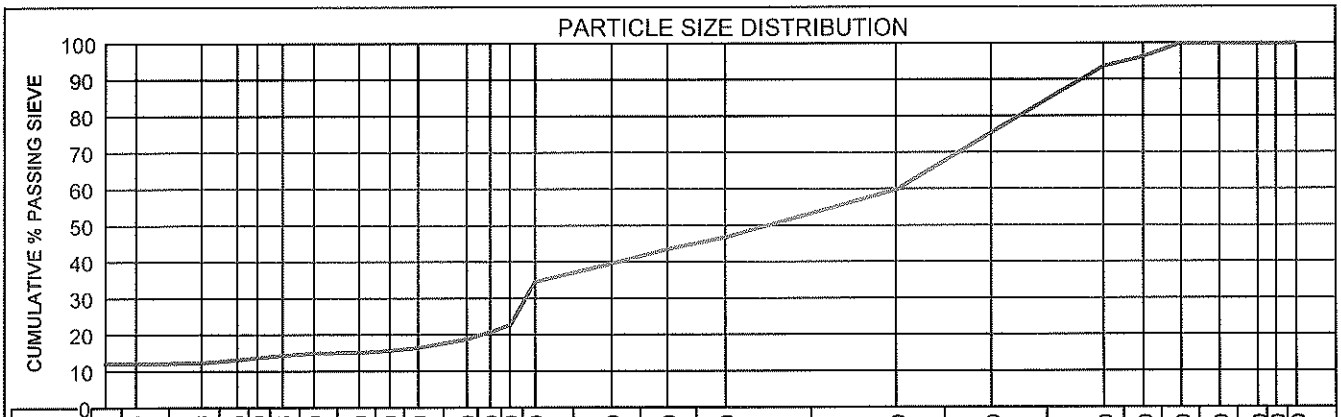
Sample No.	: 10293
Hole No.	: TP 109/1
Depth	: 700 - 1600mm
Liquid Limit (%)	: 29
Plasticity Index	: 6
Linear Shrinkage (%)	: 3,0
PI of Whole Sample	: 3
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SM
Activity	: 0,25
Heave Classification	: LOW
Grading Modulus	: 1,58
Percentage (<0.002)	: 12,0
Moisture Content (%)	: 12,5

Material Description : (Residual Tillite) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	13,2	7,6	39,1	40,1	CLAYEY SAND
Astm	13,2	21,4	40,9	24,5	SILTY SAND
British Standard	12,2	10,6	37,2	40,1	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	12	12	12	13	14	14	15	15	16	17	19	21	23	35	40	44	47	60	75	94	96	100	100	100	100	100

JENN	CLAY	SILT		SAND			GRAVEL			
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/L Date Reported : 02.11.2019

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

SAMPLE NO.	10294			
HOLE NO.	TP 111/1			
ROAD NO.	N/A			
DEPTH	0 - 400mm			
CHAINAGE	TP 111/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Hillwash			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm				
14.0 mm	100			
5.0 mm	98			
2.0 mm	91			
0.425 mm	82			
0.075 mm	34			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	10			
FINE SAND <0.425mm >0.075mm	53			
MATERIAL <0.075mm	37			
CONSTANTS				
GRADING MODULUS	0,93			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	G7			
TRH CLASSIFICATION	G7			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	SP			
LINEAR SHRINKAGE (%)	1,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2093			
OPTIMUM MOISTURE CONTENT(%)	6,4			
MOULDING MOISTURE (%)	6,1			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	61			
CBR-UCS @ 98% MOD AASHTO	43			
CBR-UCS @ 97% MOD AASHTO	37			
CBR-UCS @ 95% MOD AASHTO	26			
CBR-UCS @ 93% MOD AASHTO	18			
CBR-UCS @ 90% MOD AASHTO	11			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,00	0,10										

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

A & P. Bhikam

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

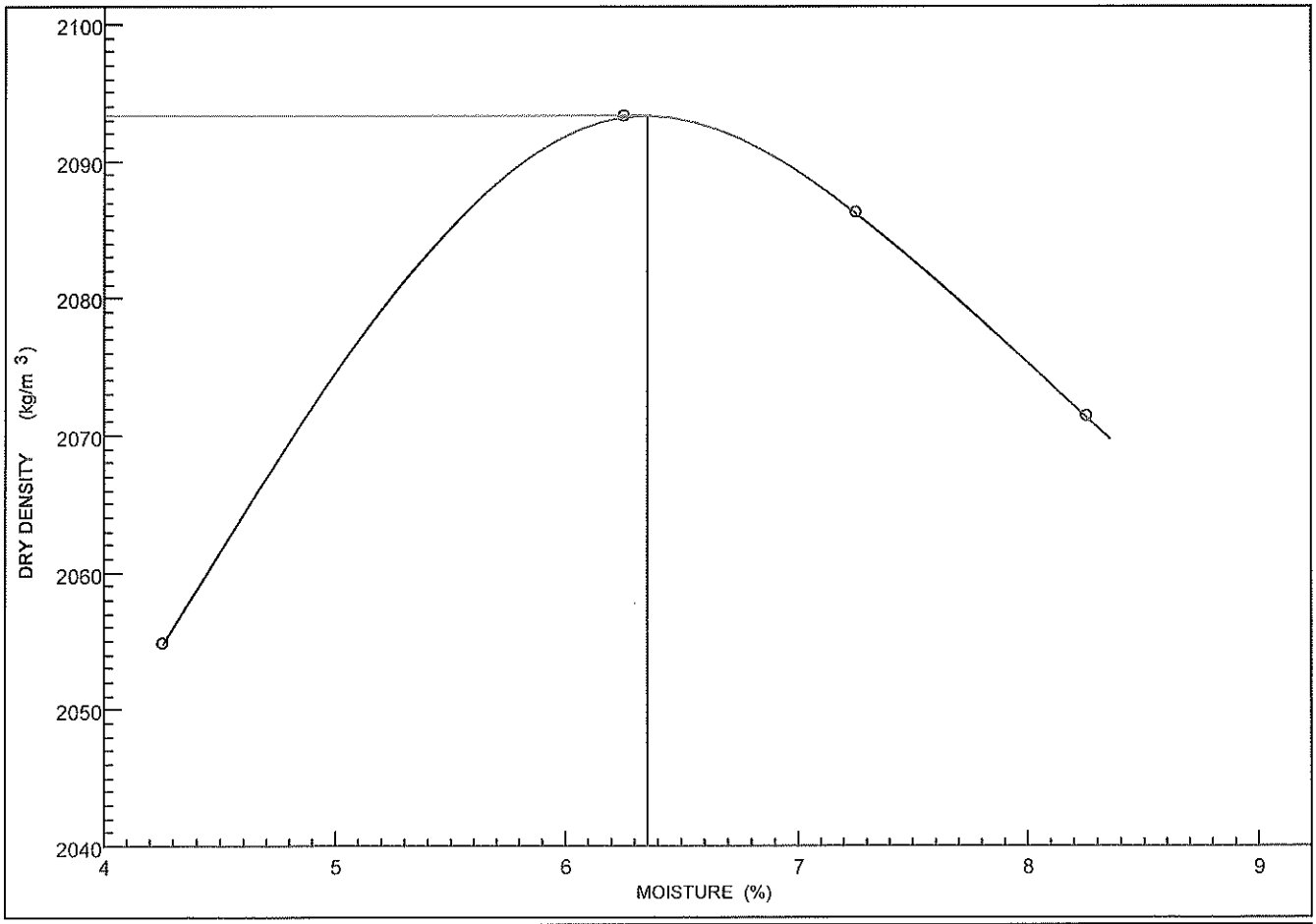
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10294	Hole No. : TP 111/1	Depth (mm) : 0 - 400mm
Origin : TP 111/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Hillwash		

Optimum Moisture Content (%) : 6,4

Maximum Dry Density (kg/m^3): 2093

Point No.	1	2	3	4				
Moisture (%)	4,3	6,3	7,3	8,3				
Density (kg/m^3)	2055	2093	2086	2071				



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

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Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

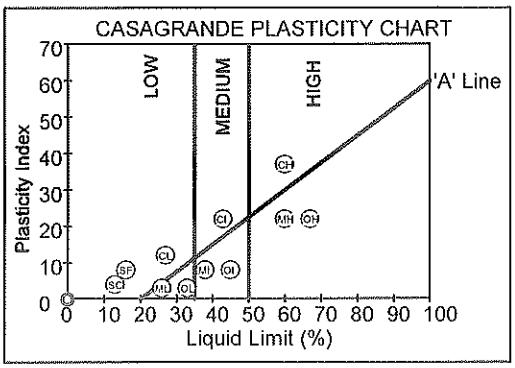
Your Ref : 505788
Our Ref : 7686
Date Reported : 11.11.2019

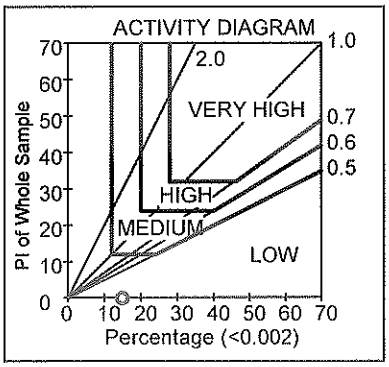
FOUNDATION INDICATOR (ASTM: D422)

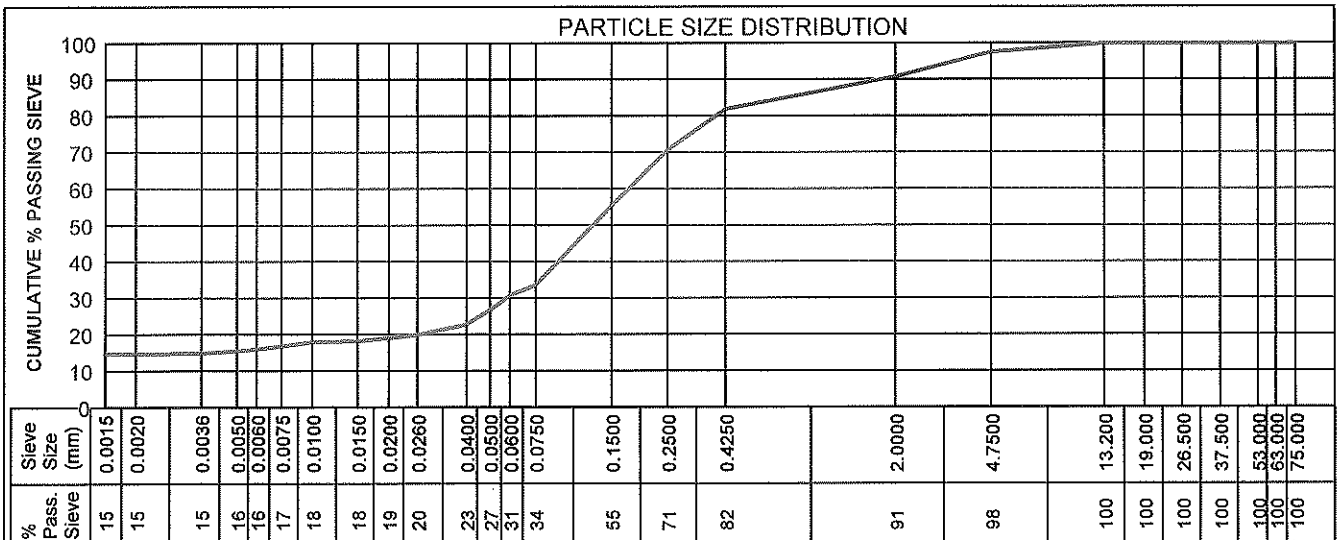
Sample No.	: 10294
Hole No.	: TP 111/1
Depth	: 0 - 400mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 0,93
Percentage (<0.002)	: 15,0
Moisture Content (%)	: 1,7

Material Description : (Hillwash) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	15,6	11,3	64,0	9,1	SILTY SAND
Astm	15,6	18,1	64,0	2,4	SILTY SAND
British Standard	14,8	16,1	60,0	9,1	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	15	15	15	16	16	17	18	18	19	20	23	27	31	34	55	71	82	91	98	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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a SANAS Accredited Testing Laboratory, No. T 0239

60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/M
Date Reported : 02.11.2019

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

SAMPLE NO.	10295			
HOLE NO.	TP 113/1			
ROAD NO.	N/A			
DEPTH	1500 - 3200mm			
CHAINAGE	TP 113/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Tillite			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm				
14.0 mm	100			
5.0 mm	93			
2.0 mm	84			
0.425 mm	67			
0.075 mm	39			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	20			
FINE SAND <0.425mm >0.075mm	33			
MATERIAL <0.075mm	47			
CONSTANTS				
GRADING MODULUS	1,10			
PRA CLASSIFICATION	A-4(1)			
COLTO CLASSIFICATION	---			
TRH Class.(INSITU |93%|90%|)	- | -			
LIQUID LIMIT (%)	30			
PLASTICITY INDEX (0.425mm)	7			
LINEAR SHRINKAGE (%)	3,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	1897			
OPTIMUM MOISTURE CONTENT(%)	12,2			
MOULDING MOISTURE (%)	11,9			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	7,4			
CBR-UCS @ 98% MOD AASHTO	5,5			
CBR-UCS @ 97% MOD AASHTO	4,8			
CBR-UCS @ 95% MOD AASHTO	3,6			
CBR-UCS @ 93% MOD AASHTO	2,7			
CBR-UCS @ 90% MOD AASHTO	1,7			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	2,30	2,50	2,70										

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

R. Bhikam

Technical Signatory : Rasalis Bhikam

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 02.11.2019

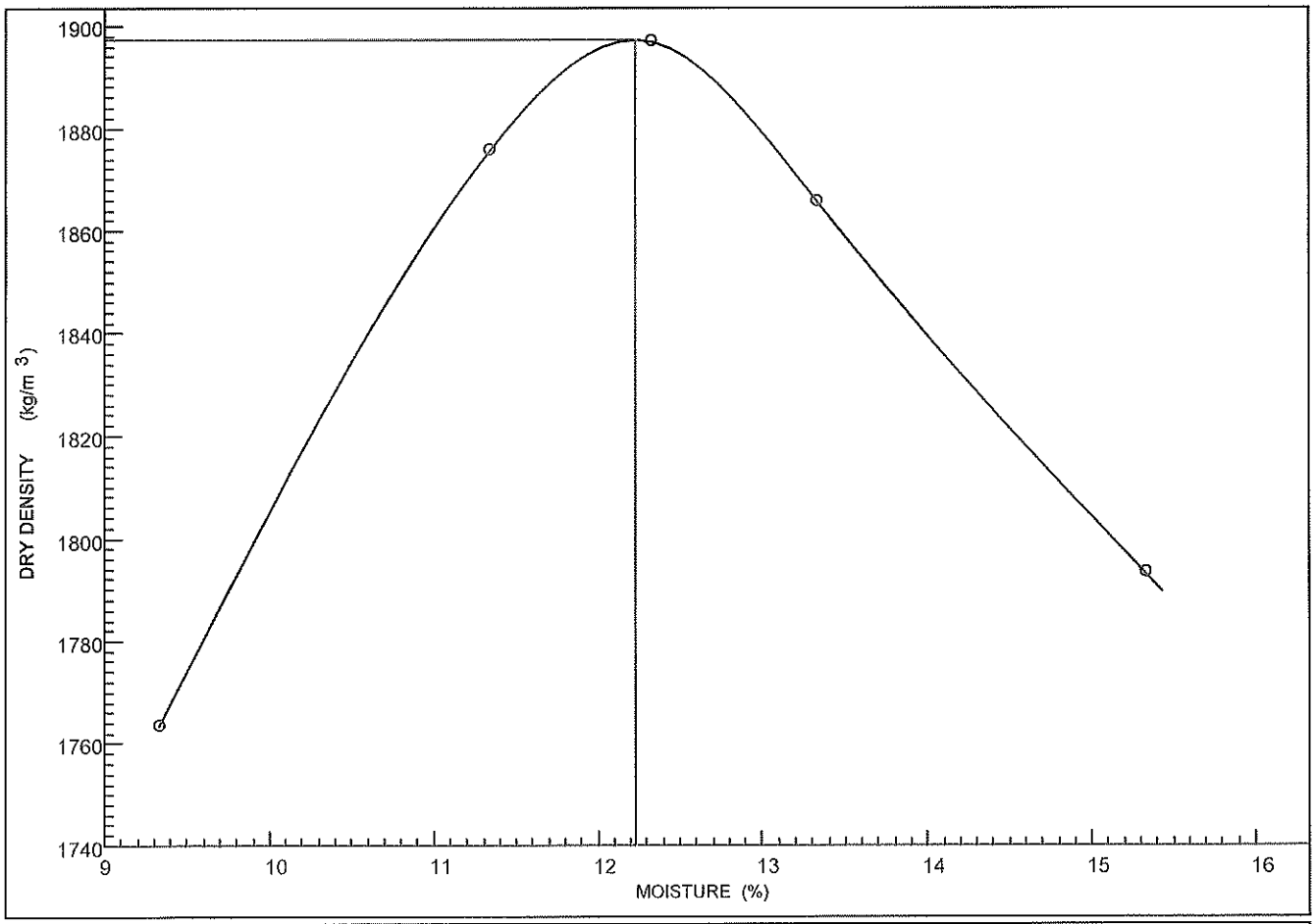
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10295	Hole No. : TP 113/1	Depth (mm) : 1500 - 3200mm
Origin : TP 113/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Tillite		

Optimum Moisture Content (%) : 12,2

Maximum Dry Density (kg/m^3): 1897

Point No.	1	2	3	4	5			
Moisture (%)	9,3	11,3	12,3	13,3	15,3			
Density (kg/m^3)	1763	1875	1897	1866	1793			



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

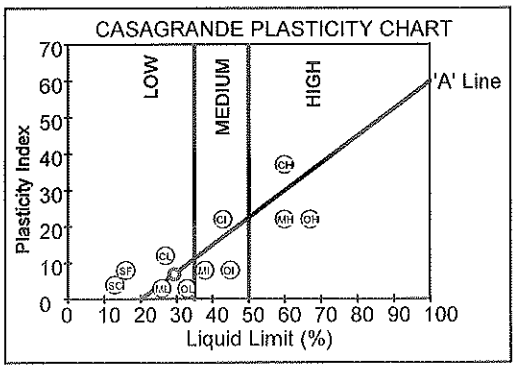
Your Ref : 505788
Our Ref : 7686
Date Reported : 11.11.2019

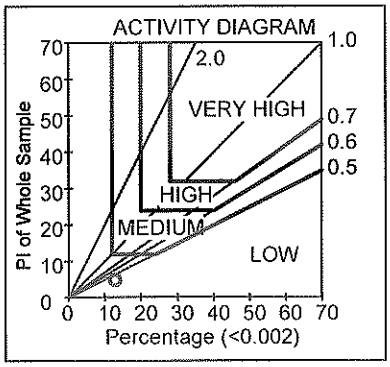
FOUNDATION INDICATOR (ASTM: D422)

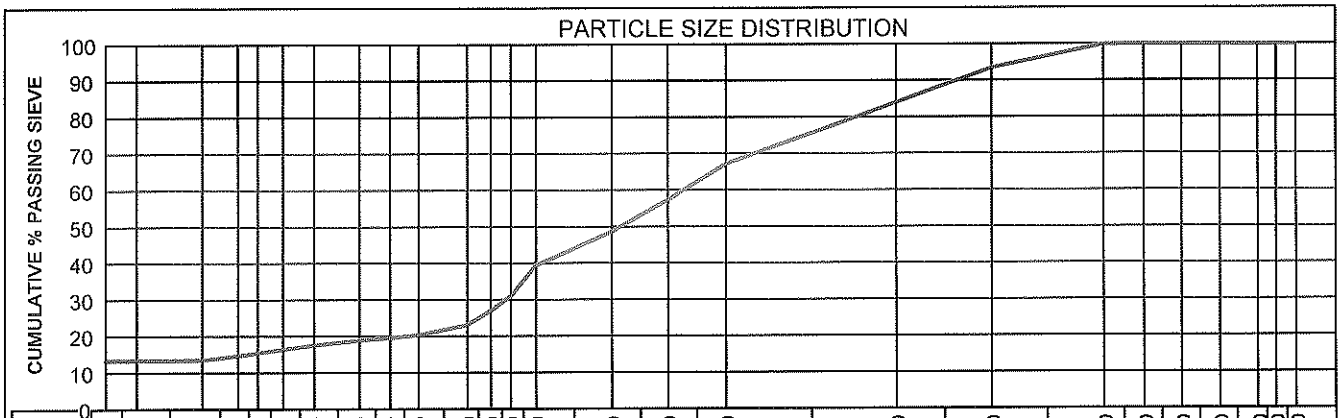
Sample No.	: 10295
Hole No.	: TP 113/1
Depth	: 1500 - 3200mm
Liquid Limit (%)	: 30
Plasticity Index	: 7
Linear Shrinkage (%)	: 3,5
PI of Whole Sample	: 5
P.R.A. Classification	: A-4(1)
Unified Soil Classificati	: SM
Activity	: 0,38
Heave Classification	: LOW
Grading Modulus	: 1,10
Percentage (<0.002)	: 13,0
Moisture Content (%)	: 8,2

Material Description : (Tillite) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	14,8	12,4	57,1	15,8	SILTY SAND
Astm	14,8	24,7	54,0	6,5	SILTY SAND
British Standard	13,4	17,8	53,1	15,8	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	13	13	14	15	16	16	18	19	20	20	23	27	31	39	49	57	67	84	93	100	100	100	100	100	100	100

JENN	CLAY	SILT		SAND			GRAVEL			
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

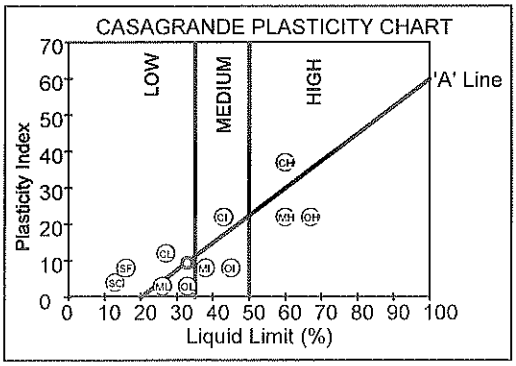
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

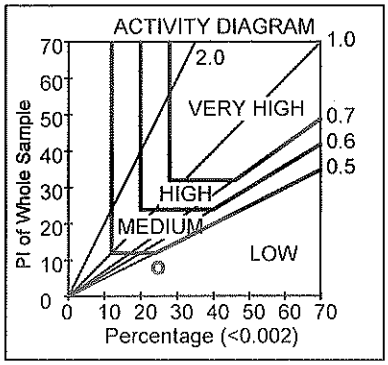
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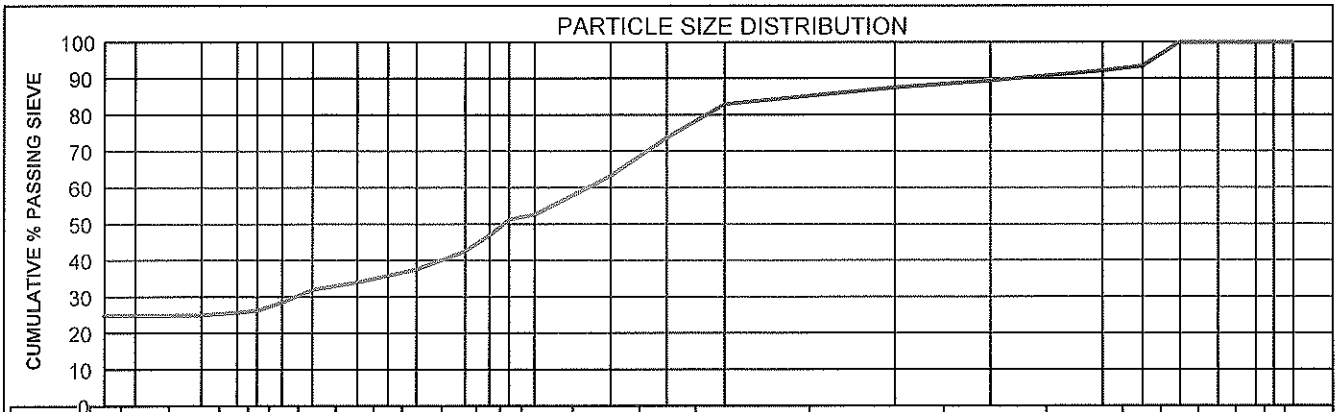
Sample No.	: 10296
Hole No.	: TP 114/1
Depth	: 600 - 2400mm
Liquid Limit (%)	: 33
Plasticity Index	: 9
Linear Shrinkage (%)	: 4,5
PI of Whole Sample	: 8
P.R.A. Classification	: A-4(4)
Unified Soil Classificati	: ML
Activity	: 0,32
Heave Classification	: LOW
Grading Modulus	: 0,76
Percentage (<0.002)	: 25,0
Moisture Content (%)	: 27,0

Material Description : (Residual Tillite) CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	25,8	21,1	40,7	12,4	CLAYEY SAND
Astm	25,8	26,8	36,8	10,5	CLAYEY SAND
British Standard	24,9	26,5	36,2	12,4	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	25	25	25	26	26	28	32	34	36	38	43	47	51	53	63	74	83	88	89	92	94	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

P. Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/N
Date Reported : 02.11.2019

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

SAMPLE NO.	10297			
HOLE NO.	TP 122/1			
ROAD NO.	N/A			
DEPTH	1500 - 2700mm			
CHAINAGE	TP 122/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Residual Sandstone			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm	100			
14.0 mm	97			
5.0 mm	95			
2.0 mm	93			
0.425 mm	77			
0.075 mm	32			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	17			
FINE SAND <0.425mm >0.075mm	48			
MATERIAL <0.075mm	35			
CONSTANTS				
GRADING MODULUS	0,98			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	---			
TRH Class.(INSITU |93%|90%|)	G10|G10			
LIQUID LIMIT (%)	24			
PLASTICITY INDEX (0.425mm)	SP			
LINEAR SHRINKAGE (%)	1,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2079			
OPTIMUM MOISTURE CONTENT(%)	8,2			
MOULDING MOISTURE (%)	8,0			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	18			
CBR-UCS @ 98% MOD AASHTO	13			
CBR-UCS @ 97% MOD AASHTO	11			
CBR-UCS @ 95% MOD AASHTO	8,0			
CBR-UCS @ 93% MOD AASHTO	5,7			
CBR-UCS @ 90% MOD AASHTO	3,4			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	1,20	1,20	1,20										

Remarks :

FORM: A1

A & R. Bhikam

Technical Signatory : Rasalis Bhikam

4.4.0(SGS)(2016.08.31)

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TEST RESULTS

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Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 02.11.2019

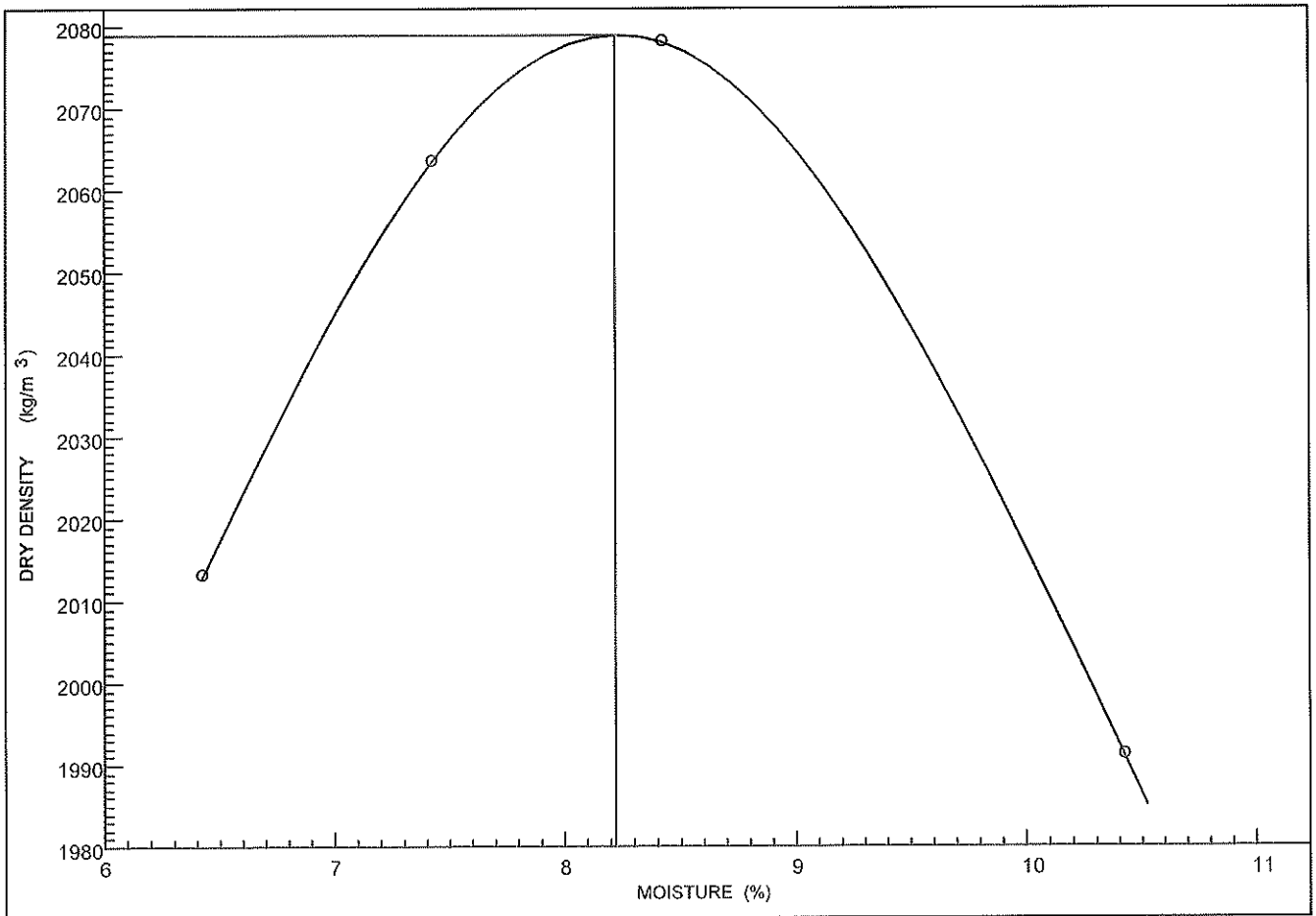
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10297	Hole No. : TP 122/1	Depth (mm) : 1500 - 2700mm
Origin : TP 122/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Residual Sandstone		

Optimum Moisture Content (%) : 8,2

Maximum Dry Density (kg/m^3): 2079

Point No.	1	2	3	4				
Moisture (%)	6,4	7,4	8,4	10,4				
Density (kg/m^3)	2013	2064	2078	1991				



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

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Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

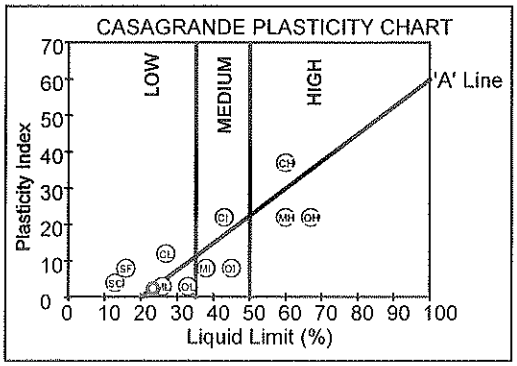
Your Ref : 505788
Our Ref : 7686
Date Reported : 11.11.2019

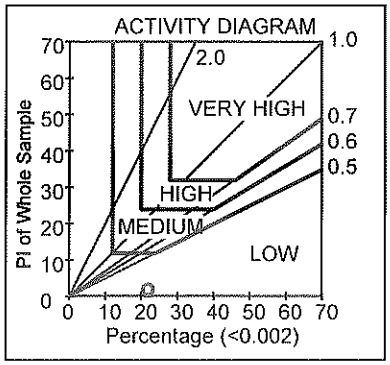
FOUNDATION INDICATOR (ASTM: D422)

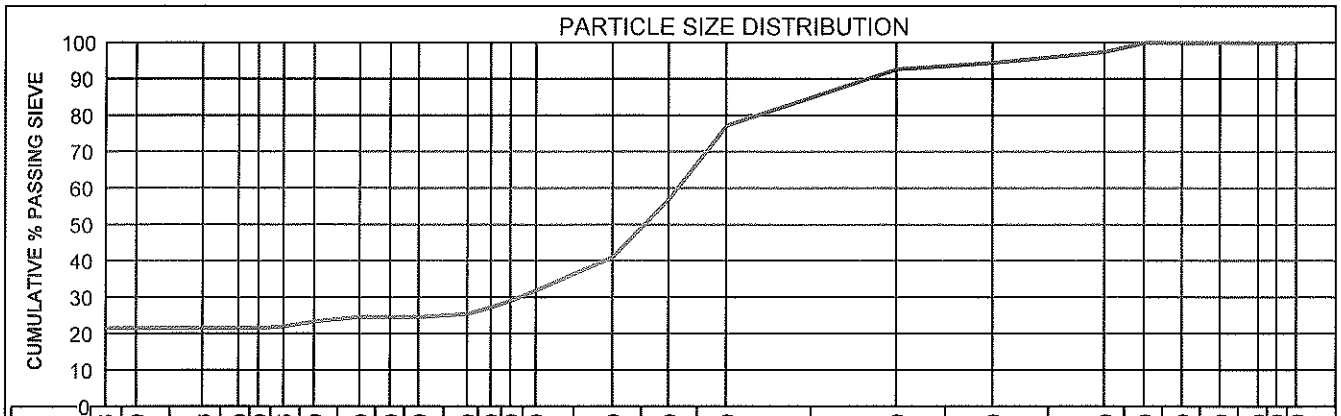
Sample No.	: 10297
Hole No.	: TP 122/1
Depth	: 1500 - 2700mm
Liquid Limit (%)	: 24
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,5
PI of Whole Sample	: 2
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SM
Activity	: 0,09
Heave Classification	: LOW
Grading Modulus	: 0,98
Percentage (<0.002)	: 22,0
Moisture Content (%)	: 2,1

Material Description : (Residual Sandstone) CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	21,6	5,7	65,5	7,3	CLAYEY SAND
Astm	21,6	10,2	62,7	5,5	CLAYEY SAND
British Standard	21,6	7,6	63,6	7,3	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	22	22	22	22	22	22	23	25	25	25	25	27	29	32	41	57	77	93	95	97	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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a SANAS Accredited Testing Laboratory, No. T 0239

60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/O
Date Reported : 02.11.2019

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

SAMPLE NO.	10298			
HOLE NO.	TP 124/1			
ROAD NO.	N/A			
DEPTH	0 - 850mm			
CHAINAGE	TP 124/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Hillwash			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm				
14.0 mm	100			
5.0 mm	99			
2.0 mm	99			
0.425 mm	79			
0.075 mm	27			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	20			
FINE SAND <0.425mm >0.075mm	53			
MATERIAL <0.075mm	27			
CONSTANTS				
GRADING MODULUS	0,95			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	G7			
TRH CLASSIFICATION	G7			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	SP			
LINEAR SHRINKAGE (%)	0,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2067			
OPTIMUM MOISTURE CONTENT(%)	7,6			
MOULDING MOISTURE (%)	7,6			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	59			
CBR-UCS @ 98% MOD AASHTO	45			
CBR-UCS @ 97% MOD AASHTO	39			
CBR-UCS @ 95% MOD AASHTO	30			
CBR-UCS @ 93% MOD AASHTO	25			
CBR-UCS @ 90% MOD AASHTO	19			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,10	0,20	0,30										

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 02.11.2019

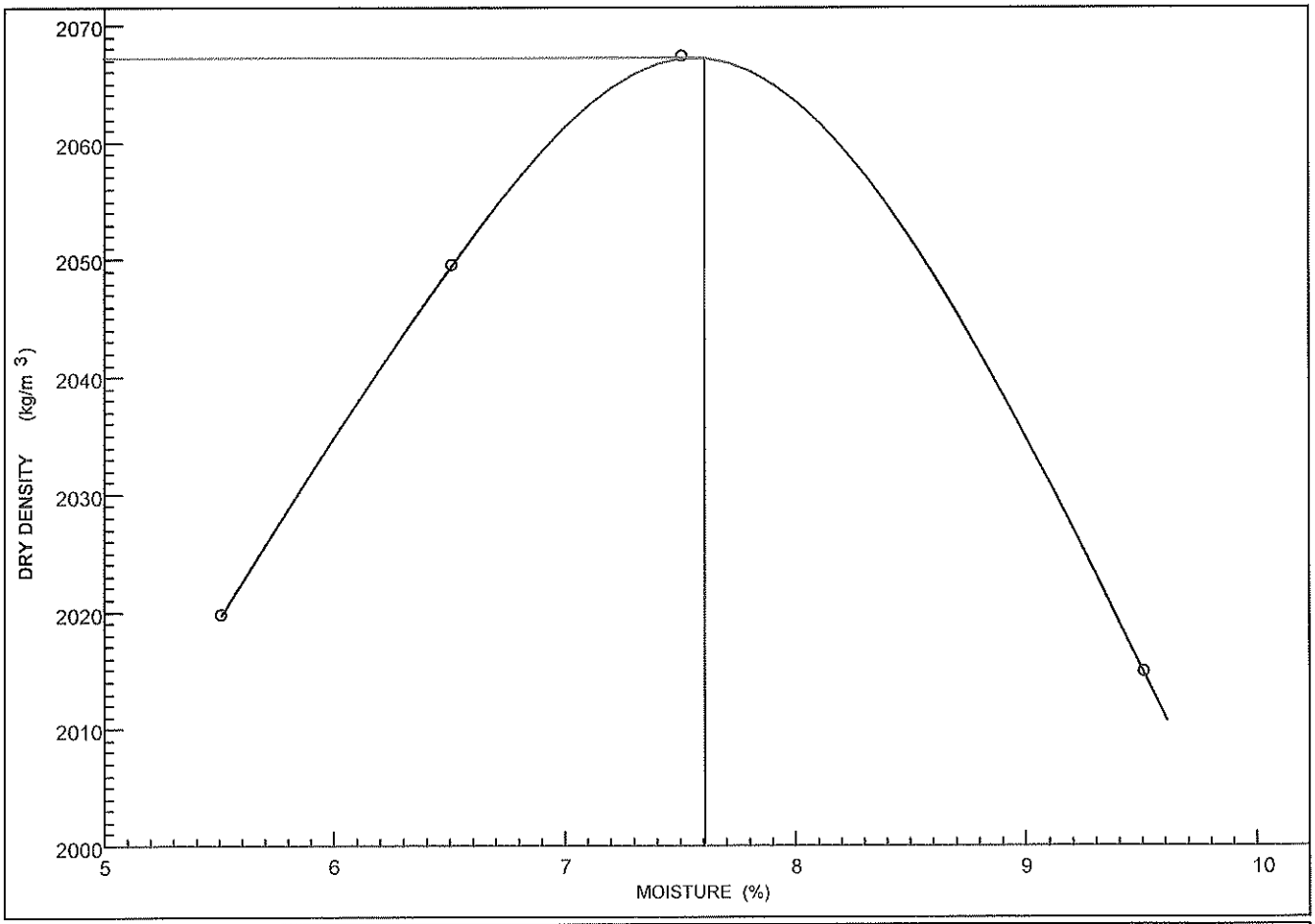
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10298	Hole No. : TP 124/1	Depth (mm) : 0 - 850mm
Origin : TP 124/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Hillwash		

Optimum Moisture Content (%) : 7,6

Maximum Dry Density (kg/m^3): 2067

Point No.	1	2	3	4				
Moisture (%)	5,5	6,5	7,5	9,5				
Density (kg/m^3)	2020	2050	2067	2015				



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

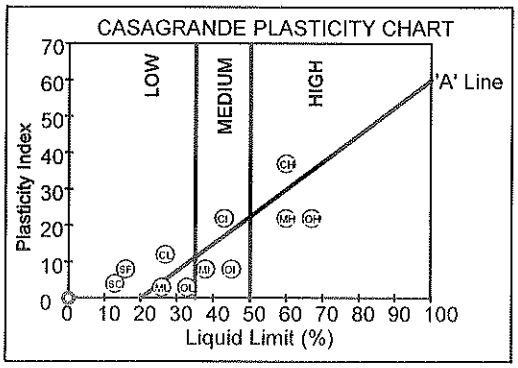
Your Ref : 505788
Our Ref : 7686
Date Reported : 11.11.2019

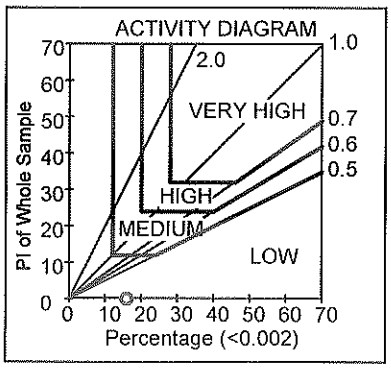
FOUNDATION INDICATOR (ASTM: D422)

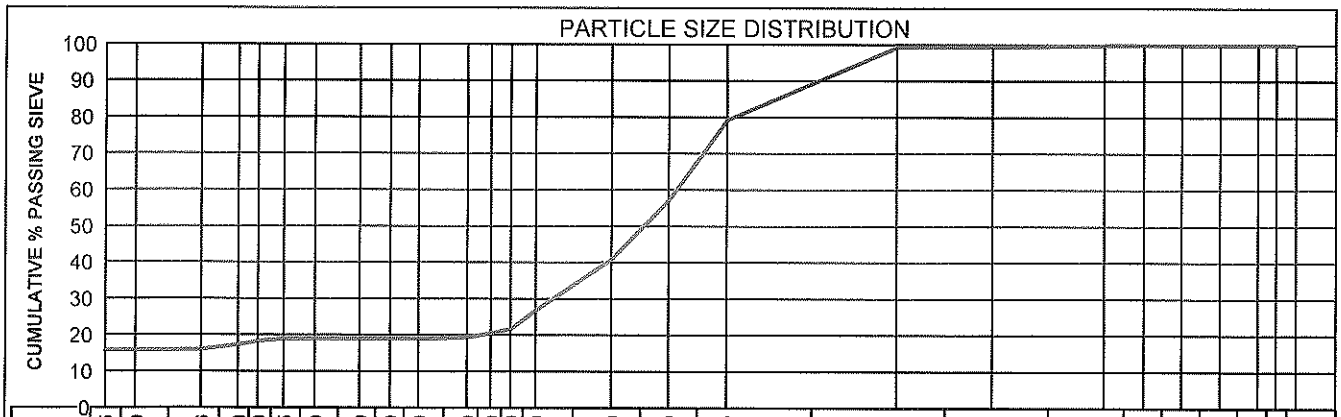
Sample No.	: 10298
Hole No.	: TP 124/1
Depth	: 0 - 850mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 0,5
PI of Whole Sample	: 0
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 0,95
Percentage (<0.002)	: 16,0
Moisture Content (%)	: 2,1

Material Description : (Hillwash) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	17,4	3,2	78,8	0,6	SILTY SAND
Astm	17,4	9,4	72,6	0,6	SILTY SAND
British Standard	15,8	6,0	77,6	0,6	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	16	16	16	17	18	19	19	19	19	19	19	21	22	27	41	57	79	99	99	100	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

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60 Columbine Place, Glen Anil, Durban North, 4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

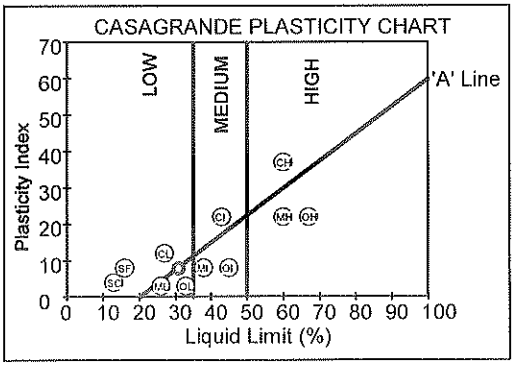
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

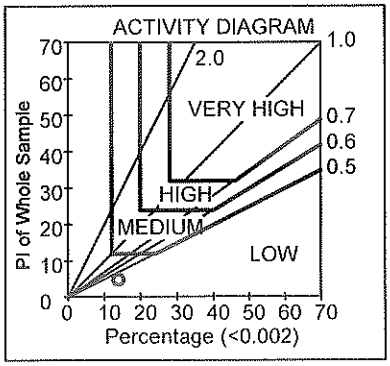
FOUNDATION INDICATOR (ASTM: D422)

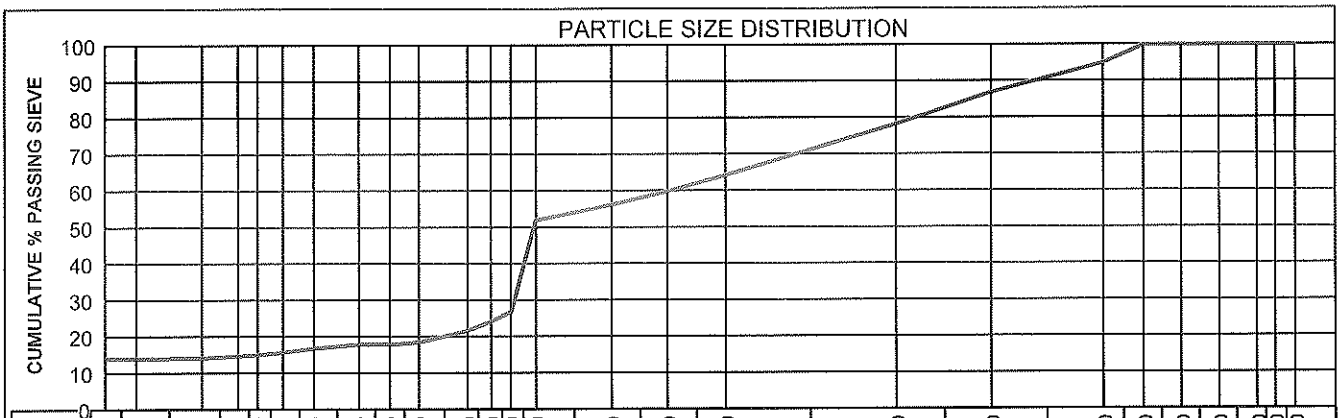
Sample No.	: 10299
Hole No.	: TP 127/1
Depth	: 1500 - 2500mm
Liquid Limit (%)	: 31
Plasticity Index	: 8
Linear Shrinkage (%)	: 4,0
PI of Whole Sample	: 5
P.R.A. Classification	: A-4(3)
Unified Soil Classificati	: ML
Activity	: 0,36
Heave Classification	: LOW
Grading Modulus	: 1,06
Percentage (<0.002)	: 14,0
Moisture Content (%)	: 12,0

Material Description : Residual Tillite SANDY SILT

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	14,7	9,5	54,1	21,6	SILTY SAND
Astm	14,7	37,3	34,9	13,1	SANDY SILT
British Standard	14,1	12,8	51,5	21,6	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	14	14	14	15	15	16	17	18	18	19	22	24	27	52	56	60	64	78	87	95	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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Technical Signatory : Rasalis Bhikam

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Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/P
Date Reported : 02.11.2019

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

SAMPLE NO.	10300			
HOLE NO.	TP 130/1			
ROAD NO.	N/A			
DEPTH	700 - 1100mm			
CHAINAGE	TP 130/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Ferricrete			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm				
14.0 mm	100			
5.0 mm	87			
2.0 mm	53			
0.425 mm	41			
0.075 mm	22			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	23			
FINE SAND <0.425mm >0.075mm	36			
MATERIAL <0.075mm	41			
CONSTANTS				
GRADING MODULUS	1,84			
PRA CLASSIFICATION	A-1-b(0)			
COLTO CLASSIFICATION	G7			
TRH CLASSIFICATION	G7			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	SP			
LINEAR SHRINKAGE (%)	1,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2032			
OPTIMUM MOISTURE CONTENT(%)	11,4			
MOULDING MOISTURE (%)	11,1			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	44			
CBR-UCS @ 98% MOD AASHTO	33			
CBR-UCS @ 97% MOD AASHTO	28			
CBR-UCS @ 95% MOD AASHTO	21			
CBR-UCS @ 93% MOD AASHTO	15			
CBR-UCS @ 90% MOD AASHTO	10			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,10	0,10	0,10										

Remarks :

FORM: A1

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Technical Signatory : Rasalis Bhikam

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60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

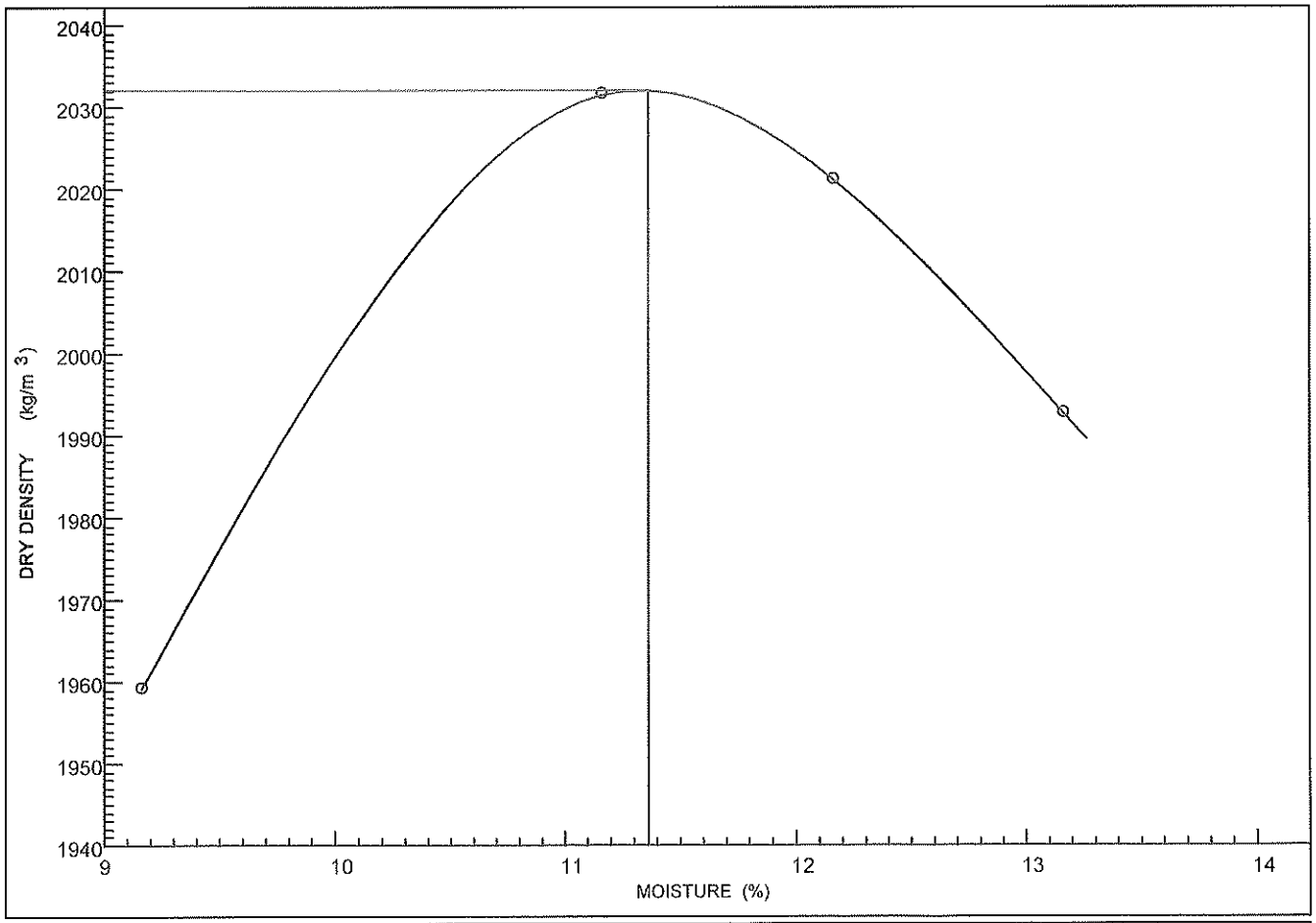
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10300	Hole No. : TP 130/1	Depth (mm) : 700 - 1100mm
Origin : TP 130/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Ferricrete		

Optimum Moisture Content (%) : 11,4

Maximum Dry Density (kg/m^3): 2032

Point No.	1	2	3	4				
Moisture (%)	9,2	11,2	12,2	13,2				
Density (kg/m^3)	1959	2032	2021	1993				



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

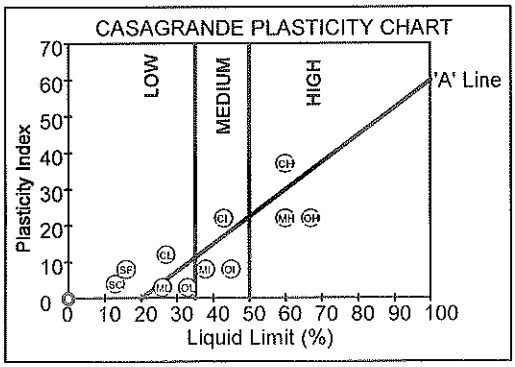
Your Ref : 505788
Our Ref : 7686
Date Reported : 11.11.2019

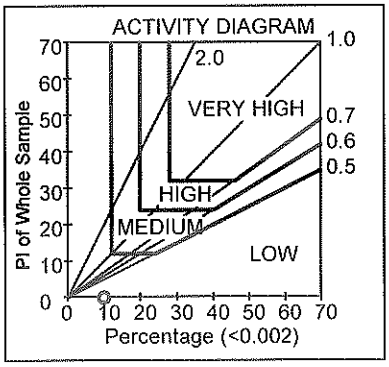
FOUNDATION INDICATOR (ASTM: D422)

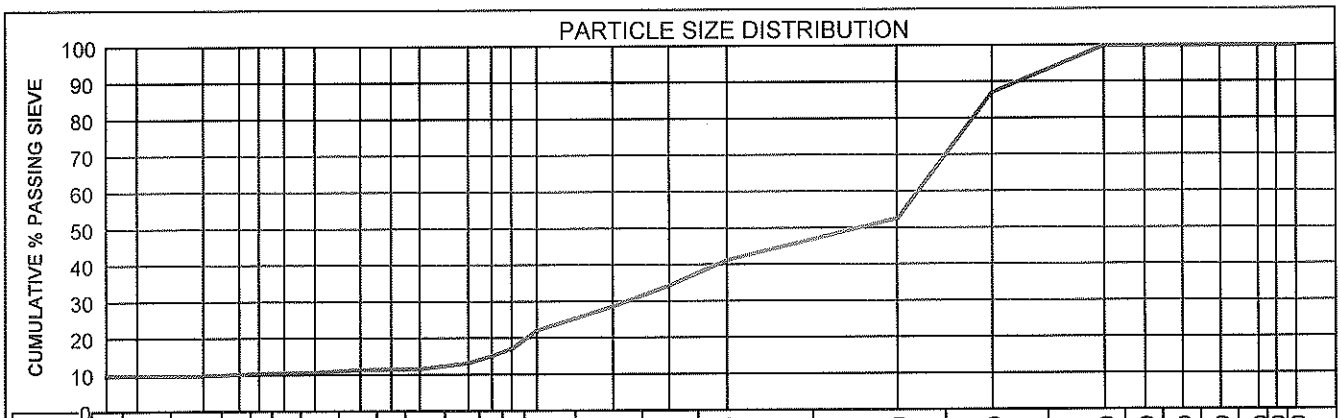
Sample No.	: 10300
Hole No.	: TP 130/1
Depth	: 700 - 1100mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-b(0)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 1,84
Percentage (<0.002)	: 10,0
Moisture Content (%)	: 8,0

Material Description : (Ferricrete) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	10,3	4,9	37,6	47,3	SILTY SAND
Astm	10,3	11,9	64,9	12,9	SILTY SAND
British Standard	9,8	7,4	35,5	47,3	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	10	10	10	10	11	11	11	11	11	12	13	15	17	22	29	34	41	53	87	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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60 Columbine Place, Glen Anil, Durban North, 4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

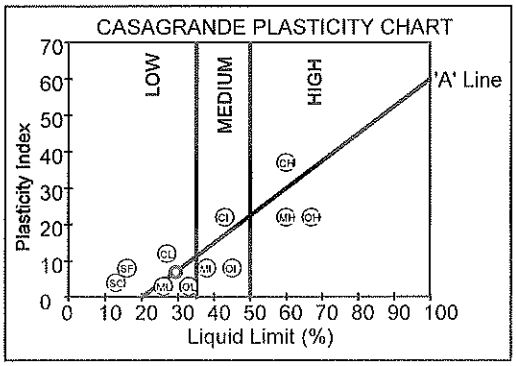
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

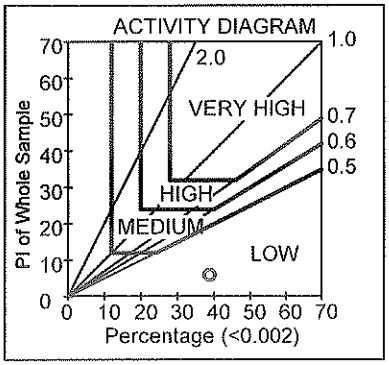
FOUNDATION INDICATOR (ASTM: D422)

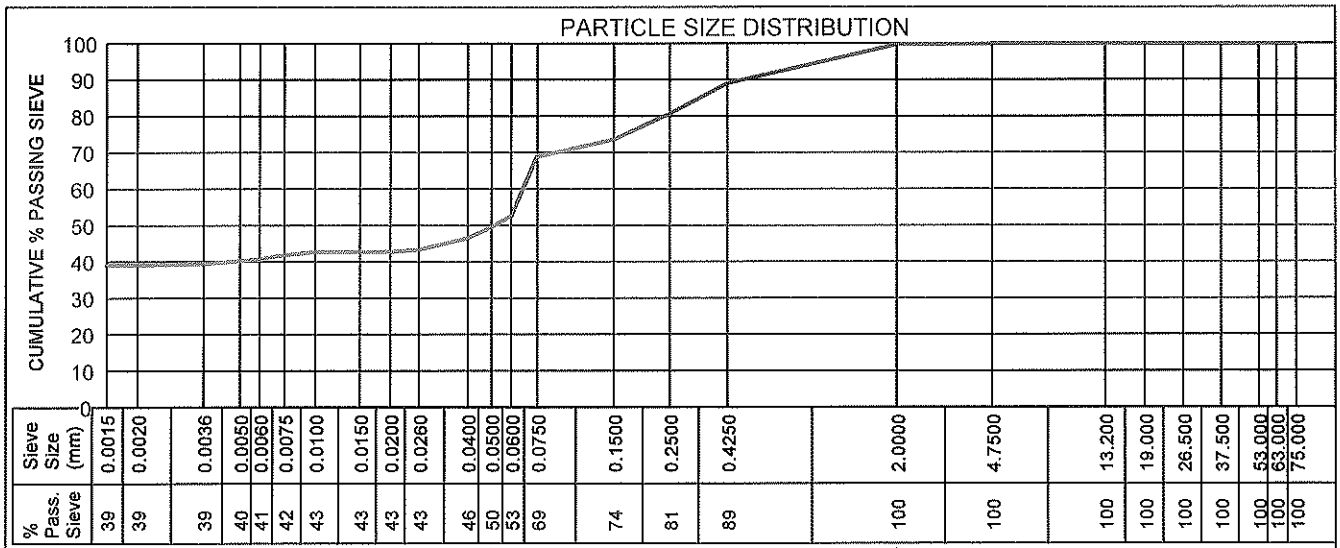
Sample No.	: 10301
Hole No.	: TP 135/1
Depth	: 2900 - 3100mm
Liquid Limit (%)	: 30
Plasticity Index	: 7
Linear Shrinkage (%)	: 3,5
PI of Whole Sample	: 6
P.R.A. Classification	: A-4(7)
Unified Soil Classificati	: ML
Activity	: 0,15
Heave Classification	: LOW
Grading Modulus	: 0,42
Percentage (<0.002)	: 39,0
Moisture Content (%)	: 17,1

Material Description : (Residual Siltstone) SANDY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	40,2	9,3	50,3	0,2	SANDY CLAY
Astm	40,2	28,6	31,1	0,0	SANDY CLAY
British Standard	39,2	13,5	47,2	0,2	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	39	39	39	40	41	42	43	43	43	43	46	50	53	69	74	81	89	100	100	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT		FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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60 Columbine Place, Glen Anil, Durban North, 4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

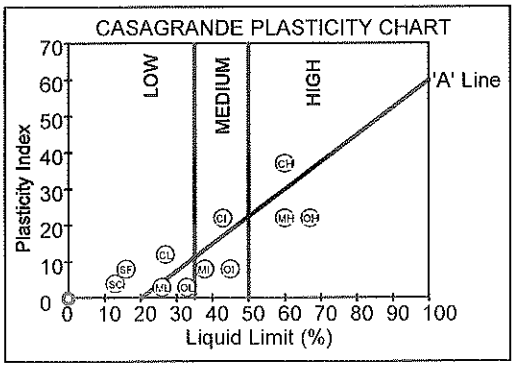
Your Ref : 505788
Our Ref : 7686
Date Reported : 11.11.2019

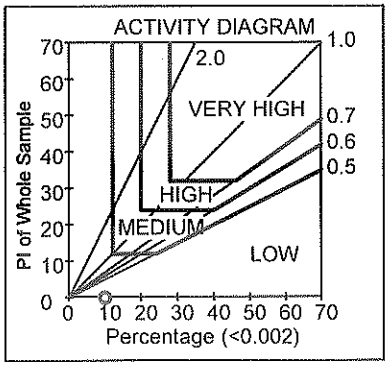
FOUNDATION INDICATOR (ASTM: D422)

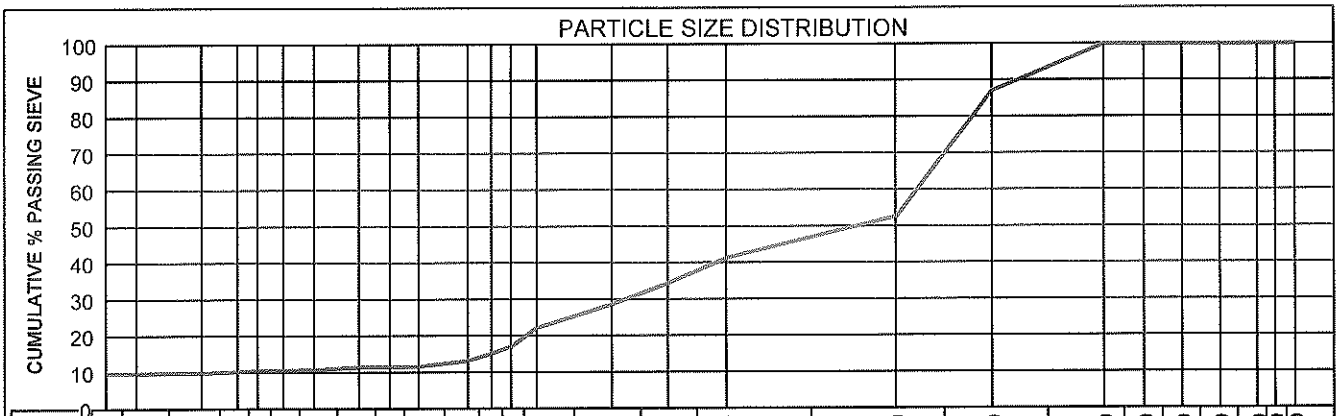
Sample No.	: 10300
Hole No.	: TP 130/1
Depth	: 700 - 1100mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-b(0)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 1,84
Percentage (<0.002)	: 10,0
Moisture Content (%)	: 8,0

Material Description : (Ferricrete) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	10,3	4,9	37,6	47,3	SILTY SAND
Astm	10,3	11,9	64,9	12,9	SILTY SAND
British Standard	9,8	7,4	35,5	47,3	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	10	10	10	10	11	11	11	11	11	12	13	15	17	22	29	34	41	53	87	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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Technical Signatory : Rasalis Bhikam

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60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/Q Date Reported : 02.11.2019

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

SAMPLE NO.	10303			
HOLE NO.	TP 136/1			
ROAD NO.	N/A			
DEPTH	1200 - 2000mm			
CHAINAGE	TP 136/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Residual Sandstone			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm	100			
14.0 mm	99			
5.0 mm	97			
2.0 mm	93			
0.425 mm	83			
0.075 mm	34			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	11			
FINE SAND <0.425mm >0.075mm	53			
MATERIAL <0.075mm	36			
CONSTANTS				
GRADING MODULUS	0,90			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	G7			
TRH CLASSIFICATION	G7			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	SP			
LINEAR SHRINKAGE (%)	1,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2105			
OPTIMUM MOISTURE CONTENT(%)	6,9			
MOULDING MOISTURE (%)	6,6			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	45			
CBR-UCS @ 98% MOD AASHTO	35			
CBR-UCS @ 97% MOD AASHTO	31			
CBR-UCS @ 95% MOD AASHTO	24			
CBR-UCS @ 93% MOD AASHTO	19			
CBR-UCS @ 90% MOD AASHTO	14			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,10	0,20	0,20										

Remarks :

FORM: A1

A.B.R. Bhikam

Technical Signatory : Rasalis Bhikam

4.4.0(SGS)(2016.08.31)

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Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

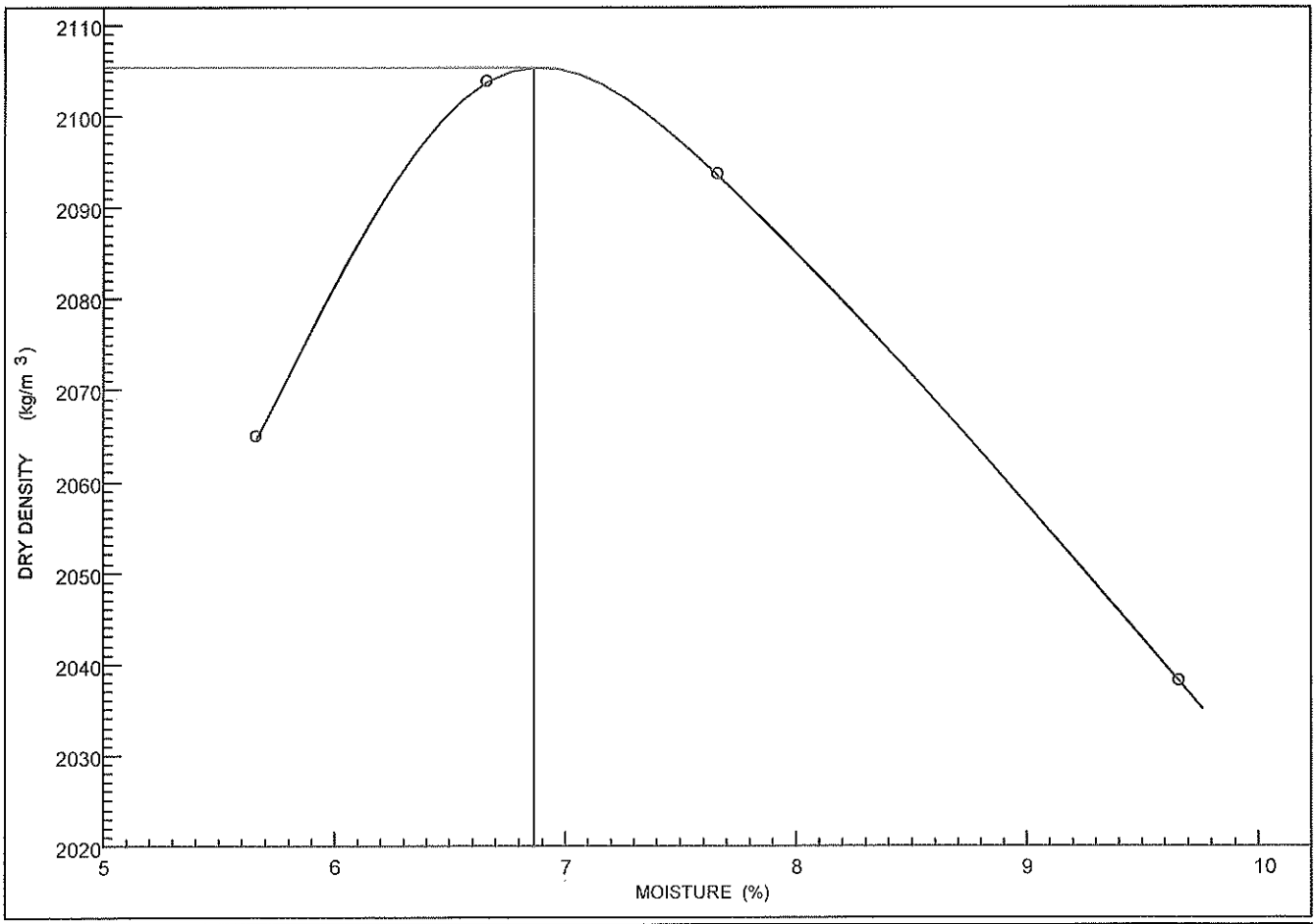
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10303	Hole No. : TP 136/1	Depth (mm) : 1200 - 2000mm
Origin : TP 126/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Residual Sandstone		

Optimum Moisture Content (%) : 6,9

Maximum Dry Density (kg/m^3): 2105

Point No.	1	2	3	4				
Moisture (%)	5,7	6,7	7,7	9,7				
Density (kg/m^3)	2065	2104	2094	2038				



Remarks :

FORM: A7

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Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

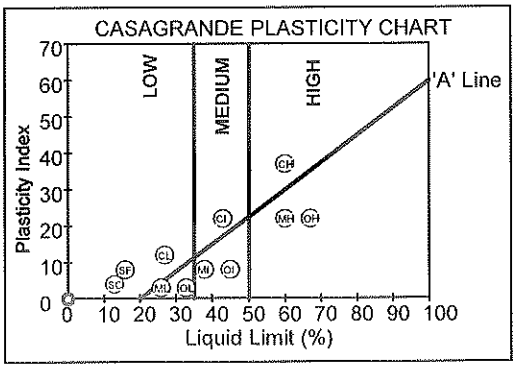
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

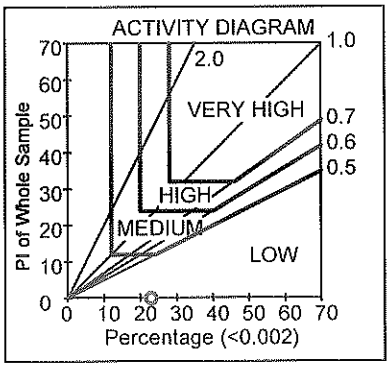
FOUNDATION INDICATOR (ASTM: D422)

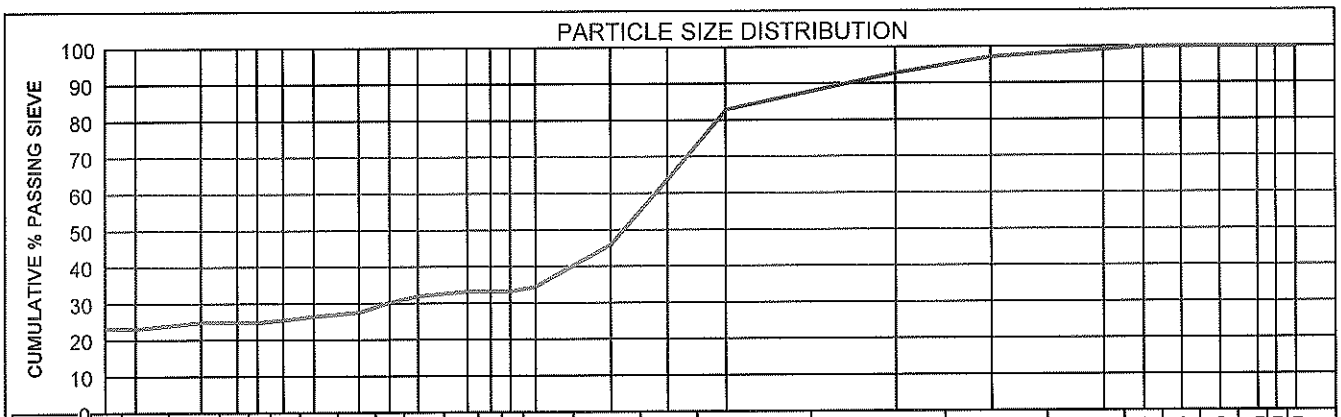
Sample No. : 10303
Hole No. : TP 136/1
Depth : 1200 - 2000mm
Liquid Limit (%) : -
Plasticity Index : SP
Linear Shrinkage (%) : 1,0
PI of Whole Sample : 0
P.R.A. Classification : A-2-4(0)
Unified Soil Classificati: SC
Activity : 0,00
Heave Classification : LOW
Grading Modulus : 0,90
Percentage (<0.002) : 23,0
Moisture Content (%) : 5,0

Material Description : (Residual Sandstone) CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	24,9	8,3	59,8	7,0	CLAYEY SAND
Astm	24,9	9,5	62,8	2,7	CLAYEY SAND
British Standard	23,2	10,0	59,8	7,0	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	23	23	25	25	25	25	27	28	30	32	33	33	33	34	46	64	83	93	97	99	100	100	100	100	100	100

JENN	CLAY		SILT		SAND				GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL	

Remarks :

FORM: A6

A & R. Bhikam

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Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/R
Date Reported : 02.11.2019

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

SAMPLE NO.	10304			
HOLE NO.	TP 138/1			
ROAD NO.	N/A			
DEPTH	1700 - 2200mm			
CHAINAGE	TP 138/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Sandstone			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm	100			
14.0 mm	96			
5.0 mm	94			
2.0 mm	91			
0.425 mm	71			
0.075 mm	25			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	22			
FINE SAND <0.425mm >0.075mm	51			
MATERIAL <0.075mm	27			
CONSTANTS				
GRADING MODULUS	1,13			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	G7			
TRH CLASSIFICATION	G7			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	SP			
LINEAR SHRINKAGE (%)	1,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2048			
OPTIMUM MOISTURE CONTENT(%)	8,5			
MOULDING MOISTURE (%)	8,2			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	57			
CBR-UCS @ 98% MOD AASHTO	47			
CBR-UCS @ 97% MOD AASHTO	43			
CBR-UCS @ 95% MOD AASHTO	36			
CBR-UCS @ 93% MOD AASHTO	21			
CBR-UCS @ 90% MOD AASHTO	7,5			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,10	0,10	0,10									

Remarks :

FORM: A1

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Technical Signatory : Rasalis Bhikam

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Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

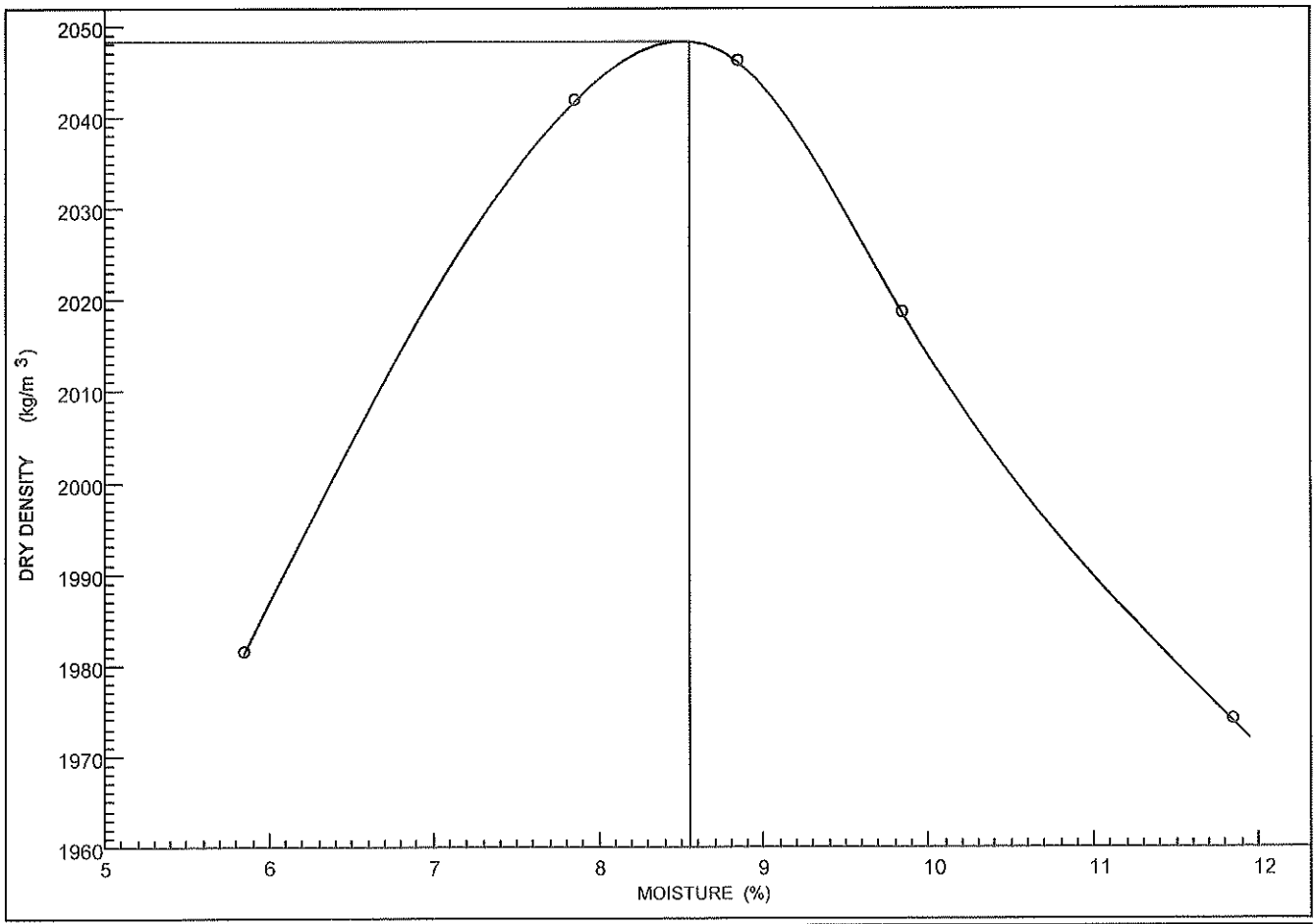
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10304	Hole No. : TP 138/1	Depth (mm) : 1700 - 2200mm
Origin : TP 138/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Sandstone		

Optimum Moisture Content (%) : 8,5

Maximum Dry Density (kg/m^3): 2048

Point No.	1	2	3	4	5			
Moisture (%)	5,8	7,8	8,8	9,8	11,8			
Density (kg/m^3)	1981	2042	2046	2018	1974			



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Mr Nombuso Khanyile

Project : Cato Ridge Township Development

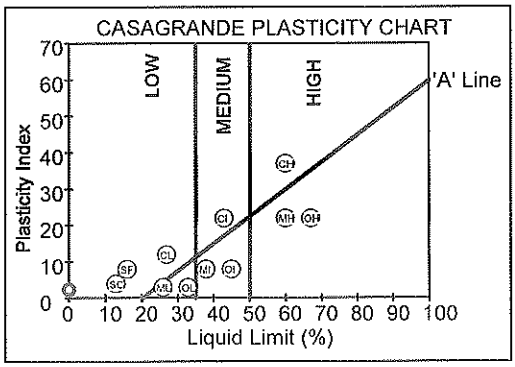
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

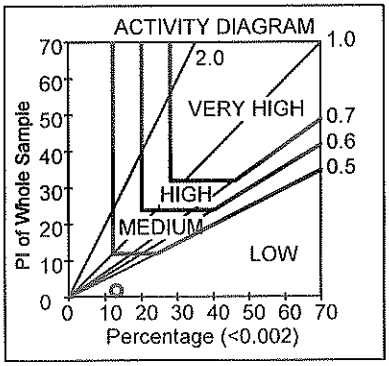
FOUNDATION INDICATOR (ASTM: D422)

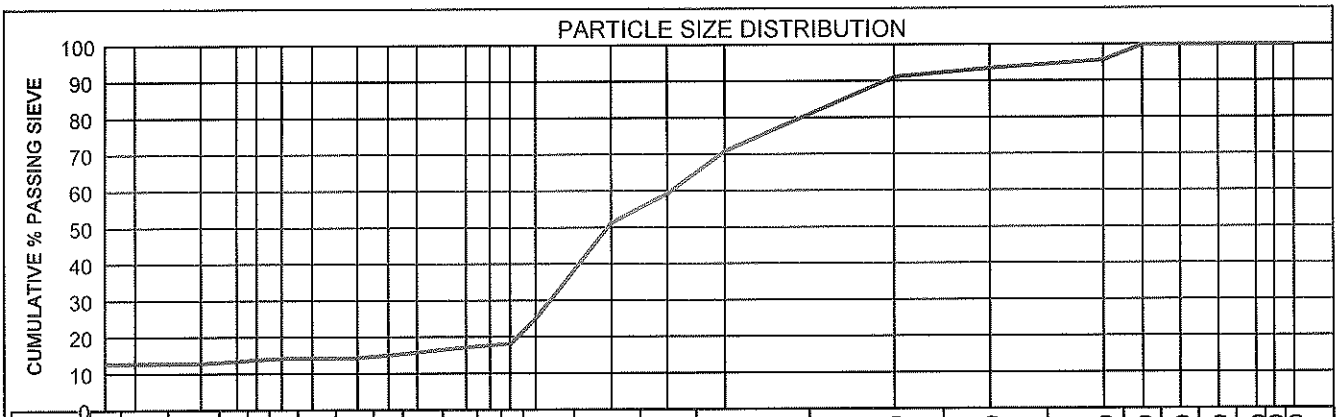
Sample No.	: 10304
Hole No.	: TP 138/1
Depth	: 1700 - 2200mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,5
PI of Whole Sample	: 2
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SC
Activity	: 0,15
Heave Classification	: LOW
Grading Modulus	: 1,13
Percentage (<0.002)	: 13,0
Moisture Content (%)	: 4,5

Material Description : (Sandstone) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	13,5	4,3	73,5	8,8	SAND
Astm	13,5	11,6	68,5	6,5	SILTY SAND
British Standard	12,8	5,5	72,9	8,8	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	13	13	13	13	14	14	14	14	15	16	17	18	18	25	51	59	71	91	94	96	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL	

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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- CIVIL ENGINEERING SERVICES -
Reg.No.: 2003/029180/07 - VAT. Reg.No.: 4040210587
a SANAS Accredited Testing Laboratory, No. T 0239

60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/S Date Reported : 02.11.2019

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

SAMPLE NO.	10305			
HOLE NO.	TP 140/1			
ROAD NO.	N/A			
DEPTH	1100 - 1300mm			
CHAINAGE	TP 140/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Ferricrete			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm	100			
28.0 mm	97			
20.0 mm	97			
14.0 mm	93			
5.0 mm	61			
2.0 mm	46			
0.425 mm	32			
0.075 mm	10			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	30			
FINE SAND <0.425mm >0.075mm	48			
MATERIAL <0.075mm	22			
CONSTANTS				
GRADING MODULUS	2,12			
PRA CLASSIFICATION	A-1-b(0)			
COLTO CLASSIFICATION	G5			
TRH CLASSIFICATION	G5			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	NP			
LINEAR SHRINKAGE (%)	0,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2266			
OPTIMUM MOISTURE CONTENT(%)	8,9			
MOULDING MOISTURE (%)	8,7			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	118			
CBR-UCS @ 98% MOD AASHTO	98			
CBR-UCS @ 97% MOD AASHTO	90			
CBR-UCS @ 95% MOD AASHTO	78			
CBR-UCS @ 93% MOD AASHTO	71			
CBR-UCS @ 90% MOD AASHTO	62			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,00	0,00										

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

A G R. Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 01.11.2019

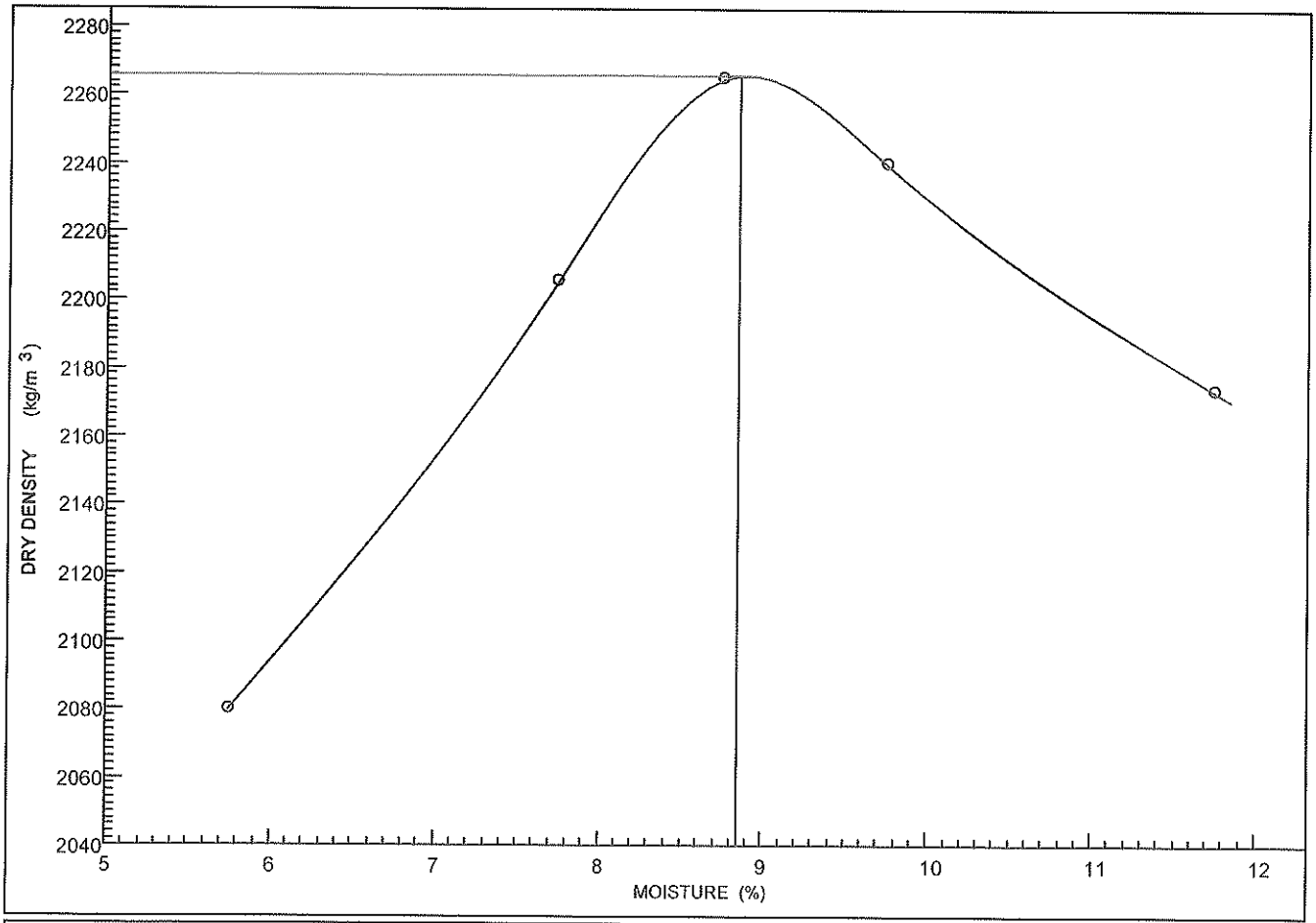
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10305	Hole No. : TP 140/1	Depth (mm) : 1100 - 1300mm
Origin : TP 140/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Ferricrete		

Optimum Moisture Content (%) : 8,9

Maximum Dry Density (kg/m^3): 2266

Point No.	1	2	3	4	5			
Moisture (%)	5,8	7,8	8,8	9,8	11,8			
Density (kg/m^3)	2080	2205	2265	2240	2173			



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

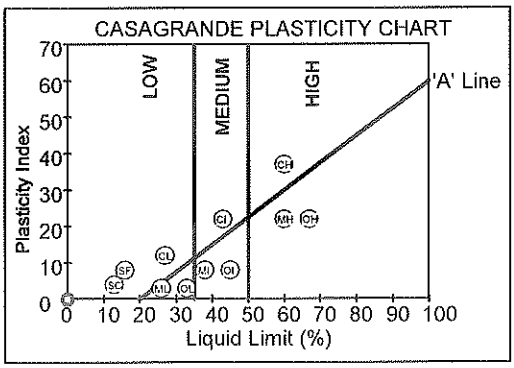
Your Ref : 505788
Our Ref : 7686
Date Reported : 01.11.2019

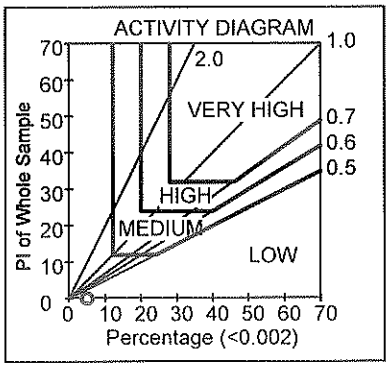
FOUNDATION INDICATOR (ASTM: D422)

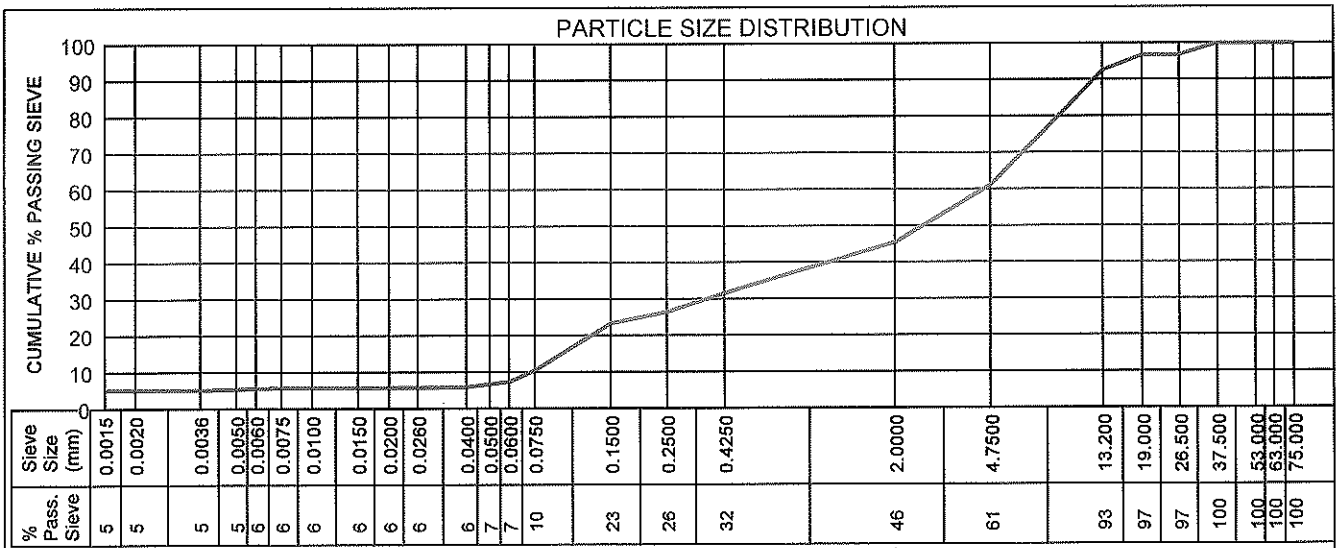
Sample No.	: 10305
Hole No.	: TP140/1
Depth	: 1100 - 1300mm
Liquid Limit (%)	: -
Plasticity Index	: NP
Linear Shrinkage (%)	: 0,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-b(0)
Unified Soil Classificati	: SP-SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 2,12
Percentage (<0.002)	: 5,0
Moisture Content (%)	: 3,5

Material Description : Ferricrete SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	5,4	1,3	38,8	54,4	SAND
Astm	5,4	5,0	50,8	38,8	SAND
British Standard	5,1	2,3	38,1	54,4	SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	5	5	5	5	6	6	6	6	6	6	6	7	7	10	23	26	32	46	61	93	97	97	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL	
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

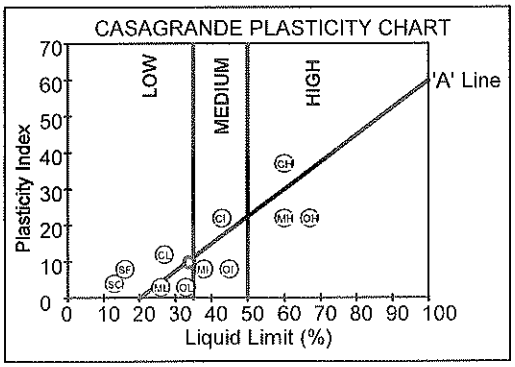
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

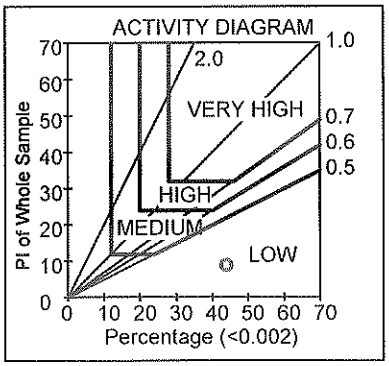
FOUNDATION INDICATOR (ASTM: D422)

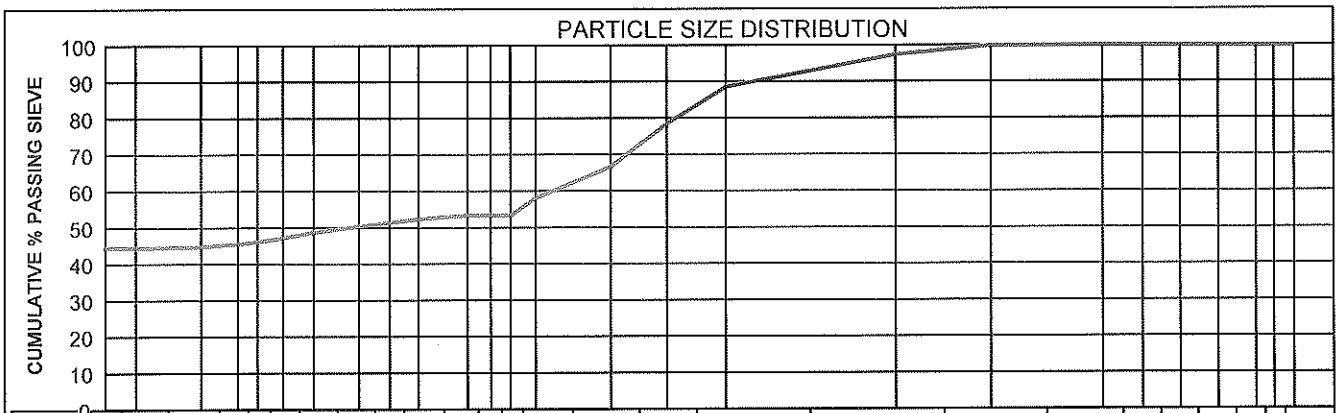
Sample No.	: 10306
Hole No.	: TP 143/1
Depth	: 1000 - 1800mm
Liquid Limit (%)	: 34
Plasticity Index	: 10
Linear Shrinkage (%)	: 5,0
PI of Whole Sample	: 9
P.R.A. Classification	: A-6(5)
Unified Soil Classificati	: ML
Activity	: 0,20
Heave Classification	: LOW
Grading Modulus	: 0,55
Percentage (<0.002)	: 44,0
Moisture Content (%)	: 18,6

Material Description : (Ferricrete/Ferruginised Residual Siltstone) SANDY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	45,6	7,8	44,1	2,5	SANDY CLAY
Astm	45,6	12,4	42,0	0,0	SANDY CLAY
British Standard	44,5	8,9	44,1	2,5	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	45	45	45	46	46	47	49	50	51	52	53	53	53	58	67	79	89	98	100	100	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL	

Remarks :

FORM: A6

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/T
Date Reported : 02.11.2019

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

SAMPLE NO.	10307			
HOLE NO.	TP 145/1			
ROAD NO.	N/A			
DEPTH	0 - 900mm			
CHAINAGE	TP 145/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Hillwash			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm				
14.0 mm	100			
5.0 mm	99			
2.0 mm	99			
0.425 mm	79			
0.075 mm	30			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	20			
FINE SAND <0.425mm >0.075mm	49			
MATERIAL <0.075mm	31			
CONSTANTS				
GRADING MODULUS	0,92			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	G8			
TRH Class.(INSITU |93%|90%|)	G8|G9			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	SP			
LINEAR SHRINKAGE (%)	1,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2056			
OPTIMUM MOISTURE CONTENT(%)	7,7			
MOULDING MOISTURE (%)	7,6			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	19			
CBR-UCS @ 98% MOD AASHTO	16			
CBR-UCS @ 97% MOD AASHTO	15			
CBR-UCS @ 95% MOD AASHTO	13			
CBR-UCS @ 93% MOD AASHTO	10			
CBR-UCS @ 90% MOD AASHTO	7,1			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,20	0,20	0,20										

Remarks :

FORM: A1

A B R. Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

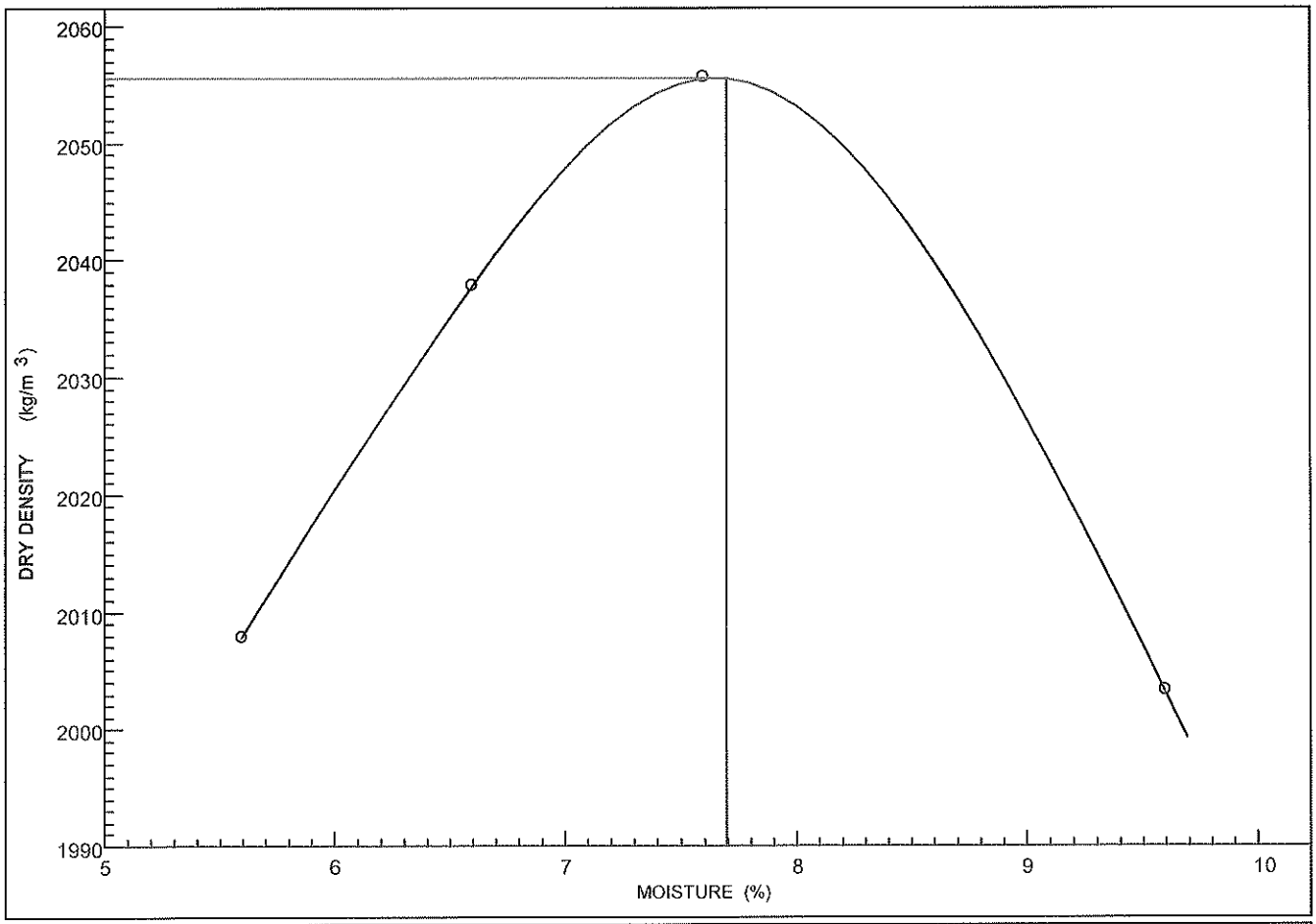
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10307	Hole No. : TP 145/1	Depth (mm) : 0 - 900mm
Origin : TP 145/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Hillwash		

Optimum Moisture Content (%) : 7,7

Maximum Dry Density (kg/m^3): 2056

Point No.	1	2	3	4				
Moisture (%)	5,6	6,6	7,6	9,6				
Density (kg/m^3)	2008	2038	2056	2003				



Remarks :

FORM: A7

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Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

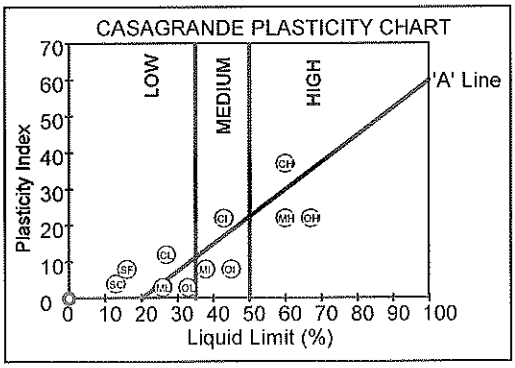
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

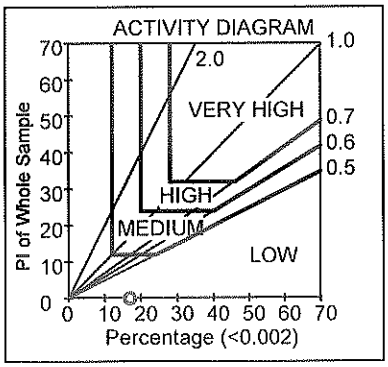
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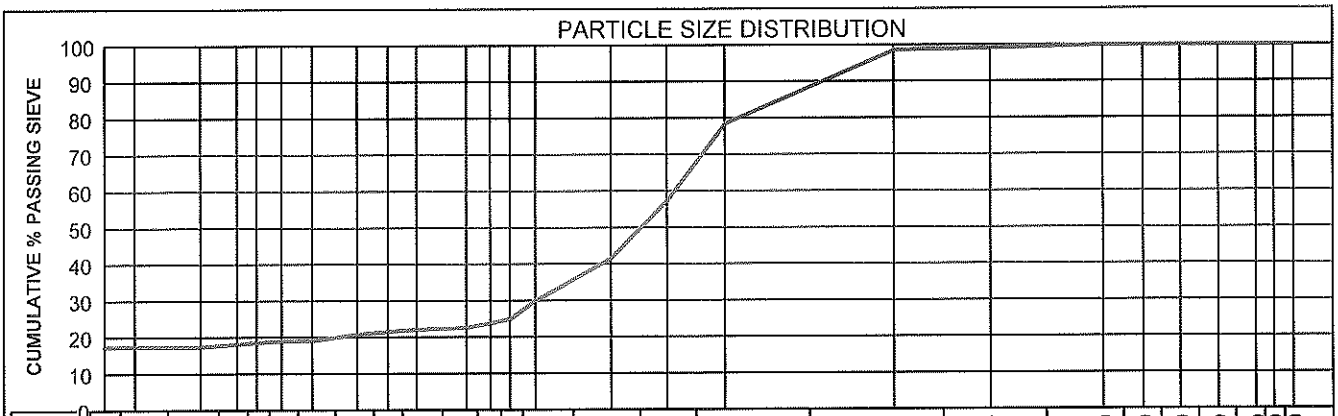
Sample No. : 10307
Hole No. : TP 145/1
Depth : 0 - 900mm
Liquid Limit (%) : -
Plasticity Index : SP
Linear Shrinkage (%) : 1,0
PI of Whole Sample : 0
P.R.A. Classification : A-2-4(0)
Unified Soil Classificati: SC
Activity : 0,00
Heave Classification : LOW
Grading Modulus : 0,92
Percentage (<0.002) : 17,0
Moisture Content (%) : 7,8

Material Description : (Hillwash) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	18,2	5,6	74,8	1,4	SILTY SAND
Astm	18,2	11,8	69,2	0,8	SILTY SAND
British Standard	17,4	7,7	73,6	1,4	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	17	17	18	18	19	19	19	21	22	22	23	24	25	30	42	57	79	99	99	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL			
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL			
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL	

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

A B R. BHIKAM

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Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

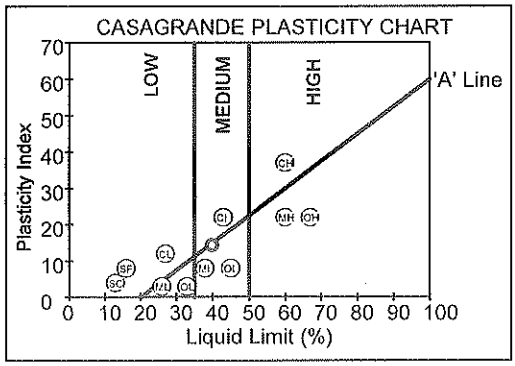
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

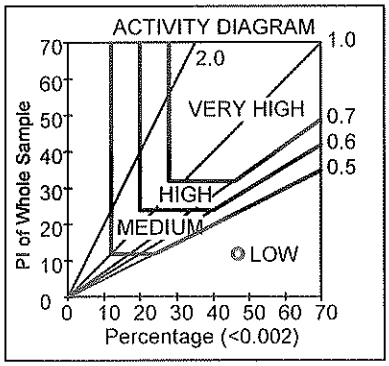
FOUNDATION INDICATOR (ASTM: D422)

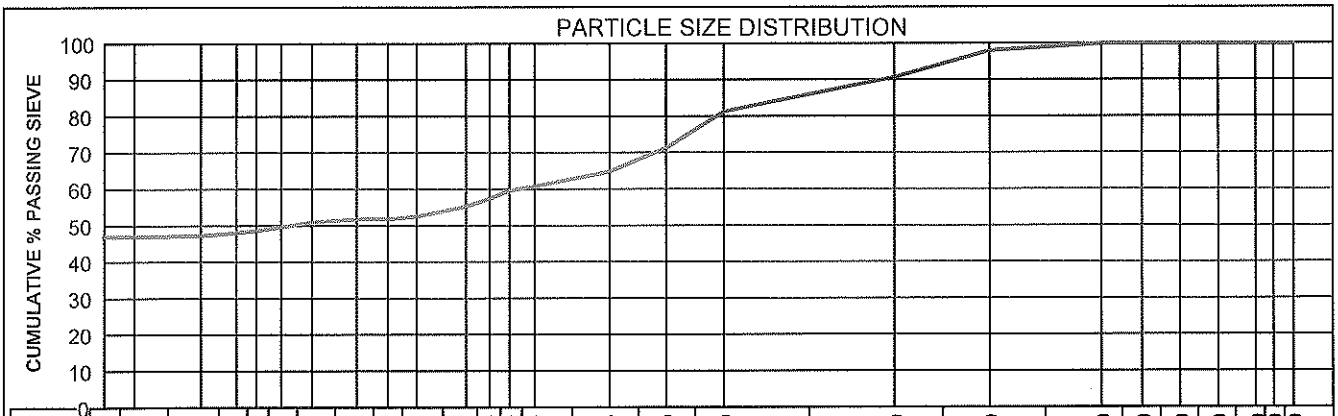
Sample No.	: 10308
Hole No.	: TP 150/1
Depth	: 500 - 2000mm
Liquid Limit (%)	: 40
Plasticity Index	: 15
Linear Shrinkage (%)	: 7,5
PI of Whole Sample	: 12
P.R.A. Classification	: A-6(7)
Unified Soil Classificati	: ML
Activity	: 0,26
Heave Classification	: LOW
Grading Modulus	: 0,67
Percentage (<0.002)	: 47,0
Moisture Content (%)	: 19,9

Material Description : (Residual Siltstone) SANDY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	48,1	9,4	33,3	9,2	CLAY
Astm	48,1	12,7	37,3	2,0	SANDY CLAY
British Standard	47,0	12,7	31,1	9,2	CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	47	47	47	48	49	50	51	52	52	53	55	57	60	61	65	71	81	91	98	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL			
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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60 Columbine Place, Glen Anil, Durban North, 4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

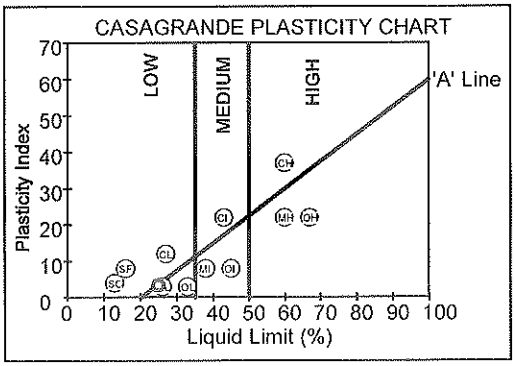
Your Ref : 505788
Our Ref : 7686
Date Reported : 30.10.2019

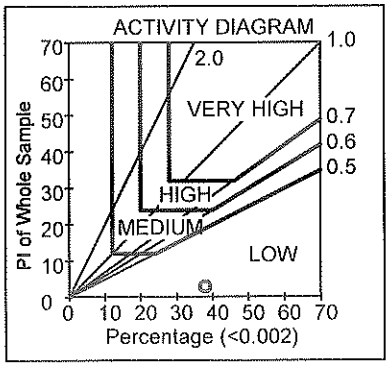
FOUNDATION INDICATOR (ASTM: D422)

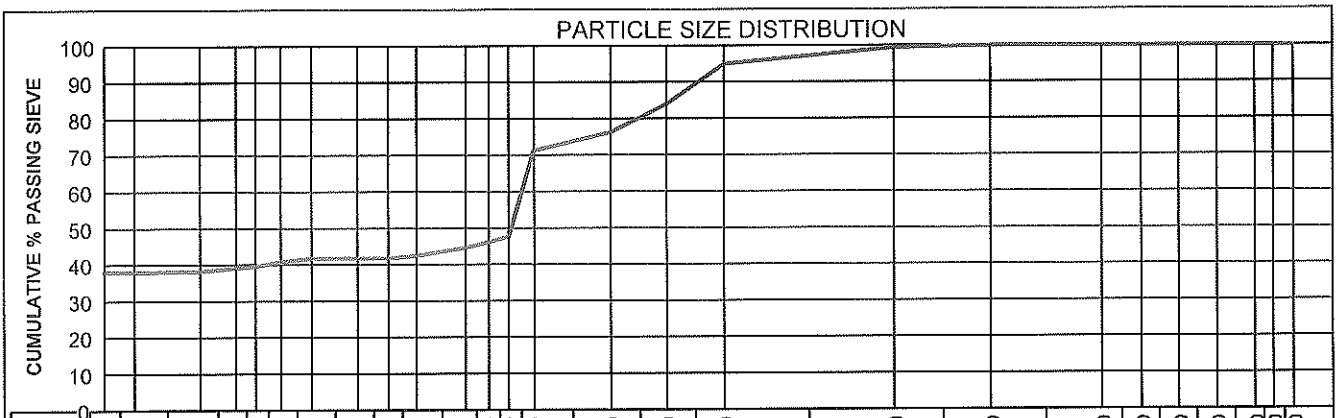
Sample No.	: 10309
Hole No.	: TP 153/1
Depth	: 800 - 1050mm
Liquid Limit (%)	: 25
Plasticity Index	: 4
Linear Shrinkage (%)	: 2,0
PI of Whole Sample	: 3
P.R.A. Classification	: A-4(7)
Unified Soil Classificati	: ML
Activity	: 0,08
Heave Classification	: LOW
Grading Modulus	: 0,35
Percentage (<0.002)	: 38,0
Moisture Content (%)	: 13,3

Material Description : (Hillwash) SILTY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	39,1	7,1	53,2	0,6	SANDY CLAY
Astm	39,1	32,1	28,8	0,0	SILTY CLAY
British Standard	38,0	9,8	51,6	0,6	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	38	38	38	39	40	41	42	42	42	42	45	46	48	71	76	84	95	99	100	100	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT		FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

A R. Bhikam

Technical Signatory : Rasalis Bhikam

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Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/U Date Reported : 02.11.2019

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

SAMPLE NO.	10310			
HOLE NO.	TP 154/1			
ROAD NO.	N/A			
DEPTH	2100 - 3200mm			
CHAINAGE	TP 154/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Residual Siltstone/ Completely Weathered			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm	100			
14.0 mm	97			
5.0 mm	92			
2.0 mm	88			
0.425 mm	71			
0.075 mm	44			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	19			
FINE SAND <0.425mm >0.075mm	31			
MATERIAL <0.075mm	50			
CONSTANTS				
GRADING MODULUS	0,97			
PRA CLASSIFICATION	A-4(2)			
COLTO CLASSIFICATION	---			
TRH Class.(INSITU |93%|90%|)	- | -			
LIQUID LIMIT (%)	30			
PLASTICITY INDEX (0.425mm)	7			
LINEAR SHRINKAGE (%)	3,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	1869			
OPTIMUM MOISTURE CONTENT(%)	13,7			
MOULDING MOISTURE (%)	13,4			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	2,7			
CBR-UCS @ 98% MOD AASHTO	2,4			
CBR-UCS @ 97% MOD AASHTO	2,2			
CBR-UCS @ 95% MOD AASHTO	2,0			
CBR-UCS @ 93% MOD AASHTO	1,6			
CBR-UCS @ 90% MOD AASHTO	1,1			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	1,00	1,20	1,40										

Remarks :

FORM: A1

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Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 02.11.2019

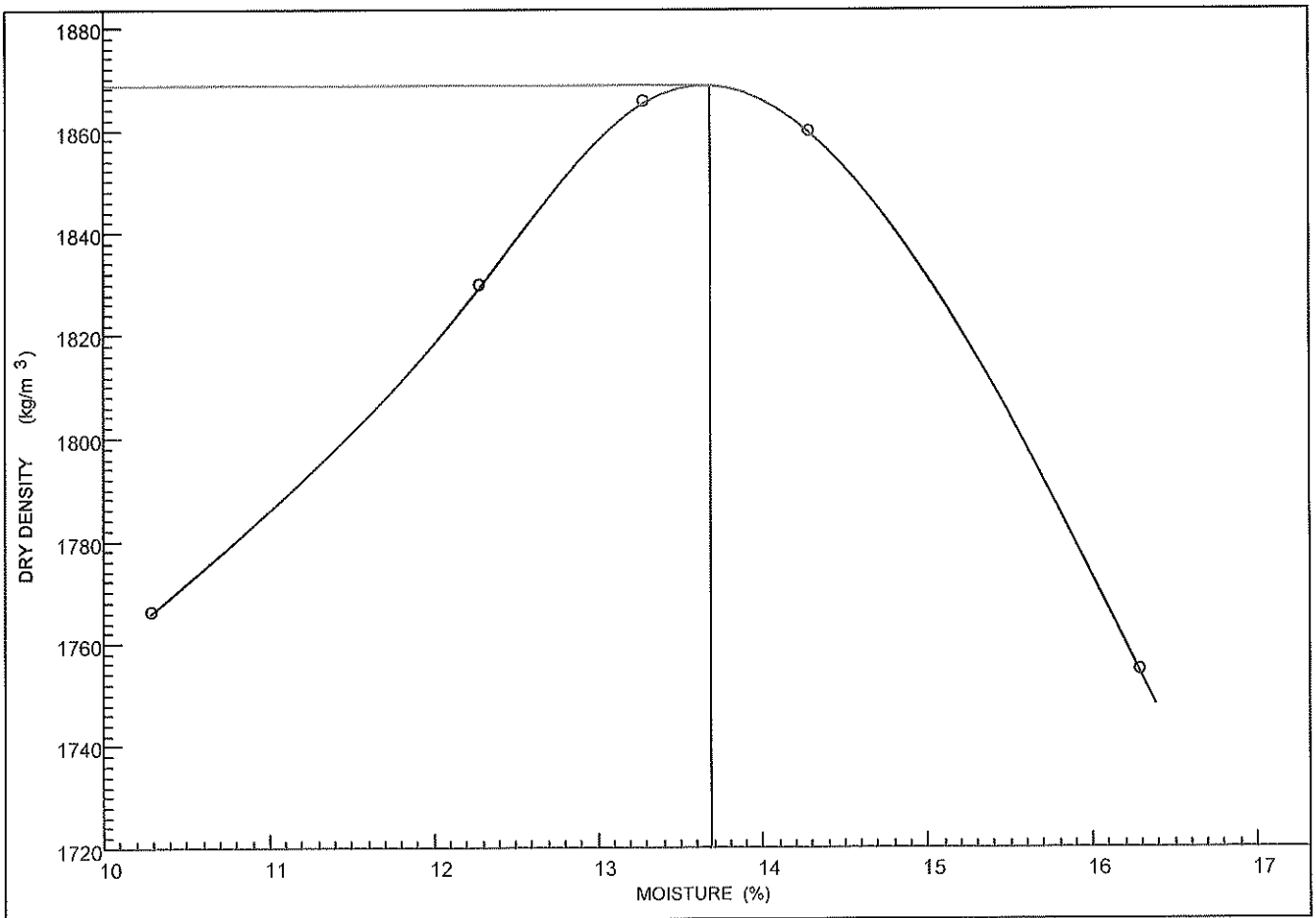
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10310	Hole No. : TP 154/1	Depth (mm) : 2100 - 3200mm
Origin : TP 154/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Residual Siltstone/ Completely Weathered		

Optimum Moisture Content (%) : 13,7

Maximum Dry Density (kg/m^3): 1869

Point No.	1	2	3	4	5			
Moisture (%)	10,3	12,3	13,3	14,3	16,3			
Density (kg/m^3)	1766	1829	1865	1860	1755			



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

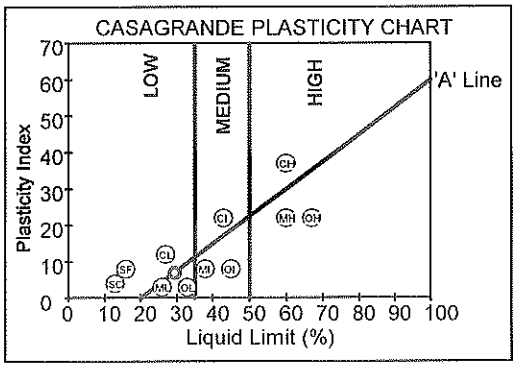
Your Ref : 505788
Our Ref : 7686
Date Reported : 11.11.2019

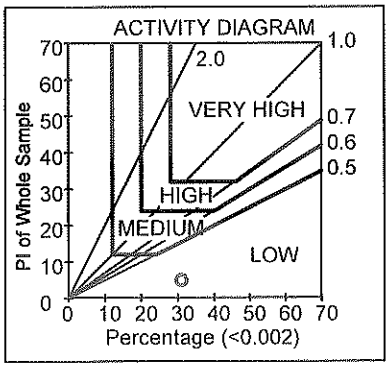
FOUNDATION INDICATOR (ASTM: D422)

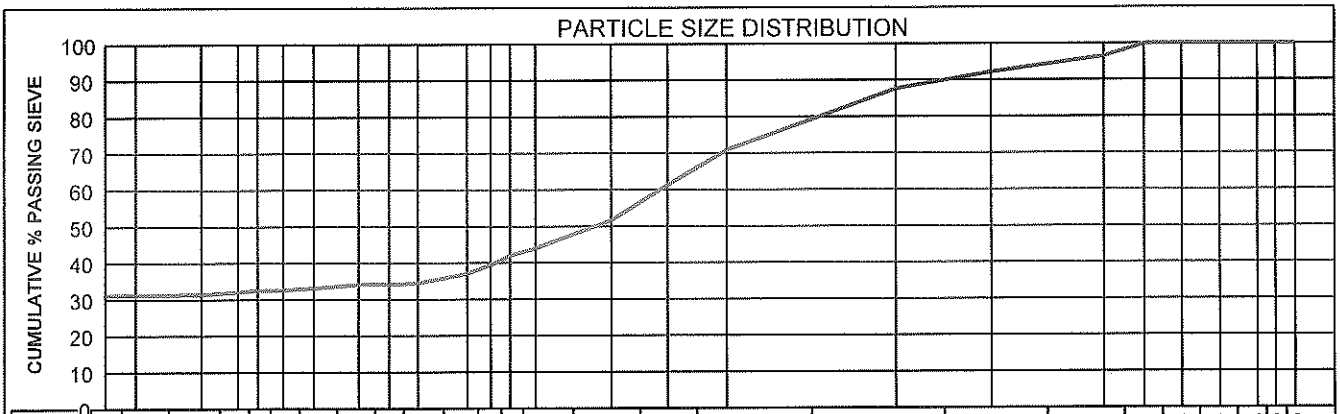
Sample No.	: 10310
Hole No.	: TP 154/1
Depth	: 2100 - 3200mm
Liquid Limit (%)	: 30
Plasticity Index	: 7
Linear Shrinkage (%)	: 3,5
PI of Whole Sample	: 5
P.R.A. Classification	: A-4(2)
Unified Soil Classificati	: SM
Activity	: 0,16
Heave Classification	: LOW
Grading Modulus	: 0,97
Percentage (<0.002)	: 31,0
Moisture Content (%)	: 5,9

Material Description : (Residual Siltstone/ Completely Weathered SANDY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	32,1	7,4	48,2	12,2	SANDY CLAY
Astm	32,1	11,9	48,2	7,8	SANDY CLAY
British Standard	31,2	10,8	45,8	12,2	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	31	31	31	32	33	33	33	34	34	35	37	40	42	44	52	61	71	88	92	97	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

A B R. Bhikam

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Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/V
Date Reported : 02.11.2019

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

SAMPLE NO.	10311			
HOLE NO.	TP 160/1			
ROAD NO.	N/A			
DEPTH	1200 - 1700mm			
CHAINAGE	TP 160/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Residual Sandstone			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm	100			
14.0 mm	99			
5.0 mm	96			
2.0 mm	95			
0.425 mm	79			
0.075 mm	31			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	17			
FINE SAND <0.425mm >0.075mm	51			
MATERIAL <0.075mm	32			
CONSTANTS				
GRADING MODULUS	0,95			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	---			
TRH Class.(INSITU |93%|90%|)	G10| -			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	SP			
LINEAR SHRINKAGE (%)	1,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2116			
OPTIMUM MOISTURE CONTENT(%)	6,9			
MOULDING MOISTURE (%)	6,7			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	9,4			
CBR-UCS @ 98% MOD AASHTO	6,9			
CBR-UCS @ 97% MOD AASHTO	6,0			
CBR-UCS @ 95% MOD AASHTO	4,4			
CBR-UCS @ 93% MOD AASHTO	3,5			
CBR-UCS @ 90% MOD AASHTO	2,4			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,40	0,60	0,80										

Remarks :

FORM: A1

A Bhikam

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Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 02.11.2019

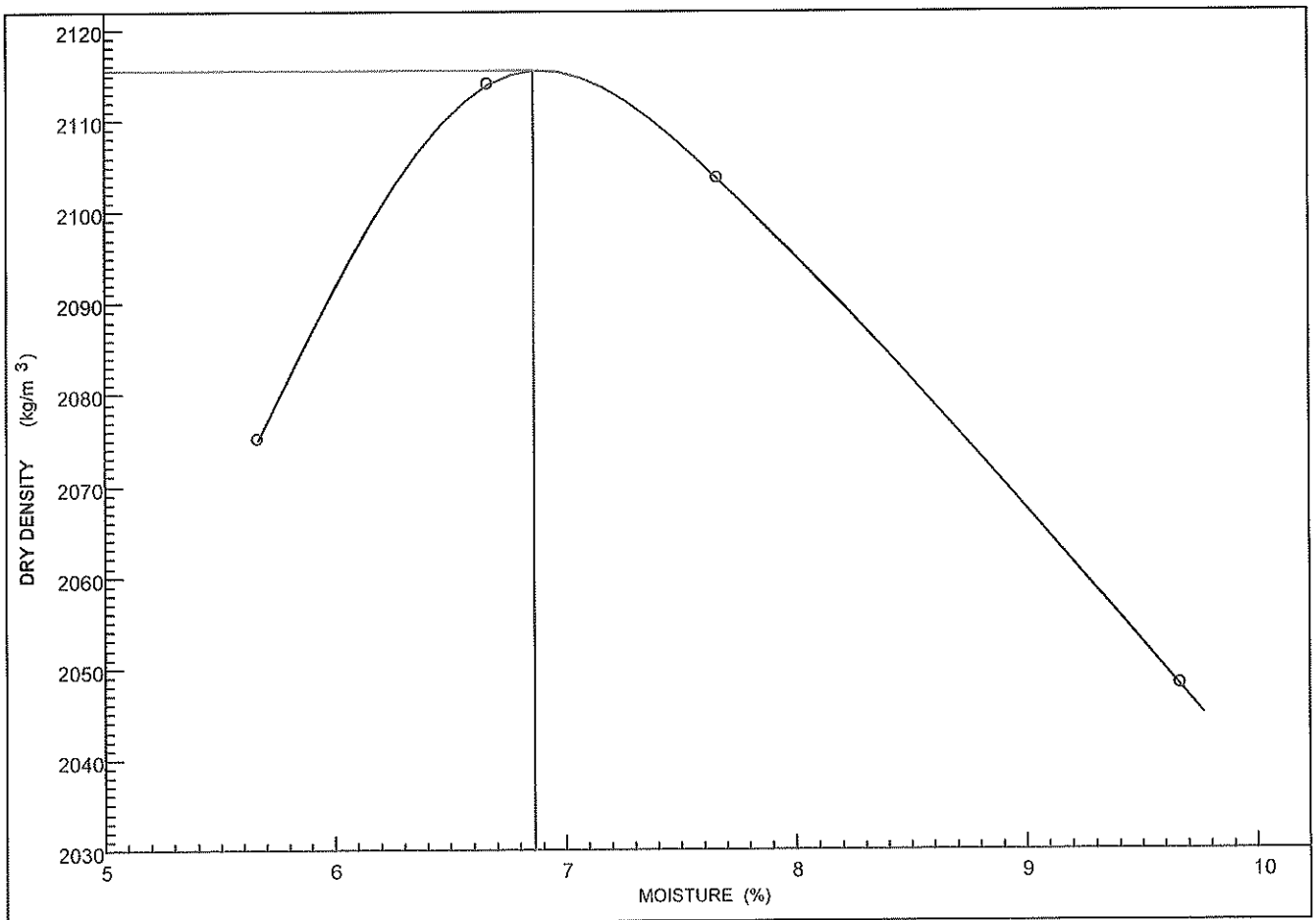
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No: 10311	Hole No. : TP 160/1	Depth (mm) : 1200 - 1700mm
Origin : TP 160/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Residual Sandstone		

Optimum Moisture Content (%) : 6,9

Maximum Dry Density (kg/m^3): 2116

Point No.	1	2	3	4				
Moisture (%)	5,7	6,7	7,7	9,7				
Density (kg/m^3)	2075	2114	2104	2048				



Remarks :

FORM: A7

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Tel. : (031) 579 1220/1
Fax : (031) 579 1344
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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

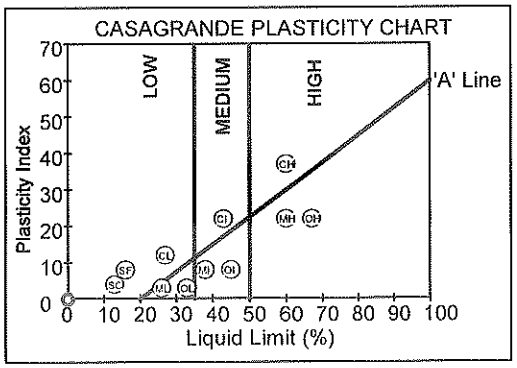
Your Ref : 505788
Our Ref : 7686
Date Reported : 08.11.2019

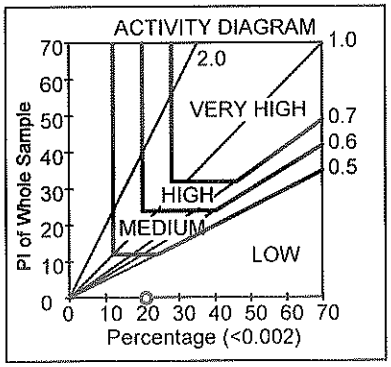
FOUNDATION INDICATOR (ASTM: D422)

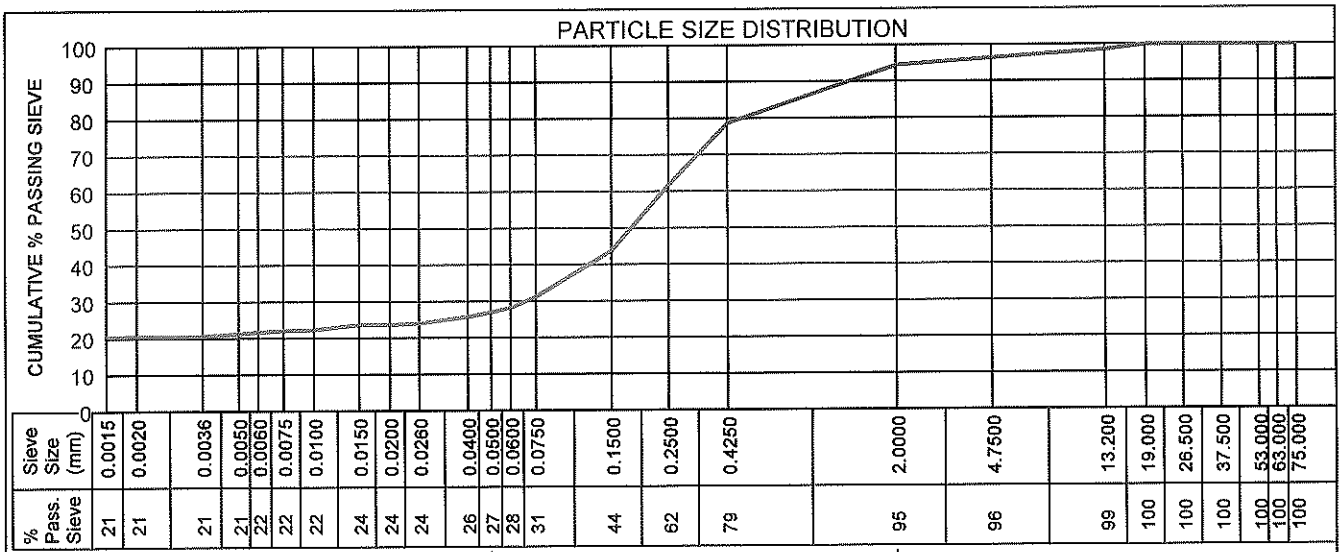
Sample No. : 10311
Hole No. : TP 160/1
Depth : 1200 - 1700mm
Liquid Limit (%) : -
Plasticity Index : SP
Linear Shrinkage (%) : 1,5
PI of Whole Sample : 0
P.R.A. Classification : A-2-4(0)
Unified Soil Classificati: SC
Activity : 0,00
Heave Classification : LOW
Grading Modulus : 0,95
Percentage (<0.002) : 21,0
Moisture Content (%) : 9,2

Material Description : (Residual Sandstone) CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	21,4	5,7	67,6	5,4	CLAYEY SAND
Astm	21,4	9,8	65,2	3,6	CLAYEY SAND
British Standard	20,5	7,8	66,3	5,4	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	21	21	21	21	22	22	22	24	24	24	26	27	28	31	44	62	79	95	96	99	100	100	100	100	100	100

JENN	CLAY	SILT		SAND			GRAVEL			
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

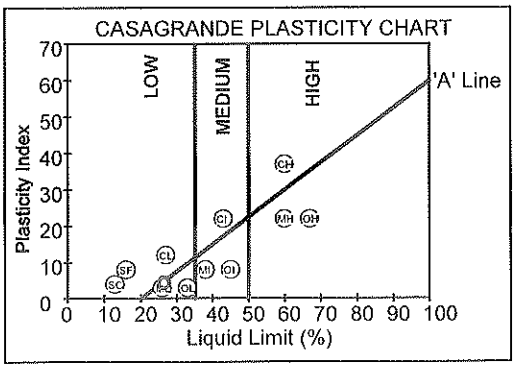
Your Ref : 505788
Our Ref : 7686
Date Reported : 01.11.2019

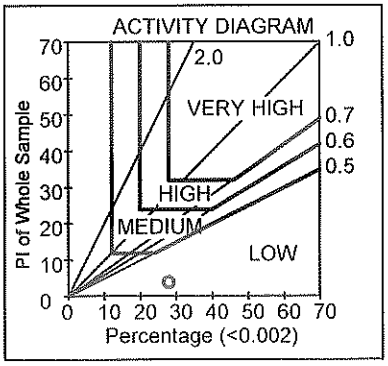
FOUNDATION INDICATOR (ASTM: D422)

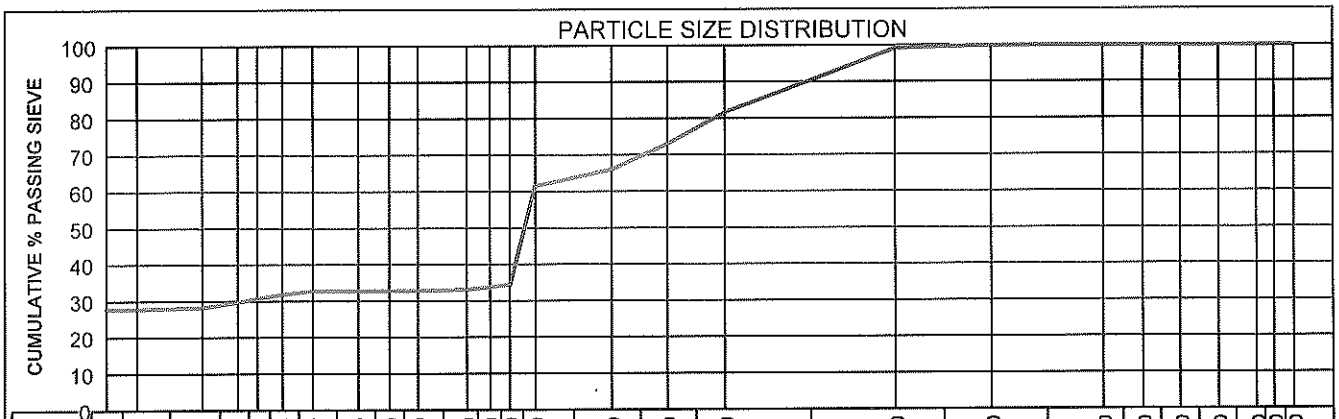
Sample No. : 10312
Hole No. : TP 164/1
Depth : 900 - 1100mm
Liquid Limit (%) : 26
Plasticity Index : 5
Linear Shrinkage (%) : 2,5
PI of Whole Sample : 4
P.R.A. Classification : A-4(5)
Unified Soil Classificati: ML
Activity : 0,14
Heave Classification : LOW
Grading Modulus : 0,57
Percentage (<0.002) : 28,0
Moisture Content (%) : 11,0

Material Description : (Residual/ Ferricrete) CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	29,7	4,1	65,5	0,7	CLAYEY SAND
Astm	29,7	31,8	38,5	0,0	CLAYEY SAND
British Standard	27,9	6,6	64,9	0,7	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	28	28	28	30	31	32	33	33	33	33	33	34	34	62	66	73	82	99	100	100	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

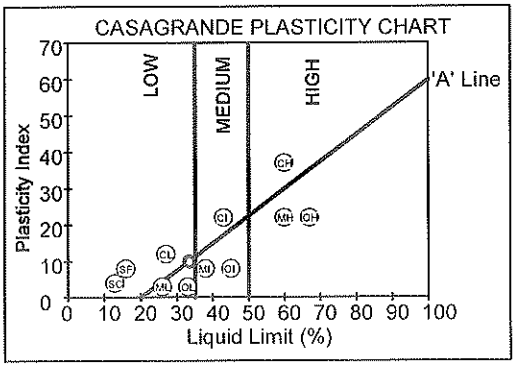
Your Ref : 505788
Our Ref : 7686
Date Reported : 30.10.2019

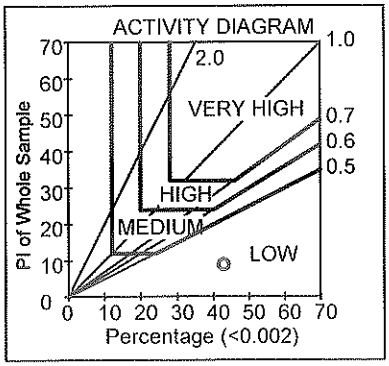
FOUNDATION INDICATOR (ASTM: D422)

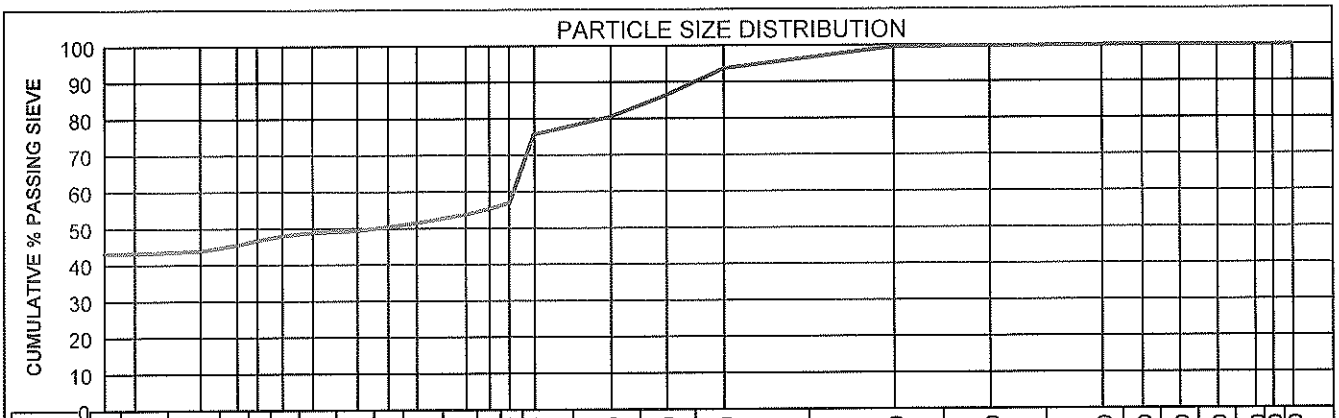
Sample No.	: 10313
Hole No.	: TP 168/1
Depth	: 2000 - 3300mm
Liquid Limit (%)	: 33
Plasticity Index	: 10
Linear Shrinkage (%)	: 5,0
PI of Whole Sample	: 9
P.R.A. Classification	: A-4(8)
Unified Soil Classificati	: ML
Activity	: 0,21
Heave Classification	: LOW
Grading Modulus	: 0,30
Percentage (<0.002)	: 43,0
Moisture Content (%)	: 17,9

Material Description : (Residual Siltstone) SILTY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	45,6	9,8	44,2	0,4	SANDY CLAY
Astm	45,6	30,2	24,0	0,2	SILTY CLAY
British Standard	43,2	13,7	42,6	0,4	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	43	43	44	46	47	48	49	49	51	52	54	55	57	76	81	86	94	100	100	100	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

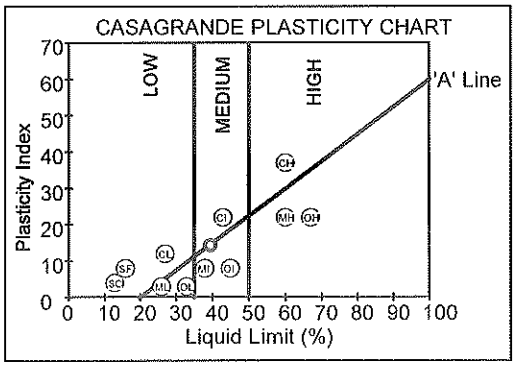
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

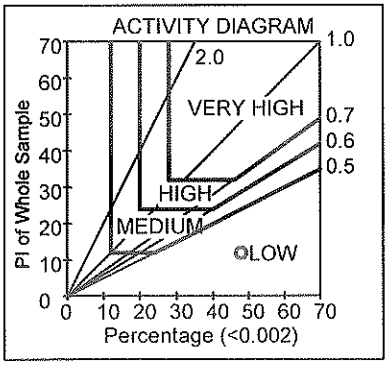
FOUNDATION INDICATOR (ASTM: D422)

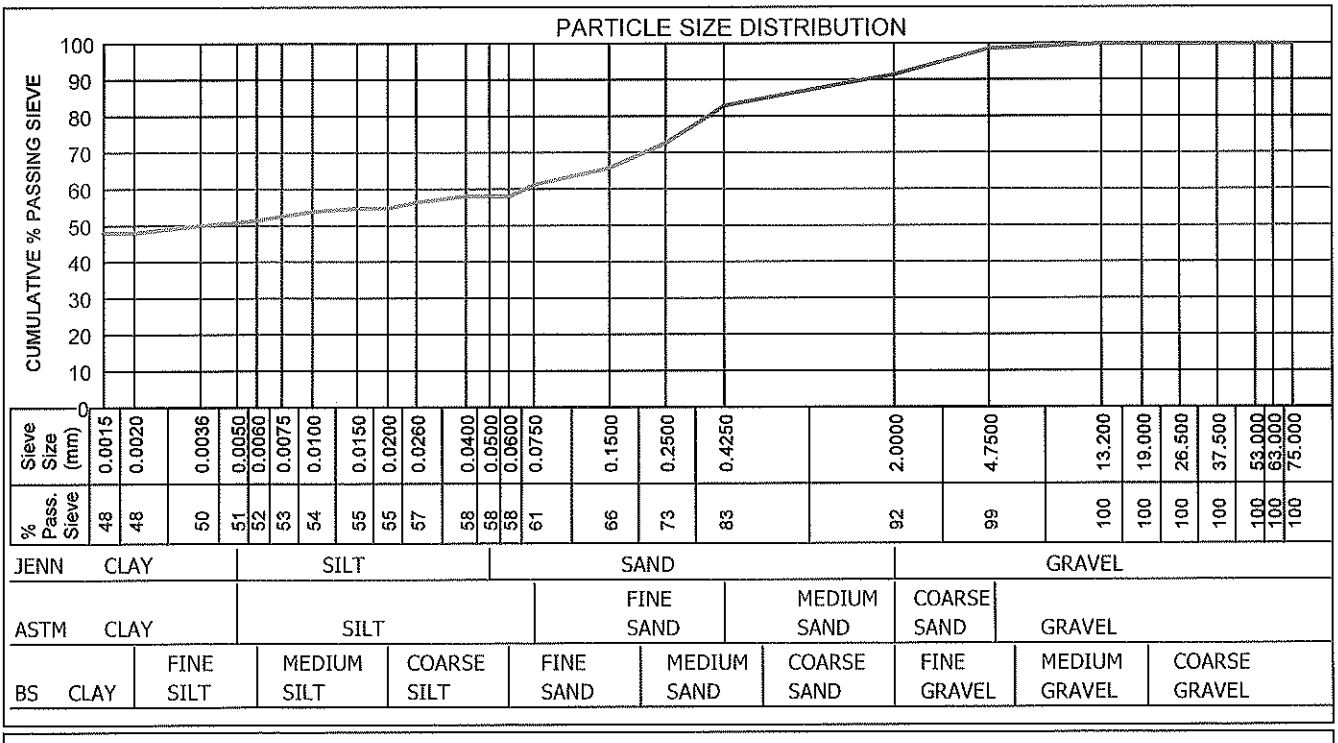
Sample No.	: 10315
Hole No.	: TP 170/1
Depth	: 1400 - 2100mm
Liquid Limit (%)	: 40
Plasticity Index	: 14
Linear Shrinkage (%)	: 7,0
PI of Whole Sample	: 12
P.R.A. Classification	: A-6(7)
Unified Soil Classificati	: ML
Activity	: 0,25
Heave Classification	: LOW
Grading Modulus	: 0,64
Percentage (<0.002)	: 48,0
Moisture Content (%)	: 18,5

Material Description : (Residual Siltstone) CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	51,0	7,1	33,5	8,4	CLAY
Astm	51,0	10,3	37,4	1,4	CLAY
British Standard	48,1	10,0	33,5	8,4	CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	48	48	50	51	52	53	54	55	55	57	58	58	58	61	66	73	83	92	99	100	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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Technical Signatory : Rasalis Bhikam

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Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/W
Date Reported : 02.11.2019

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

SAMPLE NO.	10317			
HOLE NO.	TP 170/2			
ROAD NO.	N/A			
DEPTH	2100 - 2800mm			
CHAINAGE	TP 170/2			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Residual Siltstone			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm				
14.0 mm	100			
5.0 mm	98			
2.0 mm	95			
0.425 mm	77			
0.075 mm	34			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	19			
FINE SAND <0.425mm >0.075mm	45			
MATERIAL <0.075mm	36			
CONSTANTS				
GRADING MODULUS	0,94			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	---			
TRH Class.(INSITU |93%|90%|)	G10| -			
LIQUID LIMIT (%)	29			
PLASTICITY INDEX (0.425mm)	6			
LINEAR SHRINKAGE (%)	3,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2028			
OPTIMUM MOISTURE CONTENT(%)	9,8			
MOULDING MOISTURE (%)	9,6			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	7,0			
CBR-UCS @ 98% MOD AASHTO	5,9			
CBR-UCS @ 97% MOD AASHTO	5,5			
CBR-UCS @ 95% MOD AASHTO	4,7			
CBR-UCS @ 93% MOD AASHTO	3,1			
CBR-UCS @ 90% MOD AASHTO	1,6			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	1,00	1,20	1,40										

Remarks :

FORM: A1

A.B.R. Bhikam

Technical Signatory : Rasalis Bhikam

4.4.0(SGS)(2016.08.31)

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 01.11.2019

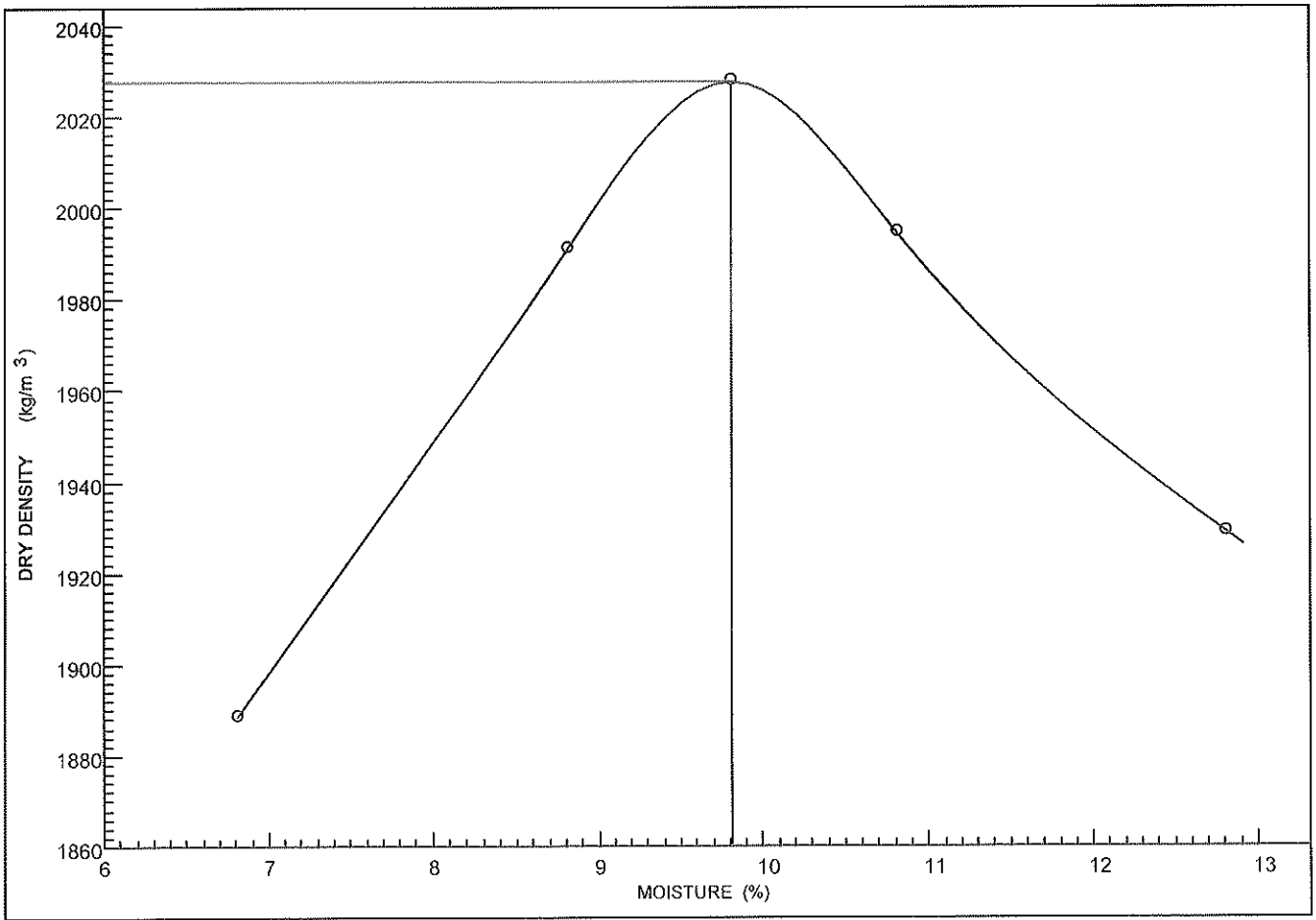
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10317	Hole No. : TP 170/2	Depth (mm) : 2100 - 2800mm
Origin : TP 170/2	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Residual Sandstone		

Optimum Moisture Content (%) : 9,8

Maximum Dry Density (kg/m^3): 2028

Point No.	1	2	3	4	5			
Moisture (%)	6,8	8,8	9,8	10,8	12,8			
Density (kg/m^3)	1889	1991	2028	1995	1929			



Remarks :

FORM: A7

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Email : rasalis.bhikam@sgs.com

TEST RESULTS

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Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

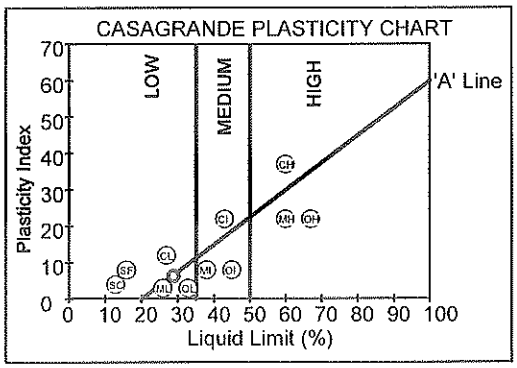
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

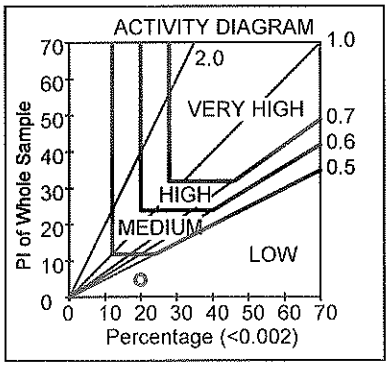
FOUNDATION INDICATOR (ASTM: D422)

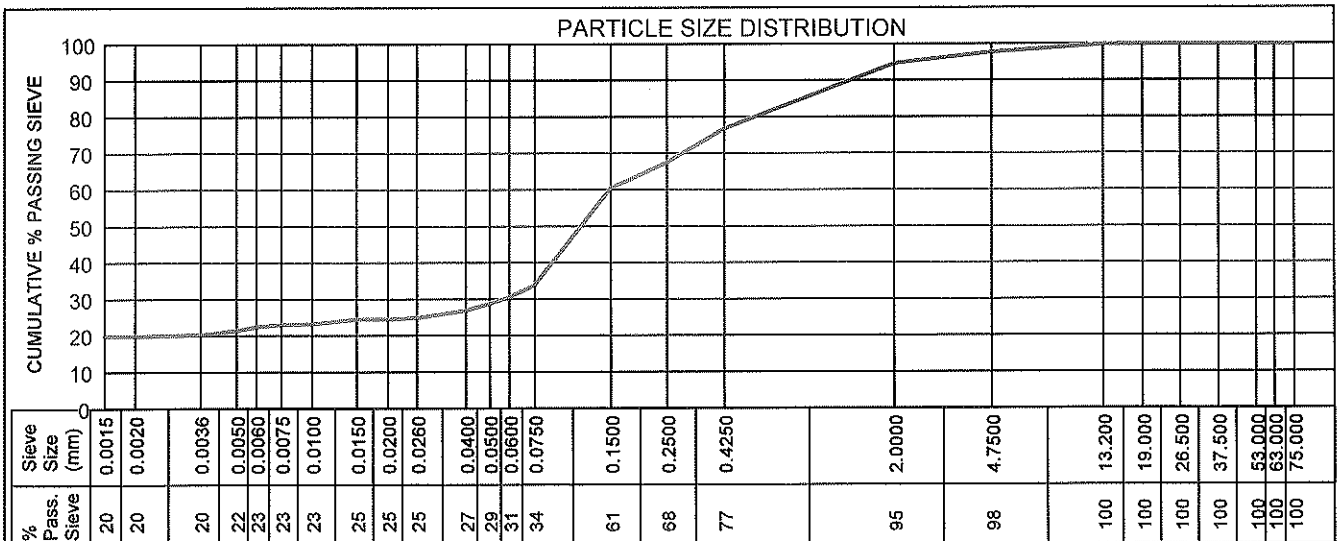
Sample No.	: 10317
Hole No.	: TP 170/2
Depth	: 2100 - 2800mm
Liquid Limit (%)	: 29
Plasticity Index	: 6
Linear Shrinkage (%)	: 3,0
PI of Whole Sample	: 5
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SM
Activity	: 0,25
Heave Classification	: LOW
Grading Modulus	: 0,94
Percentage (<0.002)	: 20,0
Moisture Content (%)	: 6,7

Material Description : (Residual Sandstone) CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	21,7	7,2	66,0	5,1	CLAYEY SAND
Astm	21,7	12,3	63,9	2,1	CLAYEY SAND
British Standard	20,0	10,7	64,1	5,1	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	20	20	20	22	23	23	23	25	25	25	27	29	31	34	61	68	77	95	98	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

A & R. Bhikam

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

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4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/X
Date Reported : 02.11.2019

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

SAMPLE NO.	10318			
HOLE NO.	TP 172/1			
ROAD NO.	N/A			
DEPTH	600 - 800mm			
CHAINAGE	TP 172/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Sandstone			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm	100			
20.0 mm	86			
14.0 mm	82			
5.0 mm	79			
2.0 mm	77			
0.425 mm	41			
0.075 mm	7			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	47			
FINE SAND <0.425mm >0.075mm	44			
MATERIAL <0.075mm	9			
CONSTANTS				
GRADING MODULUS	1,75			
PRA CLASSIFICATION	A-1-b(0)			
COLTO CLASSIFICATION	G6			
TRH CLASSIFICATION	G6			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	NP			
LINEAR SHRINKAGE (%)	0,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	1936			
OPTIMUM MOISTURE CONTENT(%)	9,1			
MOULDING MOISTURE (%)	8,8			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	89			
CBR-UCS @ 98% MOD AASHTO	56			
CBR-UCS @ 97% MOD AASHTO	44			
CBR-UCS @ 95% MOD AASHTO	32			
CBR-UCS @ 93% MOD AASHTO	27			
CBR-UCS @ 90% MOD AASHTO	21			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,00	0,00									

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

A B R. Bhikam

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

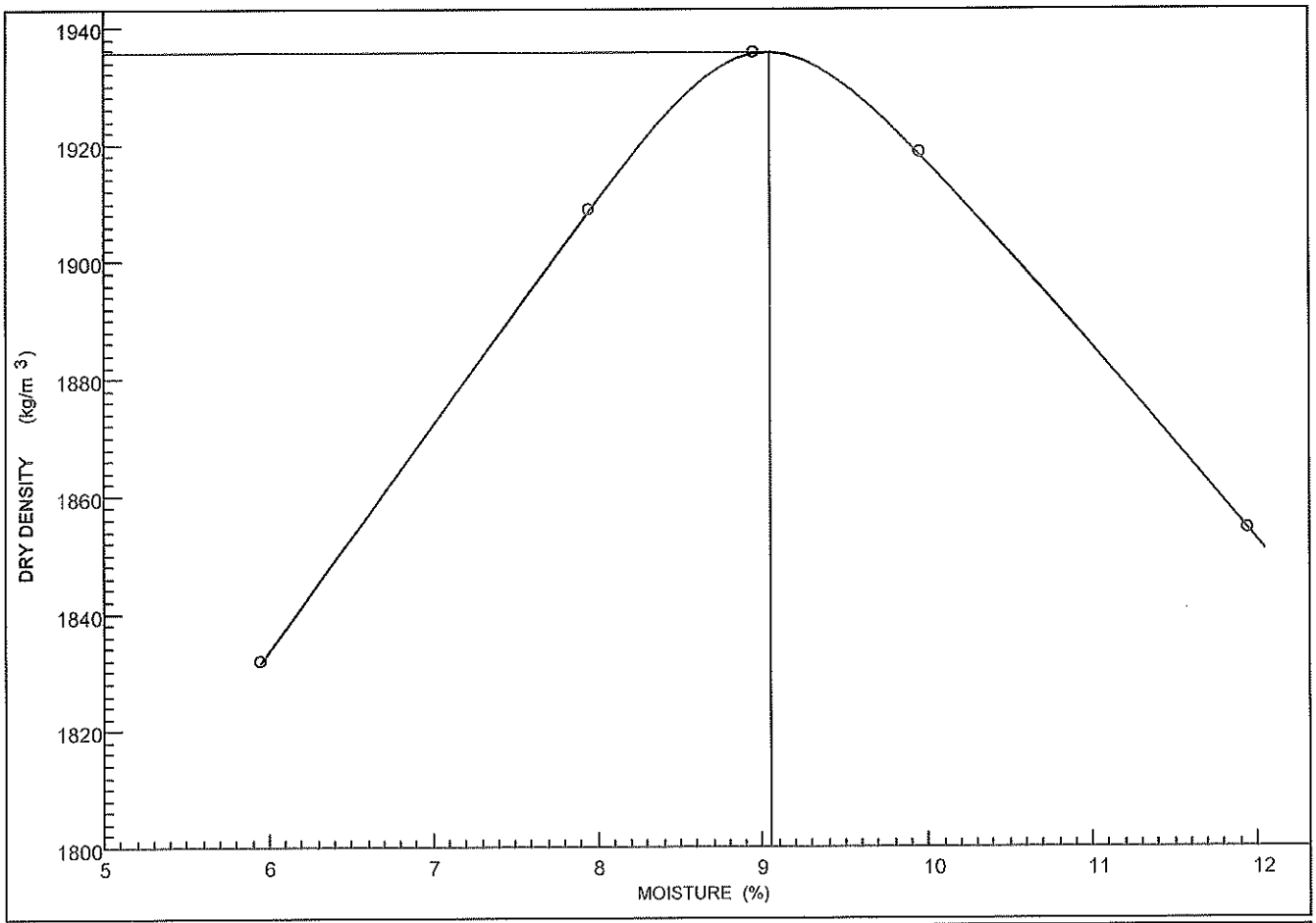
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10318	Hole No. : TP 172/1	Depth (mm) : 600 - 800mm
Origin : TP 172/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Sandstone		

Optimum Moisture Content (%) : 9,1

Maximum Dry Density (kg/m^3): 1936

Point No.	1	2	3	4	5			
Moisture (%)	6,0	8,0	9,0	10,0	12,0			
Density (kg/m^3)	1832	1909	1936	1918	1854			



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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a SANAS Accredited Testing Laboratory, No. T 0239

60 Columbine Place, Glen Anil, Durban North, 4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

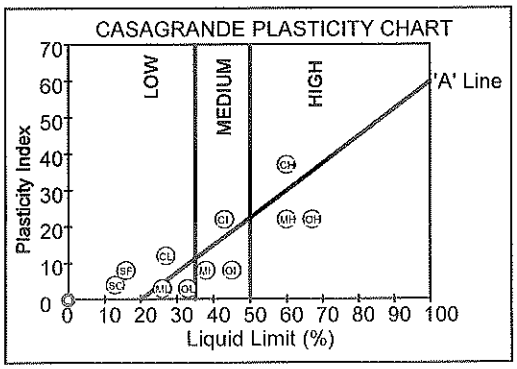
Your Ref : 505788
Our Ref : 7686
Date Reported : 08.11.2019

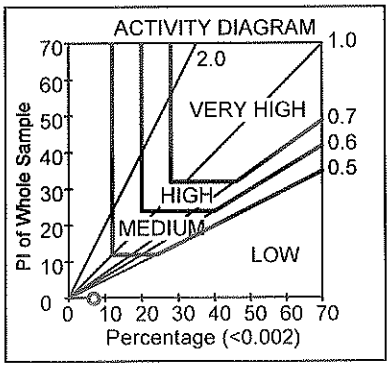
FOUNDATION INDICATOR (ASTM: D422)

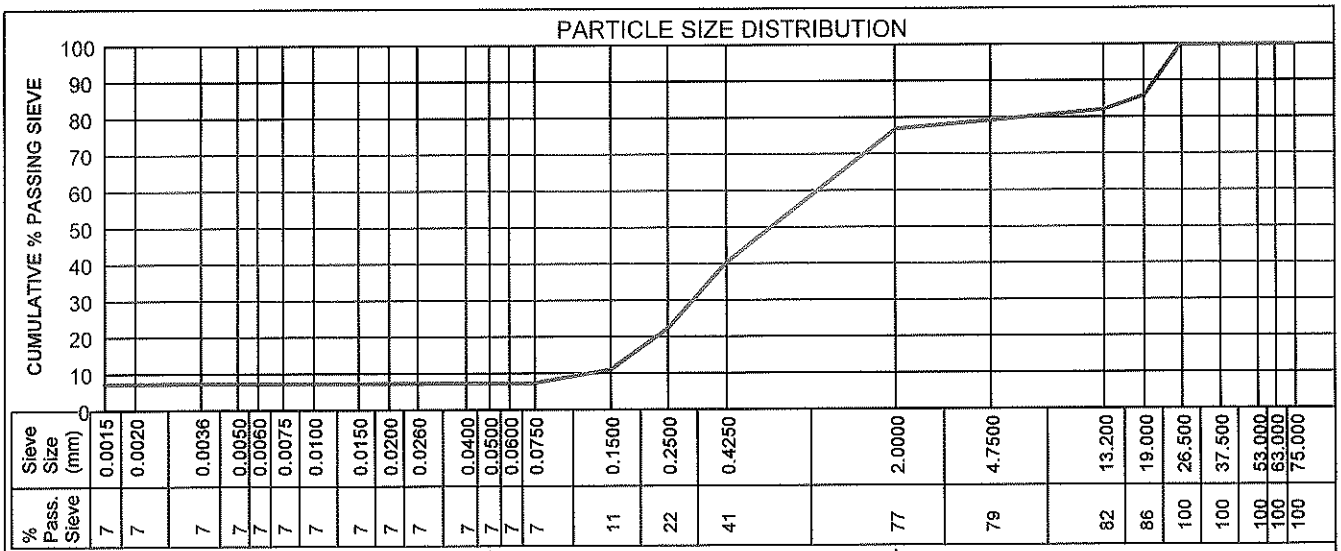
Sample No. : 10318
Hole No. : TP 172/1
Depth : 600 - 800mm
Liquid Limit (%) : -
Plasticity Index : NP
Linear Shrinkage (%) : 0,0
PI of Whole Sample : 0
P.R.A. Classification : A-1-b(0)
Unified Soil Classificati: SP-SC
Activity : 0,00
Heave Classification : LOW
Grading Modulus : 1,75
Percentage (<0.002) : 7,0
Moisture Content (%) : 1,1

Material Description : (Sandstone) SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	7,4	0,0	69,6	23,0	SAND
Astm	7,4	0,1	71,8	20,8	SAND
British Standard	7,4	0,0	69,6	23,0	SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	7	7	7	7	7	7	7	7	7	7	7	7	7	7	11	22	41	77	79	82	86	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

A B R. Bhikam

Technical Signatory : Rasalis Bhikam

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/Y
Date Reported : 02.11.2019

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

SAMPLE NO.	10319			
HOLE NO.	TP 173/1			
ROAD NO.	N/A			
DEPTH	600 - 1300mm			
CHAINAGE	TP 173/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Ferricrete			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm	100			
20.0 mm	83			
14.0 mm	80			
5.0 mm	58			
2.0 mm	51			
0.425 mm	40			
0.075 mm	12			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	22			
FINE SAND <0.425mm >0.075mm	55			
MATERIAL <0.075mm	23			
CONSTANTS				
GRADING MODULUS	1,97			
PRA CLASSIFICATION	A-1-b(0)			
COLTO CLASSIFICATION	G6			
TRH CLASSIFICATION	G6			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	NP			
LINEAR SHRINKAGE (%)	0,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2125			
OPTIMUM MOISTURE CONTENT(%)	9,1			
MOULDING MOISTURE (%)	8,8			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	62			
CBR-UCS @ 98% MOD AASHTO	51			
CBR-UCS @ 97% MOD AASHTO	46			
CBR-UCS @ 95% MOD AASHTO	37			
CBR-UCS @ 93% MOD AASHTO	28			
CBR-UCS @ 90% MOD AASHTO	18			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,10	0,10										

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

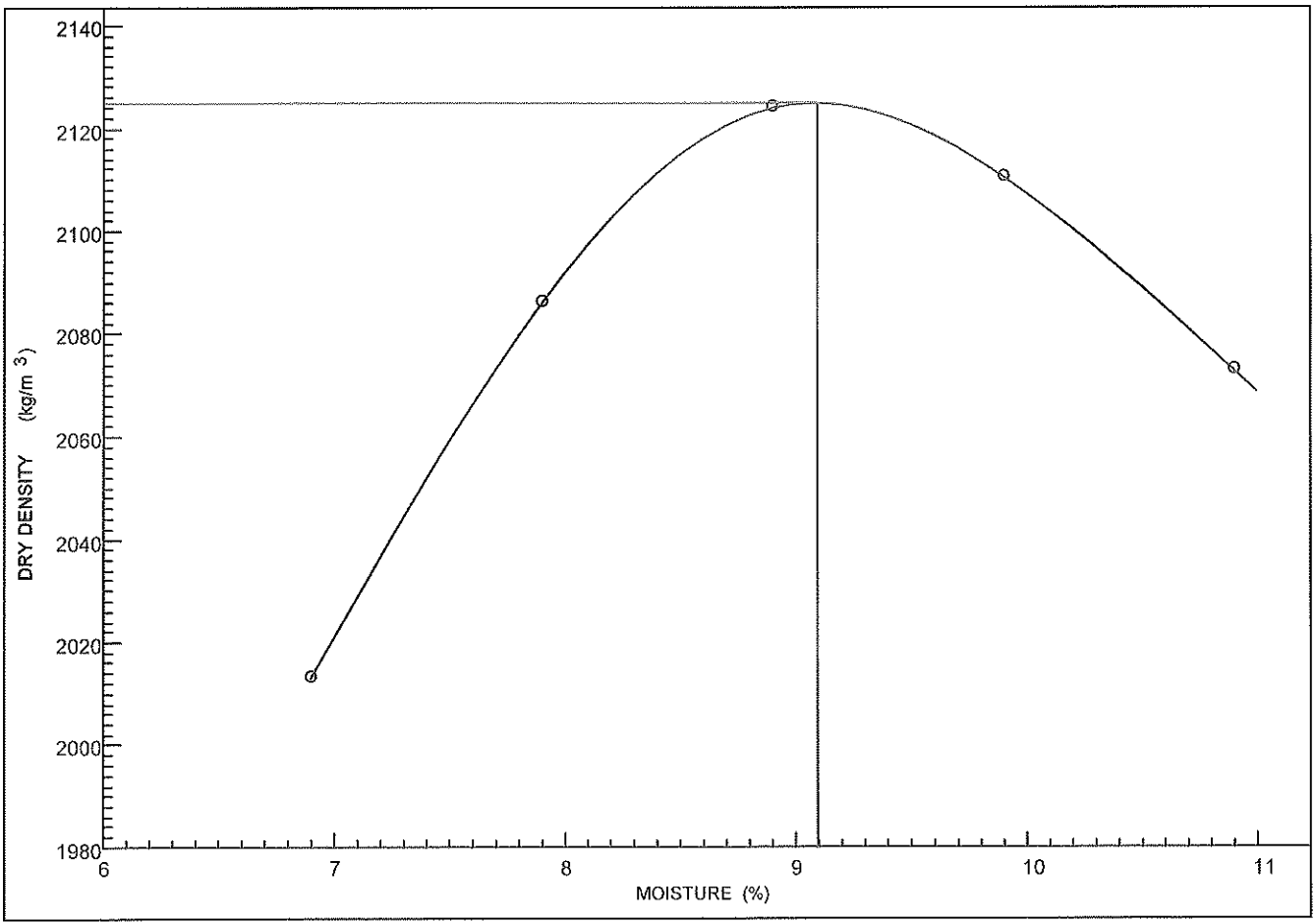
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10319	Hole No. : TP 173/1	Depth (mm) : 600 - 1300mm
Origin : TP 173/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Ferricrete		

Optimum Moisture Content (%) : 9,1

Maximum Dry Density (kg/m^3): 2125

Point No.	1	2	3	4	5			
Moisture (%)	6,9	7,9	8,9	9,9	10,9			
Density (kg/m^3)	2013	2086	2124	2111	2073			



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

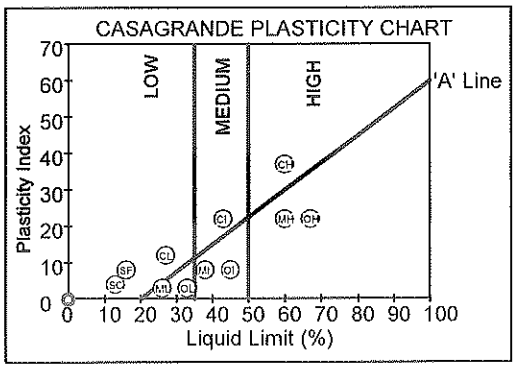
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

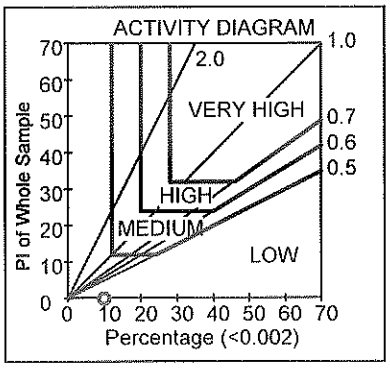
FOUNDATION INDICATOR (ASTM: D422)

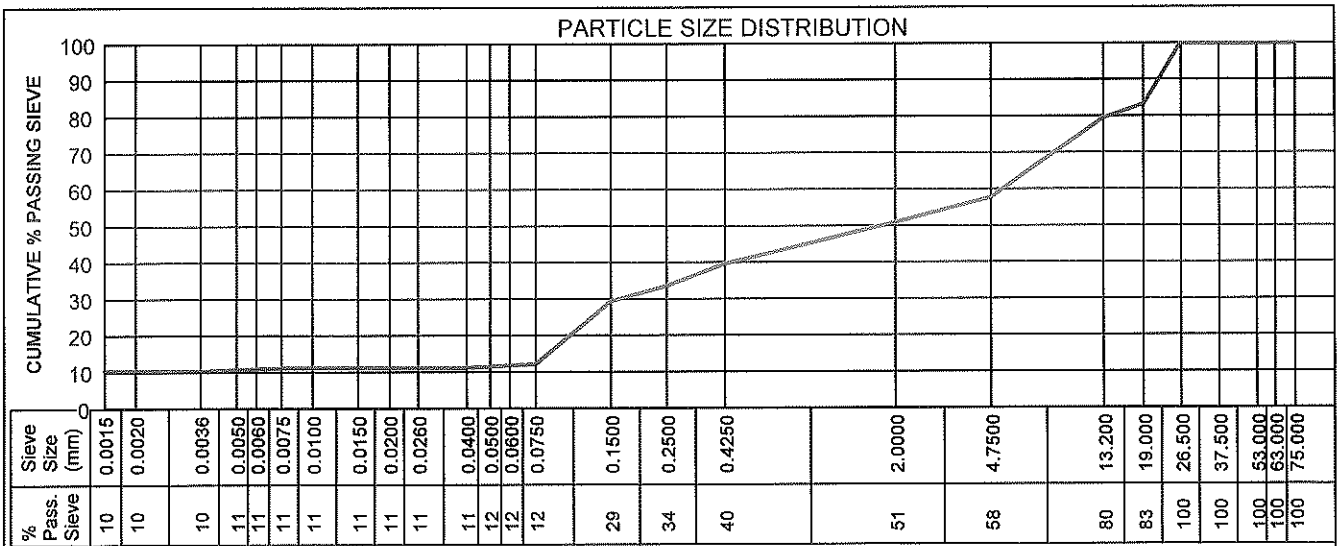
Sample No.	: 10319
Hole No.	: TP 173/1
Depth	: 600 - 1300mm
Liquid Limit (%)	: -
Plasticity Index	: NP
Linear Shrinkage (%)	: 0,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-b(0)
Unified Soil Classificati	: SP-SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 1,97
Percentage (<0.002)	: 10,0
Moisture Content (%)	: 4,2

Material Description : Ferricrete SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	10,8	0,8	39,5	48,9	CLAYEY SAND
Astm	10,8	1,4	45,6	42,2	SILTY SAND
British Standard	10,4	1,5	39,2	48,9	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	10	10	10	11	11	11	11	11	11	11	11	12	12	12	29	34	40	51	58	80	83	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL	

Remarks :

FORM: A6

A B R. Bhikam

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Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/Z Date Reported : 02.11.2019

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

SAMPLE NO.	10320			
HOLE NO.	TP 175/1			
ROAD NO.	N/A			
DEPTH	0 - 1200mm			
CHAINAGE	TP 175/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Hillwash			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm				
14.0 mm				
5.0 mm	100			
2.0 mm	99			
0.425 mm	94			
0.075 mm	47			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	5			
FINE SAND <0.425mm >0.075mm	47			
MATERIAL <0.075mm	48			
CONSTANTS				
GRADING MODULUS	0,60			
PRA CLASSIFICATION	A-4(2)			
COLTO CLASSIFICATION	---			
TRH Class.(INSITU |93%|90%|)	G9|G10			
LIQUID LIMIT (%)	25			
PLASTICITY INDEX (0.425mm)	4			
LINEAR SHRINKAGE (%)	2,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	1975			
OPTIMUM MOISTURE CONTENT(%)	10,4			
MOULDING MOISTURE (%)	10,2			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	16			
CBR-UCS @ 98% MOD AASHTO	14			
CBR-UCS @ 97% MOD AASHTO	13			
CBR-UCS @ 95% MOD AASHTO	12			
CBR-UCS @ 93% MOD AASHTO	9,2			
CBR-UCS @ 90% MOD AASHTO	6,4			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,50	0,60	0,70										

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

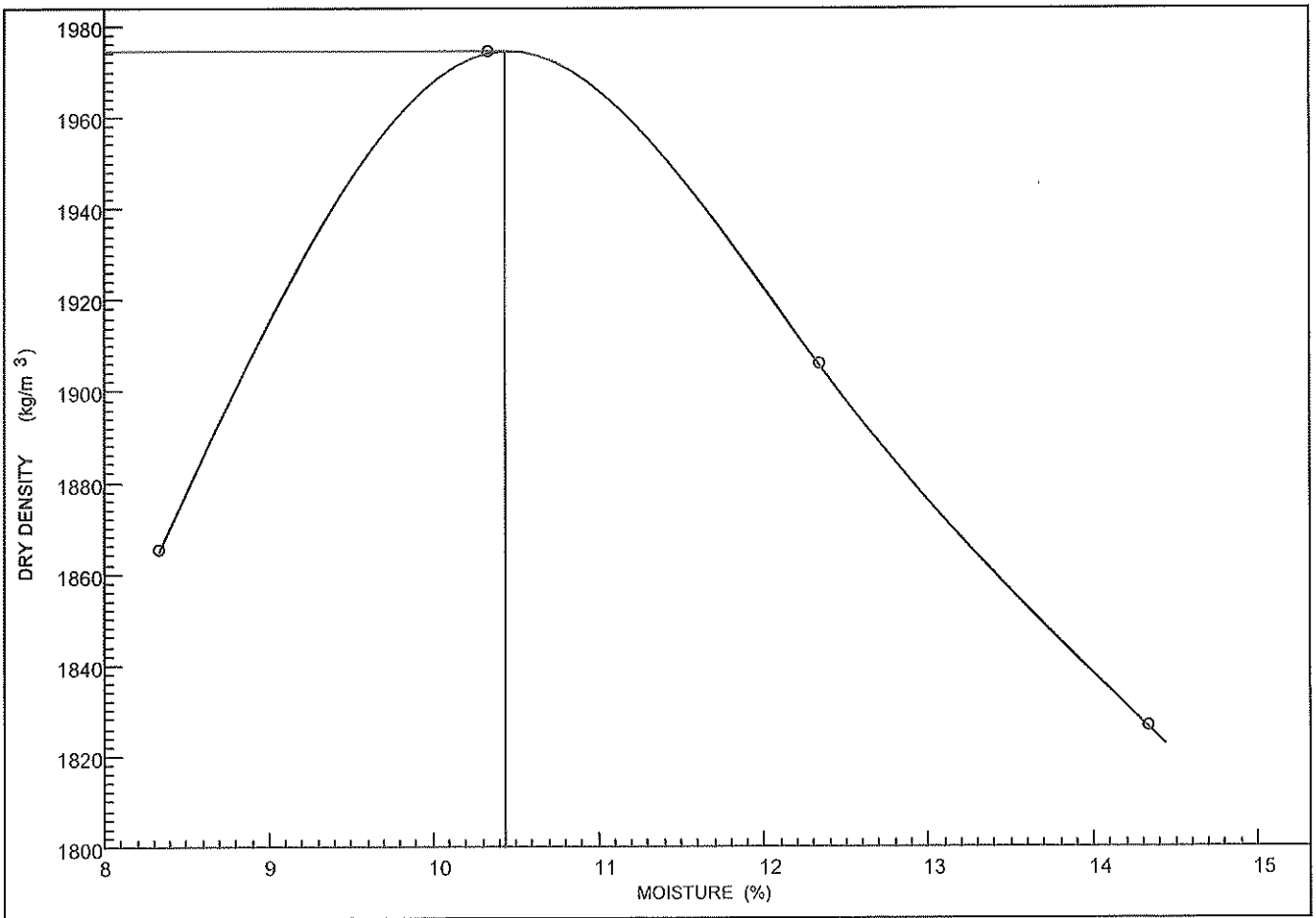
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10320	Hole No. : TP 175/1	Depth (mm) : 0 - 1200mm
Origin : TP 175/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Hillwash		

Optimum Moisture Content (%) : 10,4

Maximum Dry Density (kg/m^3): 1975

Point No.	1	2	3	4				
Moisture (%)	8,3	10,3	12,3	14,3				
Density (kg/m^3)	1865	1974	1906	1826				



Remarks :

FORM: A7

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TEST RESULTS

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4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

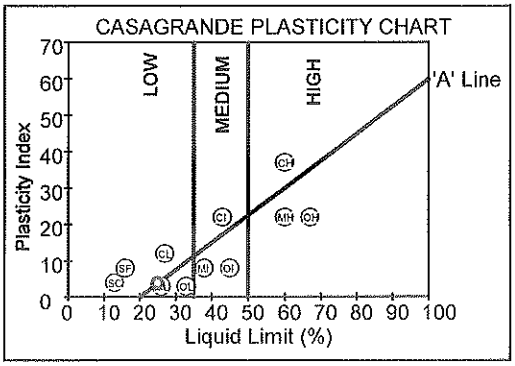
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

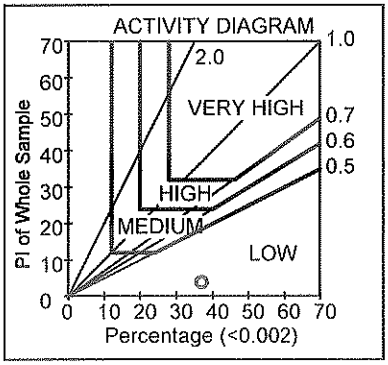
FOUNDATION INDICATOR (ASTM: D422)

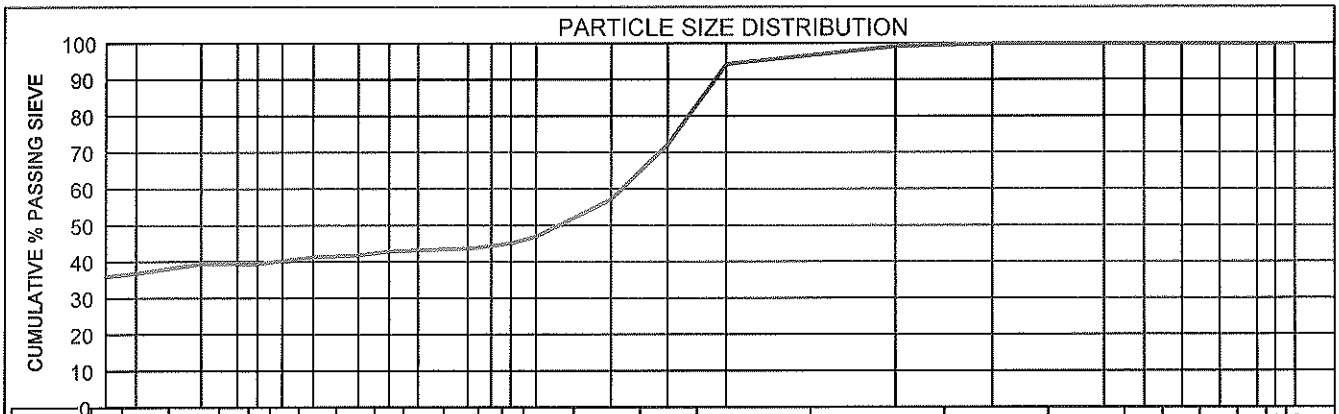
Sample No.	: 10320
Hole No.	: TP 175/1
Depth	: 31.10.2019
Liquid Limit (%)	: 25
Plasticity Index	: 4
Linear Shrinkage (%)	: 2,0
PI of Whole Sample	: 4
P.R.A. Classification	: A-4(2)
Unified Soil Classificati	: SM
Activity	: 0,11
Heave Classification	: LOW
Grading Modulus	: 0,60
Percentage (<0.002)	: 37,0
Moisture Content (%)	: 7,9

Material Description : (Hillwash) SANDY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	39,5	5,0	54,8	0,7	SANDY CLAY
Astm	39,5	7,5	53,0	0,0	SANDY CLAY
British Standard	36,9	8,3	54,1	0,7	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	36	37	39	39	39	40	41	42	43	43	44	44	45	47	57	72	94	99	100	100	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

A & R. Bhikam

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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4 Daventry Street, Lynnwood Manor
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Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

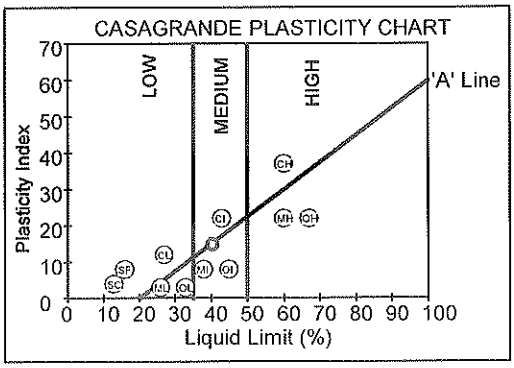
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

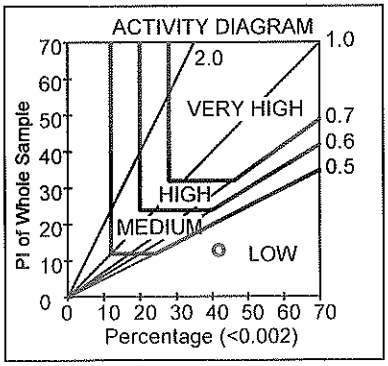
FOUNDATION INDICATOR (ASTM: D422)

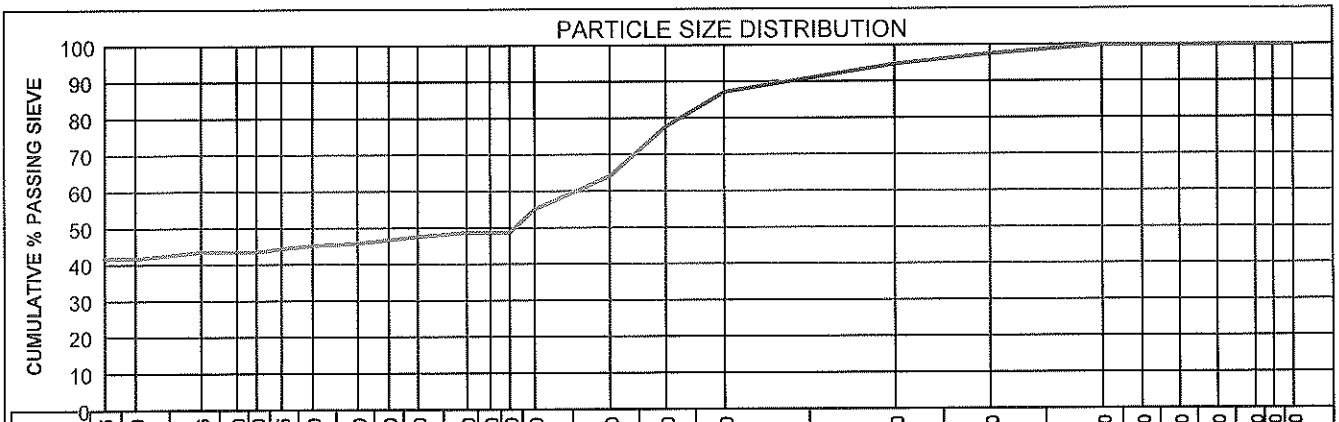
Sample No.	: 10321
Hole No.	: TP 183/1
Depth	: 900 - 1800mm
Liquid Limit (%)	: 41
Plasticity Index	: 15
Linear Shrinkage (%)	: 7,5
PI of Whole Sample	: 13
P.R.A. Classification	: A-7-6(6)
Unified Soil Classificati	: ML
Activity	: 0,31
Heave Classification	: LOW
Grading Modulus	: 0,63
Percentage (<0.002)	: 42,0
Moisture Content (%)	: 25,3

Material Description : (Residual Siltstone) SANDY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	43,5	5,2	46,2	5,1	SANDY CLAY
Astm	43,5	11,6	42,5	2,4	SANDY CLAY
British Standard	41,8	7,0	46,2	5,1	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	42	42	44	44	44	44	45	46	47	48	49	49	49	55	64	78	87	95	98	100	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL	
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

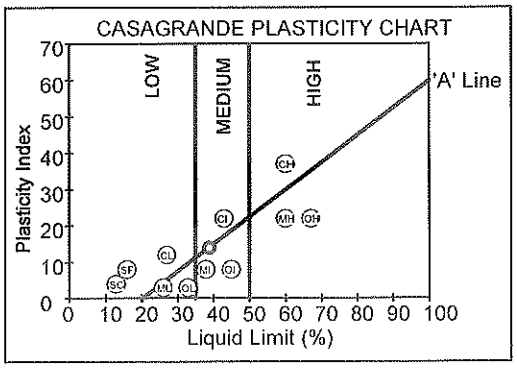
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

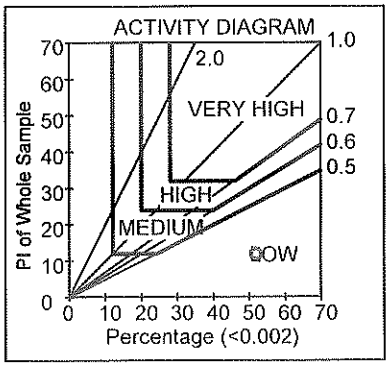
FOUNDATION INDICATOR (ASTM: D422)

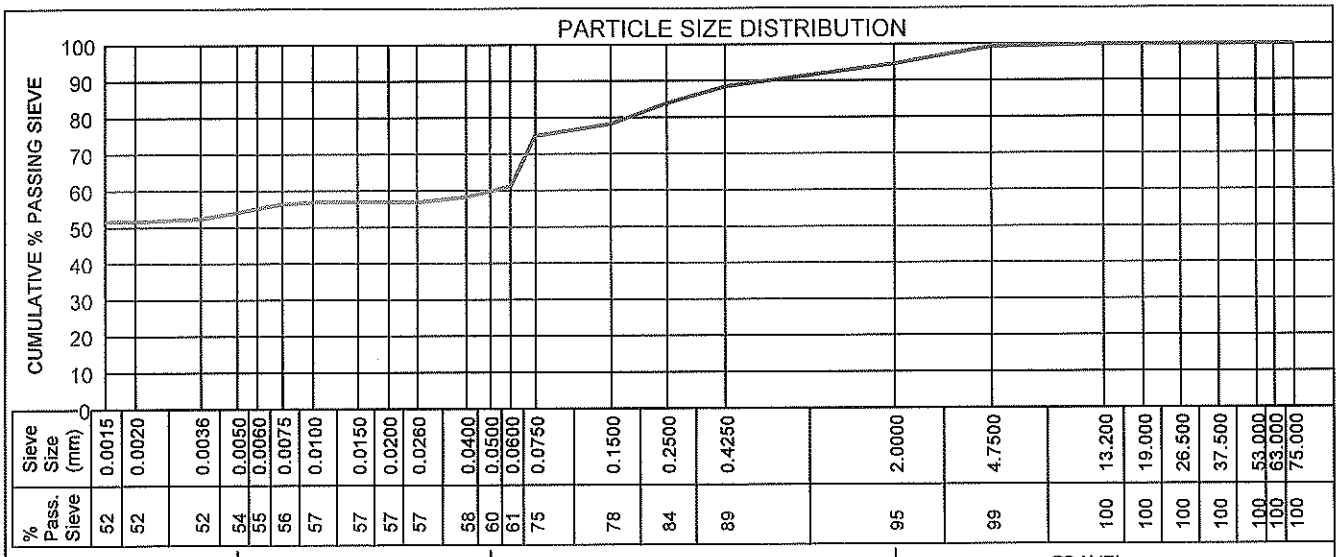
Sample No.	: 10322
Hole No.	: TP 185/1
Depth	: 1000 - 2500mm
Liquid Limit (%)	: 39
Plasticity Index	: 14
Linear Shrinkage (%)	: 7,0
PI of Whole Sample	: 12
P.R.A. Classification	: A-6(10)
Unified Soil Classificati	: ML
Activity	: 0,23
Heave Classification	: LOW
Grading Modulus	: 0,41
Percentage (<0.002)	: 52,0
Moisture Content (%)	: 20,1

Material Description : (Residual Tillite) CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	54,1	5,7	34,9	5,3	CLAY
Astm	54,1	20,9	24,4	0,6	CLAY
British Standard	51,6	9,7	33,4	5,3	CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	52	52	52	54	55	56	57	57	57	57	58	60	61	75	78	84	89	95	99	100	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL	

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/AA
Date Reported : 02.11.2019

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

SAMPLE NO.	10324			
HOLE NO.	TP 191/1			
ROAD NO.	N/A			
DEPTH	1100 - 2300mm			
CHAINAGE	TP 191/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Residual Sandstone			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm				
14.0 mm	100			
5.0 mm	92			
2.0 mm	90			
0.425 mm	73			
0.075 mm	41			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	19			
FINE SAND <0.425mm >0.075mm	36			
MATERIAL <0.075mm	45			
CONSTANTS				
GRADING MODULUS	0,96			
PRA CLASSIFICATION	A-4(1)			
COLTO CLASSIFICATION	G7			
TRH CLASSIFICATION	G7			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	SP			
LINEAR SHRINKAGE (%)	1,5			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	1775			
OPTIMUM MOISTURE CONTENT(%)	7,1			
MOULDING MOISTURE (%)	7,0			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	43			
CBR-UCS @ 98% MOD AASHTO	34			
CBR-UCS @ 97% MOD AASHTO	30			
CBR-UCS @ 95% MOD AASHTO	24			
CBR-UCS @ 93% MOD AASHTO	20			
CBR-UCS @ 90% MOD AASHTO	15			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,00	0,10										

Remarks :

FORM: A1

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Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

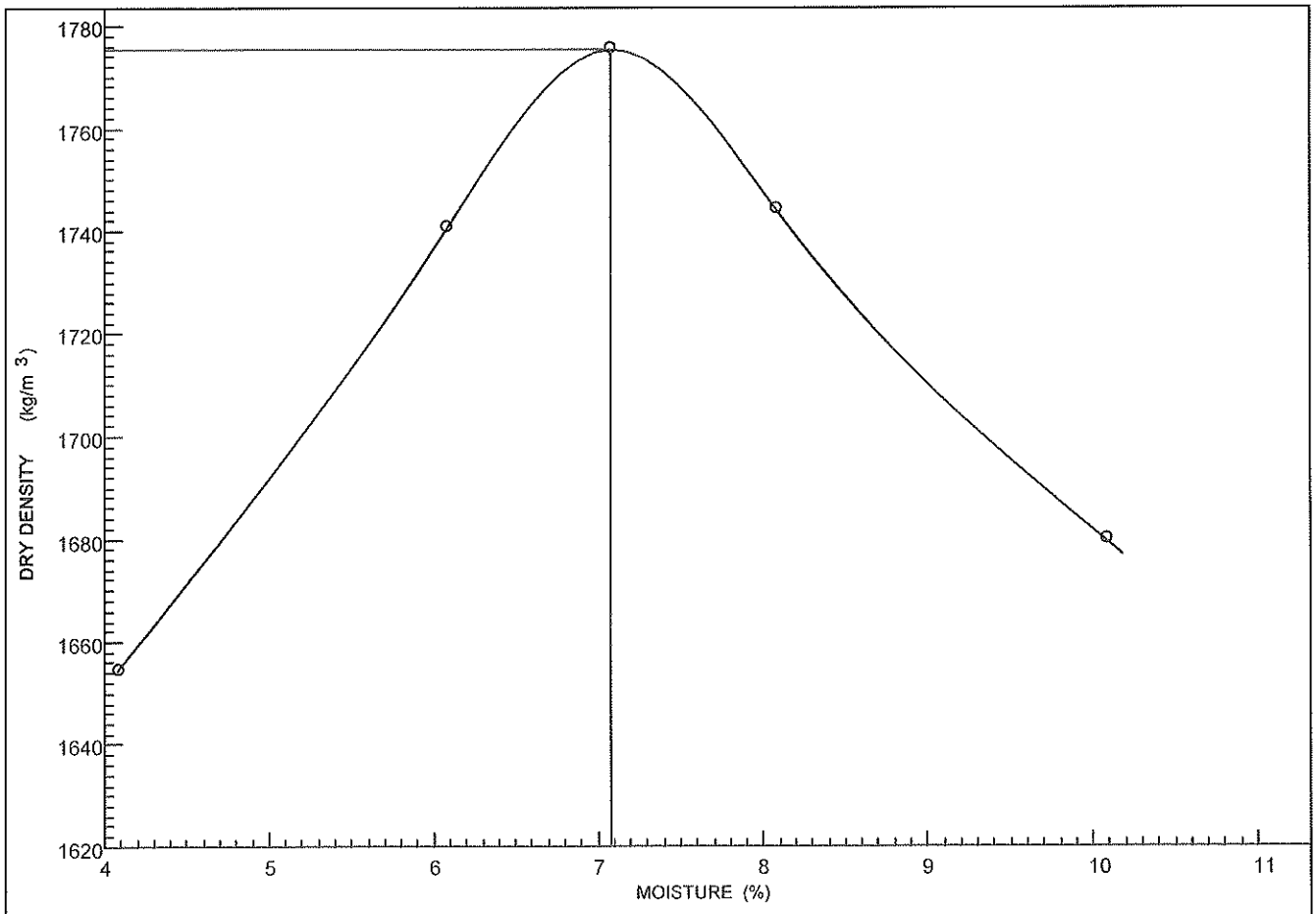
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10324	Hole No. : TP 191/1	Depth (mm) : 1100 - 2300mm
Origin : TP 191/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Residual Sandstone		

Optimum Moisture Content (%) : 7,1

Maximum Dry Density (kg/m^3): 1775

Point No.	1	2	3	4	5			
Moisture (%)	4,1	6,1	7,1	8,1	10,1			
Density (kg/m^3)	1654	1741	1775	1744	1680			



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

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Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

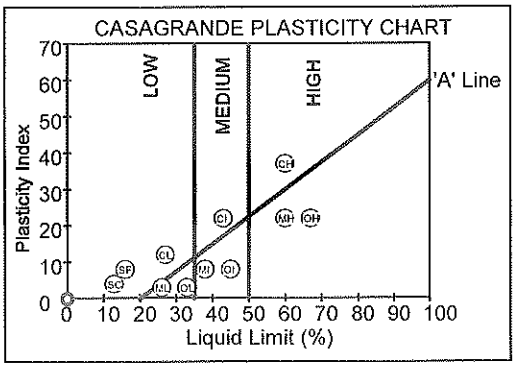
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

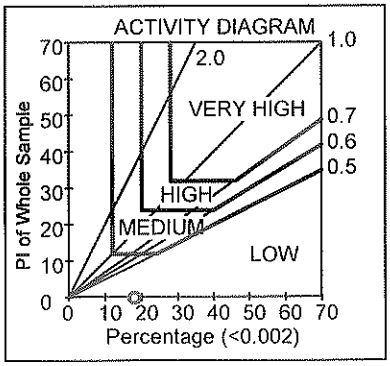
FOUNDATION INDICATOR (ASTM: D422)

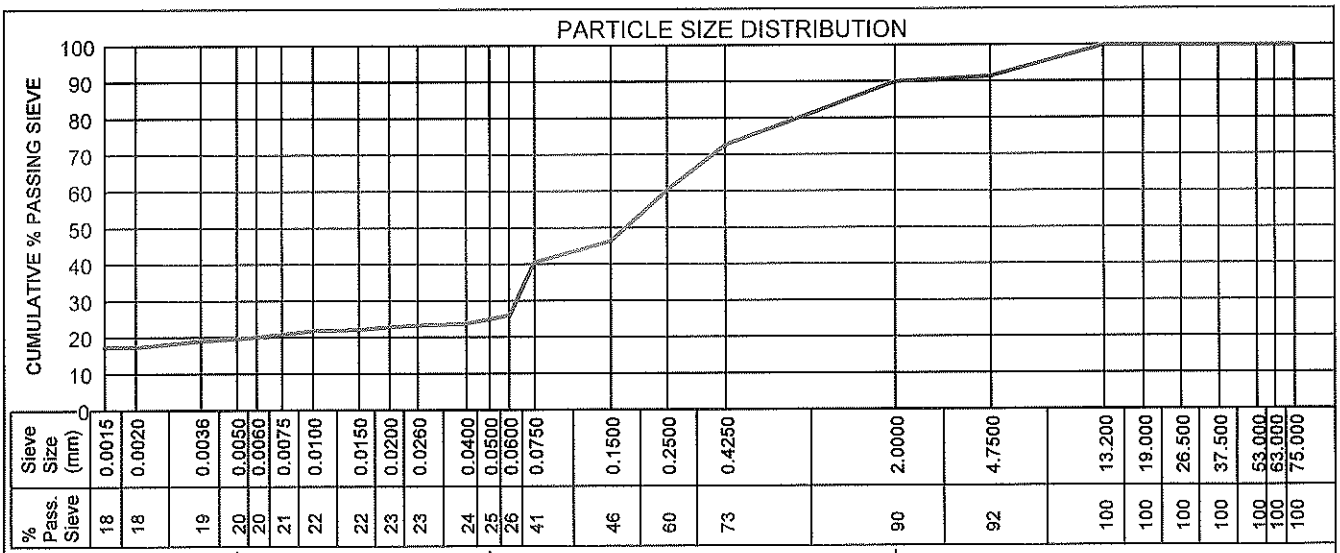
Sample No.	: 10324
Hole No.	: TP 191/1
Depth	: 1100 - 2300mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,5
PI of Whole Sample	: 0
P.R.A. Classification	: A-4(1)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 0,96
Percentage (<0.002)	: 18,0
Moisture Content (%)	: 6,0

Material Description : (Residual Sandstone) CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	19,7	5,3	65,1	9,9	CLAYEY SAND
Astm	19,7	20,9	50,9	8,4	CLAYEY SAND
British Standard	17,5	8,6	64,0	9,9	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	18	18	19	20	20	21	22	22	23	23	24	25	26	41	46	60	73	90	92	100	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

A B. Bhikam

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Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/BB Date Reported : 02.11.2019

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

SAMPLE NO.	10325			
HOLE NO.	TP 192/1			
ROAD NO.	N/A			
DEPTH	600 - 1100mm			
CHAINAGE	TP 192/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Ferricrete			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm	100			
14.0 mm	91			
5.0 mm	65			
2.0 mm	45			
0.425 mm	30			
0.075 mm	8			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	33			
FINE SAND <0.425mm >0.075mm	49			
MATERIAL <0.075mm	18			
CONSTANTS				
GRADING MODULUS	2,17			
PRA CLASSIFICATION	A-1-a(0)			
COLTO CLASSIFICATION	G5			
TRH CLASSIFICATION	G5			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	NP			
LINEAR SHRINKAGE (%)	0,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2089			
OPTIMUM MOISTURE CONTENT(%)	10,9			
MOULDING MOISTURE (%)	10,6			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	111			
CBR-UCS @ 98% MOD AASHTO	81			
CBR-UCS @ 97% MOD AASHTO	69			
CBR-UCS @ 95% MOD AASHTO	50			
CBR-UCS @ 93% MOD AASHTO	34			
CBR-UCS @ 90% MOD AASHTO	18			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,00	0,00										

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

A & R. Bhikam

Technical Signatory : Rasalis Bhikam

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Tel. : (031) 579 1220/1
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Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

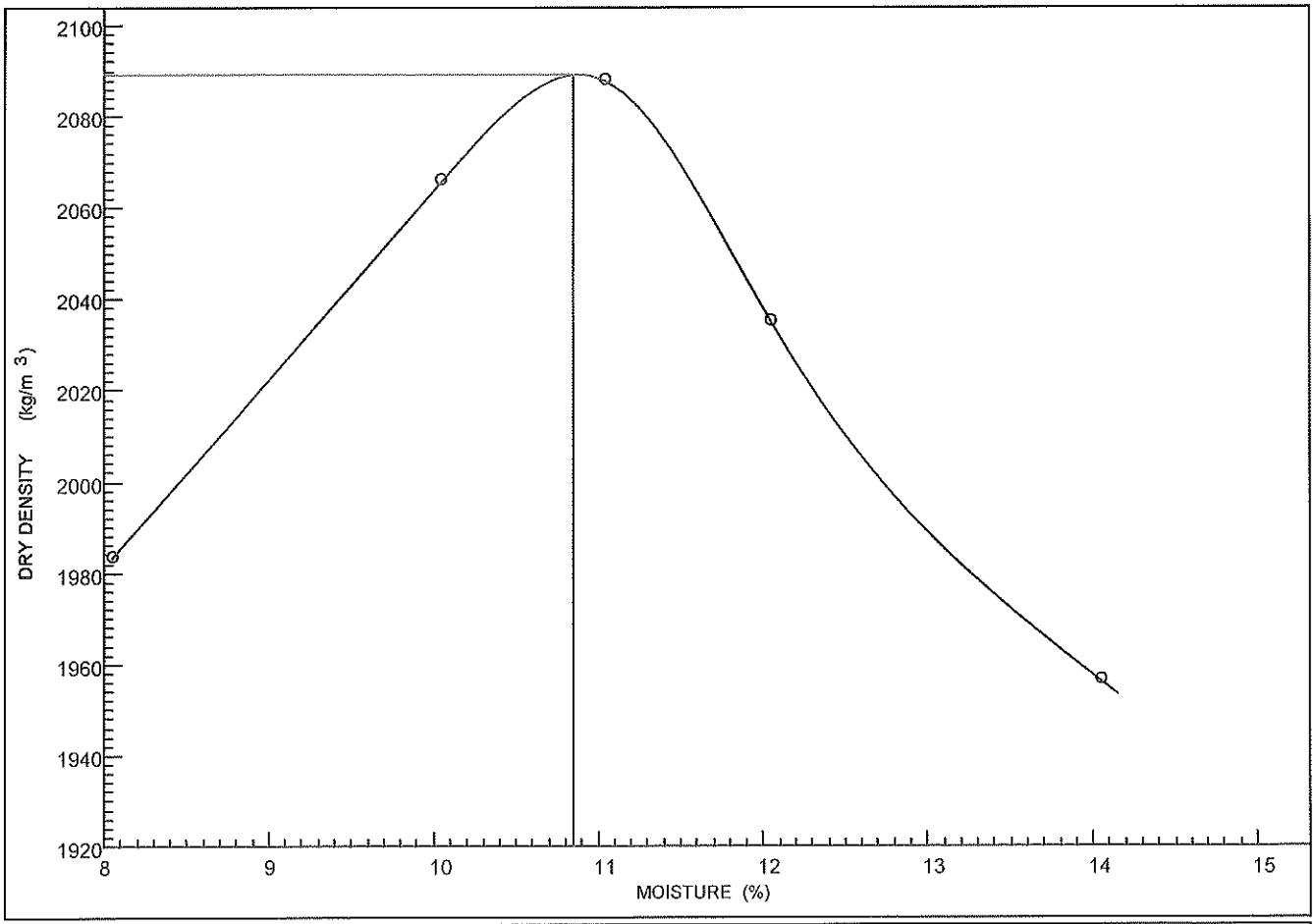
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10325	Hole No. : TP 192/1	Depth (mm) : 600 - 1100mm
Origin : TP 192/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Ferricrete		

Optimum Moisture Content (%) : 10,9

Maximum Dry Density (kg/m^3): 2089

Point No.	1	2	3	4	5			
Moisture (%)	8,1	10,1	11,1	12,1	14,1			
Density (kg/m^3)	1983	2066	2088	2035	1956			



Remarks :

FORM: A7

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

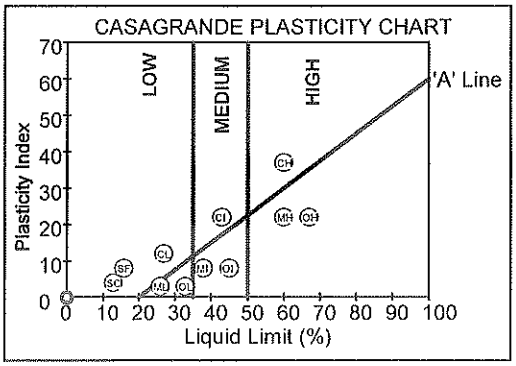
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

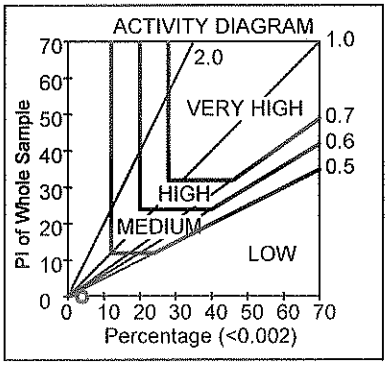
FOUNDATION INDICATOR (ASTM: D422)

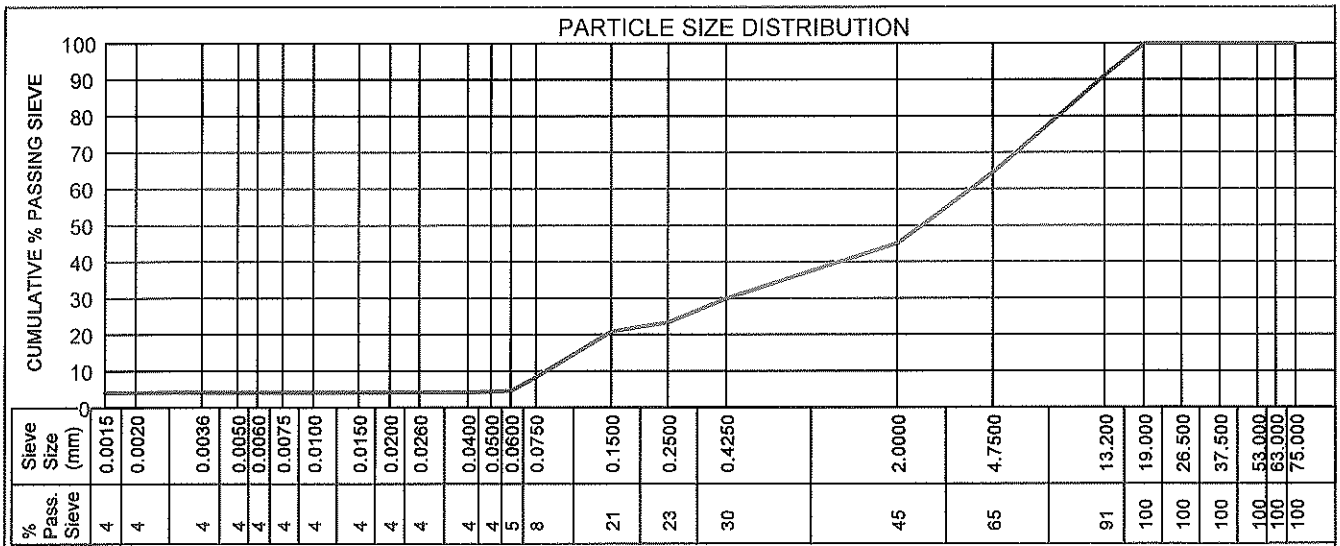
Sample No.	: 10325
Hole No.	: TP192/1
Depth	: 600 - 1100mm
Liquid Limit (%)	: -
Plasticity Index	: NP
Linear Shrinkage (%)	: 0,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-a(0)
Unified Soil Classificati	: SP-SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 2,17
Percentage (<0.002)	: 4,0
Moisture Content (%)	: 6,8

Material Description : (Ferricrete) SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	4,2	0,3	40,8	54,8	SAND
Astm	4,2	4,1	56,3	35,4	SAND
British Standard	4,2	0,5	40,5	54,8	SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	4	4	4	4	4	4	4	4	4	4	4	4	5	8	21	23	30	45	65	91	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT		FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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a SANAS Accredited Testing Laboratory, No. T 0239

60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/CC
Date Reported : 02.11.2019

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

SAMPLE NO.	10326			
HOLE NO.	TP 196/1			
ROAD NO.	N/A			
DEPTH	0 - 300mm			
CHAINAGE	TP 196/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Hillwash			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm				
14.0 mm	100			
5.0 mm	98			
2.0 mm	94			
0.425 mm	72			
0.075 mm	13			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	23			
FINE SAND <0.425mm >0.075mm	63			
MATERIAL <0.075mm	14			
CONSTANTS				
GRADING MODULUS	1,21			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	G6			
TRH CLASSIFICATION	G6			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	NP			
LINEAR SHRINKAGE (%)	0,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2043			
OPTIMUM MOISTURE CONTENT(%)	8,4			
MOULDING MOISTURE (%)	8,5			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	88			
CBR-UCS @ 98% MOD AASHTO	55			
CBR-UCS @ 97% MOD AASHTO	44			
CBR-UCS @ 95% MOD AASHTO	32			
CBR-UCS @ 93% MOD AASHTO	27			
CBR-UCS @ 90% MOD AASHTO	22			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,10	0,10										

Remarks :

FORM: A1

A & R. Bhikam

Technical Signatory : Rasalis Bhikam

4.4.0(SGS)(2016.08.31)

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

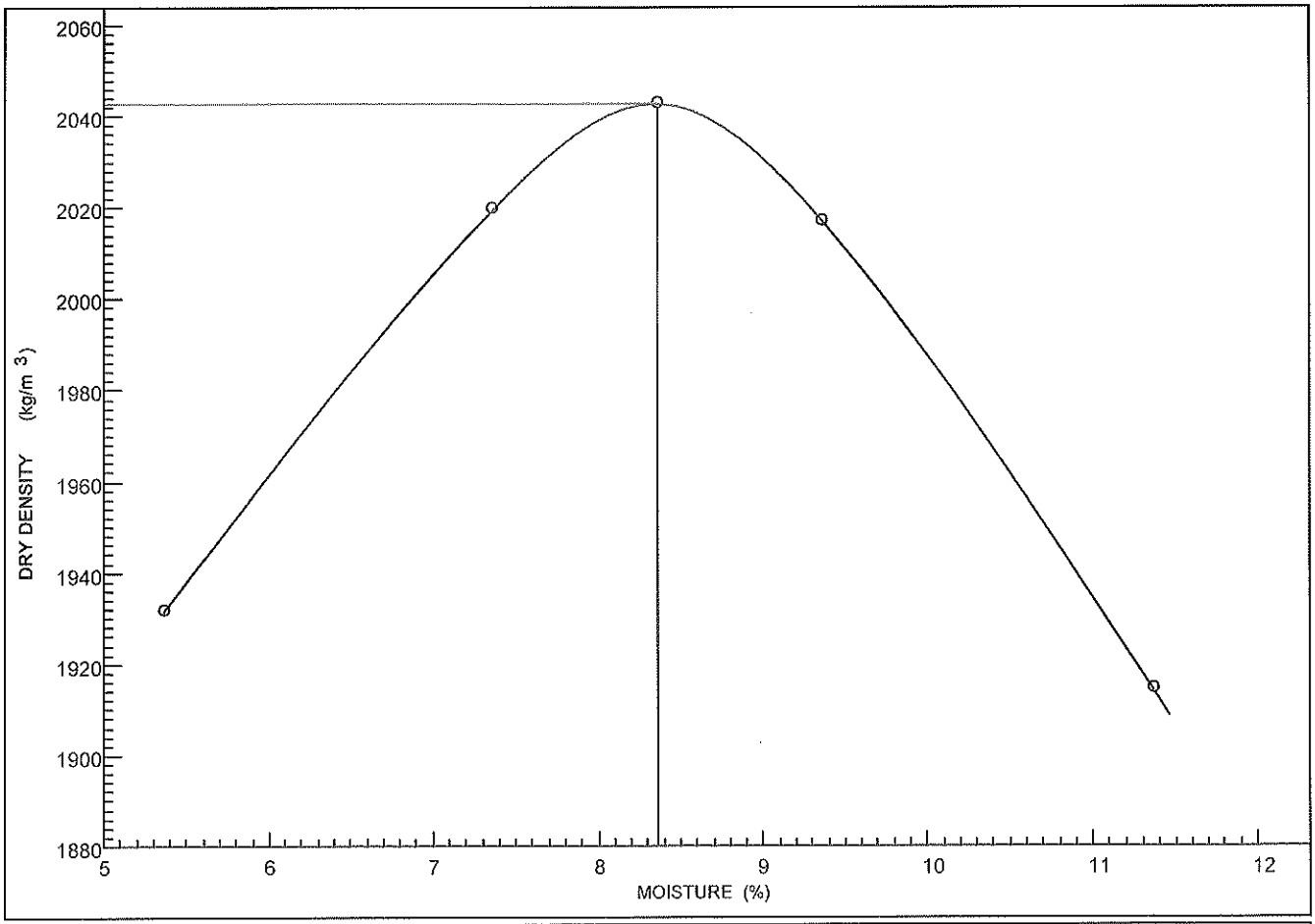
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10326	Hole No. : TP 196/1	Depth (mm) : 0 - 300mm
Origin : TP 196/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Hillwash		

Optimum Moisture Content (%) : 8,4

Maximum Dry Density (kg/m^3): 2043

Point No.	1	2	3	4	5			
Moisture (%)	5,4	7,4	8,4	9,4	11,4			
Density (kg/m^3)	1932	2020	2043	2017	1914			



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

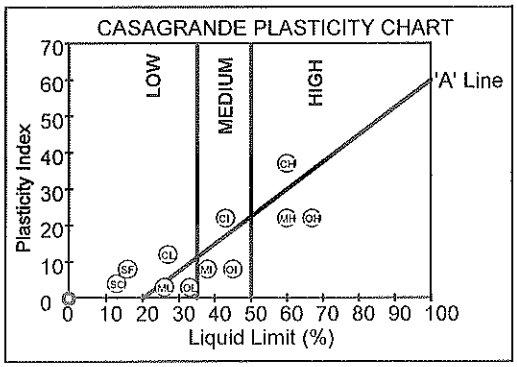
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

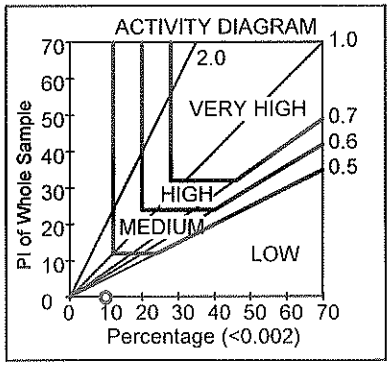
FOUNDATION INDICATOR (ASTM: D422)

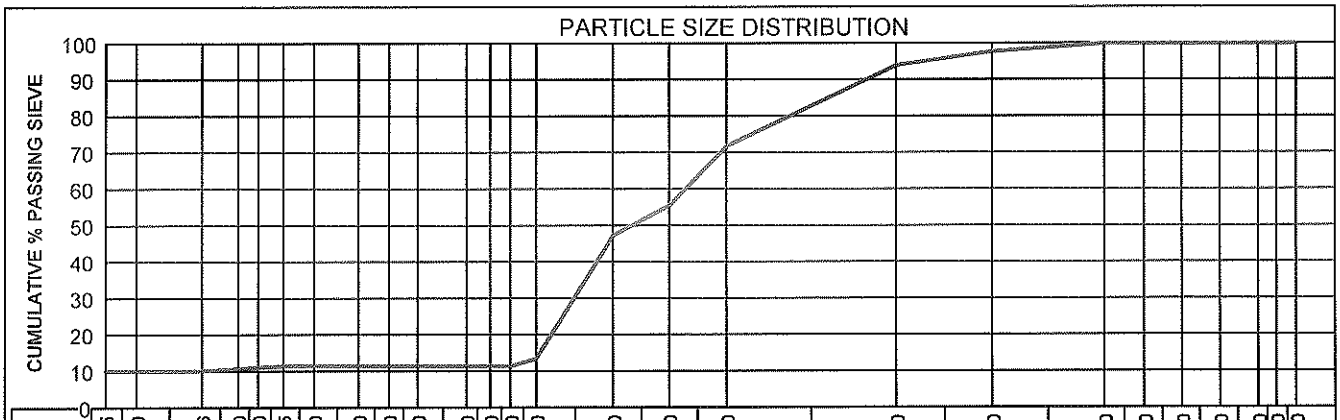
Sample No.	: 10326
Hole No.	: TP 196/1
Depth	: 0 - 300mm
Liquid Limit (%)	: -
Plasticity Index	: NP
Linear Shrinkage (%)	: 0,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 1,21
Percentage (<0.002)	: 10,0
Moisture Content (%)	: 0,0

Material Description : (Hillwash) SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	10,8	0,8	82,5	5,9	SAND
Astm	10,8	2,7	84,3	2,3	SAND
British Standard	10,1	1,4	82,5	5,9	SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	10	10	10	11	11	12	12	12	12	12	12	12	12	13	47	56	72	94	98	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/DD Date Reported : 02.11.2019

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

SAMPLE NO.	10327			
HOLE NO.	TP 198/1			
ROAD NO.	N/A			
DEPTH	800 - 1300mm			
CHAINAGE	TP 198/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Ferricrete			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm	100			
14.0 mm	93			
5.0 mm	67			
2.0 mm	48			
0.425 mm	30			
0.075 mm	7			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	38			
FINE SAND <0.425mm >0.075mm	48			
MATERIAL <0.075mm	14			
CONSTANTS				
GRADING MODULUS	2,15			
PRA CLASSIFICATION	A-1-a(0)			
COLTO CLASSIFICATION	G6			
TRH CLASSIFICATION	G6			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	0			
LINEAR SHRINKAGE (%)	2,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2020			
OPTIMUM MOISTURE CONTENT(%)	12,1			
MOULDING MOISTURE (%)	12,1			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	60			
CBR-UCS @ 98% MOD AASHTO	48			
CBR-UCS @ 97% MOD AASHTO	42			
CBR-UCS @ 95% MOD AASHTO	34			
CBR-UCS @ 93% MOD AASHTO	26			
CBR-UCS @ 90% MOD AASHTO	18			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,00	0,10									

Remarks :

FORM: A1

R. Bhikam

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

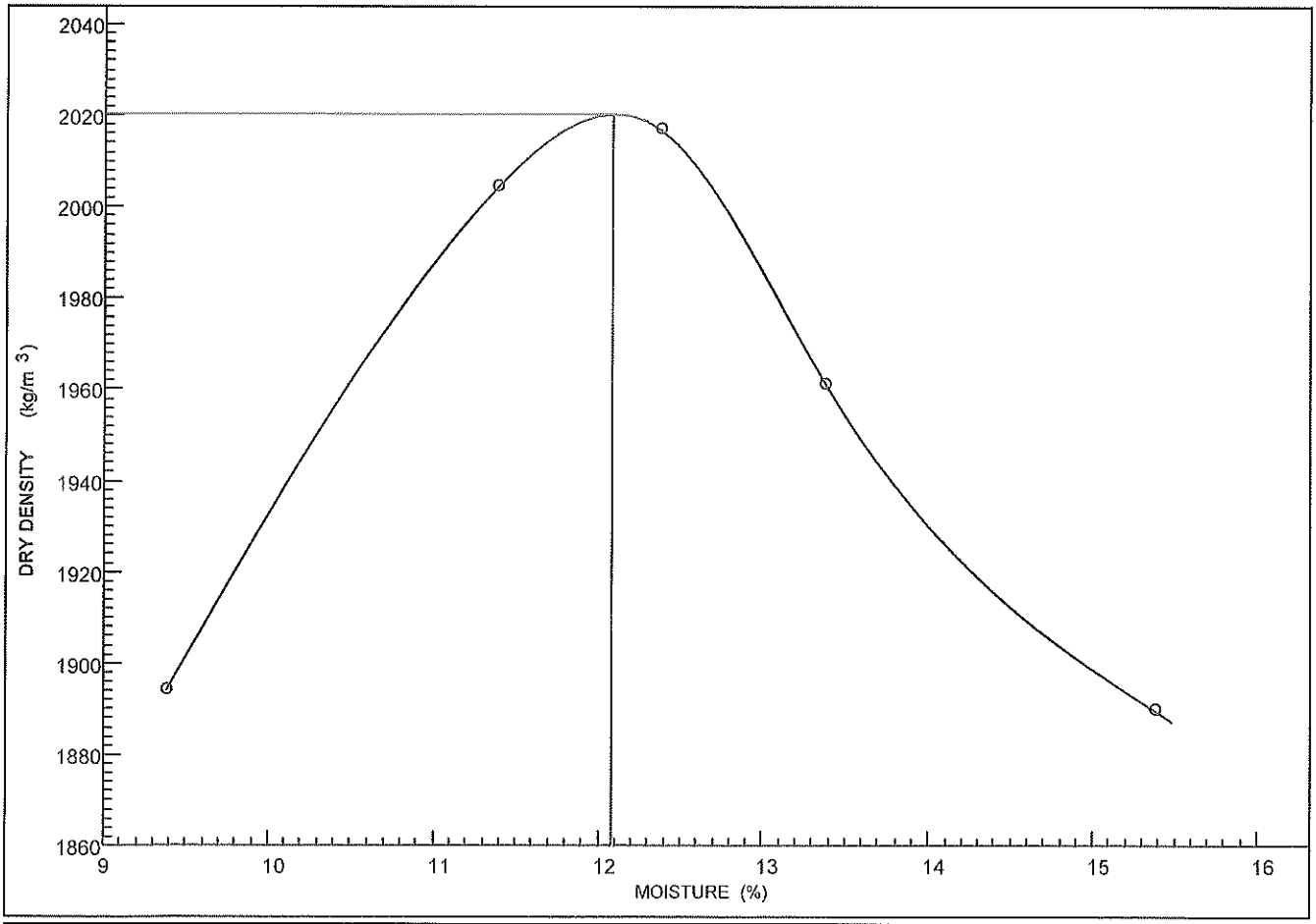
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10327	Hole No. : TP 198/1	Depth (mm) : 800 - 1300mm
Origin : TP 198/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Ferricrete		

Optimum Moisture Content (%) : 12,1

Maximum Dry Density (kg/m^3): 2020

Point No.	1	2	3	4	5			
Moisture (%)	9,4	11,4	12,4	13,4	15,4			
Density (kg/m^3)	1894	2004	2017	1961	1890			



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

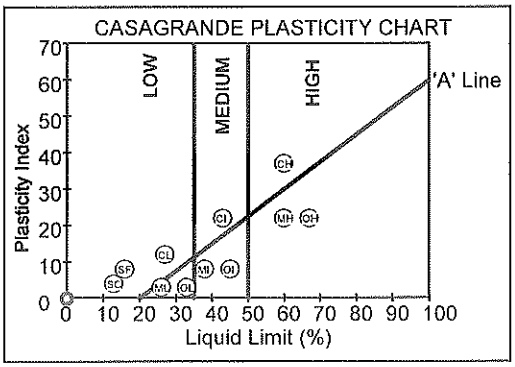
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

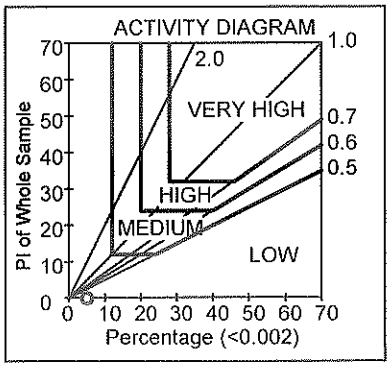
FOUNDATION INDICATOR (ASTM: D422)

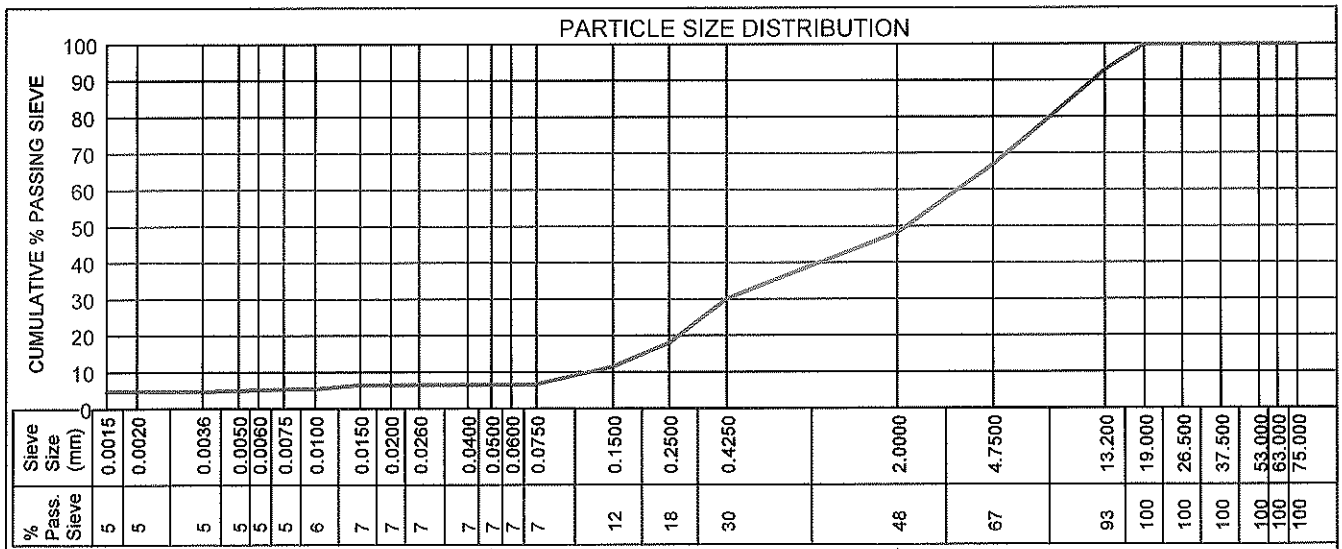
Sample No.	: 10327
Hole No.	: TP 198/1
Depth	: 800 - 1300mm
Liquid Limit (%)	: -
Plasticity Index	: 0
Linear Shrinkage (%)	: 2,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-a(0)
Unified Soil Classificati	: SP-SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 2,15
Percentage (<0.002)	: 5,0
Moisture Content (%)	: 8,5

Material Description : (Ferricrete) SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	5,1	1,5	41,8	51,6	SAND
Astm	5,1	1,7	60,2	33,1	SAND
British Standard	4,8	1,8	41,8	51,6	SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	5	5	5	5	5	5	6	7	7	7	7	7	7	7	12	18	30	48	67	93	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

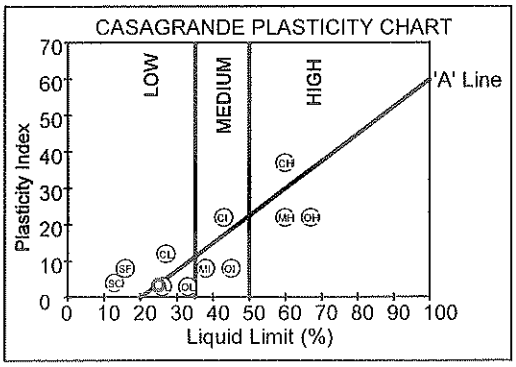
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

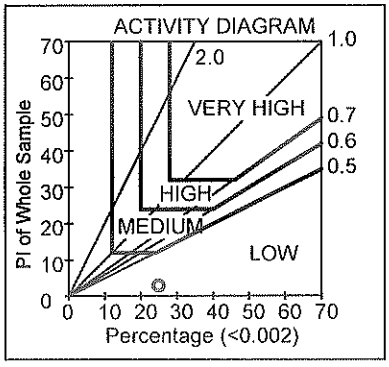
FOUNDATION INDICATOR (ASTM: D422)

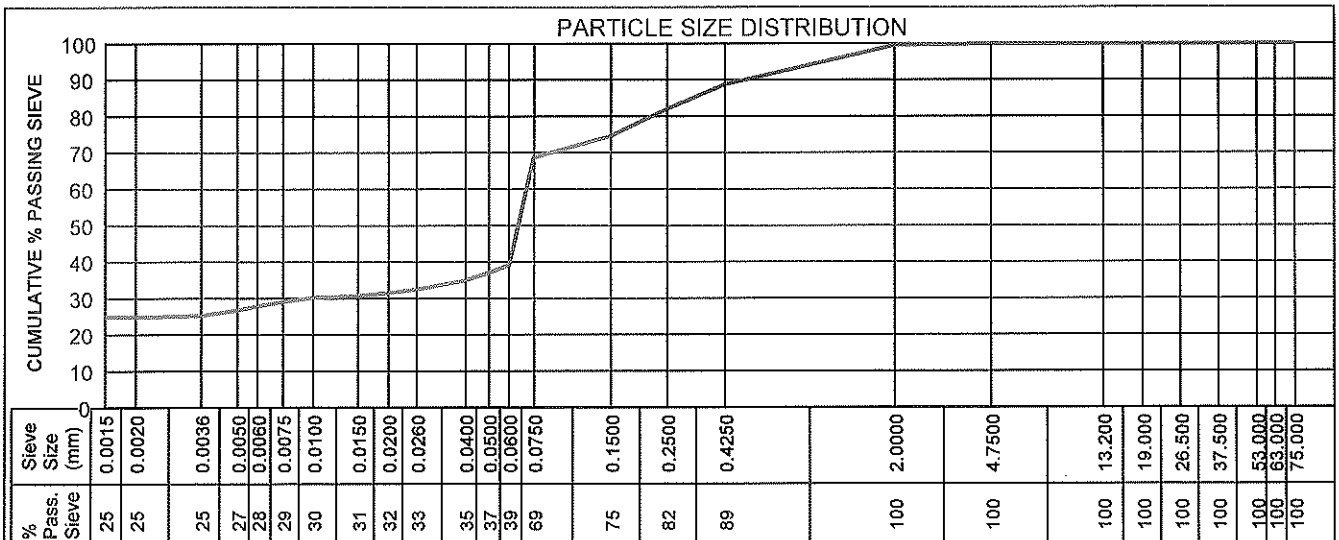
Sample No. : 10328
Hole No. : TP 199/1
Depth : 0 - 900mm
Liquid Limit (%) : 25
Plasticity Index : 4
Linear Shrinkage (%) : 2,0
PI of Whole Sample : 3
P.R.A. Classification : A-4(7)
Unified Soil Classificati: ML
Activity : 0,12
Heave Classification : LOW
Grading Modulus : 0,42
Percentage (<0.002) : 25,0
Moisture Content (%) : 23,2

Material Description : (Colluvium/ Hillwash) CLAYEY SILT

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	26,8	10,2	62,6	0,4	CLAYEY SAND
Astm	26,8	41,9	31,3	0,0	CLAYEY SILT
British Standard	24,9	14,3	60,4	0,4	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	25	25	25	27	28	29	30	31	32	33	35	37	39	69	75	82	89	100	100	100	100	100	100	100	100	100

JENN	CLAY	SILT	SAND	GRAVEL

ASTM	CLAY	SILT	FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL

BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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TEST RESULTS

Aurecon SA
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Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

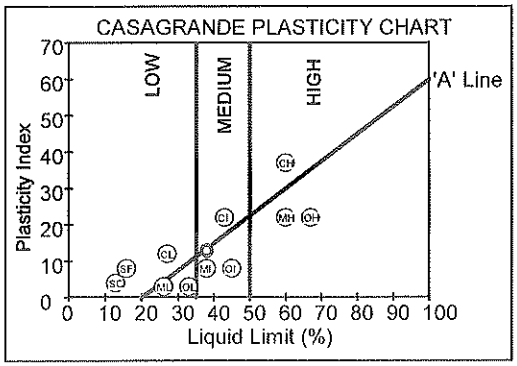
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

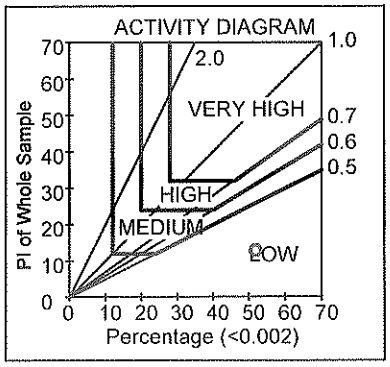
FOUNDATION INDICATOR (ASTM: D422)

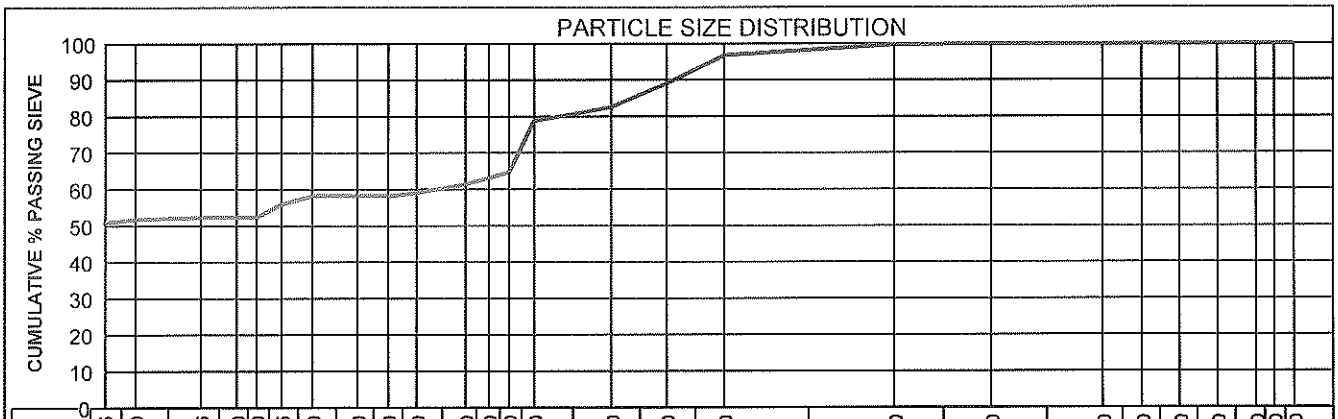
Sample No. : 10329
Hole No. : TP 200/1
Depth : 1000 - 2000mm
Liquid Limit (%) : 38
Plasticity Index : 13
Linear Shrinkage (%) : 6,5
PI of Whole Sample : 13
P.R.A. Classification : A-6(9)
Unified Soil Classificati: ML
Activity : 0,25
Heave Classification : LOW
Grading Modulus : 0,24
Percentage (<0.002) : 52,0
Moisture Content (%) : 25,0

Material Description : (Residual Siltstone) CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	52,4	10,8	36,6	0,2	CLAY
Astm	52,4	26,5	21,1	0,0	CLAY
British Standard	51,8	13,0	34,9	0,2	CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	51	52	52	52	52	56	58	58	58	59	61	63	65	79	83	89	97	100	100	100	100	100	100	100	100	100

JENN	CLAY	SILT		SAND			GRAVEL			
ASTM	CLAY	SILT		FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL			
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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60 Columbine Place, Glen Anil, Durban North, 4051

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

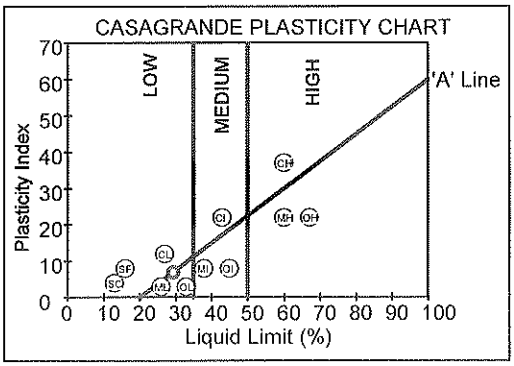
Your Ref : 505788
Our Ref : 7686
Date Reported : 30.10.2019

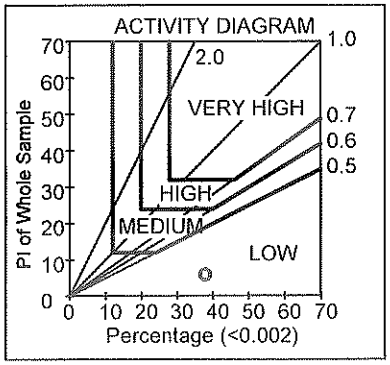
FOUNDATION INDICATOR (ASTM: D422)

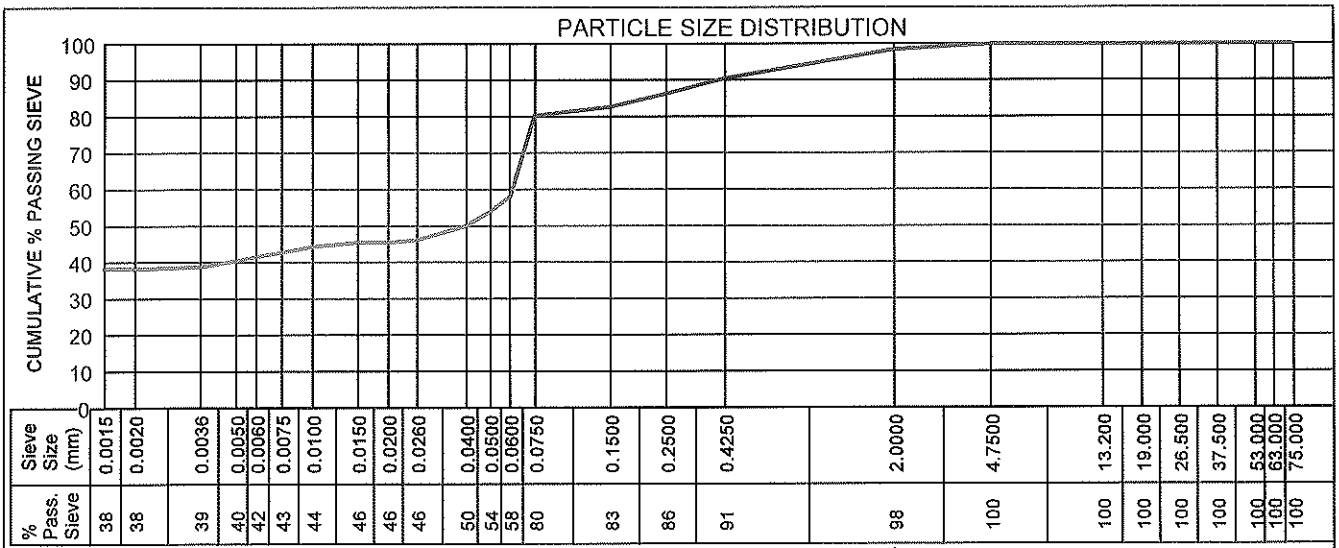
Sample No.	: 10330
Hole No.	: TP 201/1
Depth	: 3000 - 3800mm
Liquid Limit (%)	: 29
Plasticity Index	: 7
Linear Shrinkage (%)	: 3,5
PI of Whole Sample	: 6
P.R.A. Classification	: A-4(8)
Unified Soil Classificati	: ML
Activity	: 0,16
Heave Classification	: LOW
Grading Modulus	: 0,31
Percentage (<0.002)	: 38,0
Moisture Content (%)	: 18,9

Material Description : (Residual Siltstone) SILTY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	40,4	13,6	44,5	1,5	SANDY CLAY
Astm	40,4	39,9	19,6	0,0	SILTY CLAY
British Standard	38,2	19,8	40,4	1,5	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	38	38	39	40	42	43	44	46	46	46	50	54	58	80	83	86	91	98	100	100	100	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT		FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

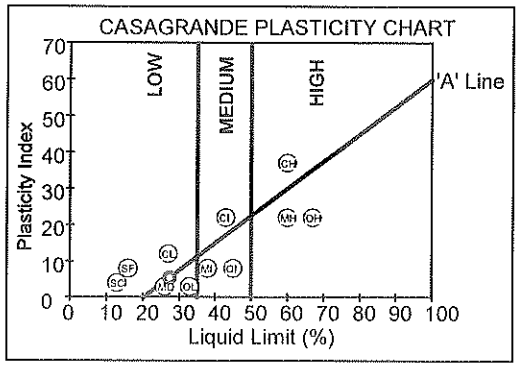
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

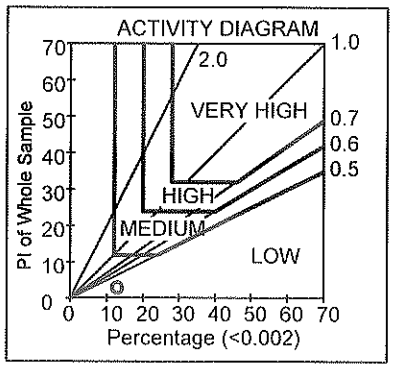
FOUNDATION INDICATOR (ASTM: D422)

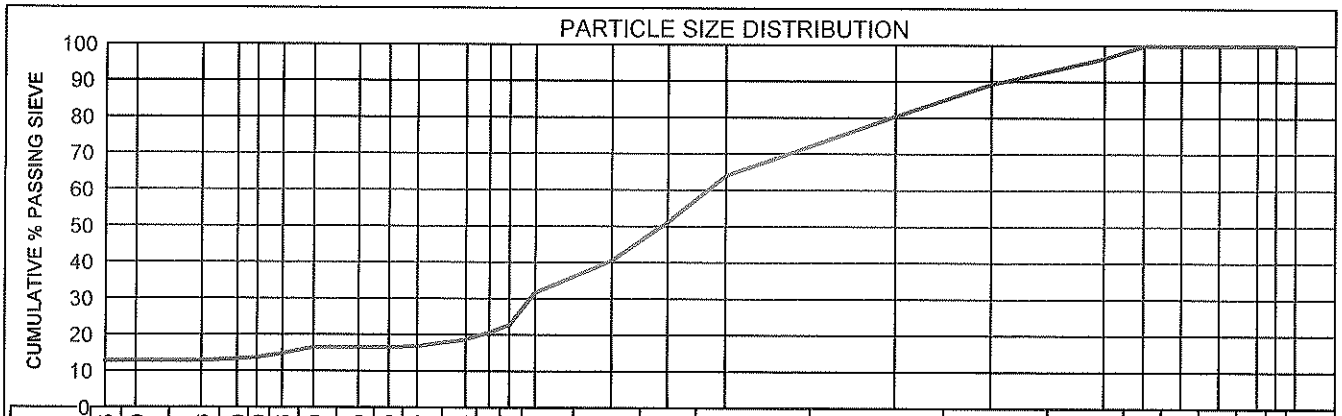
Sample No.	: 10332
Hole No.	: TP 202/1
Depth	: 1700 - 3100mm
Liquid Limit (%)	: 27
Plasticity Index	: 5
Linear Shrinkage (%)	: 2,5
PI of Whole Sample	: 3
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SM
Activity	: 0,23
Heave Classification	: LOW
Grading Modulus	: 1,23
Percentage (<0.002)	: 13,0
Moisture Content (%)	: 11,1

Material Description : Residual Siltstone SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	13,4	7,3	59,8	19,4	SILTY SAND
Astm	13,4	18,2	57,7	10,6	SILTY SAND
British Standard	12,8	10,0	57,7	19,4	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	13	13	13	13	14	15	17	17	17	17	19	21	23	32	41	51	64	81	89	97	100	100	100	100	100	100

JENN	CLAY	SILT		SAND			GRAVEL			
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/EE Date Reported : 02.11.2019

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

SAMPLE NO.	10333			
HOLE NO.	TP 207/1			
ROAD NO.	N/A			
DEPTH	800 - 1000mm			
CHAINAGE	TP 207/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Residual Sandstone			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm	100			
20.0 mm	97			
14.0 mm	90			
5.0 mm	86			
2.0 mm	82			
0.425 mm	50			
0.075 mm	7			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	39			
FINE SAND <0.425mm >0.075mm	52			
MATERIAL <0.075mm	9			
CONSTANTS				
GRADING MODULUS	1,61			
PRA CLASSIFICATION	A-1-b(0)			
COLTO CLASSIFICATION	G7			
TRH CLASSIFICATION	G7			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	NP			
LINEAR SHRINKAGE (%)	0,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	1786			
OPTIMUM MOISTURE CONTENT(%)	7,1			
MOULDING MOISTURE (%)	6,9			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	30			
CBR-UCS @ 98% MOD AASHTO	27			
CBR-UCS @ 97% MOD AASHTO	26			
CBR-UCS @ 95% MOD AASHTO	24			
CBR-UCS @ 93% MOD AASHTO	17			
CBR-UCS @ 90% MOD AASHTO	10			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,00	0,10										

Remarks :

FORM: A1

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

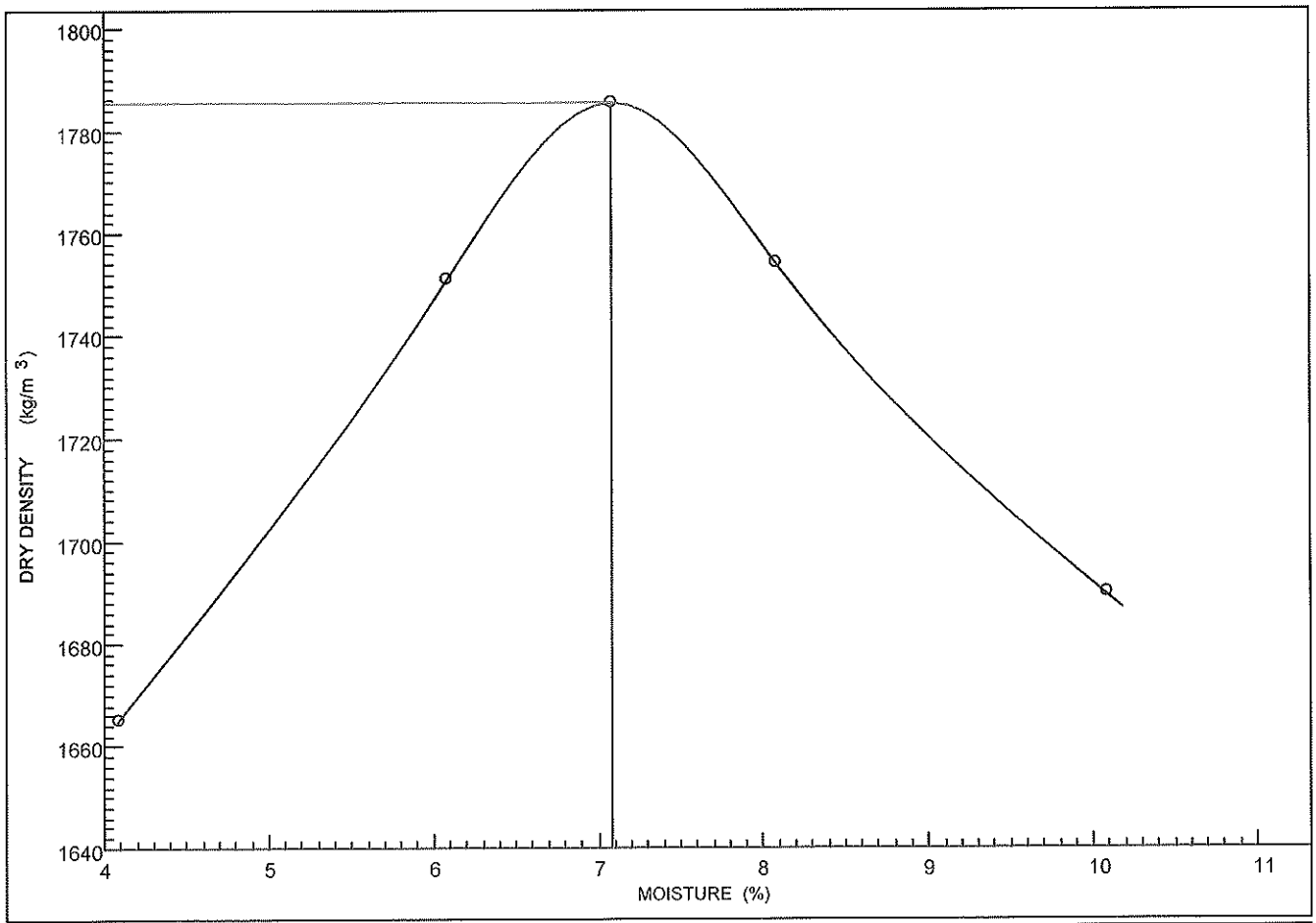
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10333	Hole No. : TP 207/1	Depth (mm) : 800 - 1000mm
Origin : TP 207/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Residual Sandstone		

Optimum Moisture Content (%) : 7,1

Maximum Dry Density (kg/m^3): 1786

Point No.	1	2	3	4	5			
Moisture (%)	4,1	6,1	7,1	8,1	10,1			
Density (kg/m^3)	1665	1751	1786	1754	1690			



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

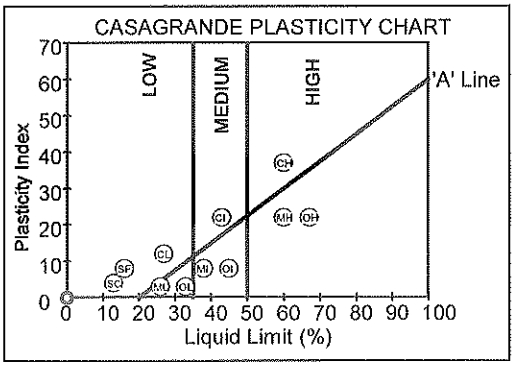
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

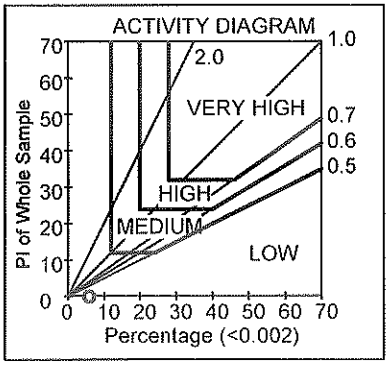
FOUNDATION INDICATOR (ASTM: D422)

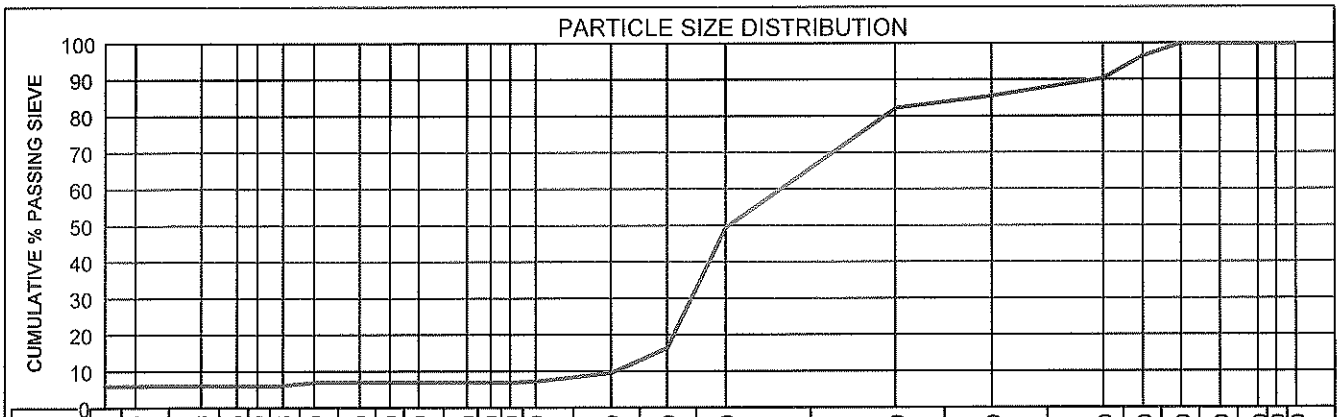
Sample No.	: 10333
Hole No.	: TP 207/1
Depth	: 800 - 1000mm
Liquid Limit (%)	: -
Plasticity Index	: NP
Linear Shrinkage (%)	: 0,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-b(0)
Unified Soil Classificati	: SP-SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 1,61
Percentage (<0.002)	: 6,0
Moisture Content (%)	: 1,2

Material Description : (Residual Sandstone) SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	6,0	1,0	75,4	17,6	SAND
Astm	6,0	1,3	78,4	14,4	SAND
British Standard	6,0	1,0	75,4	17,6	SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	6	6	6	6	6	6	7	7	7	7	7	7	7	7	10	16	50	82	86	90	97	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

A S R. Bhikam

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

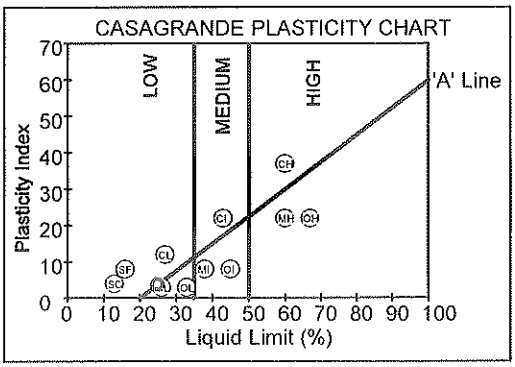
Your Ref : 505788
Our Ref : 7686
Date Reported : 04.11.2019

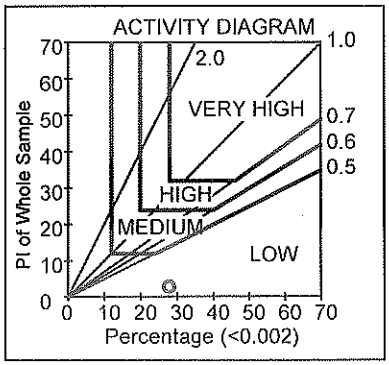
FOUNDATION INDICATOR (ASTM: D422)

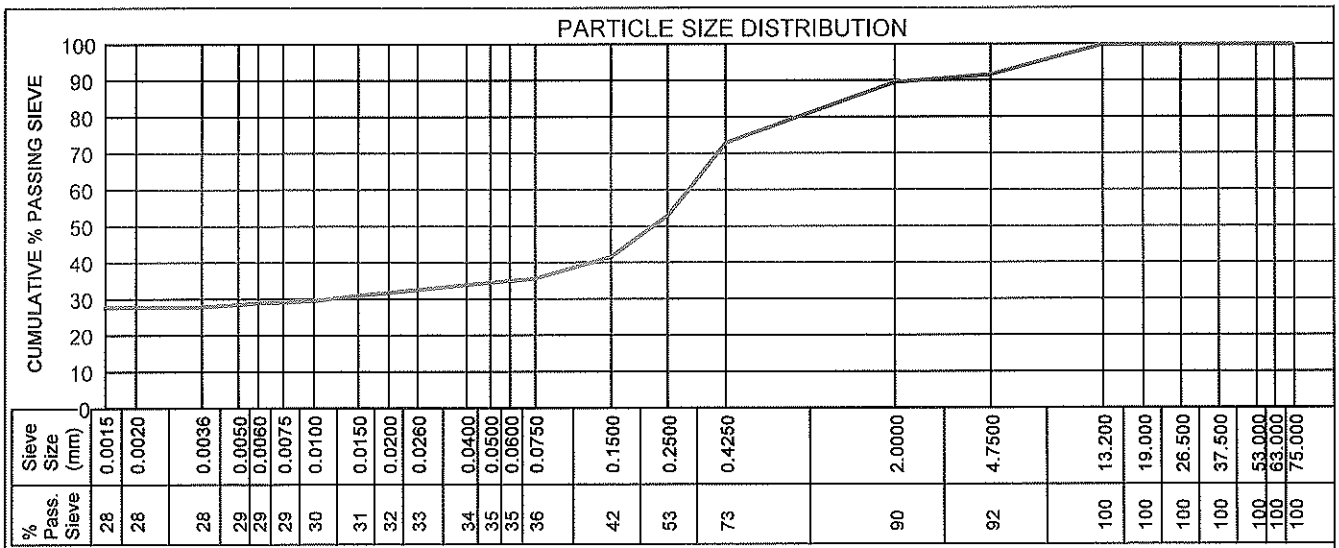
Sample No.	: 10334
Hole No.	: TP 212/1
Depth	: 2100 - 3100mm
Liquid Limit (%)	: 25
Plasticity Index	: 4
Linear Shrinkage (%)	: 2,0
PI of Whole Sample	: 3
P.R.A. Classification	: A-4(0)
Unified Soil Classificati	: SM
Activity	: 0,11
Heave Classification	: LOW
Grading Modulus	: 1,01
Percentage (<0.002)	: 28,0
Moisture Content (%)	: 16,4

Material Description : (Feeruginised Residual Sandstone) SANDY CLAY

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	28,6	5,9	55,2	10,3	SANDY CLAY
Astm	28,6	7,0	56,1	8,3	SANDY CLAY
British Standard	27,7	7,4	54,6	10,3	SANDY CLAY







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	28	28	28	29	29	29	30	31	32	33	34	35	35	36	42	53	73	90	92	100	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL	
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

A B R. Bhikam

Technical Signatory : Rasalis Bhikam

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Tel. : (031) 579 1220/1
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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/FF Date Reported : 02.11.2019

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

SAMPLE NO.	10335			
HOLE NO.	TP 213/1			
ROAD NO.	N/A			
DEPTH	0 - 600mm			
CHAINAGE	TP 213/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Hillwash			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm				
14.0 mm				
5.0 mm				
2.0 mm	100			
0.425 mm	78			
0.075 mm	17			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	22			
FINE SAND <0.425mm >0.075mm	61			
MATERIAL <0.075mm	17			
CONSTANTS				
GRADING MODULUS	1,05			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	G7			
TRH CLASSIFICATION	G7			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	SP			
LINEAR SHRINKAGE (%)	1,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	1984			
OPTIMUM MOISTURE CONTENT(%)	10,4			
MOULDING MOISTURE (%)	10,1			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	53			
CBR-UCS @ 98% MOD AASHTO	35			
CBR-UCS @ 97% MOD AASHTO	28			
CBR-UCS @ 95% MOD AASHTO	20			
CBR-UCS @ 93% MOD AASHTO	17			
CBR-UCS @ 90% MOD AASHTO	14			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,00	0,10										

Remarks :

FORM: A1

A B R. Bhikam

Technical Signatory : Rasalis Bhikam

4.4.0(SGS)(2016.08.31)

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Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 02.11.2019

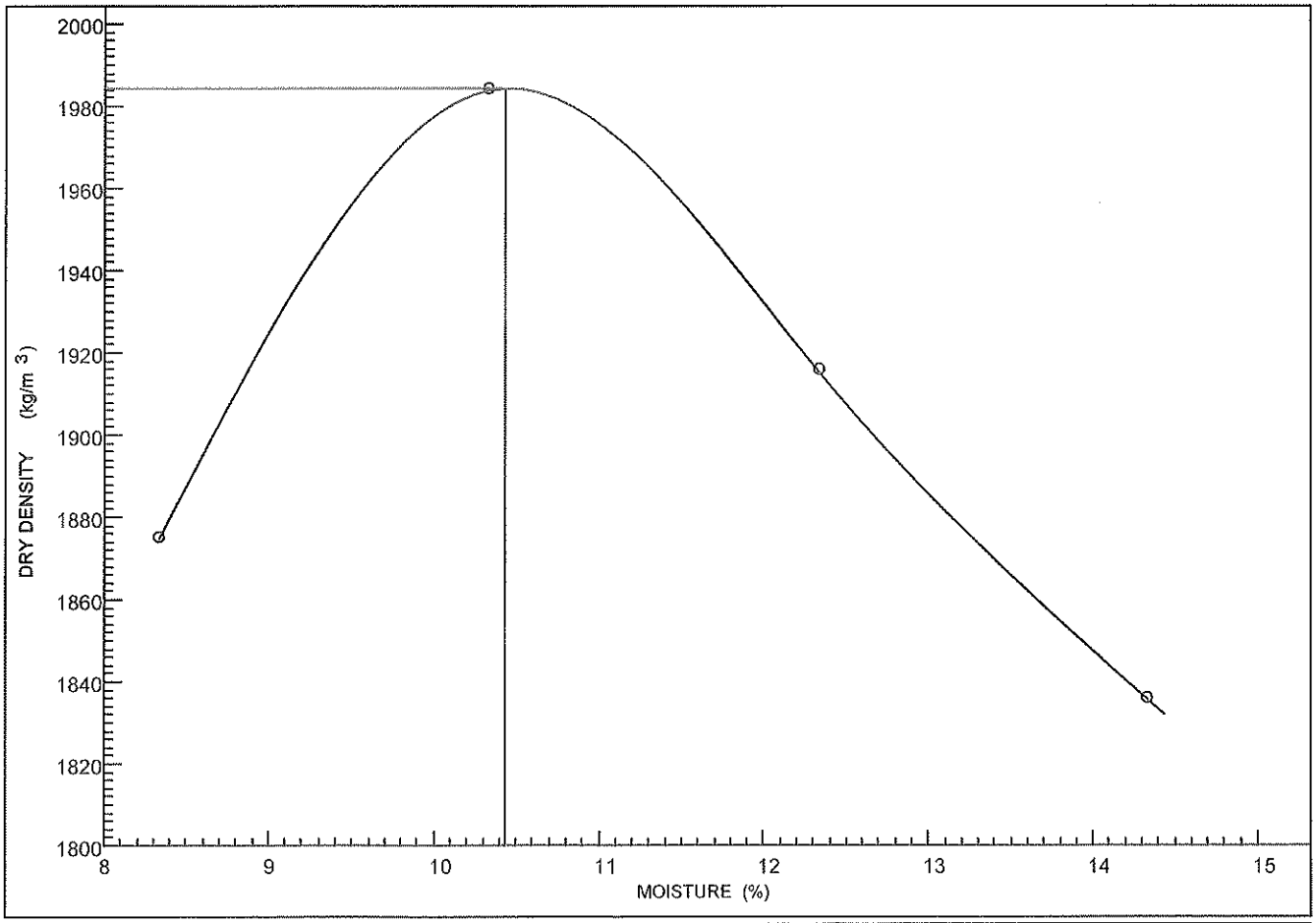
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10335	Hole No. : TP 213/1	Depth (mm) : 0 - 600mm
Origin : TP 213/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Hillwash		

Optimum Moisture Content (%) : 10,4

Maximum Dry Density (kg/m^3): 1984

Point No.	1	2	3	4				
Moisture (%)	8,3	10,3	12,3	14,3				
Density (kg/m^3)	1875	1984	1915	1836				



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

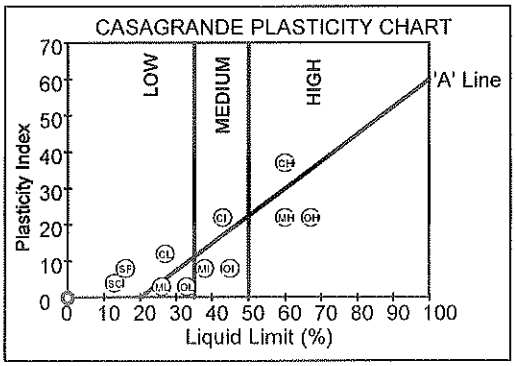
Your Ref : 505788
Our Ref : 7686
Date Reported : 11.11.2019

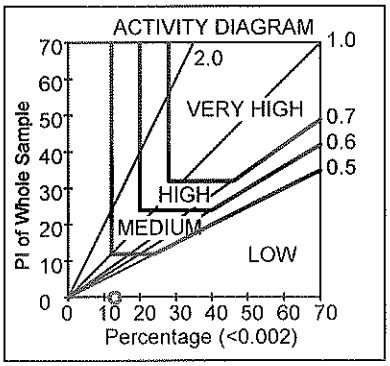
FOUNDATION INDICATOR (ASTM: D422)

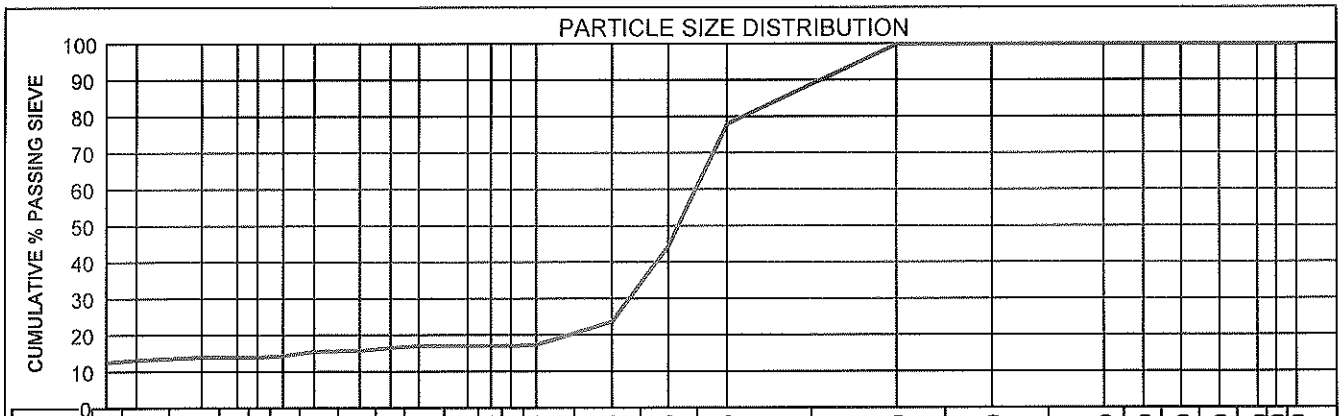
Sample No.	: 10335
Hole No.	: TP 213/1
Depth	: 0 - 600mm
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 1,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 1,05
Percentage (<0.002)	: 13,0
Moisture Content (%)	: 3,6

Material Description : (Hillwash) SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	14,0	3,1	82,8	0,0	SAND
Astm	14,0	3,4	82,6	0,0	SAND
British Standard	13,3	3,9	82,8	0,0	SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	13	13	14	14	14	14	16	16	17	17	17	17	17	17	24	44	78	100	100	100	100	100	100	100	100	100

JENN	CLAY		SILT			SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL	

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

R. Bhikam

Technical Signatory : Rasalis Bhikam

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/GG
Date Reported : 02.11.2019

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

SAMPLE NO.	10336			
HOLE NO.	TP 218/1			
ROAD NO.	N/A			
DEPTH	900 - 1100mm			
CHAINAGE	TP 218/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Ferruginised Residual Sandstone			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm	100			
20.0 mm	89			
14.0 mm	82			
5.0 mm	60			
2.0 mm	50			
0.425 mm	41			
0.075 mm	15			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	18			
FINE SAND <0.425mm >0.075mm	52			
MATERIAL <0.075mm	30			
CONSTANTS				
GRADING MODULUS	1,94			
PRA CLASSIFICATION	A-1-b(0)			
COLTO CLASSIFICATION	G6			
TRH CLASSIFICATION	G7			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	NP			
LINEAR SHRINKAGE (%)	0,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2212			
OPTIMUM MOISTURE CONTENT(%)	8,0			
MOULDING MOISTURE (%)	8,2			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	44			
CBR-UCS @ 98% MOD AASHTO	37			
CBR-UCS @ 97% MOD AASHTO	33			
CBR-UCS @ 95% MOD AASHTO	28			
CBR-UCS @ 93% MOD AASHTO	23			
CBR-UCS @ 90% MOD AASHTO	17			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,00	0,00										

Remarks :

FORM: A1

A B R. Bhikam

Technical Signatory : Rasalis Bhikam

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

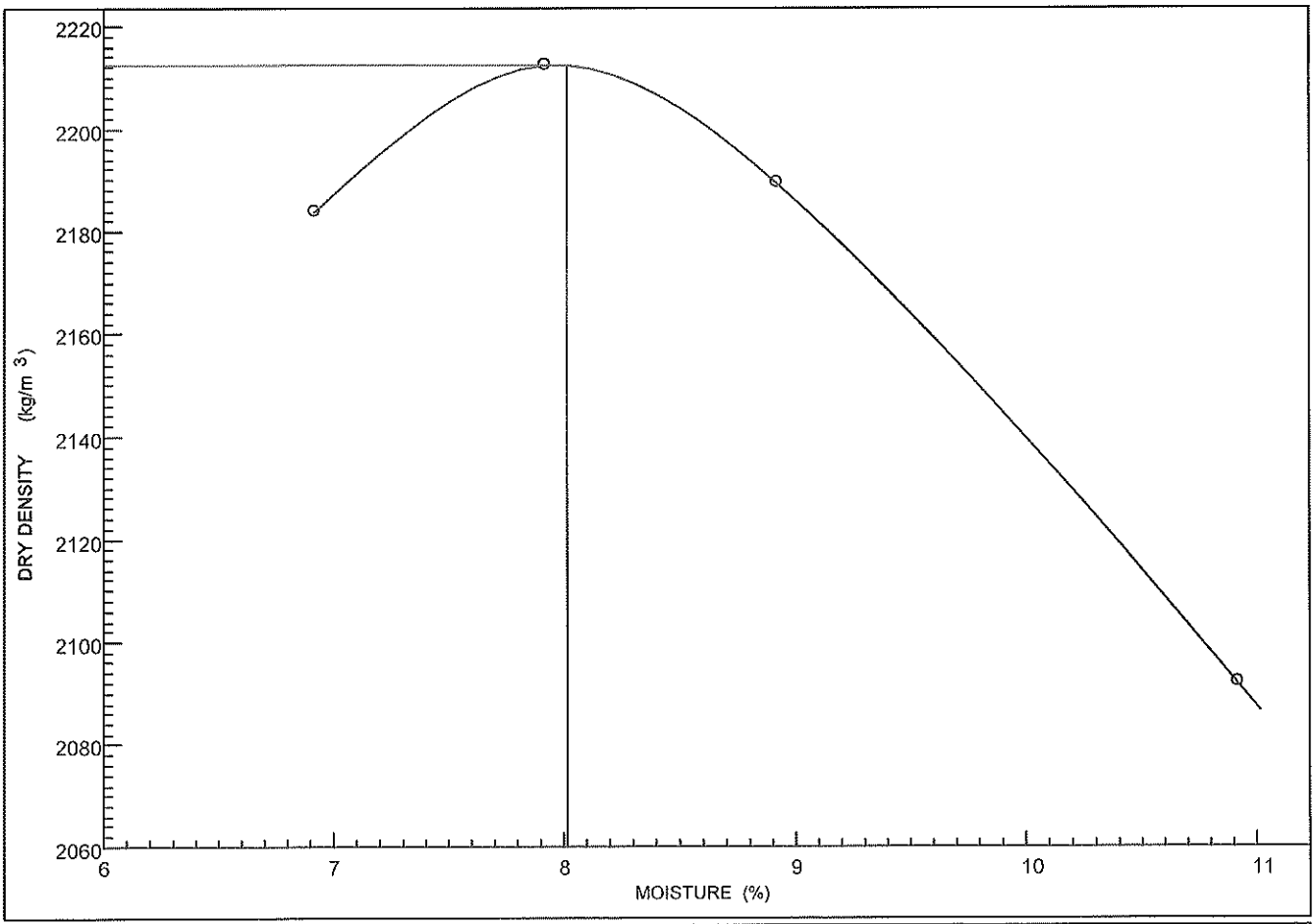
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10336	Hole No. : TP 218/1	Depth (mm) : 900 - 1100mm
Origin : TP 218/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Ferruginised Residual		

Optimum Moisture Content (%) : 8,0

Maximum Dry Density (kg/m^3): 2212

Point No.	1	2	3	4				
Moisture (%)	6,9	7,9	8,9	10,9				
Density (kg/m^3)	2184	2212	2189	2092				



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

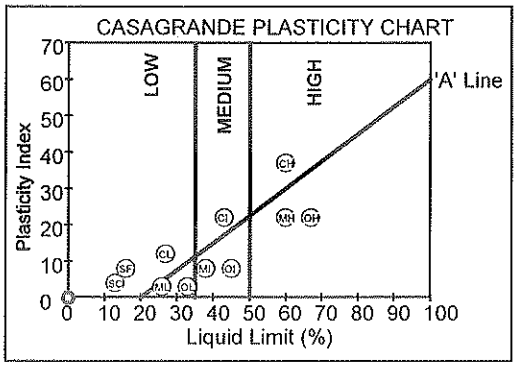
Your Ref : 505788
Our Ref : 7686
Date Reported : 01.11.2019

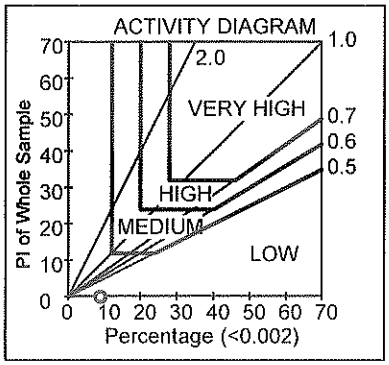
FOUNDATION INDICATOR (ASTM: D422)

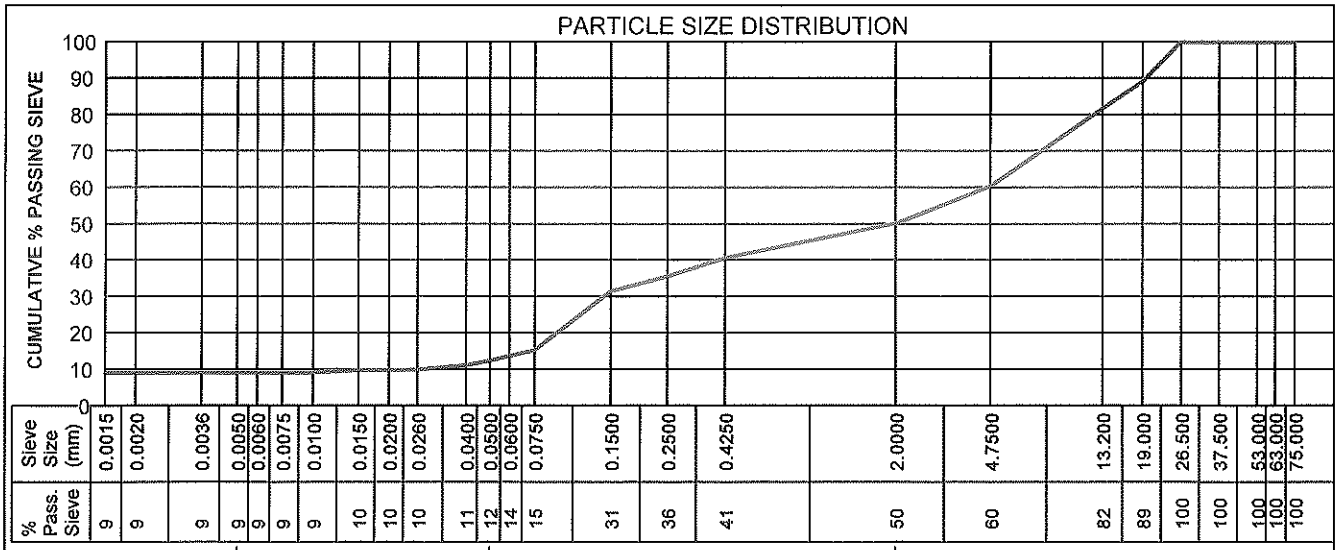
Sample No.	: 10336
Hole No.	: TP 218/1
Depth	: 900 - 1100mm
Liquid Limit (%)	: -
Plasticity Index	: NP
Linear Shrinkage (%)	: 0,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-b(0)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 1,94
Percentage (<0.002)	: 9,0
Moisture Content (%)	: 3,1

Material Description : (Ferruginised Residual Sandstone) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	9,0	3,4	37,7	49,8	SILTY SAND
Astm	9,0	6,3	45,2	39,5	SILTY SAND
British Standard	9,0	4,7	36,4	49,8	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	9	9	9	9	9	9	9	10	10	10	11	12	14	15	31	36	41	50	60	82	89	100	100	100	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT		FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686/HH Date Reported : 02.11.2019

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

SAMPLE NO.	10337			
HOLE NO.	TP 225/1			
ROAD NO.	N/A			
DEPTH	1200 - 2600mm			
CHAINAGE	TP 225/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Residual/ Completely Weathered Siltstone			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm	100			
20.0 mm	92			
14.0 mm	88			
5.0 mm	80			
2.0 mm	71			
0.425 mm	56			
0.075 mm	28			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	21			
FINE SAND <0.425mm >0.075mm	39			
MATERIAL <0.075mm	40			
CONSTANTS				
GRADING MODULUS	1,45			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	---			
TRH Class.(INSITU |93%|90%|)	G10|G10			
LIQUID LIMIT (%)	31			
PLASTICITY INDEX (0.425mm)	8			
LINEAR SHRINKAGE (%)	4,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	1935			
OPTIMUM MOISTURE CONTENT(%)	12,8			
MOULDING MOISTURE (%)	12,6			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	18			
CBR-UCS @ 98% MOD AASHTO	11			
CBR-UCS @ 97% MOD AASHTO	8,8			
CBR-UCS @ 95% MOD AASHTO	6,0			
CBR-UCS @ 93% MOD AASHTO	4,7			
CBR-UCS @ 90% MOD AASHTO	3,2			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,20	0,20	0,50										

Remarks :

FORM: A1

A.B. Bhikam

Technical Signatory : Rasalis Bhikam

4.4.0(SGS)(2016.08.31)

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TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 01.11.2019

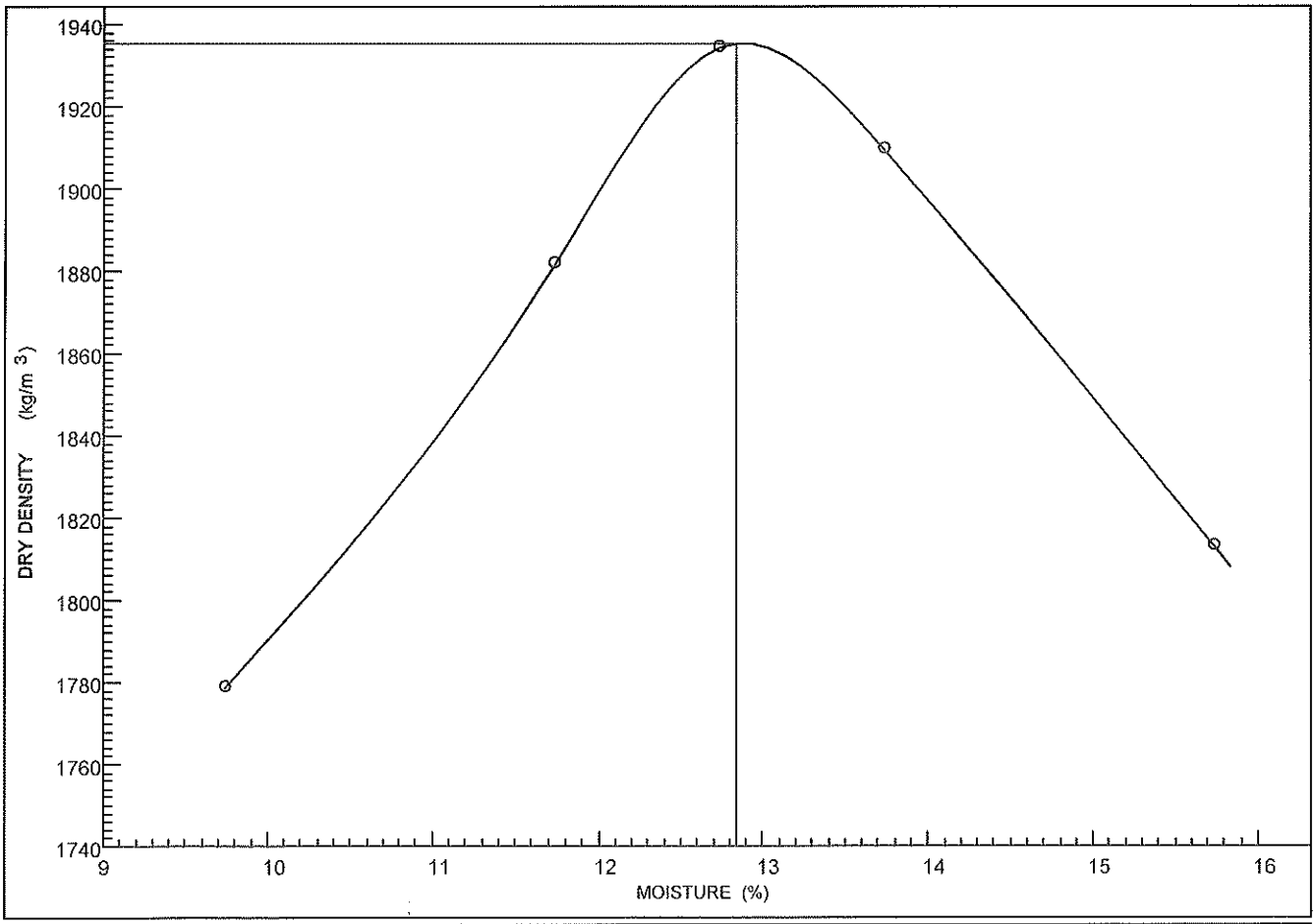
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10337	Hole No. : TP 225/1	Depth (mm) : 1200 - 2600mm
Origin : TP 225/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Residual/ Completely Weathered Siltstone		

Optimum Moisture Content (%) : 12,8

Maximum Dry Density (kg/m^3): 1935

Point No.	1	2	3	4	5			
Moisture (%)	9,7	11,7	12,7	13,7	15,7			
Density (kg/m^3)	1779	1882	1934	1909	1813			



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

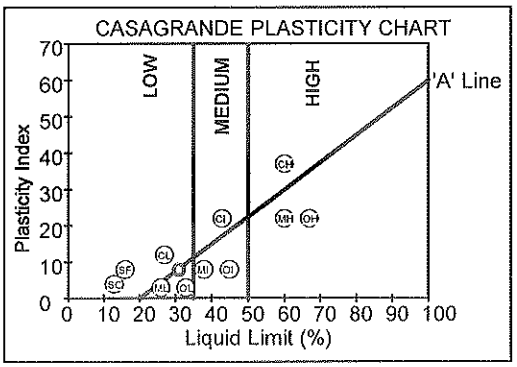
Your Ref : 505788
Our Ref : 7686
Date Reported : 31.10.2019

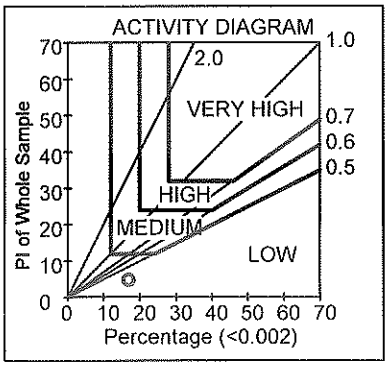
FOUNDATION INDICATOR (ASTM: D422)

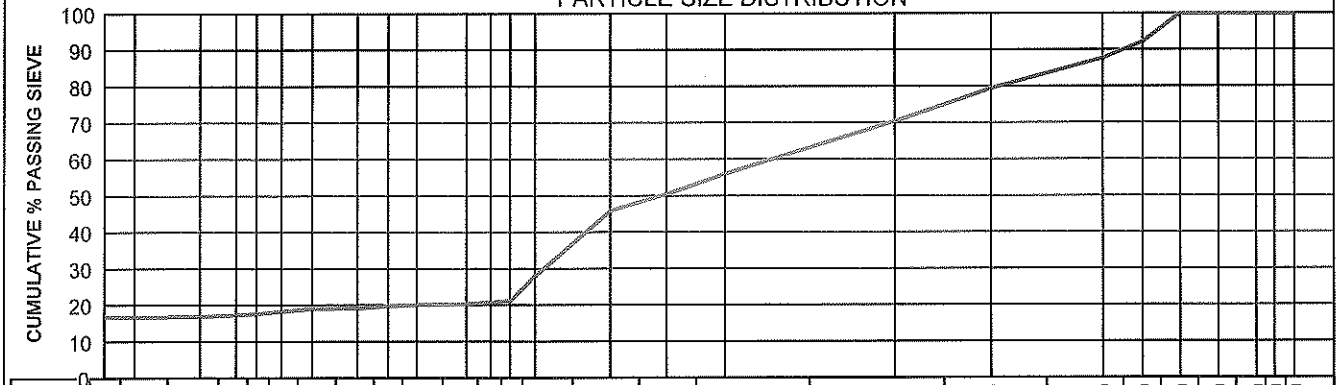
Sample No.	: 10337
Hole No.	: TP 225/1
Depth	: 1200 - 2600mm
Liquid Limit (%)	: 31
Plasticity Index	: 8
Linear Shrinkage (%)	: 4,0
PI of Whole Sample	: 5
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SM
Activity	: 0,29
Heave Classification	: LOW
Grading Modulus	: 1,45
Percentage (<0.002)	: 17,0
Moisture Content (%)	: 0,0

Material Description : (Residual/ Completely Weathered Siltstone) CLAYEY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	17,4	3,4	49,8	29,4	CLAYEY SAND
Astm	17,4	10,6	51,5	20,5	CLAYEY SAND
British Standard	16,8	4,4	49,3	29,4	CLAYEY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	17	17	17	17	18	18	19	19	20	20	20	21	21	28	46	51	56	71	80	88	92	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

A.B. Bhikam

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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a SANAS Accredited Testing Laboratory, No. T 0239

60 Columbine Place,Glen Anil,Durban North,4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/II
Date Reported : 02.11.2019

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

SAMPLE NO.	10338			
HOLE NO.	TP 229/1			
ROAD NO.	N/A			
DEPTH	0 - 1400mm			
CHAINAGE	TP 229/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Hillwash			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm				
20.0 mm				
14.0 mm				
5.0 mm	100			
2.0 mm	99			
0.425 mm	80			
0.075 mm	31			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	19			
FINE SAND <0.425mm >0.075mm	49			
MATERIAL <0.075mm	32			
CONSTANTS				
GRADING MODULUS	0,90			
PRA CLASSIFICATION	A-2-4(0)			
COLTO CLASSIFICATION	G7			
TRH CLASSIFICATION	G7			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	NP			
LINEAR SHRINKAGE (%)	0,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2125			
OPTIMUM MOISTURE CONTENT(%)	5,4			
MOULDING MOISTURE (%)	5,6			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	34			
CBR-UCS @ 98% MOD AASHTO	25			
CBR-UCS @ 97% MOD AASHTO	22			
CBR-UCS @ 95% MOD AASHTO	18			
CBR-UCS @ 93% MOD AASHTO	15			
CBR-UCS @ 90% MOD AASHTO	11			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,00	0,00										

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA Lynnwood Bridge Office Park 4 Daventry Street, Lynnwood Manor Tshwane, 0081, South Africa Attention: Ms Nombuso Khanyile	Project : Cato Ridge Township Development Your Ref : 505788 Our Ref : 7686 Date Reported : 02.11.2019

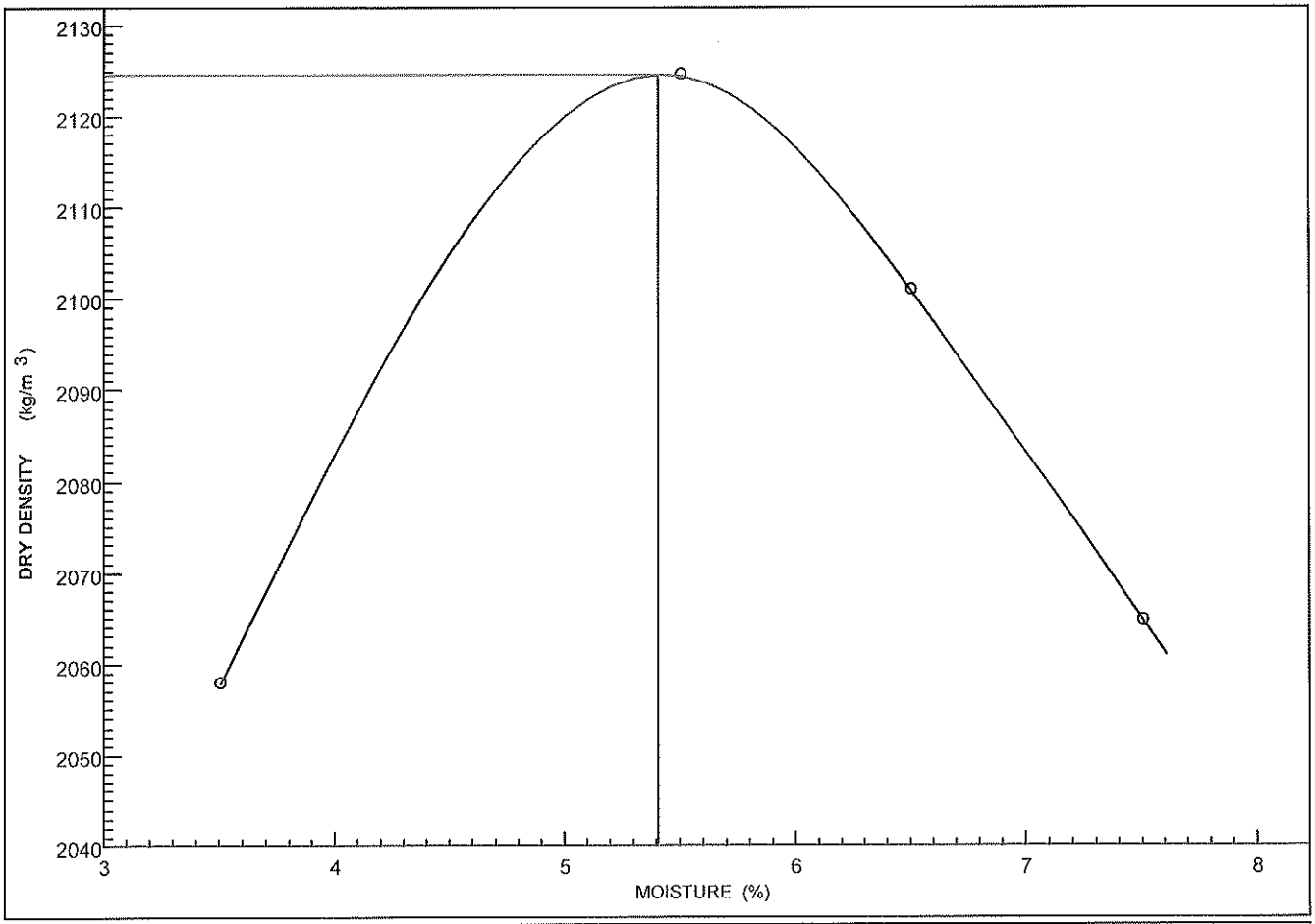
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10338	Hole No. : TP 229/1	Depth (mm) : 0 - 1400mm
Origin : TP 229/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Hillwash		

Optimum Moisture Content (%) : 5,4

Maximum Dry Density (kg/m^3): 2125

Point No.	1	2	3	4				
Moisture (%)	3,5	5,5	6,5	7,5				
Density (kg/m^3)	2058	2125	2101	2065				



Remarks :

FORM: A7

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60 Columbine Place, Glen Anil, Durban North, 4051

Tel. : (031) 579 1220/1
Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

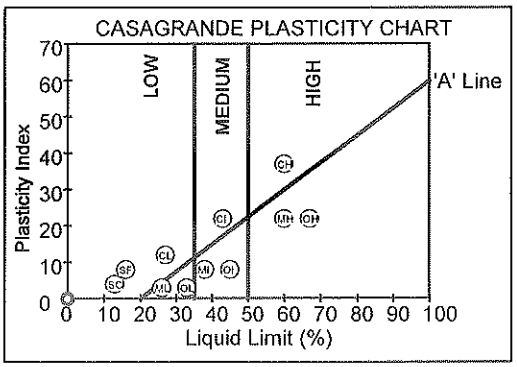
Your Ref : 505788
Our Ref : 7686
Date Reported : 08.11.2019

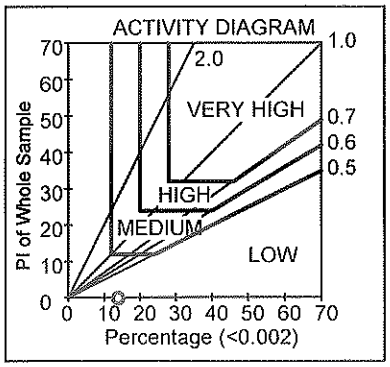
FOUNDATION INDICATOR (ASTM: D422)

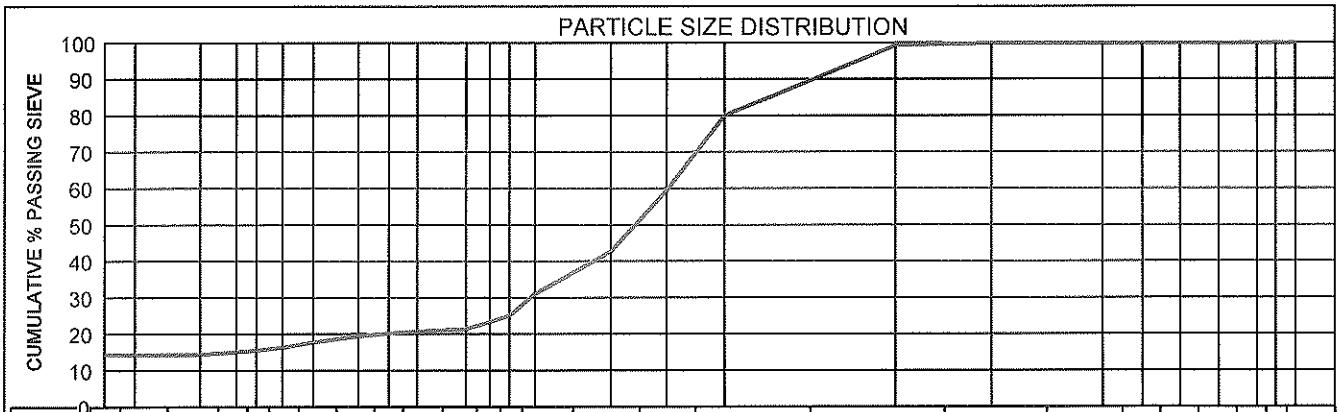
Sample No.	: 10338
Hole No.	: TP 229/1
Depth	: 0 - 1400mm
Liquid Limit (%)	: -
Plasticity Index	: NP
Linear Shrinkage (%)	: 0,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-2-4(0)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 0,90
Percentage (<0.002)	: 14,0
Moisture Content (%)	: 1,2

Material Description : (Hillwash) SILTY SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	15,2	8,2	76,1	0,6	SILTY SAND
Astm	15,2	15,9	68,9	0,0	SILTY SAND
British Standard	14,4	10,8	74,2	0,6	SILTY SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	14	14	15	15	16	16	18	19	20	21	21	23	25	31	43	60	80	99	100	100	100	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

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Fax : (031) 579 1344
Email : rasalis.bhikam@sgs.com

TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686/JJ
Date Reported : 02.11.2019

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

SAMPLE NO.	10339			
HOLE NO.	TP 234/1			
ROAD NO.	N/A			
DEPTH	1000 - 1400mm			
CHAINAGE	TP 234/1			
LAYER TYPE	N/A			
STABILISED WITH	Natural			
SUPPLIER	N/A			
CURING METHOD	N/A			
DESCRIPTION	Sandstone			
SIEVE ANALYSIS (% PASSING)				
100 mm				
75 mm				
63 mm				
50 mm				
37.5 mm				
28.0 mm	100			
20.0 mm	87			
14.0 mm	85			
5.0 mm	81			
2.0 mm	79			
0.425 mm	38			
0.075 mm	15			
SOIL MORTAR				
COARSE SAND <2.0mm >0.425mm	52			
FINE SAND <0.425mm >0.075mm	29			
MATERIAL <0.075mm	19			
CONSTANTS				
GRADING MODULUS	1,68			
PRA CLASSIFICATION	A-1-b(0)			
COLTO CLASSIFICATION	G6			
TRH CLASSIFICATION	G5			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	NP			
LINEAR SHRINKAGE (%)	0,0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2112			
OPTIMUM MOISTURE CONTENT(%)	7,5			
MOULDING MOISTURE (%)	7,3			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	113			
CBR-UCS @ 98% MOD AASHTO	85			
CBR-UCS @ 97% MOD AASHTO	73			
CBR-UCS @ 95% MOD AASHTO	57			
CBR-UCS @ 93% MOD AASHTO	45			
CBR-UCS @ 90% MOD AASHTO	31			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0,00	0,00	0,00										

Remarks :

FORM: A1

4.4.0(SGS)(2016.08.31)

Technical Signatory : Rasalis Bhikam

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

Your Ref : 505788
Our Ref : 7686
Date Reported : 02.11.2019

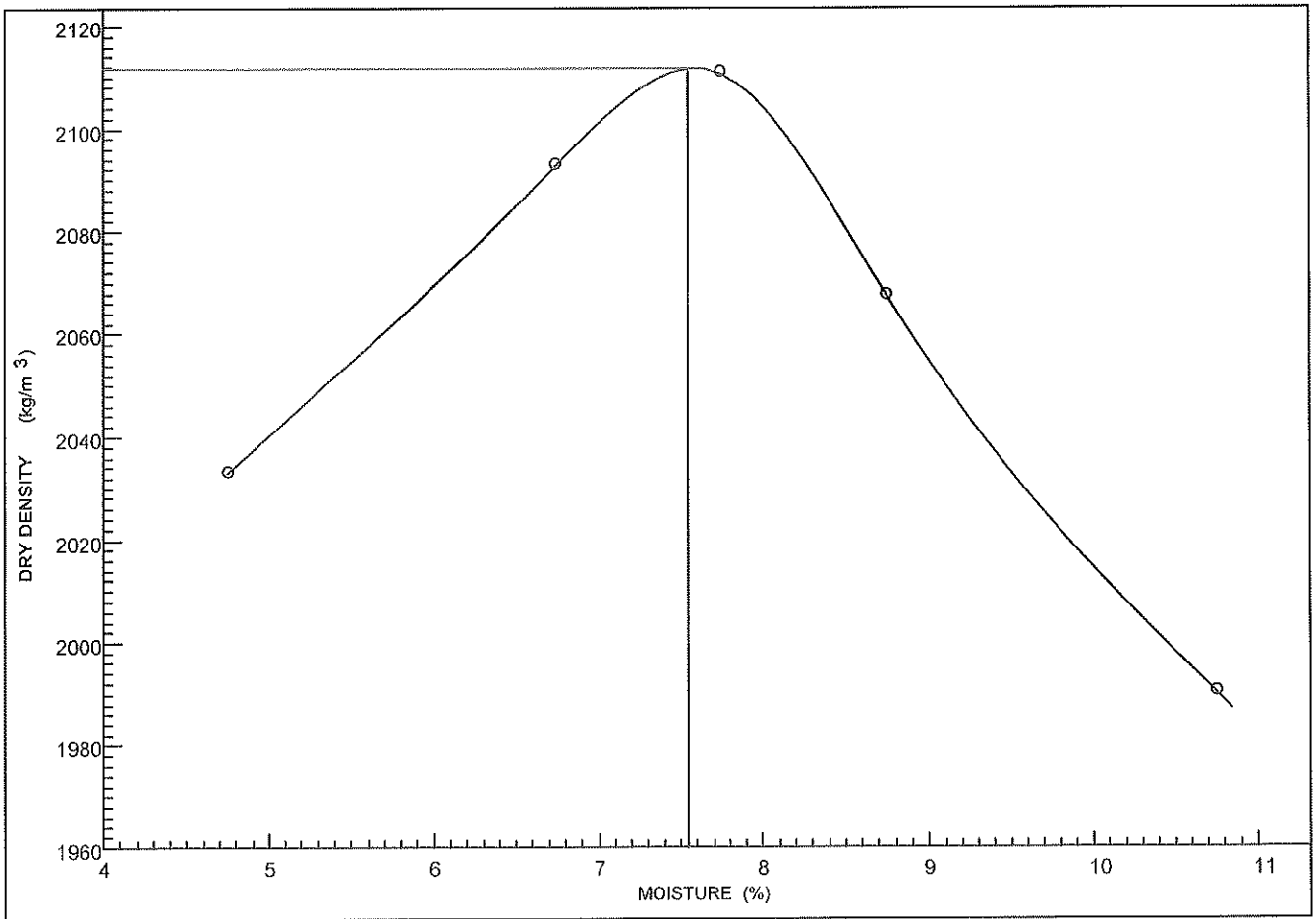
MOISTURE / DENSITY RELATIONSHIP (SANS 3001: GR30)

Sample No.: 10339	Hole No. : TP 234/1	Depth (mm) : 1000 - 1400mm
Origin : TP 234/1	Stabilized With : Natural	Compaction Energy : MDD AASHTO
Material Description : Sandstone		

Optimum Moisture Content (%) : 7,5

Maximum Dry Density (kg/m^3): 2112

Point No.	1	2	3	4	5			
Moisture (%)	4,7	6,7	7,7	8,7	10,7			
Density (kg/m^3)	2033	2093	2111	2067	1990			



Remarks :

FORM: A7

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TEST RESULTS

Aurecon SA
Lynnwood Bridge Office Park
4 Daventry Street, Lynnwood Manor
Tshwane, 0081, South Africa
Attention: Ms Nombuso Khanyile

Project : Cato Ridge Township Development

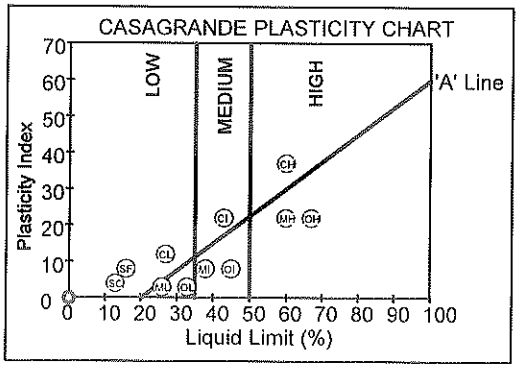
Your Ref : 505788
Our Ref : 7686
Date Reported : 11.11.2019

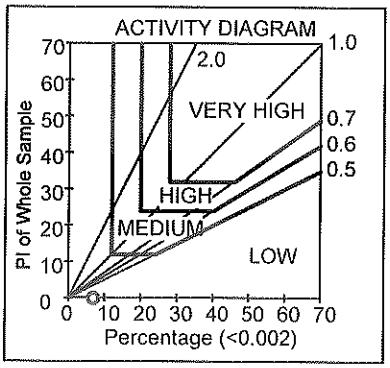
FOUNDATION INDICATOR (ASTM: D422)

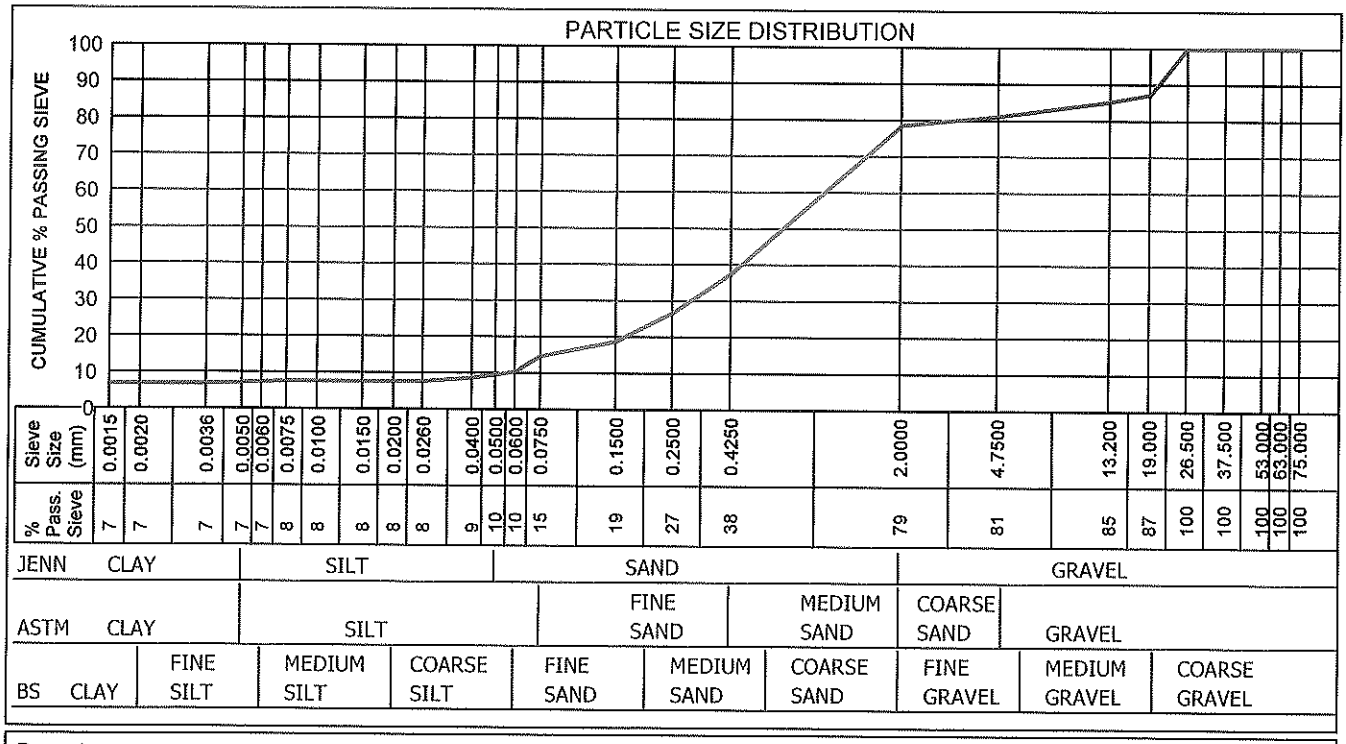
Sample No.	: 10339
Hole No.	: TP 234/1
Depth	: 1000 - 1400mm
Liquid Limit (%)	: -
Plasticity Index	: NP
Linear Shrinkage (%)	: 0,0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-b(0)
Unified Soil Classificati	: SC
Activity	: 0,00
Heave Classification	: LOW
Grading Modulus	: 1,68
Percentage (<0.002)	: 7,0
Moisture Content (%)	: 1,7

Material Description : (Sandstone) SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	7,2	2,3	69,1	21,3	SAND
Astm	7,2	7,4	66,6	18,8	SAND
British Standard	6,8	3,6	68,3	21,3	SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	7	7	7	7	7	8	8	8	8	8	9	10	10	15	19	27	38	79	81	85	87	100	100	100	100	100

JENN	CLAY	SILT			SAND			GRAVEL		
ASTM	CLAY	SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL		
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks :

FORM: A6

4.4.0(SGS)(2016.08.31)

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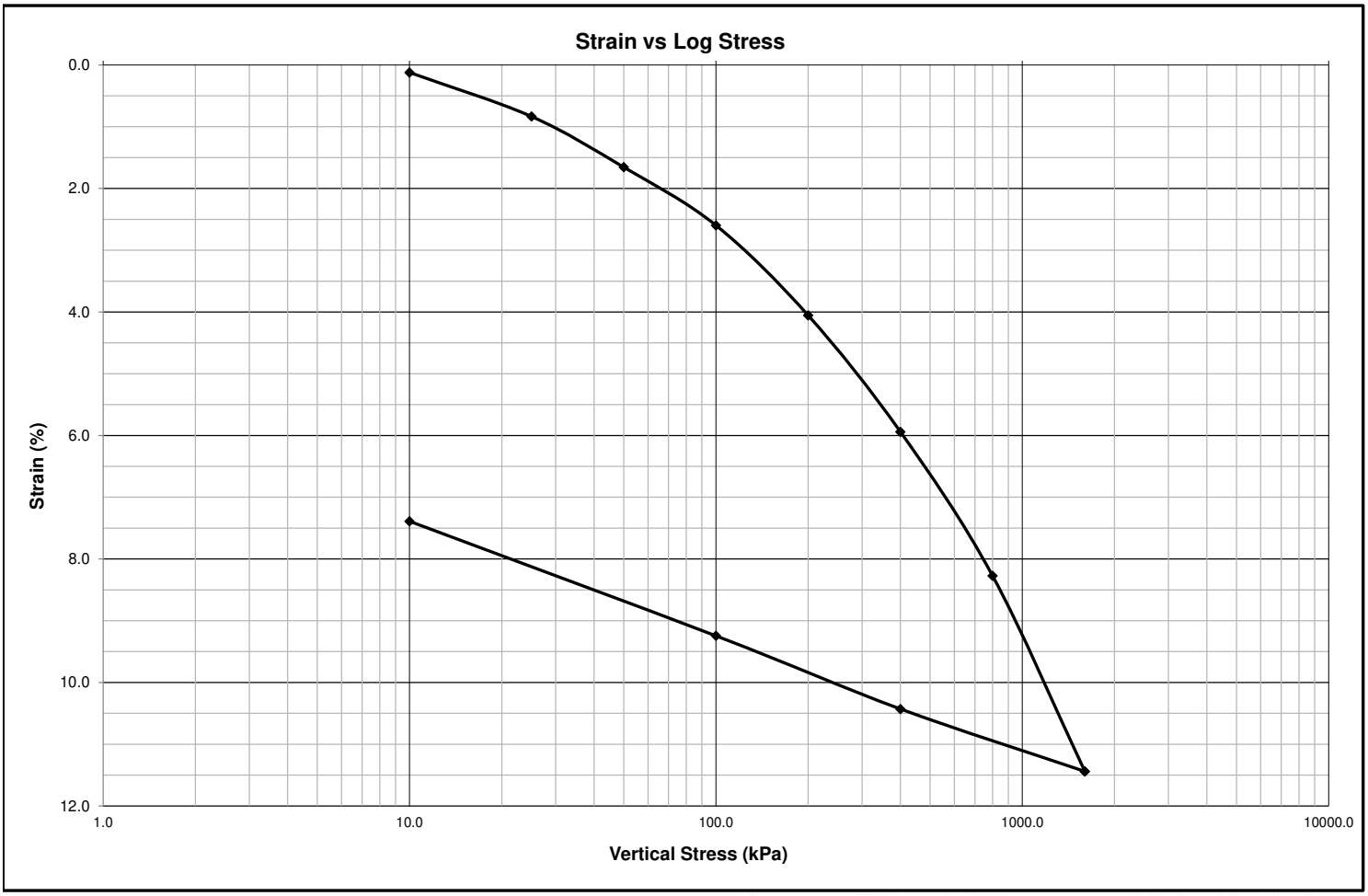
CONSOLIDATION TESTS: STANDARD OEDOMETER

BS 1377 Part 5

Client : AURECON
Project : CATO RIDGE TOWNSHIP DEVELOPMENT - 505788
Job no : 27794
Sample no : TP 102 (10283)
Date : 28/11/2019
Lab no : G19-0600
Depth (m) : 1-1.5

Sample Parameters		Unit	Value	Remarks	Test Remarks
Moisture Content	Before Test	%	15.1	Complete test specimen	Undisturbed Sample
	After Test	%	20.7	Complete test specimen	
Dry Density		Kg/m^3	1723		
Void Ratio		-	0.547		
Degree of Saturation		%	73.4		
Initial Specimen Height		mm	20.0		
Relative Density (SG)		-	2.666	Determined	

Test Parameters														
Vertical Stress	kPa	10.0	25	50	100	200	400	800	1600	400	100	10		
Time Elapsed	hr	2	4	6	8	8	9	10	11	3	3	3		
H_{100}	mm	19.976	19.833	19.669	19.481	19.189	18.812	18.345	17.712	17.914	18.151	18.522		
Strain	%	0.121	0.834	1.655	2.597	4.055	5.940	8.274	11.440	10.429	9.245	7.390		
Void Ratio	-	0.545	0.534	0.522	0.507	0.485	0.455	0.419	0.370	0.386	0.404	0.433		
Mv (1/Mpa)	-	-	0.4761	0.3311	0.1916	0.1497	0.0982	0.062	0.0431	0.0095	0.0441	0.2271		



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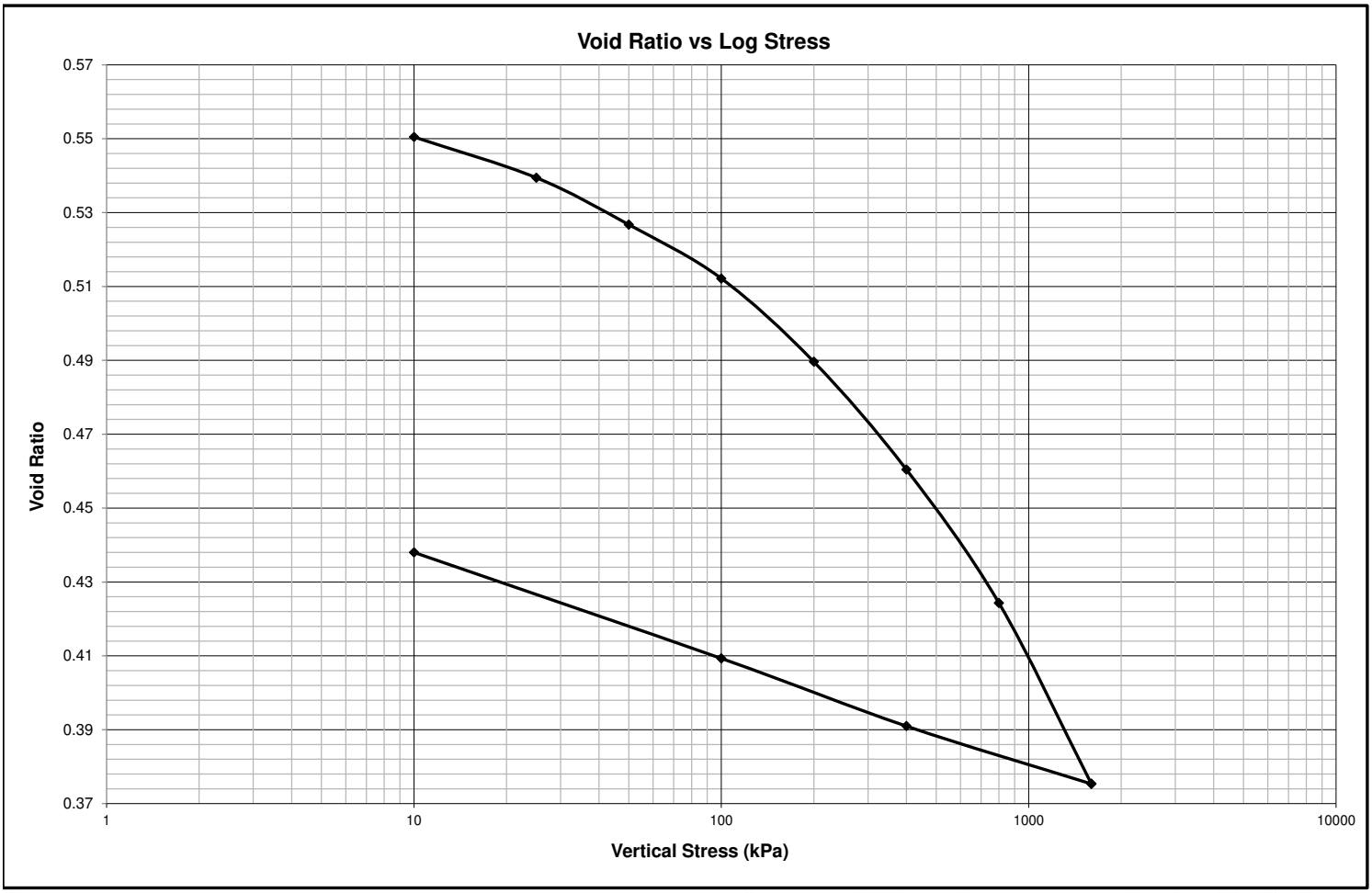
CONSOLIDATION TESTS: STANDARD OEDOMETER

BS 1377 Part 5

Client : AURECON
Project : CATO RIDGE TOWNSHIP DEVELOPMENT - 505788
Job no : 27794
Sample no : TP 102 (10283)
Date : 28/11/2019
Lab no : G19-0600
Depth (m) : 1-1.5

Sample Parameters		Unit	Value	Remarks	Test Remarks
Moisture Content	Before Test	%	15.1	Complete test specimen	Undisturbed Sample
	After Test	%	20.7	Complete test specimen	
Dry Density		Kg/m³	1723		
Void Ratio		-	0.547		
Degree of Saturation		%	73.4		
Initial Specimen Height		mm	20.0		
Relative Density (SG)		-	2.666	Determined	

Test Parameters														
Vertical Stress	kPa	10	25	50	100	200	400	800	1600	400	100	10		
Time Elapsed	hr	2	4	6	8	8	9	10	11	3	3	3		
H_{100}	mm	19.976	19.833	19.669	19.481	19.189	18.812	18.345	17.712	17.914	18.151	18.522		
Strain	%	0.121	0.834	1.655	2.597	4.055	5.940	8.274	11.440	10.429	9.245	7.390		
Void Ratio	-	0.545	0.534	0.522	0.507	0.485	0.455	0.419	0.370	0.386	0.404	0.433		
Mv (1/Mpa)	-	-	0.4761	0.3311	0.1916	0.1497	0.0982	0.062	0.0431	0.0095	0.0441	0.2271		



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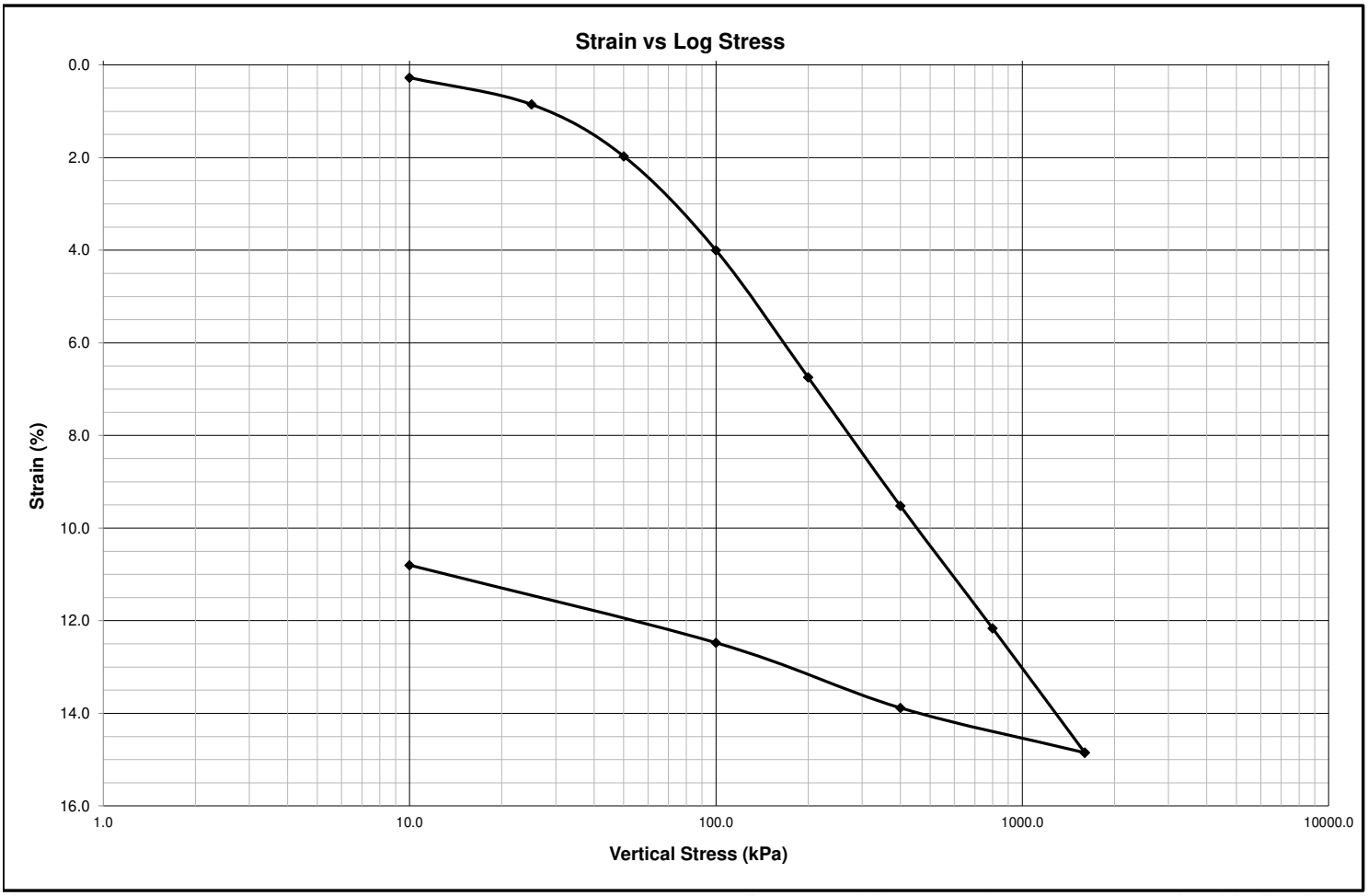
CONSOLIDATION TESTS: STANDARD OEDOMETER

BS 1377 Part 5

Client : AURECON
Project : CATO RIDGE TOWNSHIP DEVELOPMENT - 505788
Job no : 27794
Sample no : TP 105 (10290)
Date : 20/11/2019
Lab no : G19-0601
Depth (m) : 2.2-3.5

Sample Parameters		Unit	Value	Remarks	Test Remarks
Moisture Content	Before Test	%	17.9	Complete test specimen	Undisturbed Sample
	After Test	%	22.7	Complete test specimen	
Dry Density		Kg/m^3	1686		
Void Ratio		-	0.597		
Degree of Saturation		%	80.8		
Initial Specimen Height		mm	20.0		
Relative Density (SG)		-	2.692	Determined	

Test Parameters														
Vertical Stress	kPa	10.0	25	50	100	200	400	800	1600	400	100	10		
Time Elapsed	hr	3	4	6	7	8	10	11	10	3	3	3		
H_{100}	mm	19.945	19.830	19.606	19.200	18.651	18.096	17.567	17.030	17.224	17.505	17.840		
Strain	%	0.273	0.852	1.971	3.999	6.745	9.521	12.163	14.850	13.882	12.475	10.800		
Void Ratio	-	0.593	0.583	0.565	0.533	0.489	0.445	0.403	0.360	0.375	0.398	0.424		
Mv (1/Mpa)	-	-	0.3872	0.4513	0.4139	0.2861	0.1488	0.073	0.0382	0.0095	0.0544	0.2127		



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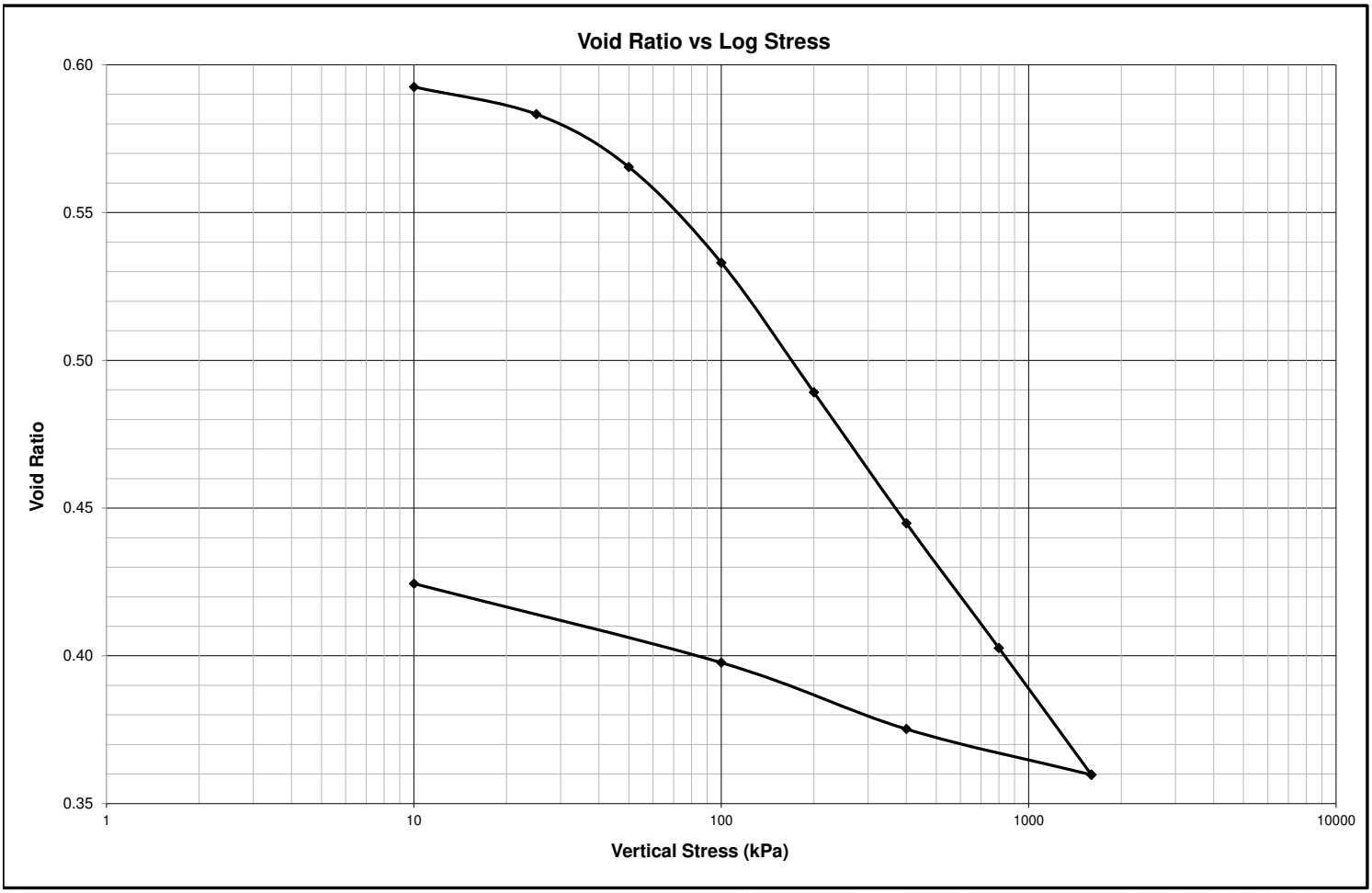
CONSOLIDATION TESTS: STANDARD OEDOMETER

BS 1377 Part 5

Client : AURECON
Project : CATO RIDGE TOWNSHIP DEVELOPMENT - 505788
Job no : 27794
Sample no : TP 105 (10290)
Date : 20/11/2019
Lab no : G19-0601
Depth (m) : 2.2-3.5

Sample Parameters		Unit	Value	Remarks	Test Remarks
Moisture Content	Before Test	%	17.9	Complete test specimen	Undisturbed Sample
	After Test	%	22.7	Complete test specimen	
Dry Density		Kg/m³	1686		
Void Ratio		-	0.597		
Degree of Saturation		%	80.8		
Initial Specimen Height		mm	20.0		
Relative Density (SG)		-	2.692	Determined	

Test Parameters														
Vertical Stress	kPa	10	25	50	100	200	400	800	1600	400	100	10		
Time Elapsed	hr	3	4	6	7	8	10	11	10	3	3	3		
H_{100}	mm	19.945	19.830	19.606	19.200	18.651	18.096	17.567	17.030	17.224	17.505	17.840		
Strain	%	0.273	0.852	1.971	3.999	6.745	9.521	12.163	14.850	13.882	12.475	10.800		
Void Ratio	-	0.593	0.583	0.565	0.533	0.489	0.445	0.403	0.360	0.375	0.398	0.424		
Mv (1/Mpa)	-	-	0.3872	0.4513	0.4139	0.2861	0.1488	0.073	0.0382	0.0095	0.0544	0.2127		



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CONSOLIDATION TESTS: STANDARD OEDOMETER

BS 1377 Part 5

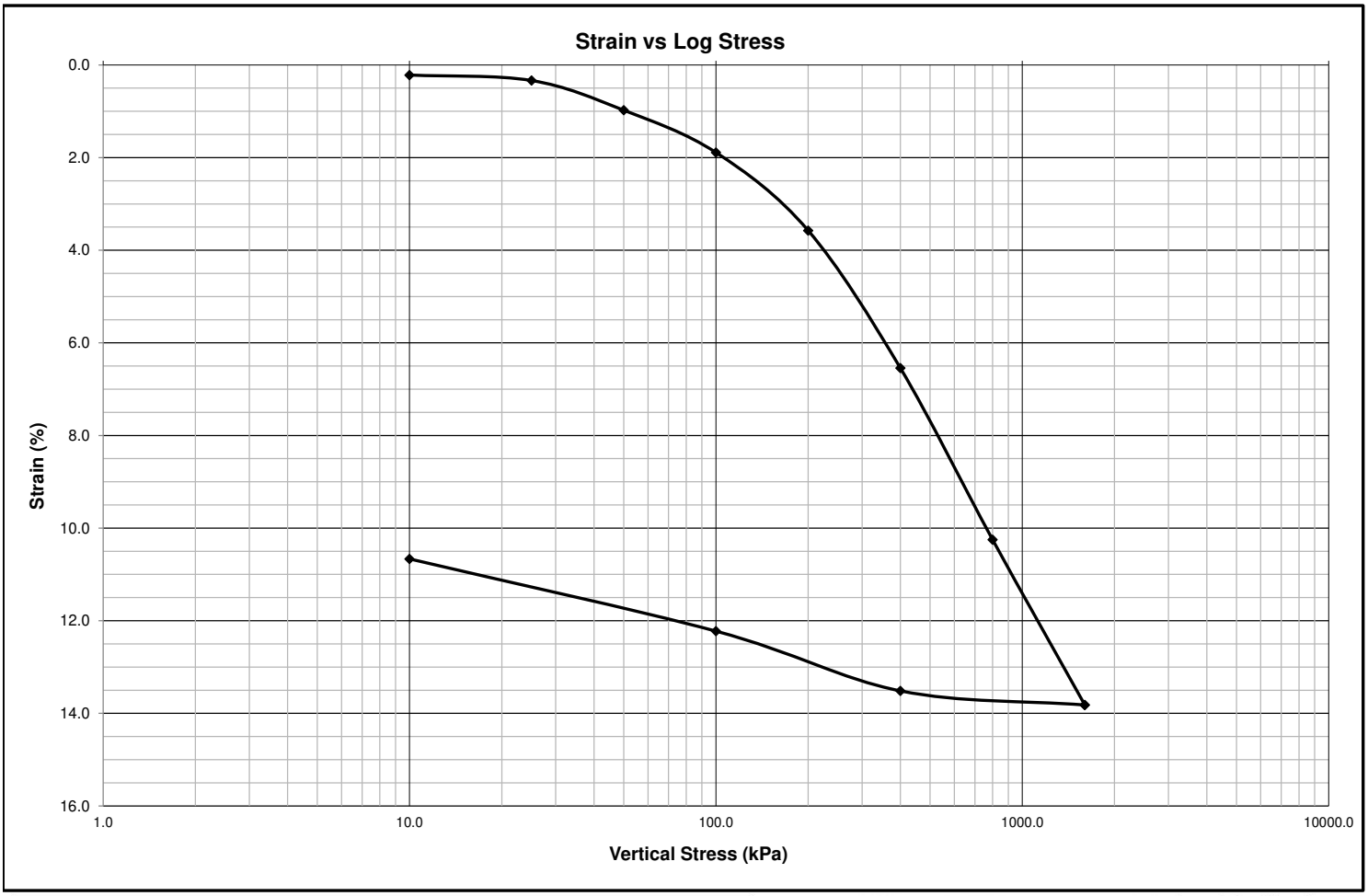
Client : AURECON **Project :** CATO RIDGE TOWNSHIP DEVELOPMENT-505788 **Job no :** 27794

Sample no : TP 135 (10302) **Date :** 20/11/2019

Lab no : G19-0602 **Depth (m) :** 2.9-3.1

Sample Parameters		Unit	Value	Remarks	Test Remarks
Moisture Content	Before Test	%	21.0	Complete test specimen	Undisturbed Sample
	After Test	%	19.9	Complete test specimen	
Dry Density		Kg/m³	1739		
Void Ratio		-	0.530		
Degree of Saturation		%	105.7		
Initial Specimen Height		mm	20.0		
Relative Density (SG)		-	2.660	Determined	

Test Parameters														
Vertical Stress	kPa	10.0	25	50	100	200	400	800	1600	400	100	10		
Time Elapsed	hr	2	2	3	6	11	14	18	23	3	3	3		
H_{100}	mm	19.957	19.933	19.805	19.622	19.285	18.691	17.950	17.236	17.297	17.555	17.867		
Strain	%	0.216	0.335	0.976	1.889	3.574	6.544	10.250	13.819	13.515	12.224	10.665		
Void Ratio	-	0.526	0.524	0.515	0.501	0.475	0.430	0.373	0.318	0.323	0.343	0.366		
Mv (1/Mpa)	-	-	0.0793	0.2573	0.1844	0.1718	0.154	0.0991	0.0497	0.0029	0.0497	0.1974		



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CONSOLIDATION TESTS: STANDARD OEDOMETER

BS 1377 Part 5

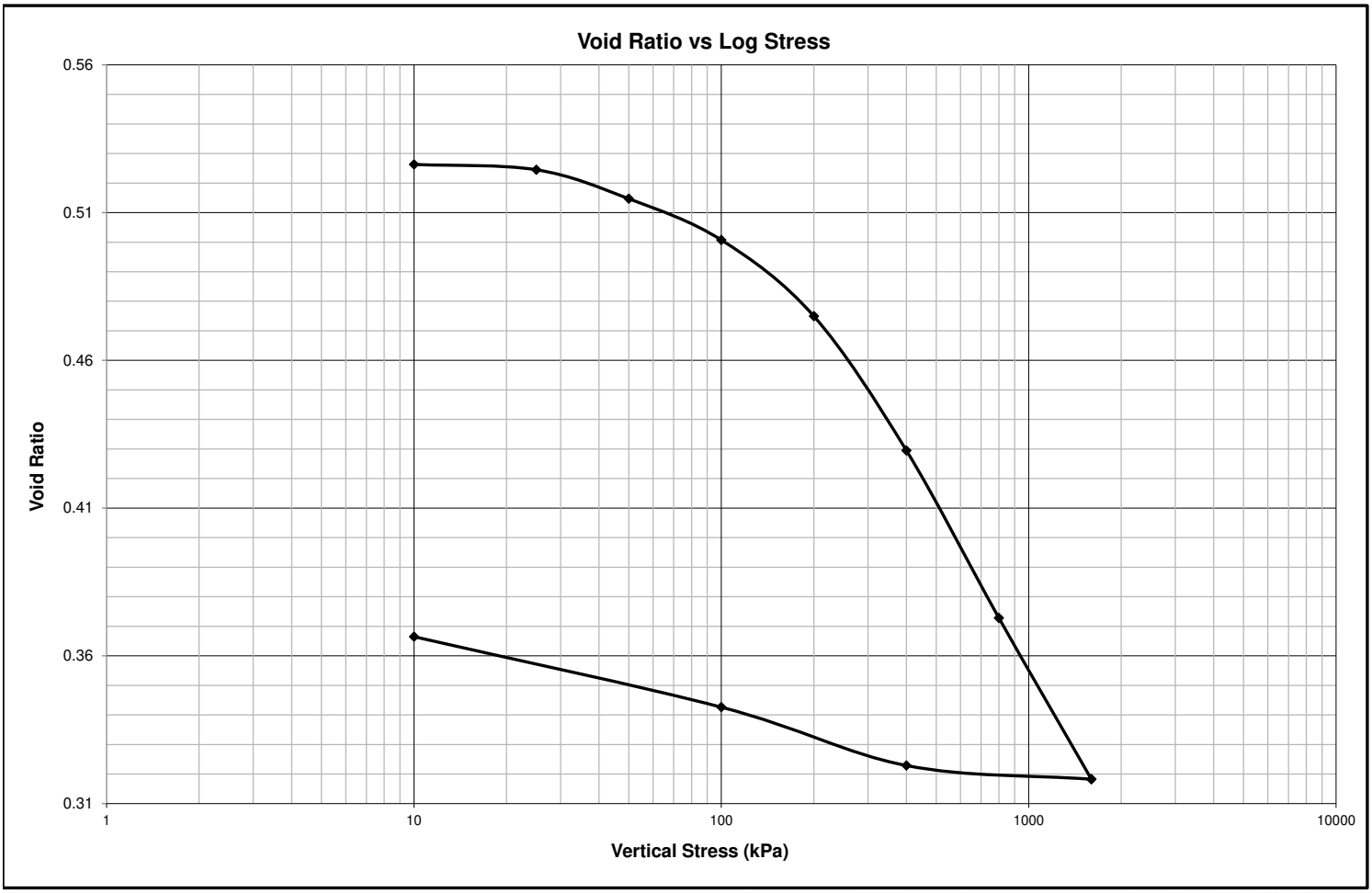
Client : AURECON **Project :** CATO RIDGE TOWNSHIP DEVELOPMENT-505788 **Job no :** 27794

Sample no : TP 135 (10302) **Date :** 20/11/2019

Lab no : G19-0602 **Depth (m) :** 2.9-3.1

Sample Parameters		Unit	Value	Remarks	Test Remarks
Moisture Content	Before Test	%	21.0	Complete test specimen	Undisturbed Sample
	After Test	%	19.9	Complete test specimen	
Dry Density		Kg/m³	1739		
Void Ratio		-	0.530		
Degree of Saturation		%	105.7		
Initial Specimen Height		mm	20.0		
Relative Density (SG)		-	2.660	Determined	

Test Parameters														
Vertical Stress	kPa	10	25	50	100	200	400	800	1600	400	100	10		
Time Elapsed	hr	2	2	3	6	11	14	18	23	3	3	3		
H_{100}	mm	19.957	19.933	19.805	19.622	19.285	18.691	17.950	17.236	17.297	17.555	17.867		
Strain	%	0.216	0.335	0.976	1.889	3.574	6.544	10.250	13.819	13.515	12.224	10.665		
Void Ratio	-	0.526	0.524	0.515	0.501	0.475	0.430	0.373	0.318	0.323	0.343	0.366		
Mv (1/Mpa)	-	-	0.0793	0.2573	0.1844	0.1718	0.154	0.0991	0.0497	0.0029	0.0497	0.1974		



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CONSOLIDATION TESTS: STANDARD OEDOMETER

BS 1377 Part 5

Client AURECON **Project** CATO RIDGE TOWNSHIP DEVELOPMENT - 505788 **Job no:** 27794

Sample no TP 168 (10314) **Date** 28/11/2019

Lab no G19-0603 **Depth (m)** 2-3.3

Sample Parameters		Unit	Value	Remarks	Test Remarks
Moisture Content	Before Test	%	18.2	Complete test specimen	Undisturbed sample
	After Test	%	23.3	Complete test specimen	
Dry Density		Kg/m³	1652		
Void Ratio		-	0.620		
Degree of Saturation		%	78.8		
Initial Specimen Height		mm	25.4		
Relative Density (SG)		-	2.675	Determined	

Test Parameters														
Vertical Stress	kPa	10	25	50	100	200	400	800	1600	400	100	10		
Time Elapsed	hr	24	24	24	24	24	24	24	24	2	2	3		
H_{100}	mm	26.208	26.086	25.783	25.352	24.713	24.013	23.264	22.435	22.950	23.423	24.016		
Strain	%	-3.179	-2.701	-1.509	0.187	2.706	5.462	8.411	11.673	9.645	7.784	5.448		
Void Ratio	-	0.671	0.663	0.644	0.617	0.576	0.531	0.483	0.431	0.463	0.494	0.531		
Mv (1/Mpa)	-	-	0.3088	0.4642	0.3343	0.2524	0.1416	0.078	0.0445	0.0191	0.0687	0.2814		



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CONSOLIDATION TESTS: STANDARD OEDOMETER

BS 1377 Part 5

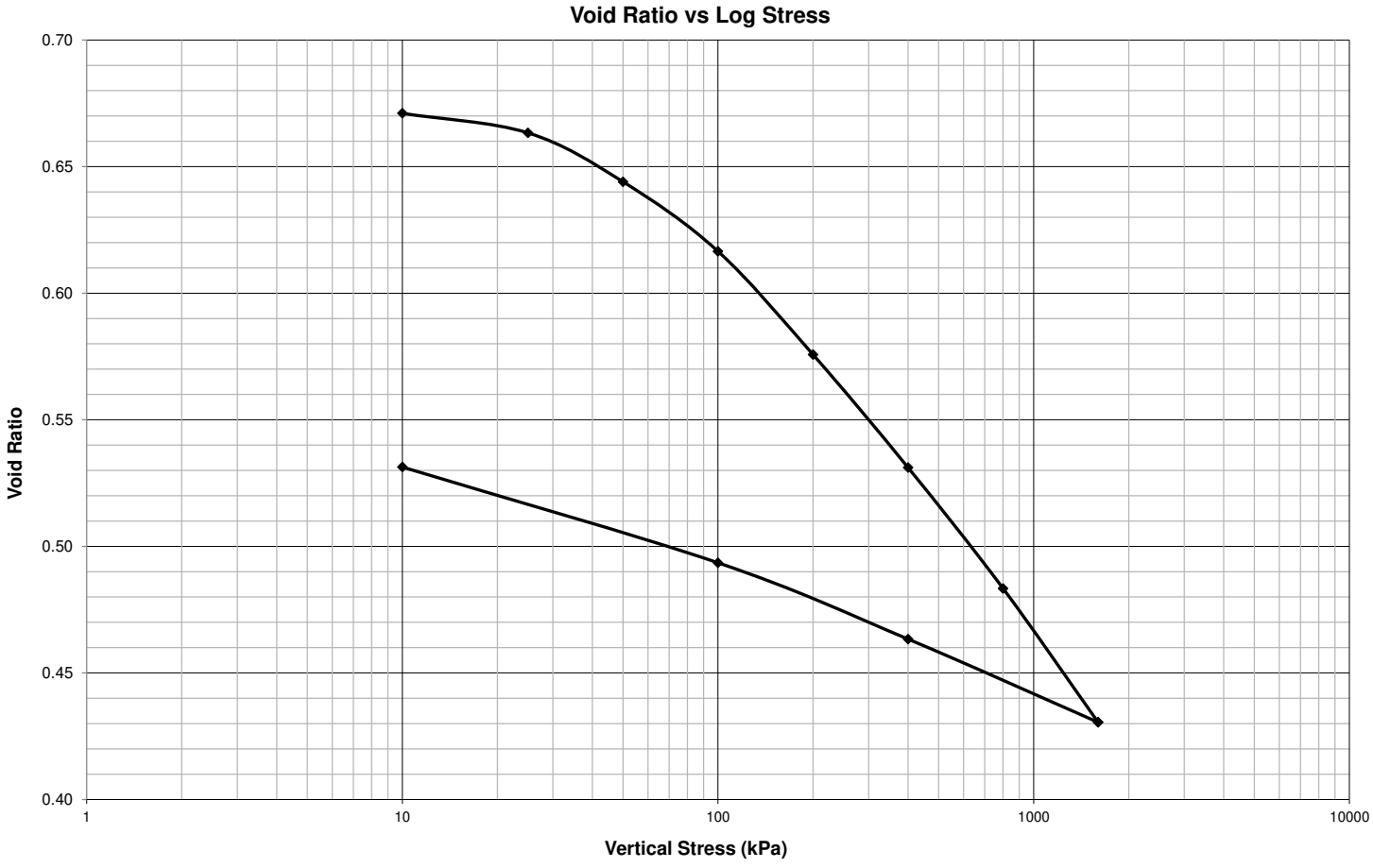
Client AURECON **Project** CATO RIDGE TOWNSHIP DEVELOPMENT - 505788 **Job no:** 27794

Sample no TP 168 (10314) **Date** 28/11/2019

Lab no G19-0603 **Depth (m)** 2-3.3

Sample Parameters		Unit	Value	Remarks	Test Remarks
Moisture Content	Before Test	%	18.2	Complete test specimen	Undisturbed sample
	After Test	%	23.3	Complete test specimen	
Dry Density		Kg/m^3	1652		
Void Ratio		-	0.620		
Degree of Saturation		%	78.8		
Initial Specimen Height		mm	25.4		
Relative Density (SG)		-	2.675	Determined	

Test Parameters														
Vertical Stress	kPa	10	25	50	100	200	400	800	1600	400	100	10		
Time Elapsed	hr	24	24	24	24	24	24	24	24	2	2	3		
H_{100}	mm	26.208	26.086	25.783	25.352	24.713	24.013	23.264	22.435	22.950	23.423	24.016		
Strain	%	-3.179	-2.701	-1.509	0.187	2.706	5.462	8.411	11.673	9.645	7.784	5.448		
Void Ratio	-	0.671	0.663	0.644	0.617	0.576	0.531	0.483	0.431	0.463	0.494	0.531		
Mv (1/Mpa)	-	-	0.3088	0.4642	0.3343	0.2524	0.1416	0.078	0.0445	0.0191	0.0687	0.2814		



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CONSOLIDATION TESTS: STANDARD OEDOMETER

BS 1377 Part 5

Client AURECON **Project** CATO RIDGE TOWNSHIP DEVELOPMENT - 505788 **Job no:** 27794
Sample no TP 185 (10323) **Depth (m)** 1-2.5 **Date** 28/11/2019
Lab no G19-0604

Sample Parameters		Unit	Value	Remarks	Test Remarks
Moisture Content	Before Test	%	24.2	Complete test specimen	Undisturbed sample
	After Test	%	29.2	Complete test specimen	
Dry Density		Kg/m³	1515		
Void Ratio		-	0.811		
Degree of Saturation		%	82.0		
Initial Specimen Height		mm	25.4		
Relative Density (SG)		-	2.743	Determined	

Test Parameters														
Vertical Stress	kPa	10	25	50	100	200	400	800	1600	400	100	10		
Time Elapsed	hr	24	24	24	24	24	24	24	24	2	2	3		
H_{100}	mm	25.788	25.700	25.530	25.201	24.711	24.079	23.343	22.667	23.112	23.540	24.139		
Strain	%	-1.526	-1.179	-0.511	0.784	2.715	5.201	8.099	10.759	9.007	7.321	4.966		
Void Ratio	-	0.838	0.832	0.820	0.797	0.762	0.717	0.664	0.616	0.648	0.678	0.721		
Mv (1/Mpa)	-	-	0.2275	0.264	0.2577	0.1946	0.1278	0.0764	0.0362	0.0164	0.0618	0.2824		



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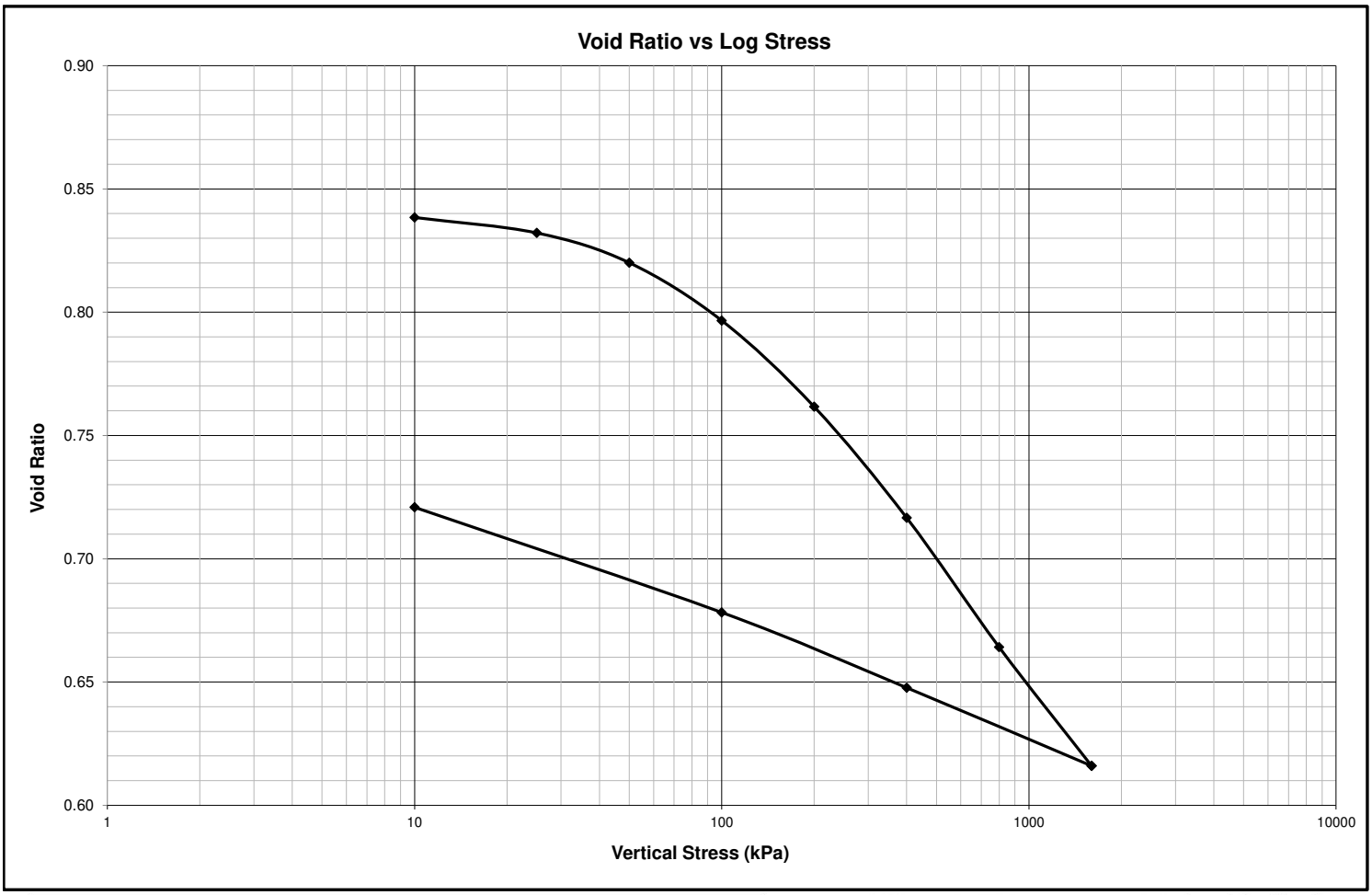
CONSOLIDATION TESTS: STANDARD OEDOMETER

BS 1377 Part 5

Client AURECON **Project** CATO RIDGE TOWNSHIP DEVELOPMENT - 505788 **Job no:** 27794
Sample no TP 185 (10323) **Depth (m)** 1-2.5 **Date** 28/11/2019
Lab no G19-0604

Sample Parameters		Unit	Value	Remarks	Test Remarks
Moisture Content	Before Test	%	24.2	Complete test specimen	Undisturbed sample
	After Test	%	29.2	Complete test specimen	
Dry Density		Kg/m³	1515		
Void Ratio		-	0.811		
Degree of Saturation		%	82.0		
Initial Specimen Height		mm	25.4		
Relative Density (SG)		-	2.743	Determined	

Test Parameters														
Vertical Stress	kPa	10	25	50	100	200	400	800	1600	400	100	10		
Time Elapsed	hr	24	24	24	24	24	24	24	24	2	2	3		
H_{100}	mm	25.788	25.700	25.530	25.201	24.711	24.079	23.343	22.667	23.112	23.540	24.139		
Strain	%	-1.526	-1.179	-0.511	0.784	2.715	5.201	8.099	10.759	9.007	7.321	4.966		
Void Ratio	-	0.838	0.832	0.820	0.797	0.762	0.717	0.664	0.616	0.648	0.678	0.721		
Mv (1/Mpa)	-	-	0.2275	0.264	0.2577	0.1946	0.1278	0.0764	0.0362	0.0164	0.0618	0.2824		



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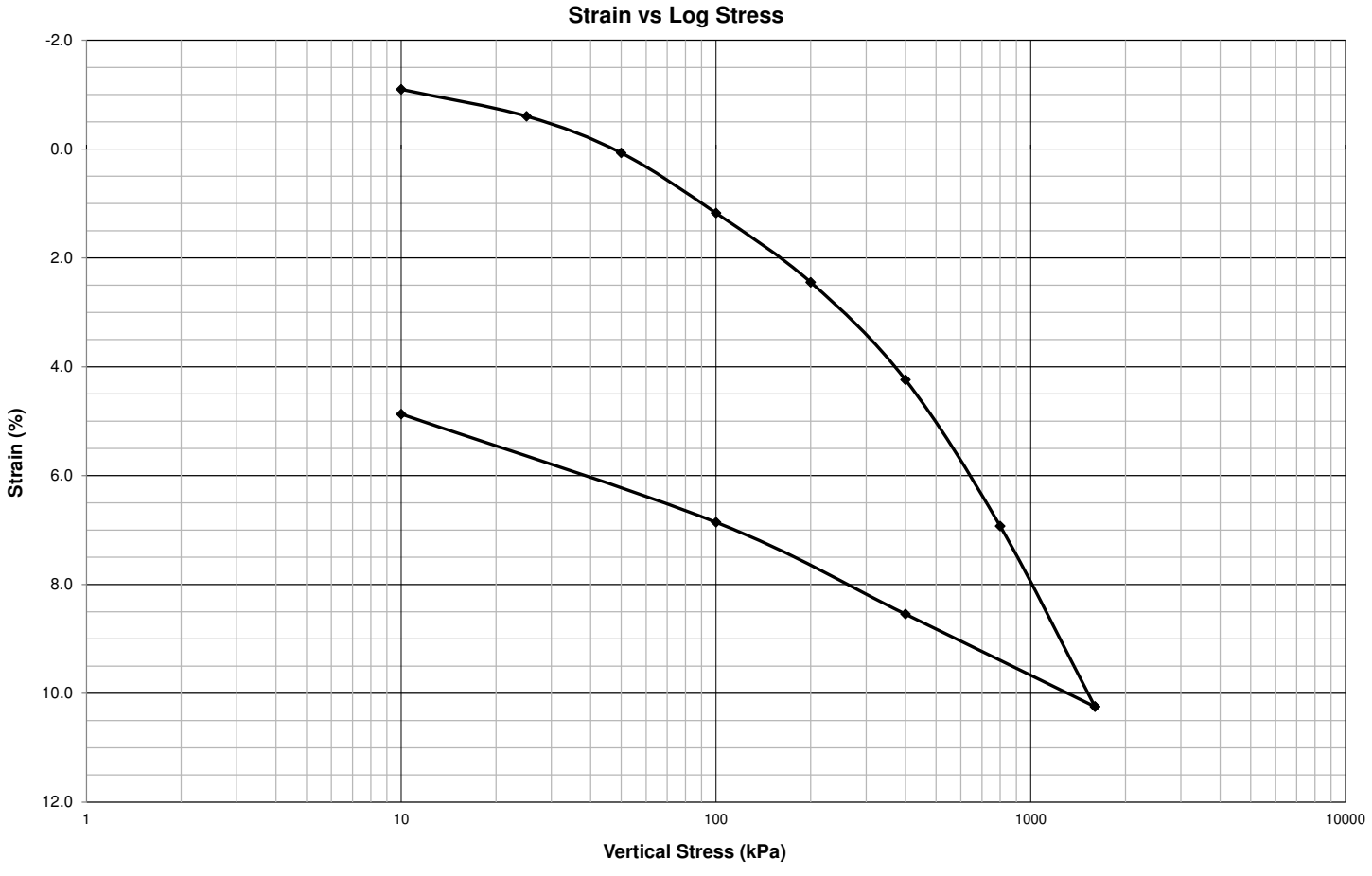
CONSOLIDATION TESTS: STANDARD OEDOMETER

BS 1377 Part 5

Client AURECON **Project** CATO RIDGE TOWNSHIP DEVELOPMENT - 505788 **Job no:** 27794
Sample no TP 201 (10331) **Depth (m)** 3-3.8 **Date** 28/11/2019
Lab no G19-0605

Sample Parameters		Unit	Value	Remarks	Test Remarks
Moisture Content	Before Test	%	15.9	Complete test specimen	Undisturbed sample
	After Test	%	18.5	Complete test specimen	
Dry Density		Kg/m³	1804		
Void Ratio		-	0.498		
Degree of Saturation		%	86.2		
Initial Specimen Height		mm	25.4		
Relative Density (SG)		-	2.702	Determined	

Test Parameters														
Vertical Stress	kPa	10	25	50	100	200	400	800	1600	400	100	10		
Time Elapsed	hr	24	24	24	24	24	24	24	24	2	2	3		
H_{100}	mm	25.678	25.553	25.382	25.102	24.778	24.323	23.640	22.798	23.230	23.658	24.163		
Strain	%	-1.096	-0.604	0.071	1.175	2.448	4.239	6.929	10.244	8.544	6.857	4.869		
Void Ratio	-	0.514	0.507	0.497	0.480	0.461	0.434	0.394	0.344	0.370	0.395	0.425		
Mv (1/Mpa)	-	-	0.3248	0.2683	0.2209	0.1288	0.0918	0.0702	0.0445	0.0158	0.0615	0.2371		



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CONSOLIDATION TESTS: STANDARD OEDOMETER

BS 1377 Part 5

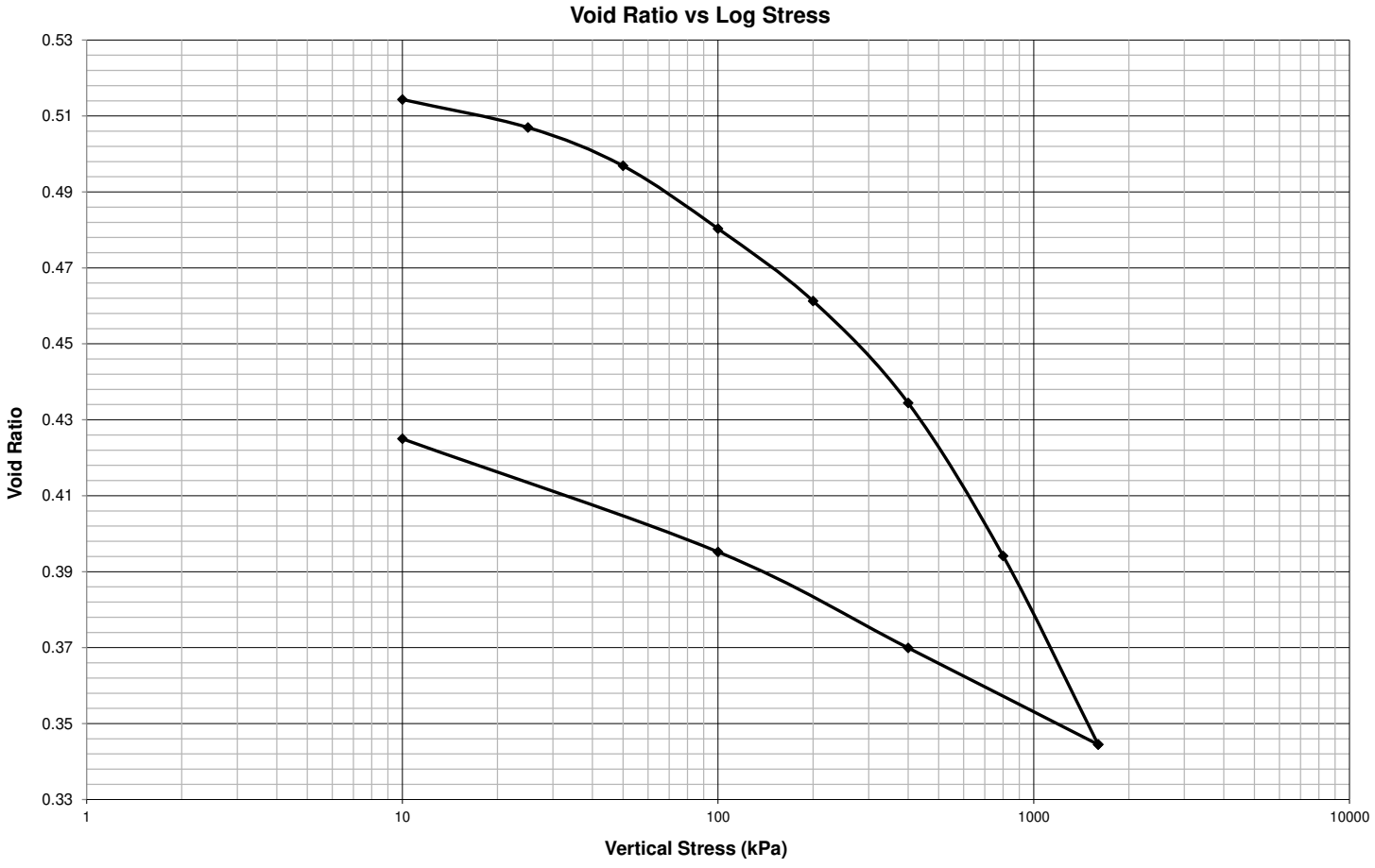
Client AURECON **Project** CATO RIDGE TOWNSHIP DEVELOPMENT - 505788 **Job no:** 27794

Sample no TP 201 (10331) **Depth (m)** 3-3.8 **Date** 28/11/2019

Lab no G19-0605

Sample Parameters		Unit	Value	Remarks	Test Remarks
Moisture Content	Before Test	%	15.9	Complete test specimen	Undisturbed sample
	After Test	%	18.5	Complete test specimen	
Dry Density		Kg/m^3	1804		
Void Ratio		-	0.498		
Degree of Saturation		%	86.2		
Initial Specimen Height		mm	25.4		
Relative Density (SG)		-	2.702	Determined	

Test Parameters														
Vertical Stress	kPa	10	25	50	100	200	400	800	1600	400	100	10		
Time Elapsed	hr	24	24	24	24	24	24	24	24	2	2	3		
H_{100}	mm	25.678	25.553	25.382	25.102	24.778	24.323	23.640	22.798	23.230	23.658	24.163		
Strain	%	-1.096	-0.604	0.071	1.175	2.448	4.239	6.929	10.244	8.544	6.857	4.869		
Void Ratio	-	0.514	0.507	0.497	0.480	0.461	0.434	0.394	0.344	0.370	0.395	0.425		
Mv (1/Mpa)	-	-	0.3248	0.2683	0.2209	0.1288	0.0918	0.0702	0.0445	0.0158	0.0615	0.2371		



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C-TP182	-36599	-3286151
C-TP207	-35942	-3286344
C-TP222	-35756	-3286346
C-TP188	-36315	-3286152
C-TP203	-35935	-3287119
C-TP202	-35920	-3287305
C-TP201	-36118	-3286923
C-TP204	-35932	-3286912
C-TP185	-36318	-3286719
C-TP200	-36124	-3286718
C-TP205	-35926	-3286710
C-TP225	-35740	-3286707
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C-TP186	-36321	-3286534
C-TP199	-36125	-3286528
C-TP206	-35928	-3286536
C-TP223	-35748	-3286533
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C-TP208	-35932	-3286145
C-TP181	-36606	-3285931
C-TP189	-36327	-3285922
C-TP196	-36140	-3285926
C-TP209	-35940	-3285930
C-TP220	-35740	-3286132
C-TP218	-35631	-3285954
C-TP219	-35459	-3285956
C-TP221	-35542	-3286105
C-TP191	-36319	-3285732
C-TP195	-36141	-3285730
C-TP194	-36145	-3285522
C-TP210	-35910	-3285798
C-TP211	-35918	-3285600
C-TP216	-35684	-3285753
C-TP217	-35466	-3285714
C-TP215	-35668	-3285521
C-TP214	-35768	-3285341
C-TP213	-35950	-3285171
C-TP193	-36162	-3285302
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C-TP22	-39426	-3292157
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C-TP43	-39745	-3291308
C-TP50	-40234	-3291402
C-TP49	-40039	-3291402
C-TP46	-39842	-3291494

Test Pit ID	SA LO31 WGS84 X	Y
C-TP46	-39963	-3291679
C-TP47	-40132	-3291600
C-TP42	-39647	-3291427
C-TP14	-39056	-3291990
C-TP37	-40269	-3291856
C-TP32	-40035	-3291903
C-TP27	-39723	-3291959
C-TP13	-39098	-3292281
C-TP23	-39638	-3292102
C-TP19	-39621	-3292384
C-TP16	-39626	-3292568
C-TP48	-40134	-3291500
C-TP45	-39943	-3291500
C-TP57	-40974	-3292553
C-TP56	-40823	-3292405
C-TP55	-40607	-3292515
C-TP58	-40940	-3292296
C-TP54	-40743	-3292298
C-TP59	-40941	-3292145
C-TP53	-40678	-3292150
C-TP52	-40550	-3292101
C-TP51	-40551	-3292004
C-TP65	-41007	-3292008
C-TP64	-40946	-3291806
C-TP61	-40742	-3291807
C-TP60	-40742	-3292001
C-TP63	-40850	-3291903
C-TP66	-41147	-3292000
C-TP70	-41336	-3292003
C-TP71	-41434	-3291902
C-TP72	-41531	-3292003
C-TP73	-41925	-3291995
C-TP74	-41918	-3291801
C-TP75	-41724	-3291799
C-TP77	-41735	-3291651
C-TP76	-41535	-3291697
C-TP79	-41528	-3291497
C-TP80	-41532	-3291300
C-TP81	-41738	-3291297
C-TP82	-41731	-3291107
C-TP88	-41294	-3291201
C-TP67	-41132	-3291807
C-TP68	-41036	-3291653
C-TP103	-40444	-3291797
C-TP101	-40637	-3291604
C-TP102	-40544	-3291695
C-TP104	-40645	-3291230
C-TP105	-40440	-3291200
C-TP107	-40628	-3290982
C-TP106	-40470	-3291060
C-TP98	-40840	-3291197
C-TP96	-40841	-3291004
C-TP97	-40981	-3291096
C-TP89	-41161	-3291103
C-TP93	-41143	-3290900
C-TP91	-41290	-3290804
C-TP90	-41290	-3291001
C-TP94	-41042	-3290798
C-TP92	-41230	-3290697
C-TP84	-41479	-3290624
C-TP85	-41441	-3290798
C-TP86	-41437	-3291006
C-TP83	-41628	-3290800
C-TP100	-41141	-3291353
C-TP99	-40998	-3291305
C-TP87	-41295	-3291350
C-TP108	-40454	-3290868
C-TP109	-40596	-3290849
C-TP95	-40906	-3290851
C-TP62	-40841	-3291707
C-TP69	-41280	-3291530
C-TP78	-41742	-3291465
C-TP114	-39155	-3291221
C-TP113	-39297	-3291060
C-TP112	-39747	-3290805
C-TP110	-40029	-3290895
C-TP111	-39903	-3290868
C-TP122	-38015	-3289889
C-TP123	-38011	-3289690
C-TP121	-37828	-3289888
C-TP124	-37825	-3289693
C-TP125	-37538	-3289779
C-TP126	-37539	-3289602
C-TP129	-37344	-3289588
C-TP128	-37344	-3289403
C-TP130	-37153	-3289501
C-TP131	-37141	-3289307
C-TP132	-36963	-3289306
C-TP133	-37146	-3289109
C-TP127	-37531	-3289407

Test Pit ID	SA LO31 WGS84 X	Y
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C-TP135	-36945	-3288885
C-TP136	-36755	-3288901
C-TP137	-36761	-3288685
C-TP139	-36845	-3288497
C-TP140	-36660	-3288501
C-TP142	-36666	-3288299
C-TP143	-36407	-3288299
C-TP141	-36859	-3288305
C-TP145	-36850	-3288102
C-TP144	-36666	-3288111
C-TP147	-36671	-3287913
C-TP146	-36851	-3287914
C-TP150	-36610	-3287791
C-TP149	-36340	-3287901
C-TP138	-36952	-3288592
C-TP148	-36458	-3287986
C-TP151	-36745	-3287686
C-TP152	-36724	-3287503
C-TP153	-36539	-3287491
C-TP154	-36351	-3287490
C-TP159	-36715	-3287304
C-TP158	-36527	-3287299
C-TP157	-36347	-3287299
C-TP156	-36150	-3287302
C-TP165	-36527	-3287107
C-TP166	-36339	-3287111
C-TP167	-36142	-3287115
C-TP164	-36712	-3287108
C-TP169	-36528	-3286920
C-TP168	-36340	-3286915
C-TP155	-36149	-3287498
C-TP175	-36529	-3286715
C-TP160	-36904	-3287296
C-TP163	-36914	-3287113
C-TP170	-36724	-3286919
C-TP171	-36910	-3286924
C-TP174	-36720	-3286712
C-TP173	-36906	-3286726
C-TP177	-36911	-3286528
C-TP176	-36721	-3286532
C-TP179	-36717	-3286333
C-TP180	-36821	-3286153
C-TP178	-36916	-3286330
C-TP162	-37091	-3287108
C-TP161	-37080	-3287298
C-TP172	-37082	-3286891

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CLIENT

ASSMANG

REV	DATE	REVISION DETAILS	APPROVED
1	06/02/2020	Geotechnical Investigation - Layout of Test Pit Locations - Northern and Southern Portions	

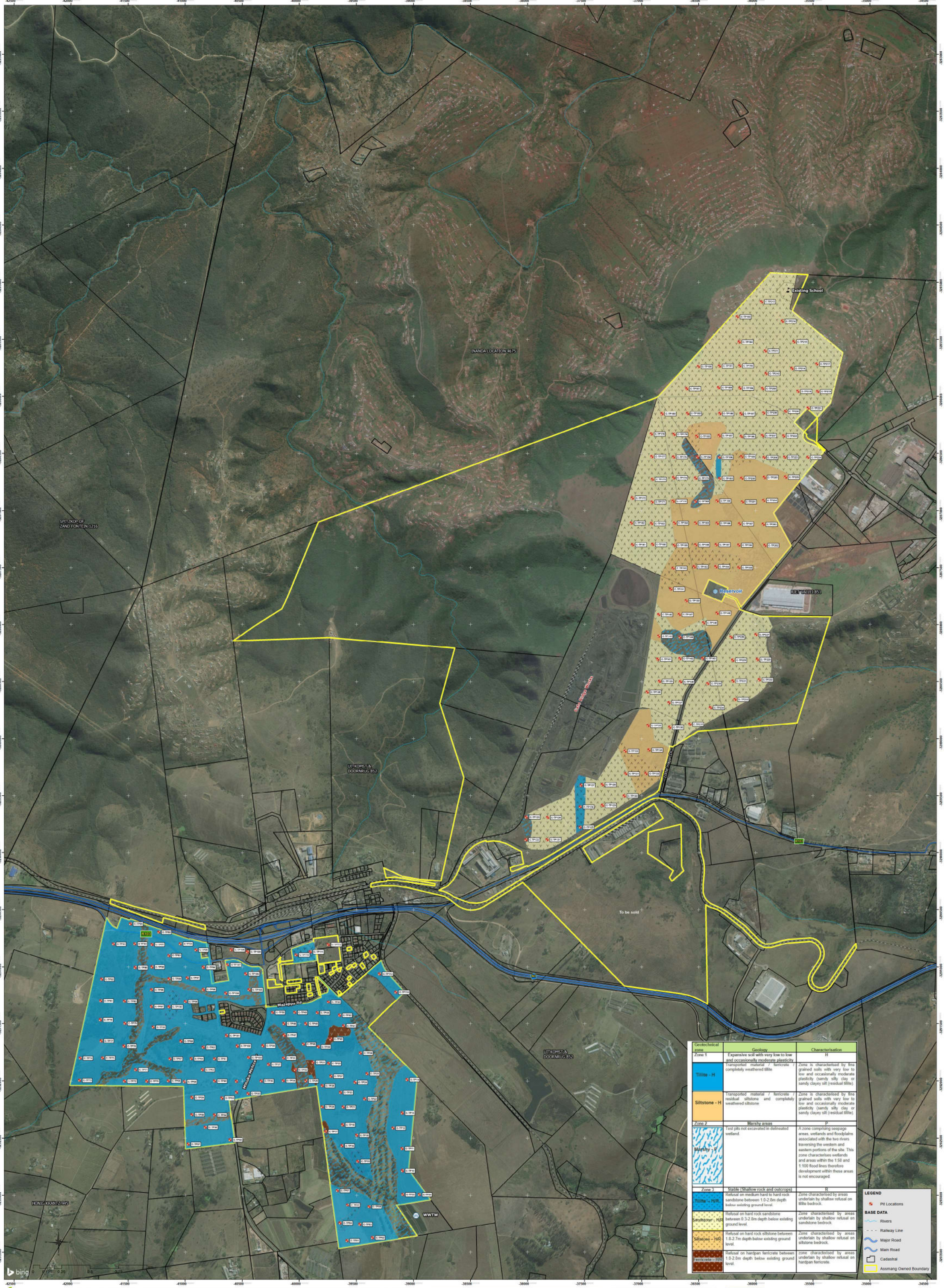
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DRAWN: AW
DESIGNED: NK
REVIEWED:
APPROVED:

PROJECT: CATO RIDGE LAND DEVELOPMENT PRE-FEASIBILITY

TITLE: Geotechnical Investigation
Layout of Test Pit location
Northern and Southern Portions

DRAWING No.: PROJECT No. 505788 – WBS 0000 – TYPE DRG – DISC G1 – NUMBER 0001 – REV



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CLIENT

ASSMANG

REV	DATE	REVISION DETAILS	APPROVED
1	06/02/2020	Geotechnical Investigation - Layout of Test Pit Locations & Geotech Zoning - Northern and Southern Portions	

SCALE	SIZE
1:10 000	A0

DRAWN: AW
DESIGNED: NK
REVIEWED:
APPROVED:

PROJECT: CATO RIDGE LAND DEVELOPMENT PRE-FEASIBILITY

TITLE: Geotechnical Investigation
Zonation Map
Northern and Southern Portions

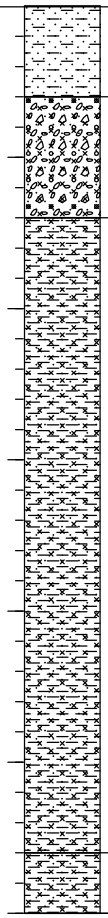
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP1**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, grey brown, DENSE, intact, clayey sand with gravel and roots. Hillwash.

0.30 Loosely packed, black, sub-angular to sub-rounded, ferruginised gravel in a slightly moist, light grey brown silty sand matrix. Overall consistency is LOOSE. Ferricrete

0.70 Moist, orange to red brown stained black and red brown, STIFF, intact, sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material contains some ferruginised gravel and is ferruginised in places. Residual tillite.

2.80 Moist, yellow to orange brown, STIFF, intact, sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material contains some ferruginised gravel and is ferruginised in places. Residual tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3293401
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/15/2019	*Y COORD:*	- 39580
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/15/2019		
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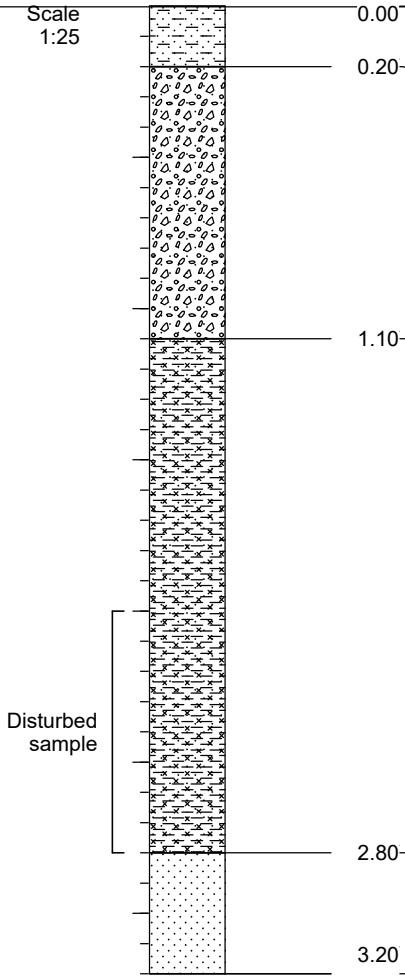
HOLE No: **C- TP1**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP2**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist to dry, grey brown, DENSE, intact, clayey sand containing gravel and roots. Hillwash.

0.20 — Tightly packed, brown, orange brown and black, sub-angular to sub-rounded, ferruginised fine to coarse grained gravel and cobbles in a slightly moist to dry grey brown, clayey sand, Overall consistency is MEDIUM DENSE. Ferricrete.

1.10 — Moist, orange to red brown stained black and red brown, STIFF, intact, sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material contains some ferruginised gravel and is ferruginised in places. Residual tillite.

2.80 — Completely to highly weathered, yellow brown stained red brown, VERY SOFT to SOFT ROCK, fine grained tillite

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 2.0--2.8 m (C-TP02/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3293375
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/15/2019	*Y COORD:*	- 39360
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/15/2019		
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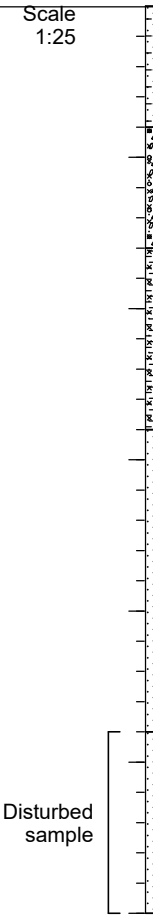
HOLE No: **C- TP2**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP3**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist to dry, grey brown, DENSE, intact, clayey sand containing gravel and roots. Hillwash.

0.40 — Loosely packed, black, sub-angular to sub-rounded, ferruginised gravel in a slightly moist, light grey brown silty sand matrix. Overall consistency is LOOSE. Ferricrete.

0.80 — Moist, orange to red brown stained black and red brown, STIFF, intact, sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material contains some ferruginised gravel and is ferruginised in places. Residual tillite.

1.40 — Highly to completely weathered, yelllow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.

2.40 — Highly weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 2.4--3.0 m (C-TP03/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3293259
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/15/2019	*Y COORD:*	- 39470
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/15/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP3**

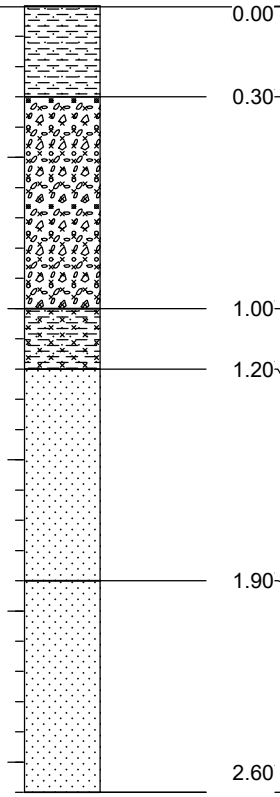
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP4**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, grey brown, DENSE, intact, clayey sand containing gravel and roots. Hillwash.
0.30	Loosely packed, black, sub-angular to sub-rounded, ferruginised gravel in a slightly moist, light grey brown silty sand matrix. Overall consistency is LOOSE. Ferricrete.
1.00	Moist, orange to red brown stained black and red brown, STIFF, intact, sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material contains some ferruginised gravel and is ferruginised in places. Residual tillite.
1.20	Highly to completely weathered, yelllow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.
1.90	Highly weathered, yellow brown stained black, SOFT ROCK, fine grained tillite.
	2.60+ EOH, Refusal on medium hard rock.
2.60	

NOTES:

Refusal at 2.6 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291634
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/15/2019	*Y COORD:*	- 39726
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/15/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP4**

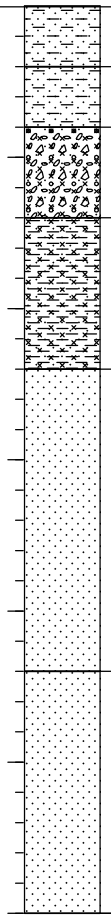
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP5**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, grey brown, LOOSE, intact, clayey sand containing gravel and roots. Hillwash.
0.20	Slightly moist to dry, grey brown, DENSE, intact, clayey sand containing gravel and minor roots. Hillwash.
0.40	Loosely packed, black, sub-angular to sub-rounded, ferruginised gravel in a slightly moist, light grey brown silty sand matrix. Overall consistency is LOOSE. Ferricrete.
0.70	Moist, orange to red brown stained black and red brown, STIFF, intact, sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material contains some ferruginised gravel and is ferruginised in places. Residual tillite.
1.20	Completely to highly weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite
2.20	Highly weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.
3.00	

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3293084
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/15/2019	*Y COORD:*	- 39578
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/15/2019		
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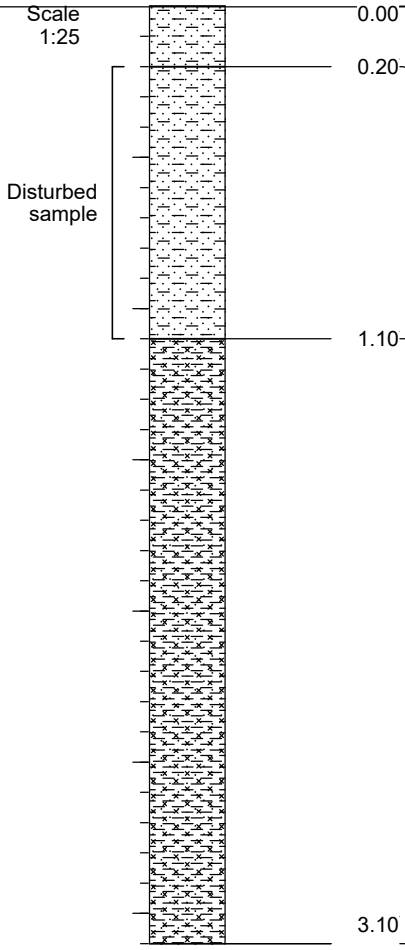
HOLE No: **C- TP5**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP6**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist to dry, grey brown, LOOSE, intact, clayey sand containing gravel and roots. Hillwash.

0.20 Tightly packed, brown, orange brown and black, sub-angular to sub-rounded, ferruginised fine to coarse grained gravel and cobbles in a slightly moist to dry grey brown, clayey sand. Overall consistency is MEDIUM DENSE. Ferricrete.

1.10 Moist, orange to red brown stained black and red brown, STIFF, intact, sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material contains some ferruginised gravel and is ferruginised in places. Residual tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.2--1.1 m (C-TP06/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3293101
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/15/2019	*Y COORD:*	- 39387
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/15/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP6**

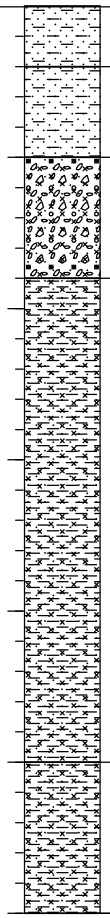
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP7**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, grey brown, LOOSE, intact, clayey sand containing gravel and roots. Hillwash.
0.20	Slightly moist to dry, grey brown, DENSE, intact, clayey sand containing gravel and minor roots. Hillwash.
0.50	Loosely packed, black, sub-angular to sub-rounded, ferruginised gravel in a slightly moist, light grey brown silty sand matrix (± 40%). Overall consistency is LOOSE. Ferricrete.
0.90	Moist, orange to red brown stained black and red brown, STIFF, intact, sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material contains some ferruginised gravel and is ferruginised in places. Residual tillite.
2.50	Moist, yellow to orange brown, STIFF, intact, sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material contains some ferruginised gravel and is ferruginised in places. Residual tillite.
3.00	

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292958
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/15/2019	*Y COORD:*	- 39667
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/15/2019		
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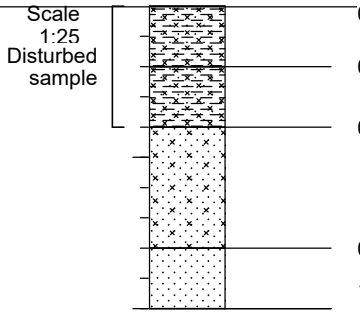
HOLE No: **C- TP7**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP8**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00	Slightly moist, dark grey brown, SOFT, shattered, sandy silty clay with abundant roots. Colluvium.
0.20	Slightly moist, grey brown, STIFF, micro-shattered, sandy silty clay. Colluvium.
0.40	Tightly packed, grey brown stained orange brown, sub-angular to angular, weathered SOFT ROCK, sandstone boulders, cobbles and occasional coarse gravel with pockets of slightly moist, dark brown, silty sand. Completely weathered, residual tillite.
0.80	Highly weathered, grey brown stained orange brown, SOFT ROCK becoming MEDIUM HARD ROCK with depth, FINE to MEDIUM grained tillite.
1.00	1.00+ EOH, Refusal on meidum hard rock tillite.

NOTES:

Refusal at 1.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0.0--0.4 m (C-TP08/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292993
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/8/2019	*Y COORD:*	- 39095
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/8/2019		
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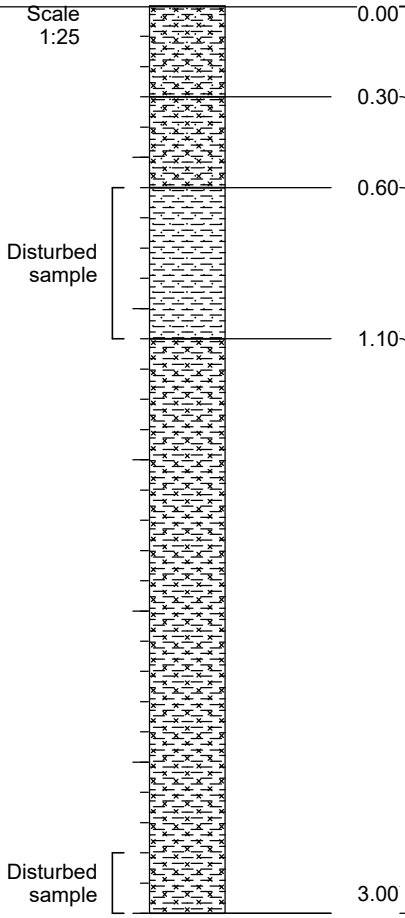
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Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP9**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, dark grey brown, SOFT, micro-shattered, sandy silty clay with abundant roots. Colluvium.

0.30 Slightly moist, grey brown, STIFF, micro-shattered, sandy silty clay. Colluvium.

0.60 Loosely packed, grey brown stained black and red brown, sub-angular to sub-rounded, ferruginised gravel in a slightly moist to moist, orange brown, sandy clay matrix (± 30%). Overall consistency is MEDIUM DENSE. Ferricrete.

1.10 Moist, orange to red brown, FIRM, intact, silty clay contains some VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample atken at 0.6--1.1 (C-TP09/1).
FI sample taken at 2.8--3.0 (C-TP09/2).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292995
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/8/2019	*Y COORD:*	- 38950
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/8/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP9**

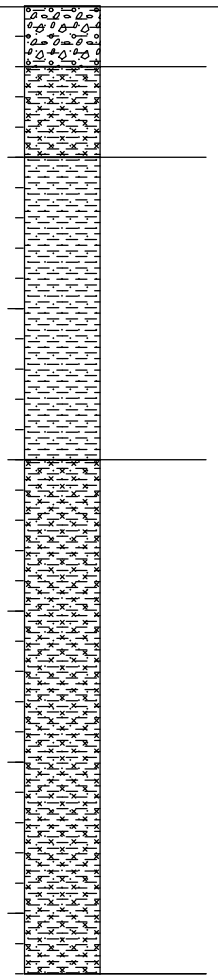
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP10**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, dark grey brown, SOFT, micro-shattered, gravelly sandy clay with roots. Colluvium.

0.20 Slightly moist, dark grey brown, STIFF, micro-shattered, sandy silty clay. Colluvium.

0.50 Loosely packed, grey brown to orange brown, sub-angular to sub-rounded gravel and boulders in a matrix (± 40-45%) of slightly moist, orange brown to brown, sandy clay. Ferricrete.

1.50 Moist, orange to red brown, FIRM, intact, sandy silty clay with some SOFT ROCK fragments with depth. Residual tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292786
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/8/2019	*Y COORD:*	- 39098
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/8/2019		
	DURBAN-1ST.GPJ				

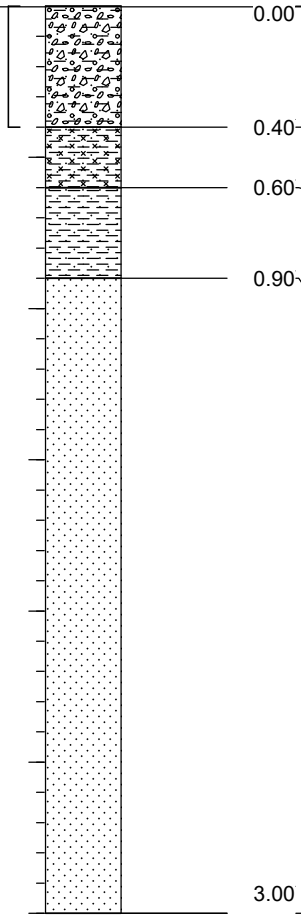
HOLE No: **C- TP10**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP11**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, dark grey brown, SOFT, micro-shattered, gravelly sandy clay with roots. Colluvium.

0.40 Slightly moist, dark grey brown, STIFF, micro-shattered, sandy silty clay. Colluvium.

0.60 Loosely packed, grey brown stained black and red brown, sub-angular to sub-rounded, ferruginised gravel in a slightly moist to moist, orange brown, sandy clay matrix (± 30%). Overall consistency is MEDIUM DENSE. Ferricrete.

0.90 Moist, orange to red brown, FIRM, intact, sandy silty clay. Residual tilite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0-0.4 m (C-TP11/01).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292589
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/8/2019	*Y COORD:*	- 39099
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/8/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP11**

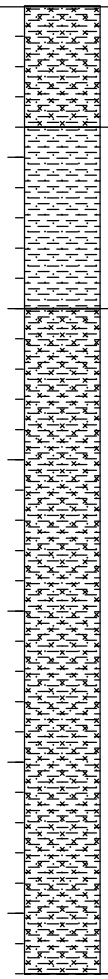
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Cato Ridge Land Development

HOLE No: **C- TP12**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, dark grey brown, SOFT, sandy silty clay with roots. Colluvium.

0.40 Loosely packed, grey brown stained black and red brown, sub-angular to sub-rounded, ferruginised gravel in a slightly moist to moist, orange brown, sandy clay matrix (± 30%). Overall consistency is MEDIUM DENSE. Ferricrete.

1.00 Moist, orange to red brown, FIRM, intact, sandy silty clay with some VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No sample taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292411
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/8/2019	*Y COORD:*	- 39178
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/8/2019		
	DURBAN-1ST.GPJ				

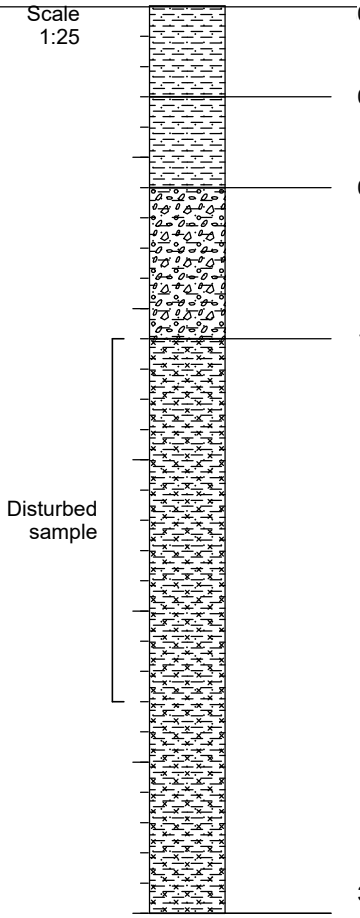
HOLE No: **C- TP12**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP13**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, grey brown, SOFT, intact, sandy clay with roots. Colluvium.

0.30 Slightly moist, grey brown, STIFF, intact, fine sandy clay. Colluvium.

0.60 Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.

1.10 Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 1.1--2.3 m (C-TP13/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292281
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/8/2019	*Y COORD:*	- 39097
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/8/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP13**

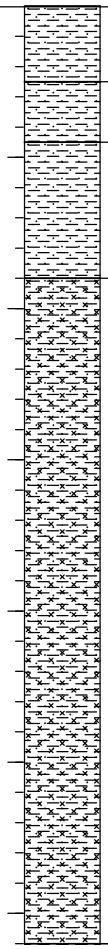
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Cato Ridge Land Development

HOLE No: **C- TP14**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, SOFT, intact, sandy clay with roots. Colluvium.
0.25	Slightly moist, grey brown, STIFF, intact, fine sandy clay. Colluvium.
0.45	Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.
0.90	Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.
3.10	

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291989
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/8/2019	*Y COORD:*	- 39055
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/8/2019		
	DURBAN-1ST.GPJ				

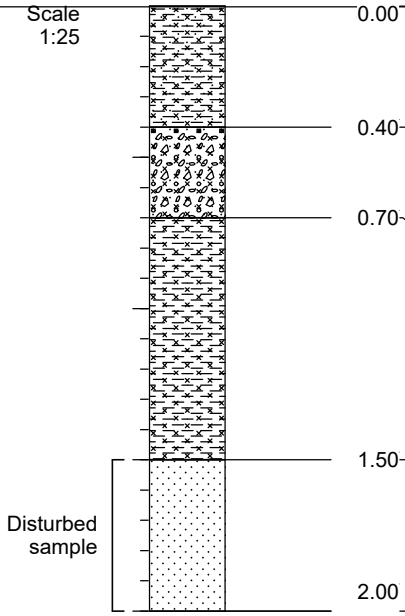
HOLE No: **C- TP14**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP15**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, dark brown to black, STIFF, shattered, sandy silty clay with some gravel and rooots. Colluvium.

0.40 Loosely packed, brown and orange to red brown, sub-rounded to sub-angular gravel and cobbles in slightly moist, dark brown, sandy silty clay matrix (± 30%). Overall consistency is DENSE. Ferricrete.

0.70 Moist, yellow to red brown and grey stained black, FIRM, intact, silty clay containing some VERY SOFT to SOFT ROCK fragments and HARD ROCK corestones. Residual tillite.

1.50 Highly to completely weathered, yellow brown stained black in places, VERY SOFT to SOFT ROCK, fine grained tillite.

2.00

NOTES:

No refusal - pit stopped at 2.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 1.5--2.0 m (C-TP15/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292705
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/12/2019	*Y COORD:*	- 39488
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/12/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP15**

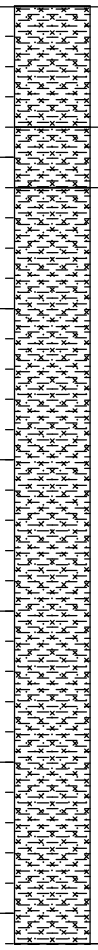
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP16**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25
Disturbed sample



0.00 Slightly moist, dark brown to black, SOFT to FIRM, sandy silty clay with abundant roots. Alluvium.

0.40 Slightly moist, dark brown to black, SOFT to FIRM, sandy silty clay with abundant ferruginised gravel and roots. Ferricrete.

0.60 Moist, dark red brown and stained black, FIRM, sandy clay containing some ferruginised gravel. Residual sandstone.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0.0--0.4 m (C-TP16/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292567
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/12/2019	*Y COORD:*	- 39628
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/12/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP16**

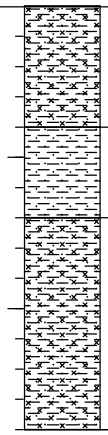
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Cato Ridge Land Development

HOLE No: **C- TP17**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, dark brown, STIFF, micro-shattered, sandy silty clay with abundant roots. Alluvium.
0.40	Slightly moist to moist, dark brown and grey (leached), SOFT, intact, fine sandy clay. Alluvium.
0.70	Moist, yellow, orange and red brown blotched dark grey, sandy silty clay with some ferruginised gravel. Ferricrete.
1.40	1.40+ EOH, Refusal on cemented or hardpan ferricrete.

NOTES:

Refusal at 1.4 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292441
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/12/2019	*Y COORD:*	- 39771
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/12/2019		
	DURBAN-1ST.GPJ				

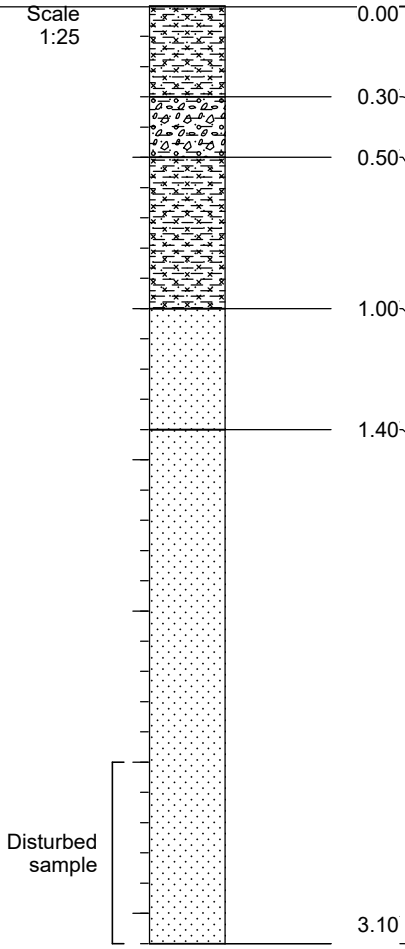
HOLE No: **C- TP17**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP18**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, dark grey brown, SOFT, becoming stiff with depth, micro-shattered, sandy silty clay with roots. Colluvium.

0.30 Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.

0.50 Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Residual tilite.

1.00 Completely to highly weathered, yellow brown stained orange brown and black in places, VERY SOFT, very fine grained. Residual tillite.

1.40 Highly to completely weathered, yellow brown, fine grained, VERY SOFT to SOFT ROCK tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 2.5--3.10 m (C-TP18/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292474
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/12/2019	*Y COORD:*	- 39499
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/12/2019		
	DURBAN-1ST.GPJ				

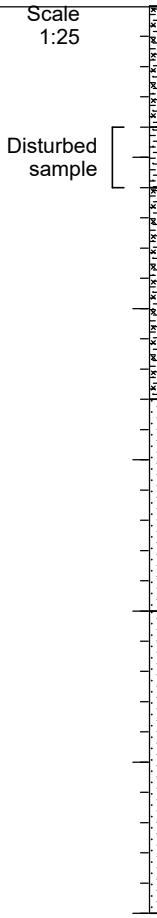
HOLE No: **C- TP18**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP19**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, dark grey brown, SOFT, becoming stiff with depth, micro-shattered, sandy silty clay with roots. Colluvium.

0.40 Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.

0.60 Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.

1.30 Completely to highly weathered, yellow brown stained orange brown and black in places, VERY SOFT ROCK, very fine grained tillite.

2.00 Highly to completely weathered, yellow brown, fine grained, VERY SOFT to SOFT ROCK tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.4--0.6 m (C-TP19/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292385
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/12/2019	*Y COORD:*	- 39621
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/12/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP19**

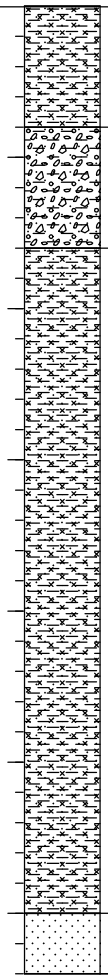
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Cato Ridge Land Development

HOLE No: **C- TP20**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, dark grey brown, SOFT, becoming STIFF with depth, micro-shattered, sandy silty clay with roots. Colluvium.

0.40 Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.

0.80 Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Ferricrete.

3.00 Completely to highly weathered, yellow brown stained orange brown and black in places, VERY SOFT, very fine grained. Residual tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292225
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/12/2019	*Y COORD:*	- 39799
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/12/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP20**

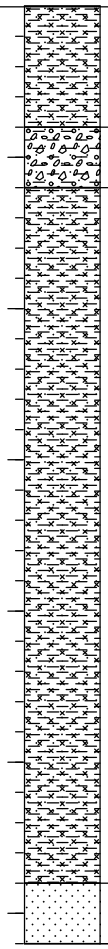
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Cato Ridge Land Development

HOLE No: **C- TP21**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, dark grey brown, SOFT, becoming STIFF with depth, micro-shattered, sandy silty clay with roots. Colluvium.

0.40 Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.

0.60 Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.

2.90 Completely to highly weathered, yellow brown stained orange brown and black in places, VERY SOFT ROCK, very fine grained tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292228
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/12/2019	*Y COORD:*	- 39616
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/12/2019		
	DURBAN-1ST.GPJ				

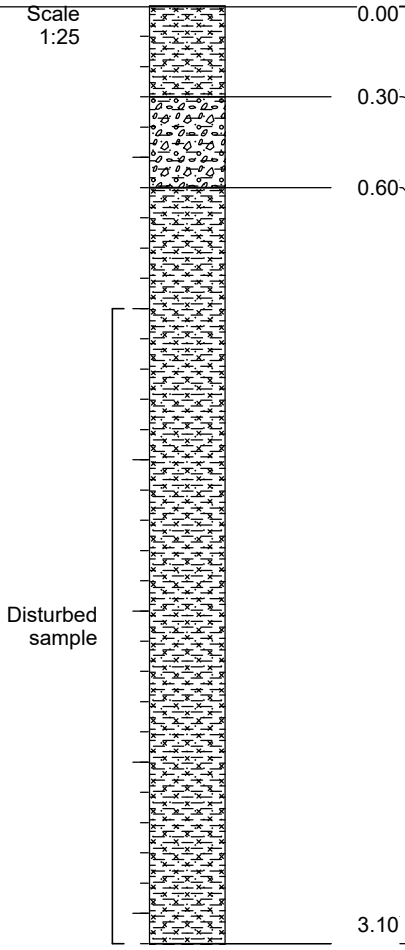
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Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP22**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, dark grey brown, SOFT, becoming stiff with depth, micro-shattered, sandy silty clay with roots. Colluvium.

0.30 Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.

0.60 Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 1.0--3.10 m (C-TP22/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292156
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/12/2019	*Y COORD:*	- 39426
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/12/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP22**

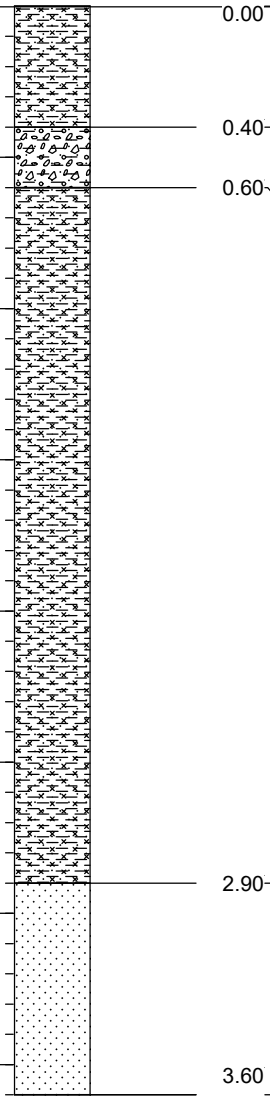
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP23**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, dark grey brown, SOFT, becoming stiff with depth, micro-shattered, sandy silty clay with roots. Colluvium.

0.40 Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.

0.60 Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.

2.90 Completely to highly weathered, yellow brown stained orange brown and black in places, VERY SOFT ROCK, very fine grained tillite.

Disturbed samples

3.60

NOTES:

No refusal - pit stopped at 3.6 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 2.9--3.6 m (C-TP23/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292102
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/12/2019	*Y COORD:*	- 39638
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/12/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP23**

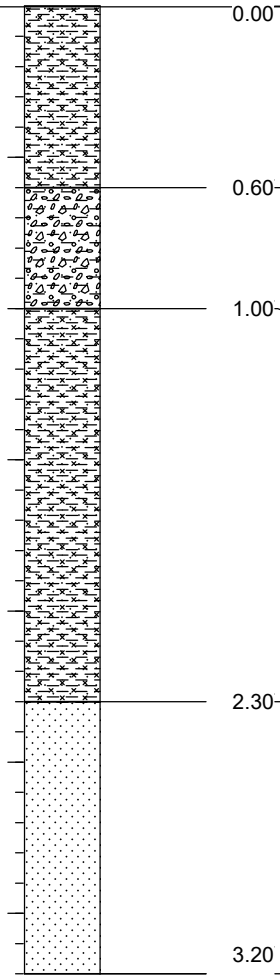
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Cato Ridge Land Development

HOLE No: **C- TP24**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, dark grey brown, SOFT, becoming STIFF with depth, micro-shattered, sandy silty clay with roots. Colluvium.

0.60 Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.

1.00 Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.

2.30 Completely to highly weathered, yellow brown stained orange brown and black in places, VERY SOFT ROCK, very fine grained tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292012
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/12/2019	*Y COORD:*	- 39512
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/12/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP24**

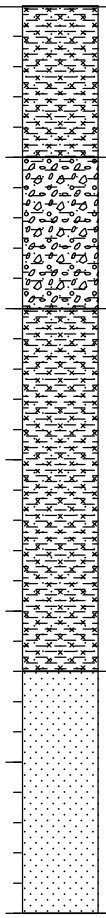
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Cato Ridge Land Development

HOLE No: **C- TP25**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, dark grey brown, SOFT, becoming STIFF with depth, micro-shattered, sandy silty clay with roots. Colluvium.

0.50 Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.

1.00 Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.

2.20 Completely to highly weathered, yellow brown stained orange brown and black in places, VERY SOFT ROCK, very fine grained tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291938
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/8/2019	*Y COORD:*	- 39408
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/8/2019		
	DURBAN-1ST.GPJ				

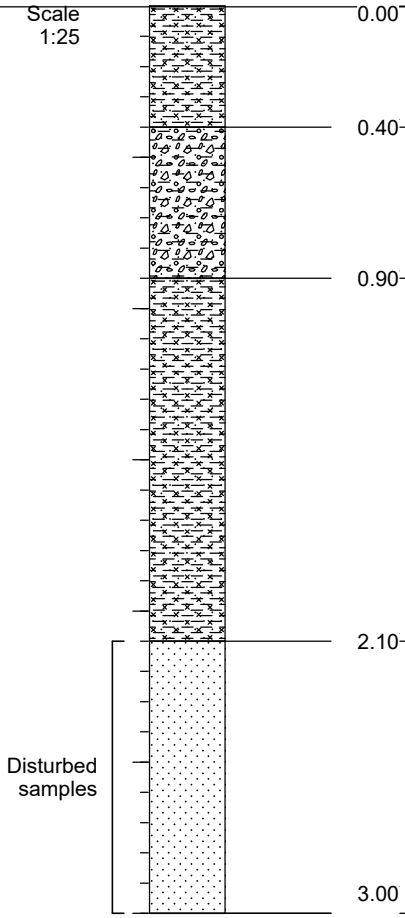
HOLE No: **C- TP25**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP26**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist, dark grey brown, SOFT, becoming STIFF with depth, micro-shattered, sandy silty clay with roots. Colluvium.

0.40 — Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.

0.90 — Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.

2.10 — Completely to highly weathered, yellow brown stained orange brown and black in places, VERY SOFT ROCK, very fine grained tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 2.1--3.0 m (C-TP26/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291756
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/8/2019	*Y COORD:*	- 39465
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/8/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP26**

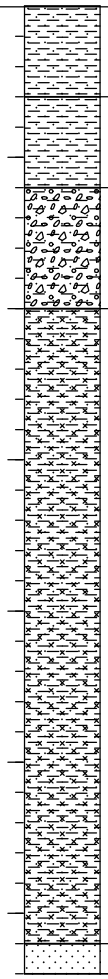
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Cato Ridge Land Development

HOLE No: **C- TP27**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, SOFT, intact, sandy clay with roots. Colluvium.
0.30	Slightly moist, grey brown, STIFF, intact, fine sandy clay. Colluvium.
0.60	Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.
1.00	Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.
3.10	
3.20	Completely to highly weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291960
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/13/2019	*Y COORD:*	- 39722
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/13/2019		
	DURBAN-1ST.GPJ				

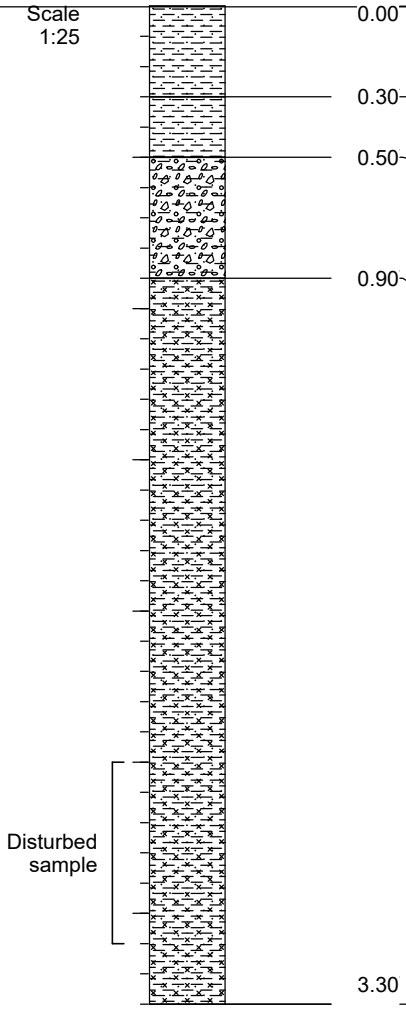
HOLE No: **C- TP27**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP28**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, grey brown, SOFT, intact, sandy clay with roots. Colluvium.

0.30 Slightly moist, grey brown, STIFF, intact, fine sandy clay. Colluvium.

0.50 Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.

0.90 Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.

3.30

NOTES:

No refusal - pit stopped at 3.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sampe taken at 2.5--3.1 m (C-TP28/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292041
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/13/2019	*Y COORD:*	- 39797
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/13/2019		
	DURBAN-1ST.GPJ				

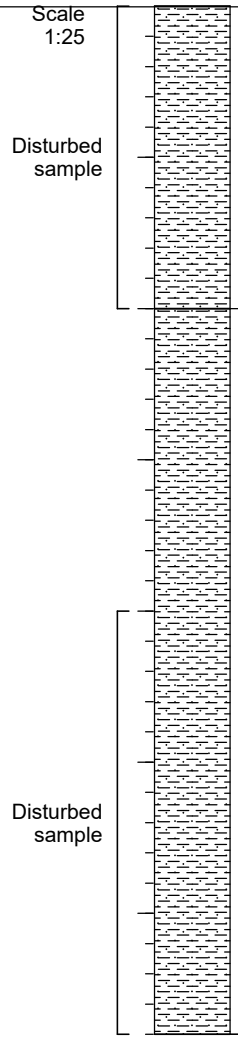
HOLE No: **C- TP28**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP29**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00

Slightly moist, dark brown to black, STIFF, shattered, sandy clay with some gracek and roots. Alluvium.

1.00

Slightly moist to moust, orange to red brown stained and mottled black, STIFF, intact, sandy clay with some ferruginised gravel. Material is ferruginised in places. Residual tillite.

3.40

NOTES:

No refusal - pit stopped at 3.4 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0.0--1.0 m (C-TP29/1).
FI and CBR sample taken at 2.0--3.40 m (C-TP29/2).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292001
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/13/2019	*Y COORD:*	- 39942
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/13/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP29**

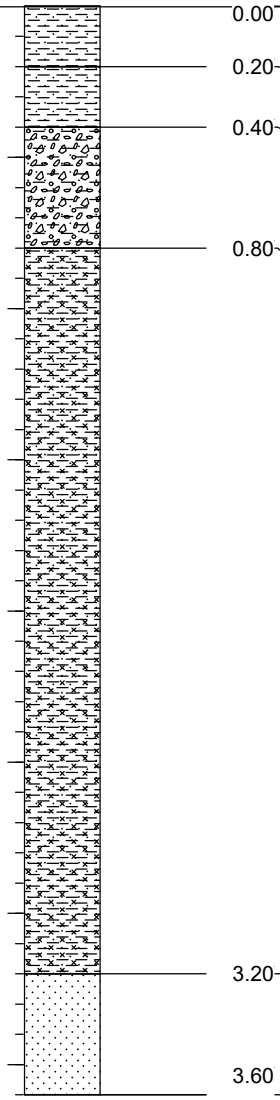
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Cato Ridge Land Development

HOLE No: **C- TP30**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, SOFT, intact, sandy clay with roots. Colluvium.
0.20	Slightly moist, grey brown, STIFF, intact, fine sandy clay. Colluvium.
0.40	Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.
0.80	Moist, orange to red brown stained black, FIRM, intact, sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments with depth. Residual tillite.
3.20	Completely to highly weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.
3.60	

NOTES:

No refusal - pit stopped at 3.6 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291846
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/13/2019	*Y COORD:*	- 39744
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/13/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP30**

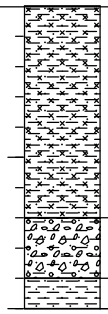
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HOLE No: **C- TP31**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, SOFT, micro-shattered, sandy silty clay with some gravel and roots. Colluvium.

0.70 Loosely packed, brown to dark brown and black, sub-rounded to sub-angular, ferruginised gravel in a slightly moist sandy clay matrix. Overall consistency is LOOSE to MEDIUM DENSE. Ferricrete.

0.90
1.00 Slightly moist to moist, orange to red brown stained and mottled black, STIFF, intact, sandy clay containing abundant ferruginised gravel and material is cemented. Ferricrete. Refusal on HARDPAN ferricrete.

NOTES:

Refusal at 1.0 m on HARDPAN ferricrete.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291838
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/14/2019	*Y COORD:*	- 39878
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/14/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP31**

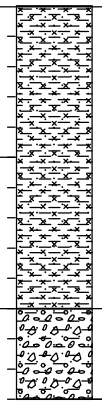
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP32**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, dark brown, STIFF, shattered, sandy silty clay with some gravel and roots up to 0.4 m. Alluvium.

1.00 Slightly moist to dry, orange to red brown stained and mottled black, STIFF, intact, sandy clay with some ferruginised gravel. Material is ferruginised or cemented in places. Residual tillite.

1.30 1.30+ EOH, Refusal on HARDPAN ferricrete.

NOTES:

Refusal at 1.3 m on HARDPAN ferricrete.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0.4--1.0 m (C-TP32/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291903
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/13/2019	*Y COORD:*	- 40034
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/13/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP32**

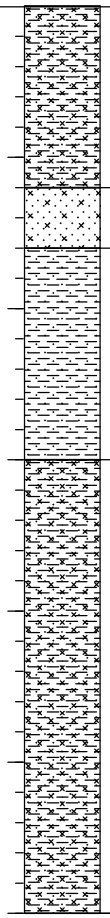
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Cato Ridge Land Development

HOLE No: **C- TP33**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, dark grey to black, SOFT, shattered, sandy silty clay with some gravel and roots. Colluvium.

0.60 Slightly moist to dry, light grey, LOOSE, Intact, silty sand containing abundant ferruginised gravel. Ferricrete.

0.80 Loosely packed, brown and black, sub-rounded to sub-angular, fine to coarse, ferruginised gravel in a moist, red brown, sandy clay matrix. Overall consistency is LOOSE. Pebble marker.

1.50 Moist, yellow to orange brown, stained black and red brown in places, FIRM, intact,sandy silty clay with some VERY SOFT to SOFT ROCK tillite fragments. Material is ferruginised in places. Residual tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0.8--1.5 m (C-TP33/1).
Excavated near wetland.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291802
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/13/2019	*Y COORD:*	- 40139
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/13/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP33**

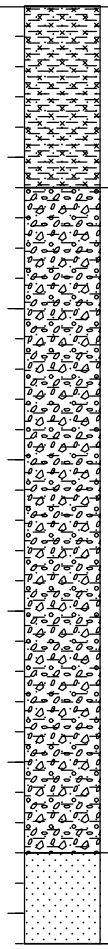
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP34**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, dark grey brown, STIFF, shattered, sandy silty clay with some gravel and roots. Colluvium.

0.60 Slightly moist to dry, orange to red brown stained and mottled black, STIFF, intact, sandy clay with some ferruginised gravel. Material is ferruginised or cemented in places. Residual tillite.

2.80 Completely to highly weathered, yellow to orange brown, VERY SOFT to SOFT ROCk, fine grained tillite. Contains occasional HARD ROCK corestones of up to 200 mm in diameter.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291999
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/13/2019	*Y COORD:*	- 40141
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/13/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP34**

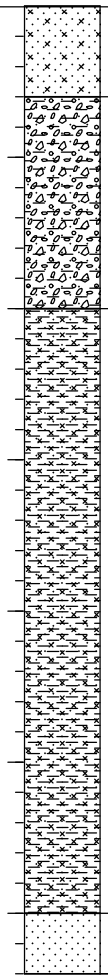
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP35**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, grey brown, SOFT, LOOSE to MEDIUM DENSE, clayey silty sand with some gravel and roots. Colluvium.

0.30 Loosely packed, brown and black, sub-rounded to sub-angular, fine to coarse, ferruginised gravel in a moist, red brown, sandy clay matrix. Overall consistency is LOOSE. Pebble marker.

1.00 Moist, yellow to orange brown, stained black and red brown in places, FIRM, intact,sandy silty clay with some VERY SOFT to SOFT ROCK tillite fragments. Material is ferruginised in places. Residual tillite.

Disturbed sample

3.00

3.20 Completely to highly weathered, yellow to orange brown stained black and red brown in places, VERY SOFT to SOFT, fine grained tillite.

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 3.0--3.2 m (C-TP35/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292111
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/13/2019	*Y COORD:*	- 40450
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/13/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP35**

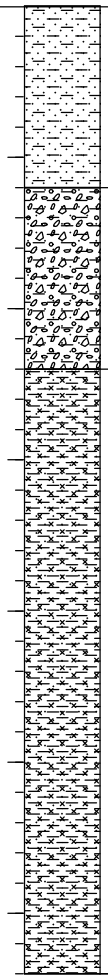
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP36**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, grey brown, SOFT, LOOSE to MEDIUM DENSE, clayey silty sand with some gravel and roots. Colluvium.

0.60 Loosely packed, brown and black, sub-rounded to sub-angular, fine to coarse, ferruginised gravel in a moist, red brown, sandy clay matrix. Overall consistency is LOOSE. Pebble marker.

1.20 Moist, yellow to orange brown, stained black and red brown in places, FIRM, intact, sandy silty clay with some VERY SOFT to SOFT ROCK tillite fragments. Material is ferruginised in places. Residual tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292003
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/13/2019	*Y COORD:*	- 40334
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/13/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP36**

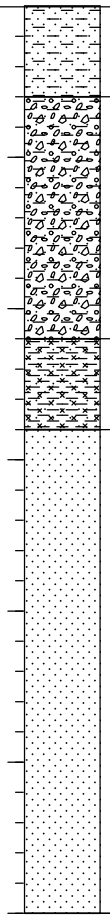
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Cato Ridge Land Development

HOLE No: **C- TP37**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, grey brown, SOFT, LOOSE to MEDIUM DENSE, clayey silty sand with some gravel and roots. Colluvium.

0.30 Loosely packed, brown and black, sub-rounded to sub-angular, fine to coarse, ferruginised gravel in a moist, red brown, sandy clay matrix. Overall consistency is LOOSE. Pebble marker.

1.10 Moist, yellow to orange brown, stained black and red brown in places, FIRM, intact,sandy silty clay with some VERY SOFT to SOFT ROCK tillite fragments. Material is ferruginised in places. Residual tillite.

1.40 Completely to highly weathered, yellow to orange brown stained black and red brown in places, VERY SOFT to SOFT, fine grained tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291854
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/13/2019	*Y COORD:*	- 40270
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/13/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP37**

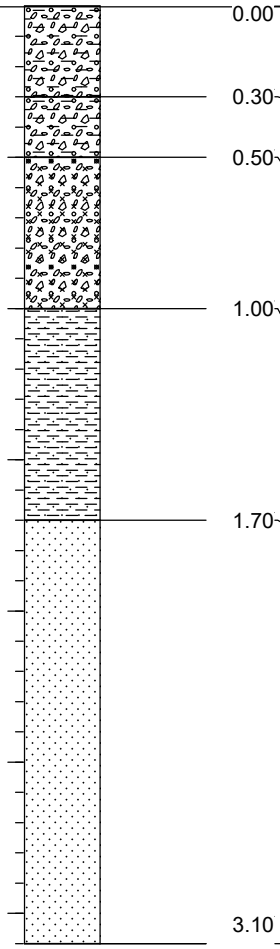
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP38**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, orange brown to brown, SOFT, micro-shattered, gravelly clay with some roots. Colluvium.
0.30	Loosely packed, brown and black, sub-rounded to sub-angular, ferruginised gravel in a slightly moist dark brown sandy silty clay matrix (± 40%). Overall consistency is DENSE. Ferricrete.
0.50	Loosely packed, brown and black, sub-rounded to sub-angular, ferruginised gravel and occasional cobbles in a slightly moist, grey brown silty sand matrix (± 40%). Overall consistency is DENSE. Ferricrete.
1.00	Moist, orange red brown stained black, FIRM, intact,sandy clay with some VERY SOFT to SOFT ROCK tillite fragments. Residual tillite.
1.70	Completely to highly weathered, yellow brown, VERY SOFT to SOFT ROCK, fine grained tillite.
3.10	

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291694
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/13/2019	*Y COORD:*	- 40319
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/13/2019		
	DURBAN-1ST.GPJ				

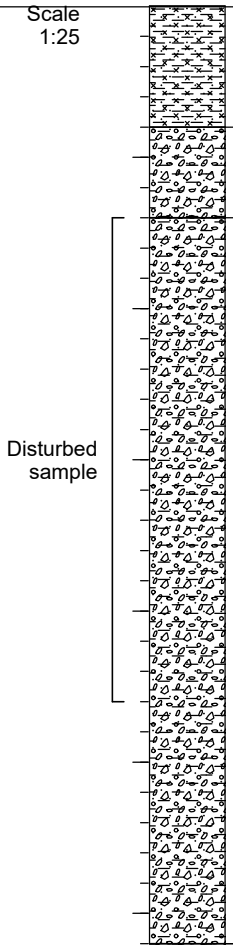
HOLE No: **C- TP38**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP39**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, grey brown, SOFT, micro-shattered, sandy silty clay with some gravel and roots. Colluvium.

0.40 Loosely packed, brown to dark brown and black, sub-rounded to sub-angular, ferruginised gravel in a slightly moist sandy clay matrix. Overall consistency is LOOSE to MEDIUM DENSE. Ferricrete.

0.70 Slightly moist to moist, orange to red brown stained and mottled black, STIFF, intact, sandy clay with some ferruginised gravel. Material is ferruginised or cemented in places. Residual ferricrete.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.7--2.3 m (C-TP39/1).
Excavated near wetland.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291702
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/13/2019	*Y COORD:*	- 39836
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/13/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP39**

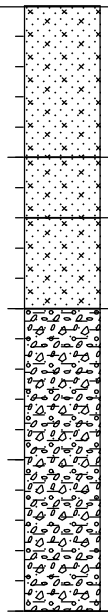
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Cato Ridge Land Development

HOLE No: **C- TP40**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to moist, dark grey brown, LOOSE, intact, silty fine sand with some roots. Colluvium.
0.50	Moist, light grey brown, LOOSE, intact, silty fine sand with minor ferricrete modules. Colluvium
0.70	Slightly moist to moist, dark grey brown, LOOSE, intact, silty fine sand with some roots. Colluvium.
1.00	Slightly moist to moist, orange to red brown stained and mottled black, STIFF, intact, sandy clay with some ferruginised gravel. Material is ferruginised or cemented in places. Residual ferricrete.
	2.0+ EOH, Refusal on HARDPAN ferricrete or very densely cemented ferruginised residual tillite.
2.00	

NOTES:

Refusal at 2.0 m
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291634
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/15/2019	*Y COORD:*	- 39726
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/15/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP40**

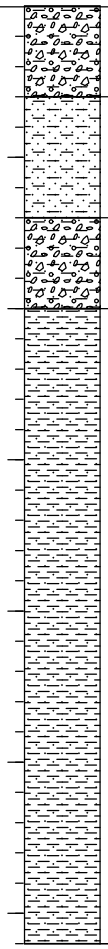
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP41**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, grey brown, LOOSE, intact, clayey sand with some gravel and roots. Colluvium.

0.30 Slightly moist to dry, grey brown, STIFF, intact, clayey sand. Colluvium.

0.70 Loosely packed, black, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, clayey sand matrix (± 30%). Overall consistency is DENSE. Ferricrete.

1.00 Moist, orange red brown, STIFF, intact,sandy clay with some VERY SOFT to SOFT ROCK fragments. Material contains ferruginised gravel and is ferruginised in places. Residual tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291517
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/14/2019	*Y COORD:*	- 39613
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/14/2019		
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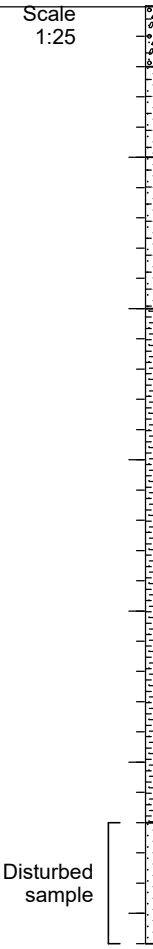
HOLE No: **C- TP41**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP42**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist to dry, grey brown, LOOSE, intact, clayey sand with some gravel and roots. Colluvium.

0.20 — Slightly moist to dry, grey brown, STIFF, intact, clayey sand. Colluvium.

0.50 — Loosely packed, black, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, clayey sand matrix (± 30%). Overall consistency is DENSE. Ferricrete.

1.00 — Moist, orange red brown, STIFF, intact, sandy clay with some VERY SOFT to SOFT ROCK fragments. Material contains ferruginised gravel and is ferruginised in places. Residual tillite.

2.70 — Moist, yellow brown, STIFF, intact,sandy clay with some VERY SOFT to SOFT ROCK fragments. Residual tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 2.7--3.10 m (C-TP42/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291424
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/15/2019	*Y COORD:*	- 39649
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/15/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP42**

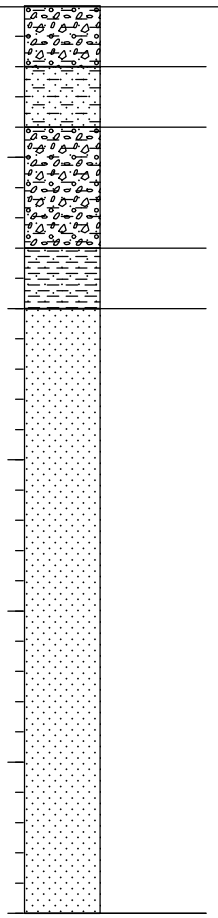
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Cato Ridge Land Development

HOLE No: **C- TP43**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, grey brown, LOOSE, intact, clayey sand with some gravel and roots. Colluvium.
0.20	Slightly moist to dry, grey brown, STIFF, intact, clayey sand. Colluvium.
0.40	Loosely packed, black, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, clayey sand matrix (± 30%). Overall consistency is DENSE. Ferricrete.
0.80	Moist, dark and light grey brown, STIFF, intact,sandy clay with some VERY SOFT to SOFT ROCK fragments. Material contains ferruginised gravel and is ferruginised in places. Residual tillite.
1.00	Completely to highly weathered, yellow brown, VERY SOFT to SOFT ROCK, fine grained tillite.
3.00	

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291308
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/15/2019	*Y COORD:*	- 39746
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/15/2019		
	DURBAN-1ST.GPJ				

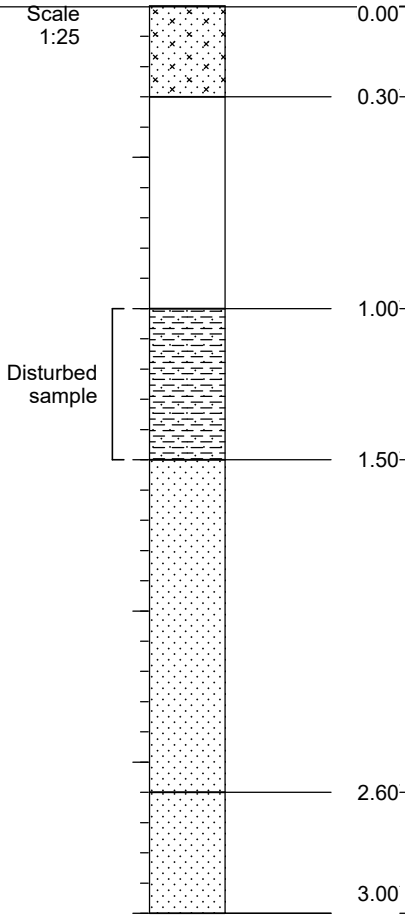
HOLE No: **C- TP43**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP44**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist to dry, grey brown, DENSE, intact, silty sand with some gravel and roots. Colluvium.

0.30 — Loosely packed, black, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, light grey brown, silty sand matrix (± 30%). Overall consistency is LOOSE. Ferricrete.

1.00 — Moist, orange to red brown, STIFF, intact,sandy clay with some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places with corestones and ferruginised gravel. Residual tillite.

1.50 — Completely to highly weathered, yellow brown, VERY SOFT to SOFT ROCK, fine grained tillite.

2.60 — Highy weathered, yellow brown, VERY SOFT to SOFT ROCK, fine grained tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 1.0--1.5 m (C-TP44/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291403
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/14/2019	*Y COORD:*	- 39845
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/14/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP44**

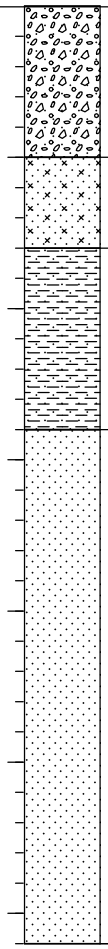
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Cato Ridge Land Development

HOLE No: **C- TP45**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, gery brown, DENSE, intact, silty sand with some gravel and roots. Colluvium.

0.50 Loosely packed, black, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, light grey brown, silty sand matrix (± 30%). Overall consistency is LOOSE. Ferricrete.

0.80 Moist, orange to red brown, STIFF, intact, sandy clay with some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places with corestones and ferruginised gravel. Residual tillite.

1.40 Completely to highly weathered, yellow brown, VERY SOFT ROCK, fine grained tillite. Contains occasional HARD ROCK corestones.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291499
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/14/2019	*Y COORD:*	- 39944
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/14/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP45**

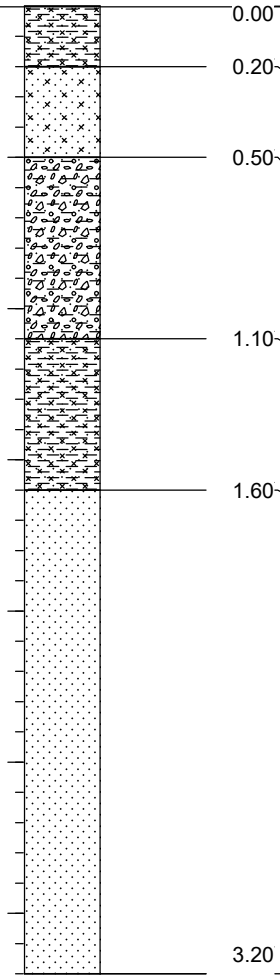
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Cato Ridge Land Development

HOLE No: **C- TP46**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, dark grey to black, SOFT, shattered, sandy silty clay with some gravel and roots. Colluvium.
0.20	Slightly moist to dry, light grey, LOOSE, Intact, silty sand containing abundant ferruginised gravel. Ferricrete.
0.50	Loosely packed, brown and black, sub-rounded to sub-angular, fine to coarse, ferruginised gravel in a moist, red brown, sandy clay matrix. Overall consistency is LOOSE. Pebble marker.
1.10	Moist, yellow to orange brown, stained black and red brown in places, FIRM, intact,sandy silty clay with some VERY SOFT to SOFT ROCK tillite fragments. Material is ferruginised in places. Residual tillite.
1.60	Completely to highly weathered, yellow brown, VERY SOFT to SOFT ROCK, fine grained tillite.
3.20	

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291678
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/14/2019	*Y COORD:*	- 39965
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/14/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP46**

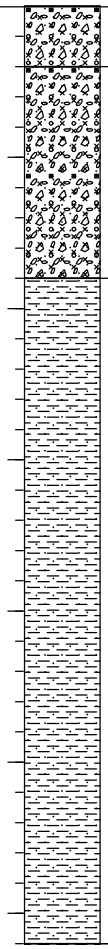
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Cato Ridge Land Development

HOLE No: **C- TP47**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, grey brown, SOFT, shattered, sandy silty clay with some gravel and roots. Colluvium.

0.20 Slightly moist to dry, grey brown, STIFF, shattered, sandy silty clay with some gravel. Colluvium.

0.90 Moist, orange brown stained black, STIFF, ntact, sandy clay containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291601
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/14/2019	*Y COORD:*	- 40132
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/14/2019		
	DURBAN-1ST.GPJ				

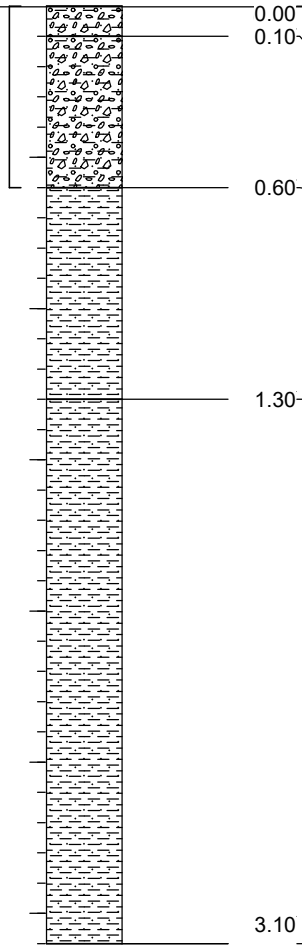
HOLE No: **C- TP47**

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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP48**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist to dry, grey brown, SOFT, shattered, sandy silty clay with some gravel and roots. Colluvium.

0.10 Slightly moist to dry, grey brown, STIFF, shattered, sandy silty clay with some gravel. Colluvium.

0.60 Loosely packed, dark red brown and black, sub-rounded to sub-angular, ferruginised gravel in a moist, yellow to orange brown, sandy clay matrix (± 40%). Overall consistency is DENSE. Ferricrete.

1.30 Moist, orange to red brown, STIFF, intact,sandy clay with some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR taken at 0--0.6 m (C-TP48/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291499
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/14/2019	*Y COORD:*	- 40135
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/14/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP48**

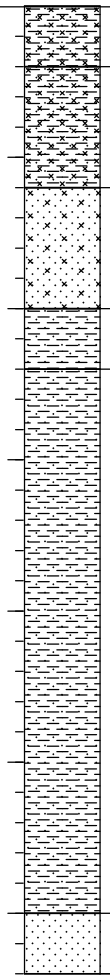
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP49**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, grey brown, SOFT, sandy silty clay with some gravel and roots. Colluvium.
0.20	Slightly moist to dry, grey brown, STIFF, micro-shattered, sandy silty clay. Colluvium.
0.60	Loosely packed, black, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, light grey brown, silty sand matrix (± 30%). Overall consistency is LOOSE. Ferricrete.
1.00	Loosely packed, dark red brown and black, sub-rounded to sub-angular, ferruginised gravel in a moist, yellow to orange brown, sandy clay matrix (± 30%). Overall consistency is DENSE. Ferricrete.
1.20	Moist, orange to red brown, STIFF, intact,sandy clay with some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.
3.00	Completely to highly weathered, yellow brown, VERY SOFT ROCK, fine grained tillite.
3.20	

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291401
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/14/2019	*Y COORD:*	- 40041
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/14/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP49**

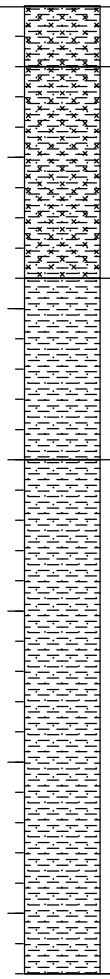
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Cato Ridge Land Development

HOLE No: **C- TP50**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, grey brown, SOFT, shattered, sandy silty clay with some gravel and roots. Colluvium.

0.20 Slightly moist to dry, grey brown, STIFF, shattered, sandy silty clay with some gravel. Colluvium.

0.90 Loosely packed, dark red brown and black, sub-rounded to sub-angular, ferruginised gravel in a moist, yellow to orange brown, sandy clay matrix (± 40%). Overall consistency is DENSE. Ferricrete.

1.50 Moist, orange to red brown, STIFF, intact, sandy clay with some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291402
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/14/2019	*Y COORD:*	- 40235
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/14/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP50**

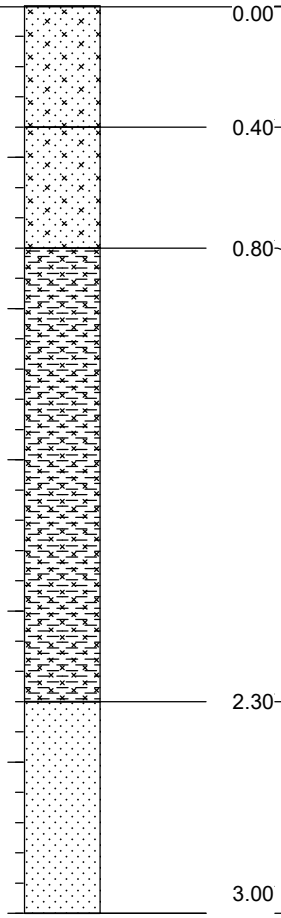
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP51**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, light grey brown, DENSE, intact, clayey silty sand with roots. Hillwash.

0.40 Tightly packed, red brown and black, sub-rounded and sub-angular, ferruginised gravel in a slightly moist, light grey brown, clayey silty sand matrix (± 10%). Overall consistency is DENSE. Ferricrete.

0.80 Slightly moist, yellow brown, STIFF, intact, sandy clayey SILT or sandy silty clay containing abundant VERY SOFT to SOFT ROCK fragments. Residual tillite.

2.30 Highly to completely weathered, yellow brown, VERY SOFT to SOFT ROCK, fine grained tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.4--0.8 m (C-TP51/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292003
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/21/2019	*Y COORD:*	- 40549
TYPE SET BY:	M Moromane	*DATE PROFILED:*	8/21/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP51**

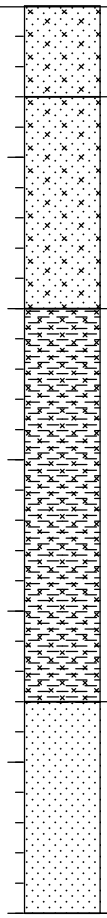
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP52**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, light grey brown, DENSE, intact, clayey silty sand with roots. Hillwash.
0.30	Tightly packed, red brown and black, sub-rounded and sub-angular, ferruginised gravel in a moist, orange to yellow brown stained black, clayey silty sand matrix (± 10%). Overall consistency is DENSE. Ferricrete.
1.00	Slightly moist, yellow brown, STIFF, intact, sandy clayey silt or sandy silty clay containing abundant VERY SOFT to SOFT ROCK fragments. Residual tillite.
2.30	Highly to completely weathered, yellow brown, VERY SOFT to SOFT ROCK, fine grained tillite.
3.00	

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292102
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/21/2019	*Y COORD:*	- 40549
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/21/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP52**

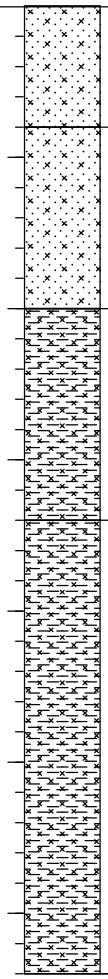
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP53**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, light grey brown, DENSE, intact, clayey silty sand with roots. Hillwash.

0.40 Tightly packed, red brown and black, sub-rounded and sub-angular, ferruginised gravel in a moist, orange to yellow brown stained black, clayey silty sand matrix (± 10%). Overall consistency is DENSE. Ferricrete.

1.00 Slightly moist, yellow brown, STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Residual tillite.

1.70 Slightly moist, yellow brown, STIFF, intact, sandy clayey silt or sandy silty clay containing abundant VERY SOFT to SOFT ROCK fragments. Completely weathered or residual tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292148
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/22/2019	*Y COORD:*	- 40678
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/22/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP53**

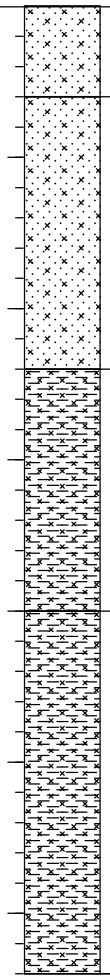
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP54**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to moist, light grey brown, DENSE, intact, clayey silty sand with roots. Hillwash.

0.30 Tightly packed, red brown and black, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, light grey brown, clayey silty sand matrix (± 10%). Overall consistency is DENSE. Ferricrete.

1.20 Slightly moist to moist, red and orange brown stained black, STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT fragments and material is ferruginised and contains occasional HARD ROCK corestones. Residual tillite.

2.00 Slightly moist to moist, yellow to orange brown stained black, STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments and material is ferruginised and contains occasional HARD ROCK corestones. Completely weathered or residual tillite.

Disturbed sample

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR samples atken at 2.0--3.2 m (C-TP54/1).

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 8/22/2019
DATE PROFILED: 8/22/2019

ELEVATION:
X COORD: - 3292299
Y COORD: - 40744

HOLE No: **C- TP54**

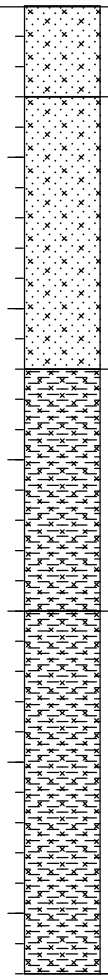
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP55**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to moist, light grey brown, DENSE, intact, clayey silty sand with roots. Hillwash.
0.30	Tightly packed, red brown and black, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, light grey brown, clayey silty sand matrix (± 10%). Overall consistency is DENSE. Ferricrete.
1.20	Slightly moist to moist, red and orange brown, stained black, STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT fragments and material is ferruginised and contains occasional HARD ROCK corestones. Residual tillite.
2.00	Slightly moist to moist, yellow to orange brown, stained black, FIRM to STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments and material is ferruginised and contains occasional HARD ROCK corestones. Completely weathered or residual tillite.
3.20	

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292515
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/22/2019	*Y COORD:*	- 40609
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/22/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP55**

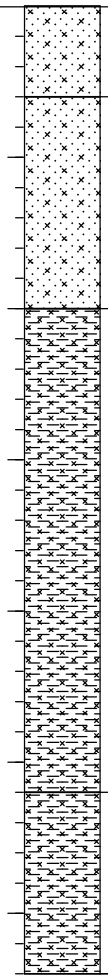
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP56**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to moist, light grey brown, DENSE, intact, clayey silty sand with roots. Hillwash.

0.30 Tightly packed, red brown and black, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, light grey brown, clayey silty sand matrix (± 10%). Overall consistency is DENSE. Ferricrete.

1.00 Slightly moist to moist, red and orange brown stained black, STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments and material is ferruginised and contains occasional HARD ROCK corestones. Residual tillite.

2.60 Slightly moist to moist, yellow to orange brown, stained black, FIRM to STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments and material is ferruginised and contains occasional HARD ROCK corestones. Completely weathered or residual tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292405
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/22/2019	*Y COORD:*	- 40825
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/22/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP56**

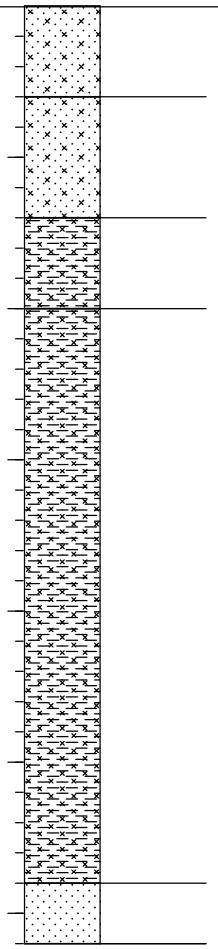
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP57**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to moist, light grey brown, DENSE, intact, clayey silty sand with roots. Hillwash.
0.30	Tightly packed, red brown and black, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, light grey brown, clayey silty sand matrix (± 10%). Overall consistency is DENSE. Ferricrete.
0.70	Slightly moist to moist, orange to red brown stained black, STIFF, intact, sandy clayey silt or sandy silty clay with some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.
1.00	Slightly moist to moist, yellow brown stained black, STIFF, intact, sandy clayey silt or sandy silty clay with some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Completely weathered or residual tillite.
2.90	Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.
3.10	

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 8/22/2019
DATE PROFILED: 8/22/2019

ELEVATION:
X COORD: - 3292553
Y COORD: - 40975

HOLE No: **C- TP57**

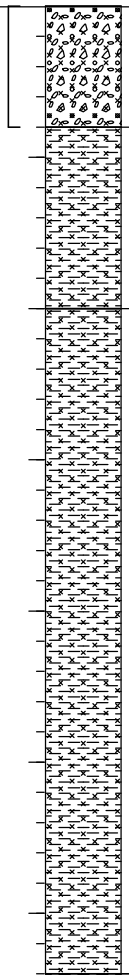
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Cato Ridge Land Development

HOLE No: **C- TP58**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25
Disturbed sample



0.00 Slightly moist to dry, brown, DENSE, intact, gravelly silty sand with abundant roots. Hillwash.

0.40 Tightly packed, black and red brown, subrounded to sub-angular, fine to coarse, ferruginised gravel and occasional cobbles in a moist, red brown, silty clay matrix (± 20%). Overall consistency is DENSE. Ferricrete.

1.00 Slightly moist to moist, orange to red brown stained black, STIFF, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised. Residual tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0--0.4 m (C-TP58/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292297
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/22/2019	*Y COORD:*	- 40941
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/22/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP58**

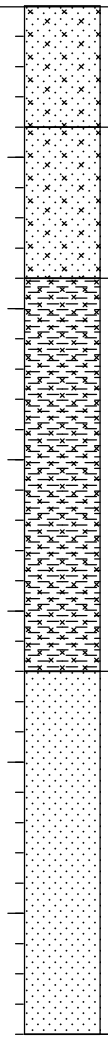
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP59**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.40	Moist, brown, MEDIUM DENSE, silty fine sand with some ferruginised gravel. Hillwash.
0.90	Slightly moist to moist, orange to red brown stained black, FIRM to STIFF, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised. Residual tillite.
2.20	Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.
3.40	

NOTES:

No refusal - pit stopped at 3.4 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292146
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/22/2019	*Y COORD:*	- 40941
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/22/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP59**

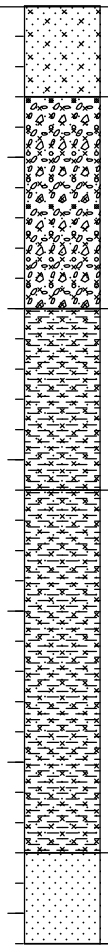
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Cato Ridge Land Development

HOLE No: **C- TP60**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, grey brown, intact, silty fine sand with roots. Hillwash.
0.30	Loosely packed, black and brown, sub-rounded to rounded, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 40%). Overall consistency is LOOSE. Ferricrete.
1.00	Slightly moist to moist, orange to red brown stained black, FIRM, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised. Residual tillite.
1.60	Slightly moist to moist, yellow brown stained black, STIFF, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised. Completely weathered or residual tillite.
2.80	Highly to completely weathered, yellow brown, VERY SOFT to SOFT ROCK, fine grained tillite.
3.10	

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292001
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/22/2019	*Y COORD:*	- 40743
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/22/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP60**

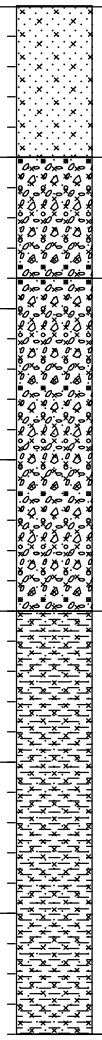
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP61**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



Disturbed sample

0.00 Slightly moist to dry, grey brown, DENSE, silty fine sand with roots. Hillwash.

0.50 Tightly packed, black and brown, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, light grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.90 Tightly packed, black and brown, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, light grey brown, silty sand matrix (± 10%). Overall consistency is DENSE. Ferricrete.

2.00 Slightly moist to moist, orange to red brown stained black, STIFF, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised. Residual tillite.

3.40

NOTES:

No refusal - pit stopped at 3.4 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.9--2.0 m (C-TP61/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291807
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/22/2019	*Y COORD:*	- 40741
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/22/2019		
	DURBAN-1ST.GPJ				

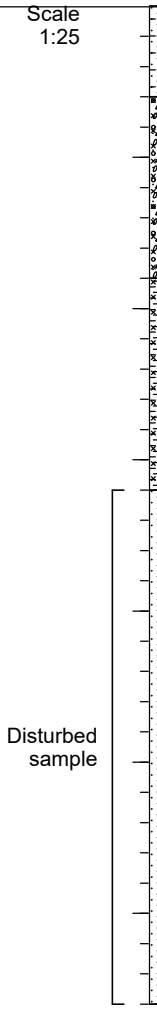
HOLE No: **C- TP61**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP62**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist to dry, brown, DENSE, intact, clayey sand with roots. Hillwash.

0.30 — Tightly packed, black and brown, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown to orange brown, silty sand matrix (± 20%) with some sub-rounded cobbles. Overall consistency is DENSE. Ferricrete.

0.90 — Slightly moist, yellow and grey brown, FIRM to STIFF, intact, sandy clayey silt or sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments. Residual tillite.

1.60 — Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.

3.30

NOTES:

No refusal - pit stopped at 3.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 1.6--3.3 m (C-TP62/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291706
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/23/2019	*Y COORD:*	- 40843
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/23/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP62**

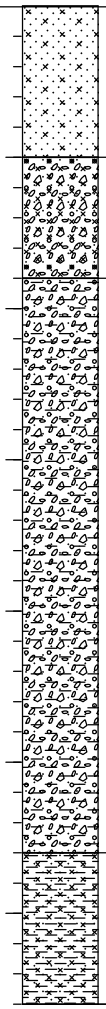
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP63**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.50 Tightly packed, black and brown, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.90 Tightly packed, black and red brown, sub-rounded to sub-angular, ferruginised gravel in a moist, red brown sandy clay matrix (± 10%). Overall consistency is DENSE. Ferricrete.

2.80 Slightly moist to moist, orange to red brown stained black, STIFF, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised. Residual tillite.

3.30

NOTES:

No refusal - pit stopped at 3.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291903
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/23/2019	*Y COORD:*	- 40851
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/23/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP63**

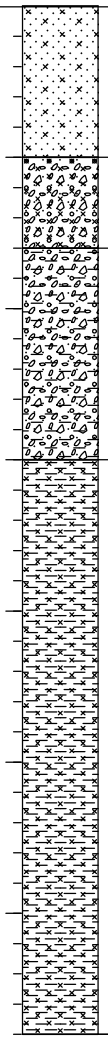
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP64**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.50 Tightly packed, black and brown, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferruginised.

0.80 Tightly packed, black and red brown, sub-rounded to sub-angular, ferruginised gravel in a moist, red brown sandy clay matrix (± 10%). Overall consistency is DENSE. Ferruginised.

1.50 Slightly moist to moist, orange to red brown stained black, STIFF, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised. Residual tillite.

3.40

NOTES:

No refusal - pit stopped at 3.4 m.
No groundwater or seepage encountered.
Sidewalls stable.
No sample taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291805
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/23/2019	*Y COORD:*	- 40948
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/23/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP64**

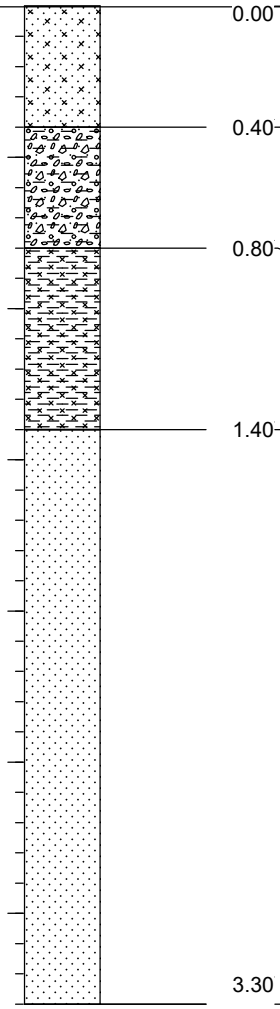
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP65**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.40 Tightly packed, black and red brown, sub-rounded to sub-angular, ferruginised gravel in a moist, red brown sandy clay matrix (± 10%). Overall consistency is DENSE. Ferruginised.

0.80 Slightly moist to moist, yellow brown stained, STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Residual tillite.

1.40 Completely to highly weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.

3.30

NOTES:

No refusal - pit stopped at 3.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292008
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/23/2019	*Y COORD:*	- 41009
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/23/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP65**

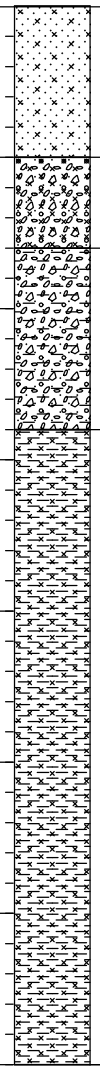
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP66**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.50	Tightly packed, black and brown, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.
0.80	Tightly packed, black and red brown, sub-rounded to sub-angular, ferruginised gravel in a moist, red brown sandy clay matrix (± 10%). Overall consistency is DENSE. Ferricrete.
1.40	Slightly moist to moist, orange to red brown stained black, STIFF, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised. Residual tillite.
3.50	

Disturbed sample

NOTES:

No refusal - pit stopped at 3.5 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 3.0--3.5 m (C-TP66/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291999
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/23/2019	*Y COORD:*	- 41146
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/23/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP66**

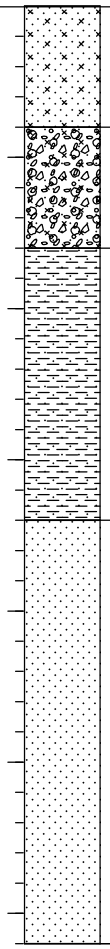
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP67**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.40 Loosely packed, black and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and occasional cobbles in a slightly moist, grey brown, silty clay matrix (± 40%). Overall consistency is LOOSE. Ferricrete.

0.80 Moist, orange to red brown stained black, FIRM to STIFF, intact, sandy clayey silt or sandy silty clay with some VERY SOFT to VERY SOFT ROCK fragments. Material is ferruginised. Residual tillite.

1.70 Highly to Completely weathered, orange brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 8/26/2019
DATE PROFILED: 8/26/2019

ELEVATION:
X COORD: - 3291808
Y COORD: - 41133

HOLE No: **C- TP67**

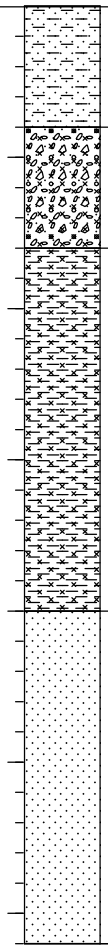
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP68**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, brown, DENSE, intact, clayey sand with roots. Hillwash.

0.40 Tightly packed, black and brown, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown to orange brown, silty sand matrix (± 20%) with some sub-rounded cobbles. Overall consistency is DENSE. Ferricrete.

0.80 Slightly moist, yellow and grey brown, FIRM to STIFF, intact, sandy clayey silt or sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments. Residual tillite.

2.00 Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291651
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/26/2019	*Y COORD:*	- 41037
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/26/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP68**

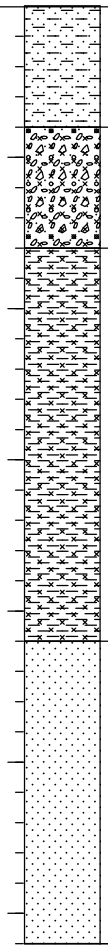
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP69**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, brown, DENSE, intact, clayey sand with roots. Hillwash.

0.40 Tightly packed, black and brown, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown to orange brown, silty sand matrix (± 20%) with some sub-rounded cobbles. Overall consistency is DENSE. Ferricrete.

0.80 Slightly moist, yellow and grey brown, FIRM to STIFF, intact, sandy clayey silt or sandy silty clay with occasional VERY SOFT to SOFT ROCK fragments. Residual tillite.

2.10 Highly to completely weathered, brown, VERY SOFT to SOFT ROCK, fine grained tillite.

3.10

NOTES:

Refusal at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291532
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/26/2019	*Y COORD:*	- 41282
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/26/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP69**

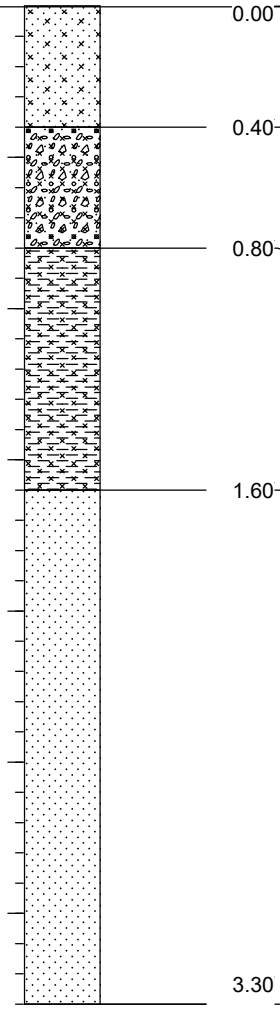
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP70**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.40 Tightly packed, black and red brown, sub-rounded to sub-angular, ferruginised gravel and some cobbles in a slightly moist, grey brown silty sand matrix (± 40%). Overall consistency is DENSE. Ferricrete.

0.80 Slightly moist, yellow brown stained black, STIFF, intact, sandy clayey silt or sandy silty clay containing abundant VERY SOFT to SOFT ROCK fragments. Residual tillite or completely weathered tillite.

1.60 Highly weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.

3.30

NOTES:

No refusal- pit stopped at 3.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292003
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/23/2019	*Y COORD:*	- 41337
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/23/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP70**

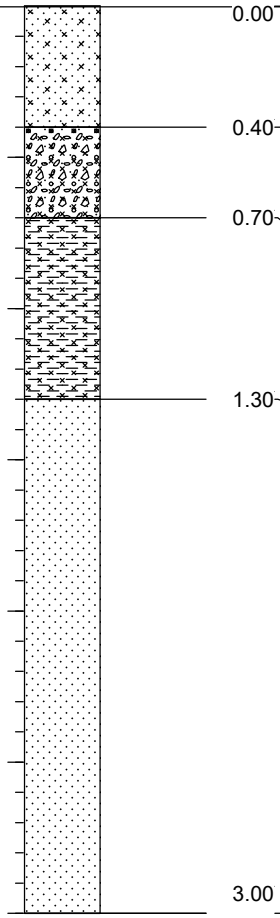
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP71**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.40	Tightly packed, black and red brown, sub-rounded to sub-angular, ferruginised gravel and some cobbles in a slightly moist, grey brown silty sand matrix (± 10%). Overall consistency is DENSE. Ferricrete.
0.70	Slightly moist, yellow brown stained black, STIFF, intact, sandy clayey silt or sandy silty clay containing abundant VERY SOFT to SOFT ROCK fragments. Residual tillite or completely weathered tillite.
1.30	Highly weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.
3.00	

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 8/23/2019
DATE PROFILED: 8/23/2019

ELEVATION:
X COORD: - 3291902
Y COORD: - 41434

HOLE No: **C- TP71**

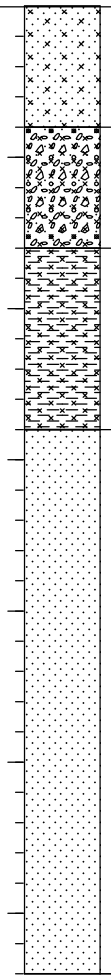
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP72**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.40 Tightly packed, black and brown, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.80 Slightly moist, orange to red brown stained black, STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.

1.40 Highly weathered, yellow brown and grey stained black and red brown, SOFT ROCK to VERY SOFT ROCK, fine grained tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3292004
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/23/2019	*Y COORD:*	- 41530
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/23/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP72**

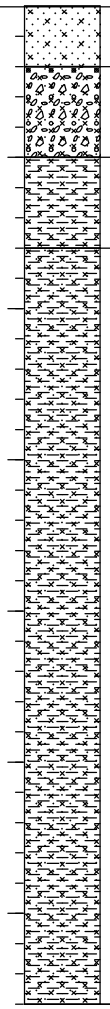
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP73**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.20	Tightly packed, black and brown, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.
0.50	Slightly moist, orange to red brown stained black, STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.
0.80	Slightly moist to moist, orange brown, stained black, FIRM to STIFF, intact, sandy clayey silt or sandy silt clay containing VERY SOFT to SOFT ROCK fragments. Residual tillite.
3.30	

NOTES:

No refusal - pit stopped at 3.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 8/27/2019
DATE PROFILED: 8/27/2019

ELEVATION:
X COORD: - 3291996
Y COORD: - 41925

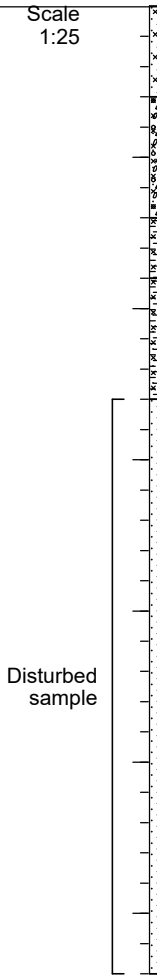
HOLE No: **C- TP73**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP74**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00	Slightly moist to dry, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.30	Tightly packed, black and brown, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.
0.70	Slightly moist, orange to red brown stained black, STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.
0.90	Slightly moist to moist, orange brown, stained black, FIRM to STIFF, intact, sandy clayey silt or sandy silt clay containing VERY SOFT to SOFT ROCK fragments. Residual tillite.
1.30	Highly to completely wethered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.
3.20	

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 1.30--3.20 m (C-TP74/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291799
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/27/2019	*Y COORD:*	- 41921
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/27/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP74**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP75**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist, grey brown, STIFF, intact, gravelly sandy clay with roots. Colluvium or Hillwash.

0.40 — Loosely packed, black, fine to coarse, sub-rounded, ferruginised gravel in a moist, red brown, silty clay matrix (± 30%). Overall consistency is MEDIUM DENSE. Ferricrete.

1.30 — Moist, dark red brown stained black, FIRM, sandy silty clay or sandy clayey silt. Material is ferruginised in places. Residual tillite.

2.10 — Moist, yellow to orange brown, SOFT, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT ROCK fragments. Residual tillite or completely weathered tillite.

3.30

NOTES:

No refusal - pit stopped at 3.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 2.10--3.30 m (C-TP75/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291798
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/27/2019	*Y COORD:*	- 41724
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/27/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP75**

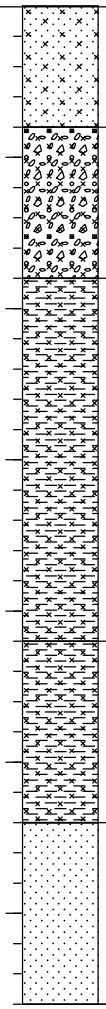
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP76**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.40	Loosely packed, black, fine to coarse, sub-rounded, ferruginised gravel in a moist, red brown, silty clay matrix (± 40%). Overall consistency is MEDIUM DENSE. Ferricrete.
0.90	Moist, dark red brown stained black, FIRM, sandy silty clay or sandy clayey silt. Material is ferruginised in places. Residual tillite.
2.10	Slightly moist to moist, yellow to orange brown, SOFT, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT ROCK fragments. Residual tillite.
2.70	Completely to highly weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.
3.30	

NOTES:

No refusal - pit stopped at 3.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 8/27/2019
DATE PROFILED: 8/27/2019

ELEVATION:
X COORD: - 3291650
Y COORD: - 41521

HOLE No: **C- TP76**

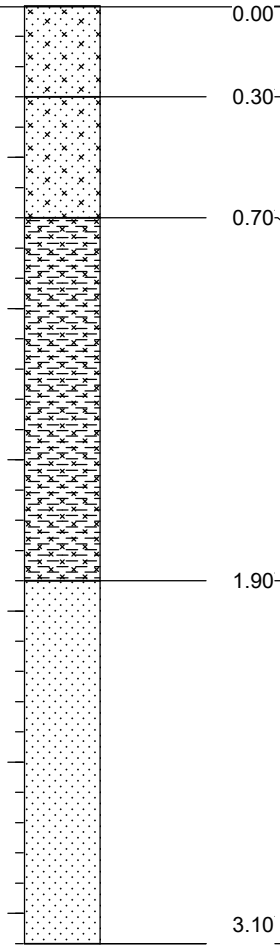
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP77**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.30 Tightly packed, black and brown, fine to coarse, sub-rounded and sub-angular, ferruginised gravel in a slightly moist, light grey and grey brown silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.70 Slightly moist to moist, orange to red brown, FIRM to STIFF, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.

1.90 Completely to highly weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291650
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/27/2019	*Y COORD:*	- 41736
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/27/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP77**

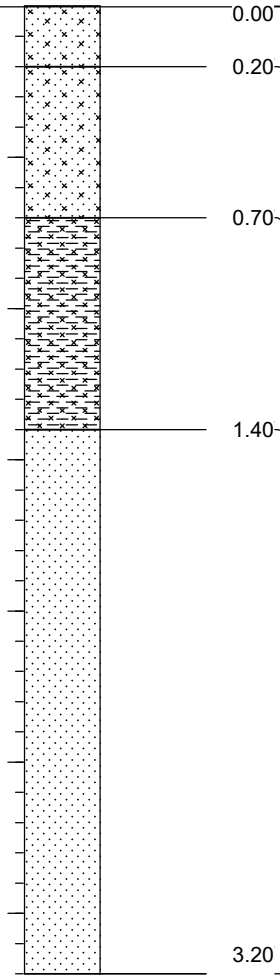
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP78**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.20	Tightly packed, black and red brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist light grey brown and grey brown, silty sand matrix (± 15%). Overall consistency is DENSE. Ferricrete.
0.70	Slightly moist, orange to red brown, blotched yellow and stained black, STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.
1.40	Highly weathered, yellow brown stained black and red brown SOFT to VERY SOFT ROCK, fine grained tillite.
3.20	

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291468
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/27/2019	*Y COORD:*	- 41667
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/27/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP78**

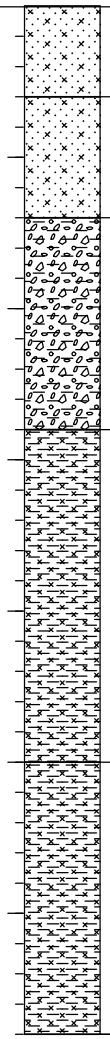
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP79**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, intact, silty fine sand with roots. Hillwash.
0.30	Tightly packed, black and brown, fine to coarse, sub-rounded, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 10%). Overall consistency is DENSE. Ferricrete.
0.70	Loosely packed, black, fine to coarse, sub-rounded, ferruginised gravel in a moist, red brown, silty clay matrix (± 30%). Overall consistency is MEDIUM DENSE. Ferricrete.
1.40	Moist, dark red brown stained black, FIRM, sandy silty clay or sandy clayey silt. Material is ferruginised in places. Residual tillite.
2.50	Moist, yellow to orange brown, SOFT, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT ROCK fragments. Residual tillite.
3.40	

NOTES:

No refusal - pit stopped at 3.4 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291496
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/27/2019	*Y COORD:*	- 41527
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/27/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP79**

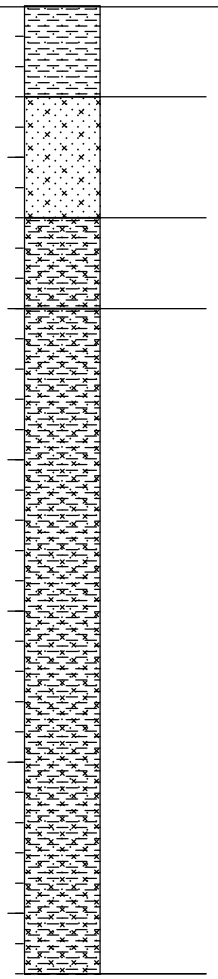
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP80**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, STIFF, intact, gravelly sandy clay with roots. Hillwash.
0.30	Tightly packed, black and orange brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a silty sand matrix (± 15%). Overall consistency is DENSE. Ferricrete.
0.70	Slightly moist to moist, grey and yellow red brown, FIRM, intact, sandy silty clay or sandy clayey silt containing some ferruginised gravel. Residual tillite.
1.00	Slightly moist to moist, yellow brown stained black and red brown, FIRM, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Residual tillite.
3.20	

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291302
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/27/2019	*Y COORD:*	- 41530
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/27/2019		
	DURBAN-1ST.GPJ				

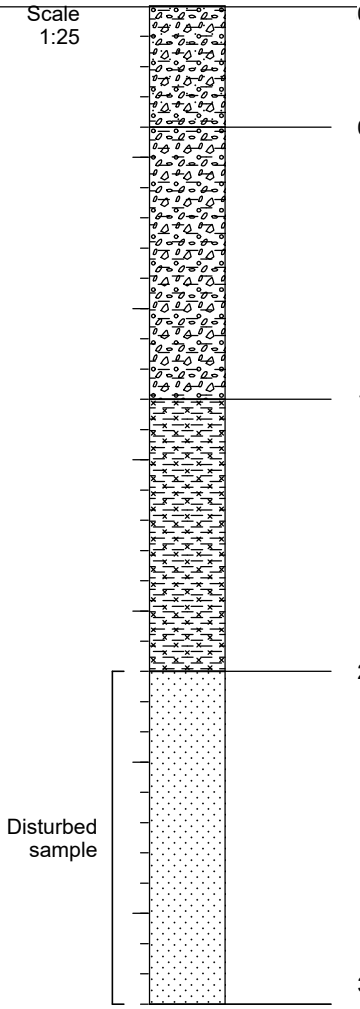
HOLE No: **C- TP80**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP81**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist, grey brown, STIFF, intact, gravelly sandy clay with roots. Hillwash.

0.40 — Loosely packed, black, fine to coarse, sub-rounded, ferruginised gravel in a moist, red brown, silty clay matrix (± 40%). Overall consistency is MEDIUM DENSE. Ferricrete.

1.30 — Moist, dark red brown stained black, FIRM, sandy silty clay or sandy clayey silt. Material is ferruginised in places. Residual tillite.

2.20 — Highly weathered, olive grey, SOFT to VERY SOFT ROCK, fine grained tillite.

3.30

NOTES:

No refusal - pit stopped at 3.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR samples taken at 2.2--3.3 m (C-TP81/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291296
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/27/2019	*Y COORD:*	- 41737
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/27/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP81**

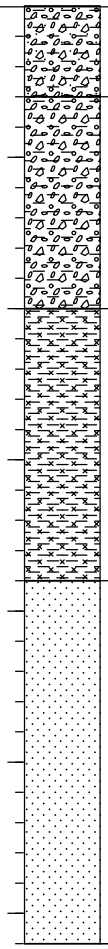
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP82**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, STIFF, intact, gravelly sandy clay with roots. Hillwash.

0.30 Loosely packed, black, fine to coarse, sub-rounded, ferruginised gravel in a moist, red brown, silty clay matrix (± 40%). Overall consistency is MEDIUM DENSE. Ferricrete.

1.00 Moist, dark red brown stained black, FIRM, sandy silty clay or sandy clayey silt. Material is ferruginised in places. Residual tillite.

1.90 Highly weathered, olive grey, SOFT to VERY SOFT ROCK, fine grained tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291075
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/27/2019	*Y COORD:*	- 41788
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/27/2019		
	DURBAN-1ST.GPJ				

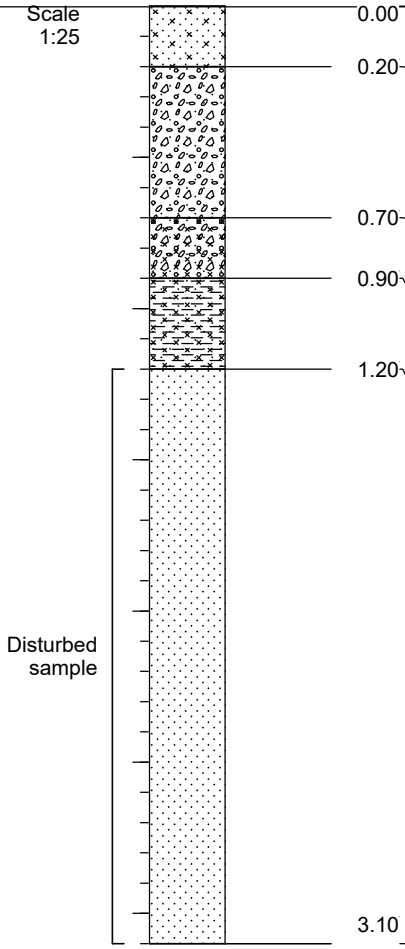
HOLE No: **C- TP82**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP83**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00	Slightly moist to dry, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.20	Tightly packed, red brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, yellow to red brown, sandy clay matrix (± 10%). Overall consistency is DENSE. Ferricrete.
0.70	Tightly packed, red brown and brown, medium to coarse, generally sub-angular (platy), HARD ROCK, ferruginised gravel in a slightly moist, light grey, sandy silt matrix (± 5%). Overall consistency is DENSE. Ferricrete.
0.90	Slightly moist, red brown blotched grey and stained black, STIFF, intact, sandy silty clay or sandy clayey silt. Residual tillite.
1.20	Highly to moderately weathered, grey stained orange brown, SOFT ROCK to VERY SOFT ROCK, fine grained tillite.
3.10	

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR samples taken at 1.2--3.1 m (C-TP83/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290800
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/28/2019	*Y COORD:*	- 41629
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/28/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP83**

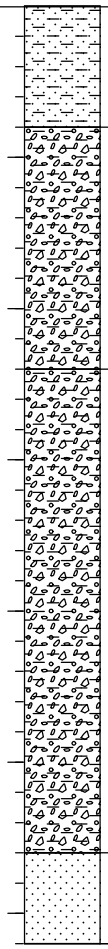
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP84**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, DENSE, intact,clayey sand with roots. Hillwash.
0.40	Tightly packed, red brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a moist, red brown, sandy silty clay matrix (± 30%). Overall consistency is MEDIUM DENSE. Ferricrete.
1.20	Slightly moist, orange to yellow brown stained red brown and black, FIRM, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.
2.80	Completely to highly weathered, yellow brown, stained red brown and black, VERY SOFT to SOFT ROCK, fine grained tillite.
3.10	

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290624
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/28/2019	*Y COORD:*	- 41479
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/28/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP84**

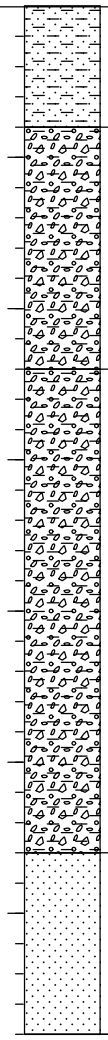
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP85**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, DENSE, intact,clayey sand with roots. Hillwash.
0.40	Tightly packed, red brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a moist, red brown, sandy silty clay matrix (± 30%). Overall consistency is MEDIUM DENSE. Ferricrete.
1.20	Slightly moist, orange to yellow brown, stained red brown and black, FIRM, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.
2.80	Completely to highly weathered, yellow brown, stained red brown and black, VERY SOFT to SOFT ROCK, fine grained tillite.
3.40	

NOTES:

No refusal - pit stopped at 3.4 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290799
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/28/2019	*Y COORD:*	- 41441
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/28/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP85**

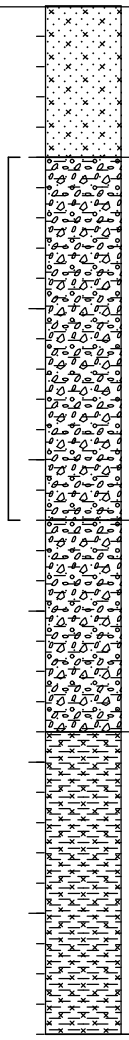
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP86**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, light grey brown, intact, silty fine sand with roots. Hillwash.

0.50 Tightly packed, black and red brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist to moist, orange brown, sandy clay matrix (± 10-20%). Overall consistency is DENSE. Ferricrete.

1.70 Tightly packed, black and red brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist to moist, dark red brown, sandy clay matrix (± 20%). Overall consistency is DENSE. Ferricrete.

2.40 Moist, red and orange brown, STIFF, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Residual tillite.

3.40

NOTES:

No refusal - pit stopped at 3.4 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR samples taken at 0.5--1.7 m (C-TP86/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291006
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/28/2019	*Y COORD:*	- 41437
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/28/2019		
	DURBAN-1ST.GPJ				

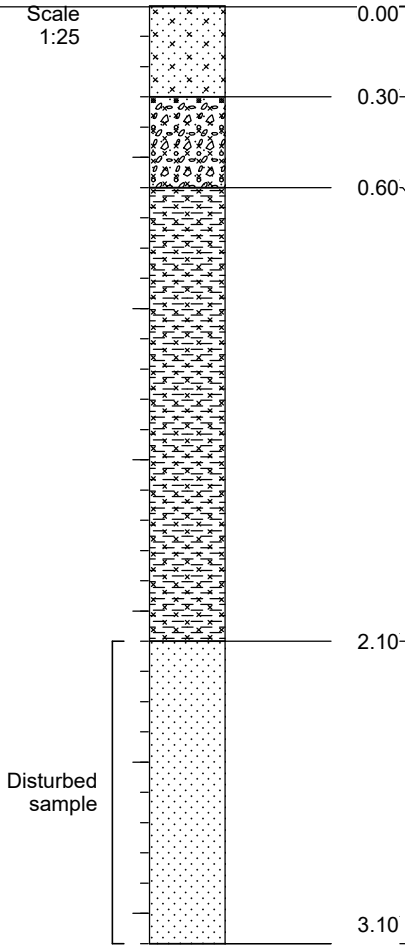
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Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP87**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist to dry, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.30 Loosely packed, black and brown, fine to coarse, sub-angular and sub-rounded, ferruginised gravel and some cobbles in a slightly moist, grey brown, silty sand matrix (± 40%). Overall consistency is DENSE. Ferricrete.

0.60 Slightly moist, yellow brown stained black and red brown, FIRM to STIFF, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Residual tillite.

2.10 Highly to completely weathered, yellow to orange brown, VERY SOFT to SOFT ROCK, fine grained tillite. Material contains some hard rock corestones in places.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 2.1--3.10 m (C-TP87/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291350
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/26/2019	*Y COORD:*	- 41296
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/26/2019		
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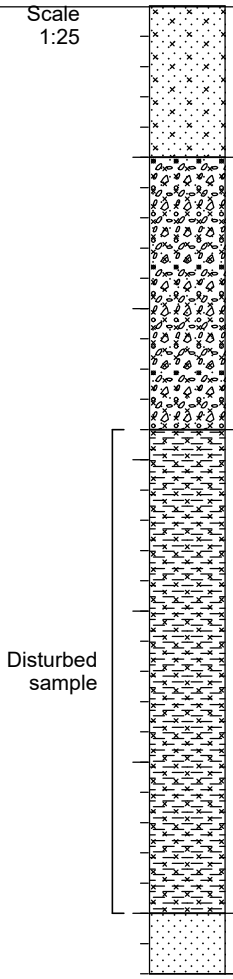
HOLE No: **C- TP87**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP88**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.50 — Loosely packed, black and red brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 30%). Overall consistency is MEDIUM DENSE. Ferricrete.

1.40 — Moist, orange to red brown and yellow brown stained black, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.

3.00 — Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 1.4--3.0 m (C-TP88/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291199
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/26/2019	*Y COORD:*	- 41294
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/26/2019		
	DURBAN-1ST.GPJ				

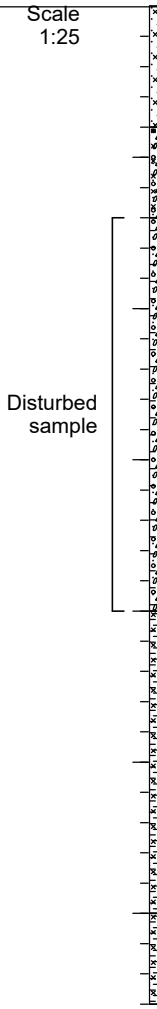
HOLE No: **C- TP88**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP89**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist to dry, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.40 — Tightly packed, black and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and some cobbles in a slightly moist, grey brown silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.70 — Tightly packed, black and red brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a moist, orange to red brown, sandy clay matrix (± 10%). Overall consistency is DENSE. Ferricrete.

2.00 — Moist, orange to red brown stained black, FIRM, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.

3.00 — Moist, orange to yellow brown stained black, FIRM, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.

3.30

NOTES:

No refusal - pit stopped at 3.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.7--2.0 m (C-TP89/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291103
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/26/2019	*Y COORD:*	- 41141
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/26/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP89**

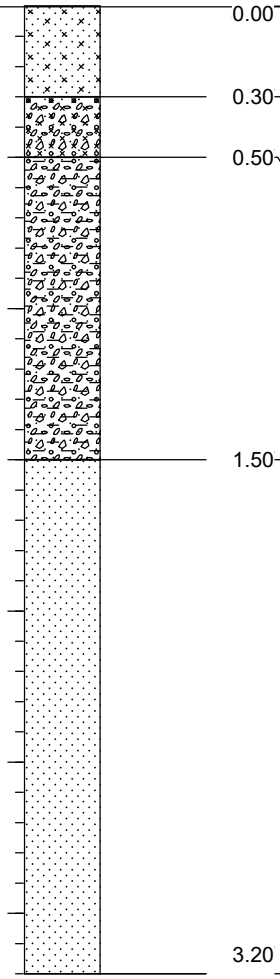
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Cato Ridge Land Development

HOLE No: **C- TP90**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, DENSE, intact, silty fine sand with some gravel and roots. Hillwash.
0.30	Tightly packed, black and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and some cobbles in a slightly moist, light grey brown, silty sand matrix (± 20%). Overall consitency is DENSE. Ferricrete.
0.50	Slightly moist, yellow brown and dark grey, STIFF, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Residual tillite.
1.50	Completely to highly weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.
3.20	

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291002
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/28/2019	*Y COORD:*	- 41292
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/28/2019		
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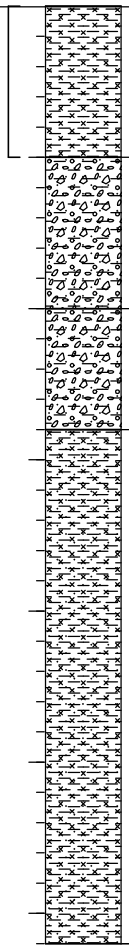
HOLE No: **C- TP90**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP91**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, dark brown, STIFF, micro-shattered, sandy silty clay with roots. Hillwash.

0.50 Tightly packed, red brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist to moist, orange brown, sandy clay matrix (± 10-20%). Overall consistency is DENSE. Ferricrete.

1.00 Tightly packed, red brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist to moist, dark red brown, sandy clay matrix (± 20%). Overall consistency is DENSE. Ferricrete.

1.40 Moist, red and orange brown, STIFF, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Residual tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0--0.5 m (C-TP91/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290805
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/28/2019	*Y COORD:*	- 41290
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/28/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP91**

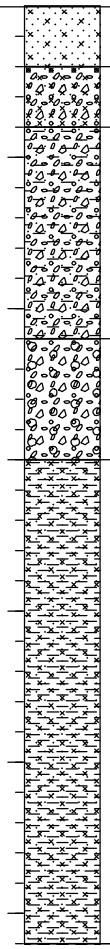
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP92**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.20	Loosely packed, black and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 40%). Overall consistency is LOOSE. Ferricrete.
0.40	Tightly packed, red brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist to moist, red brown, sandy clay matrix (± 10%). Overall consistency is DENSE. Ferricrete.
1.10	Loosely packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel. Overall consistency is LOOSE. No fines noted. Containing occasional cobbles. Ferricrete.
1.50	Moist, yellow to orange brown blotched red brown and stained black, FIRM, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.
3.10	

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290697
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/29/2019	*Y COORD:*	- 41231
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/29/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP92**

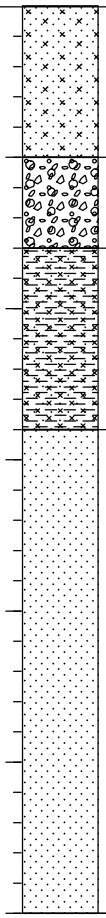
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Cato Ridge Land Development

HOLE No: **C- TP93**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, DENSE, intact, silty fine sand with some gravel and roots. Hillwash.

0.50 Tightly packed, black and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and some cobbles in a slightly moist, light grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.80 Slightly moist, yellow brown and dark grey, STIFF, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Residual tillite.

1.40 Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290900
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/28/2019	*Y COORD:*	- 41145
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/28/2019		
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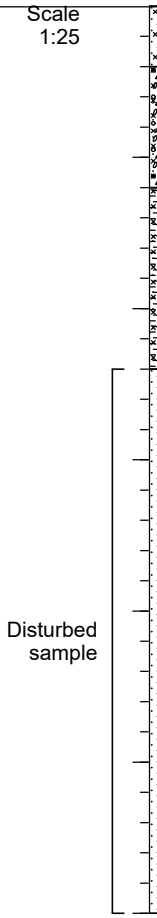
HOLE No: **C- TP93**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP94**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.20 Tightly packed, black and brown, fine to coarse, sub-rounded and sub-angular, ferruginised gravel in a slightly moist, light grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.60 Slightly moist, yellow brown blotched grey and red brown and stained black, STIFF, intact, sandy silty clay. Material is ferruginised in places. Residual tillite.

1.20 Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK (Also contains some hard rock corestones), fine grained tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 1.20--3.0 m (C-TP94/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290798
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/29/2019	*Y COORD:*	- 41043
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/29/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP94**

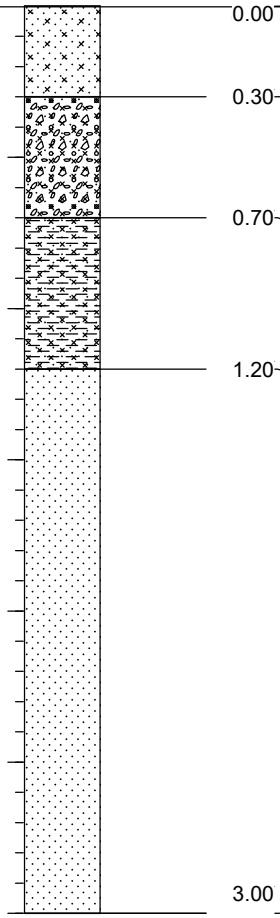
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Cato Ridge Land Development

HOLE No: **C- TP95**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.30 Tightly packed, black and brown, fine to coarse, sub-rounded and sub-angular, ferruginised gravel in a slightly moist, light grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.70 Slightly moist, yellow brown blotched grey and red brown and stained black, STIFF, intact, sandy silty clay or sandy clayey silt. Material is ferruginised in places. Residual tillite.

1.20 Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK (Also contains some hard rock corestones), fine grained tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290850
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/29/2019	*Y COORD:*	- 40906
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/29/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP95**

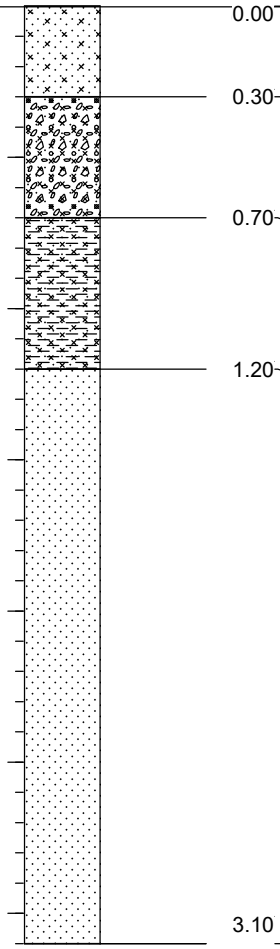
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Cato Ridge Land Development

HOLE No: **C- TP96**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.30 Tightly packed, black and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, light grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.70 Slightly moist, dark red brown and orange brown stained black, STIFF, intact, sandy silty clay or sandy clayey silt with some VERY SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.

1.20 Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291004
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/28/2019	*Y COORD:*	- 40841
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/28/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP96**

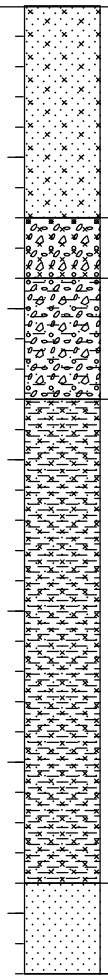
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Cato Ridge Land Development

HOLE No: **C- TP97**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.70	Tightly packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and some cobbles in a slightly moist, grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.
0.90	
1.30	Tightly packed, red brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a moist, orange to red brown, sandy clay matrix (± 10%). Overall consistency is DENSE. Ferricrete.
	Moist, orange to red brown stained black, FIRM, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Material is ferrugnised in places. Residual tillite.
2.90	Highly to completely weathered, yellow to orange brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.
3.20	

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291097
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/26/2019	*Y COORD:*	- 40983
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/26/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP97**

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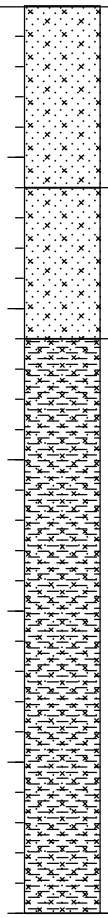
aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP98**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25

Disturbed sample



0.00 Slightly moist, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.60 Moist, brown, LOOSE, intact, silty fine sand. Hillwash.

1.10 Moist, dark red brown and yellow to orange brown blotched grey, STIFF, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT ROCK fragments. Material ferruginised in places. Residual tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0--0.6 m (C-TP98/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291198
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/28/2019	*Y COORD:*	- 40840
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/28/2019		
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HOLE No: **C- TP98**

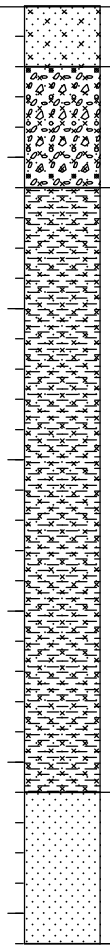
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Cato Ridge Land Development

HOLE No: **C- TP99**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, DENSE, intact, silty fine sand with some gravel and roots. Hillwash.
0.20	Tightly packed, black and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 15%). Overall consistency is DENSE. Ferricrete.
0.60	Slightly moist, orange to red brown stained black, STIFF, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.
2.60	Completely to highly weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.
3.10	

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291303
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/28/2019	*Y COORD:*	- 40998
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/28/2019		
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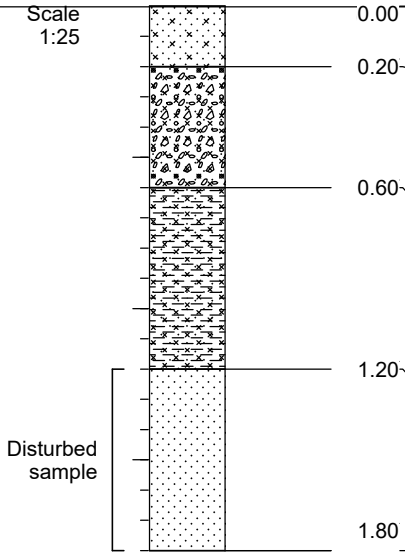
HOLE No: **C- TP99**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP100**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00	Slightly moist, lightly grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.20	Tightly packed, black and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and some cobbles in a slightly moist, light grey brown, silty sand matrix. Overall consistency is DENSE. Ferricrete.
0.60	Slightly moist, orange to red brown blotched grey and stained black, STIFF, intact, sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.
1.20	Highly weathered, brown to yellow brown, VERY SOFT to SOFT ROCK, fine grained tillite.
1.80	

NOTES:

Refusal at 1.8 m on soft to medium hard tillite..
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 1.20--1.80 m.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291353
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/28/2019	*Y COORD:*	- 41143
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/28/2019		
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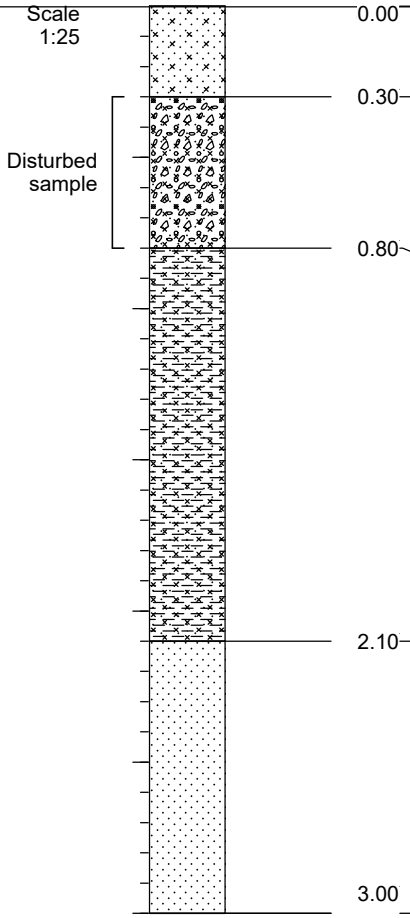
HOLE No: **C- TP100**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP101**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist, lightly grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.30 — Tightly packed, black and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 20%). Overall consistency is MEDIUM DENSE to DENSE. Ferricrete.

0.80 — Slightly moist, orange brown blotched red brown and stained black in places, FIRM, intact, sandy silty clay or sandy clayey silt. Material is ferruginised in places. Residual tillite.

2.10 — Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK, fine grained tillite.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.3--0.8 m (C-TP101/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291603
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/29/2019	*Y COORD:*	- 40637
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/29/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP101**

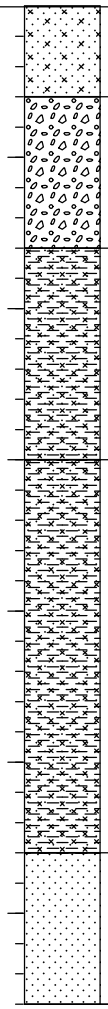
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Cato Ridge Land Development

HOLE No: **C- TP102**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.30	Tightly packed, orange brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown matrix (± 20%). Overall consistency is DENSE. Ferricrete.
0.80	Slightly moist, yellow to orange brown blotched grey and black, FIRM to STIFF, intact, sandy silty clay or sandy clayey silt. Material is ferruginised in places. Residual tillite.
1.50	Slightly moist, yellow brown stained black, STIFF, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Residual tillite.
2.80	Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK fragments, fine grained tillite.
3.30	

NOTES:

No refusal - pit stopped at 3.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291695
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/30/2019	*Y COORD:*	- 40542
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/30/2019		
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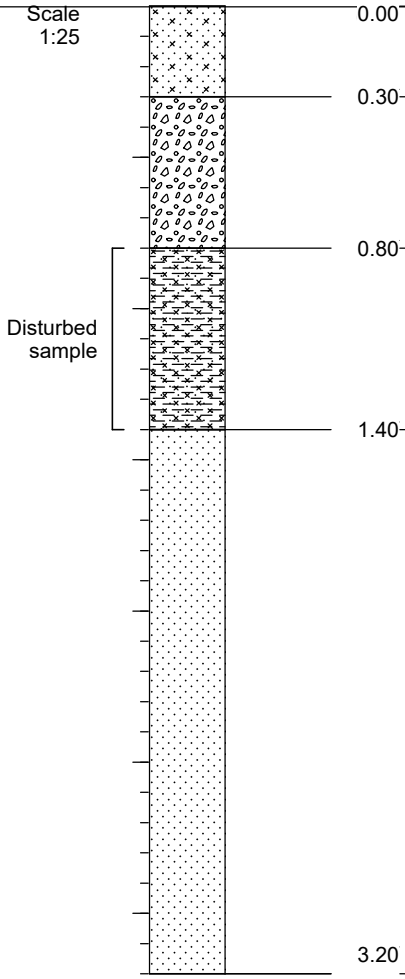
HOLE No: **C- TP102**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP103**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.30 Tightly packed, orange brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.80 Slightly moist, yellow to orange brown blotched grey and black, FIRM to STIFF, intact, sandy silty clay or sandy clayey silt. Material is ferruginised in places. Residual tillite.

1.40 Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK fragments, fine grained tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0.8--1.4 m (C-TP103/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291797
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/30/2019	*Y COORD:*	- 40443
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/30/2019		
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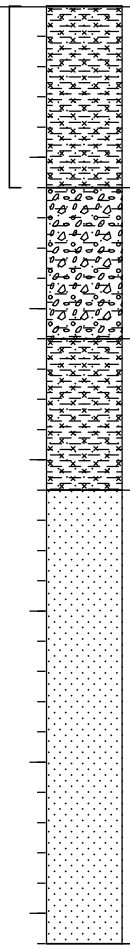
HOLE No: **C- TP103**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP104**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Dry, dark grey brown, STIFF, intact, sandy silty clay with roots. Hillwash.

0.60 Tightly packed, brown, red brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, yellow to orange brown, sandy clay matrix (± 30%). Overall consistency is DENSE. Ferricrete.

1.10 Slightly moist, yellow to orange brown blotched black, intact, sandy silty clay or sandy clayey silt. Material is ferruginised in places. Residual tillite.

1.60 Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK fragments, fine grained tillite.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0--0.6 m (C-TP104/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291231
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/28/2019	*Y COORD:*	- 40644
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/28/2019		
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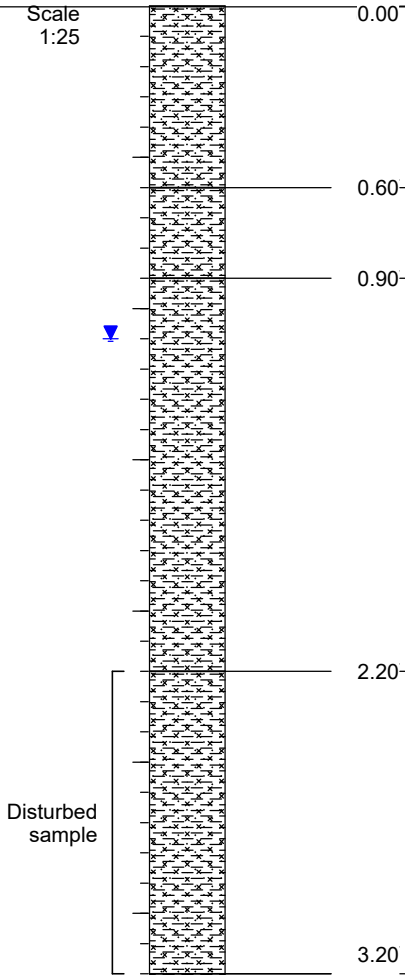
HOLE No: **C- TP104**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP105**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist, dark grey brown, STIFF, sandy silty clay with roots. Hillwash.

0.60 — Moist, brown, SOFT, sandy silty clay. Hillwash.

0.90 — Moist, orange to red brown blotched grey and stained black, SOFT to FIRM, sandy silty clay or sandy clayey silt containing abundant ferruginised gravel. Residual tillite.

2.20 — Moist, yellow to orange brown blotched grey, FIRM, sandy silty clay or sandy clayey silt containing abundant ferruginised gravel. Residual tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
Seepage encountered at 1.1, 1.4 and 2.7 m.
Sidewalls stable.
FI and CBR sample taken at 2.2--3.2 m (C-TP105/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291199
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/29/2019	*Y COORD:*	- 40439
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/29/2019		
	DURBAN-1ST.GPJ				

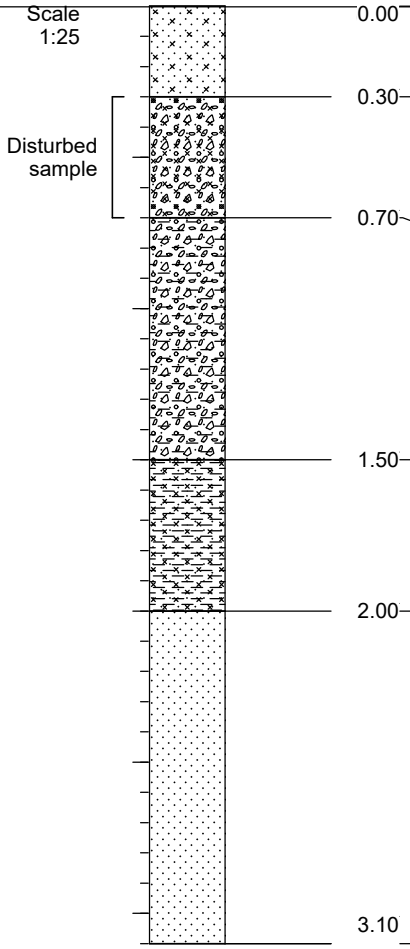
HOLE No: **C- TP105**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP106**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist to dry, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.30 Tightly packed, black and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.70 Tightly packed, black and red brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a moist, orange to red brown, sandy clay matrix (± 15%). Overall consistency is DENSE. Ferricrete.

1.50 Moist, yellow to red brown, STIFF, intact, sandy silty clay or sandy clayey silt containing some ferruginised gravel. Residual tillite.

2.00 Highly to completely weathered, yellow brown stained black, VERY SOFT to SOFT ROCK fragments, fine grained tillite. Contains some hard rock corestones.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.3--0.7 m (C-TP106/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291061
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/29/2019	*Y COORD:*	- 40470
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/29/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP106**

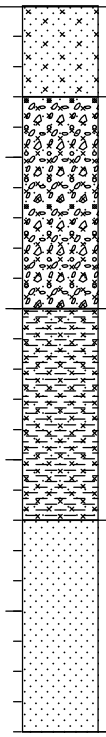
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Cato Ridge Land Development

HOLE No: **C- TP107**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.30	Tightly packed, black and brown, fine to coarse, sub-rounded and sub-angular, ferruginised gravel in a slightly moist, light grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.
1.00	Slightly moist, yellow brown blotched grey and red brown and stained black, STIFF, intact, sandy silty clay or sandy clayey silt containing abundant VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.
1.70	Highly weathered, yellow brown stained black, SOFT ROCK, fine grained tillite.
2.40	

NOTES:

Refusal at 2.4 m on soft to medium hard tillite.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290981
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/29/2019	*Y COORD:*	- 40628
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/29/2019		
	DURBAN-1ST.GPJ				

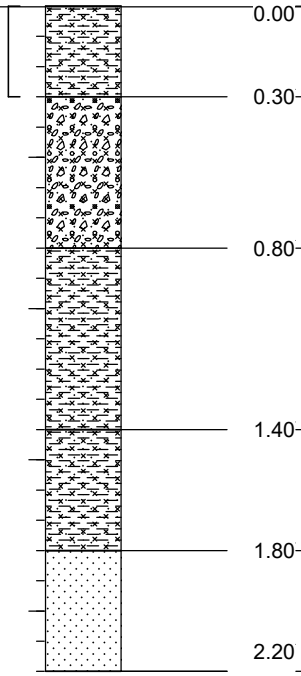
HOLE No: **C- TP107**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP108**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00	Slightly moist, brown, STIFF, microshattered, sandy silty clay with roots. Hillwash.
0.30	Tightly packed, black and brown, fine to coarse, sub-rounded and sub-angular, ferruginised gravel in a slightly moist, light grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.
0.80	Moist, yellow and grey brown, FIRM, intact, sandy silty clay or sandy clayey silt. Residual tillite.
1.40	Moist, yellow brown, STIFF, intact, sandy silty clay or sandy clayey silt containing abundant VERY SOFT to SOFT ROCK fragments. Residual tillite.
1.80	Highly weathered, yellow brown stained black, SOFT ROCK, fine grained tillite.
2.20	

NOTES:

Refusal at 2.2 m on soft to medium hard tillite.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR samples taken at 0--0.3 m (C-TP108/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290867
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/29/2019	*Y COORD:*	- 40454
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/29/2019		
	DURBAN-1ST.GPJ				

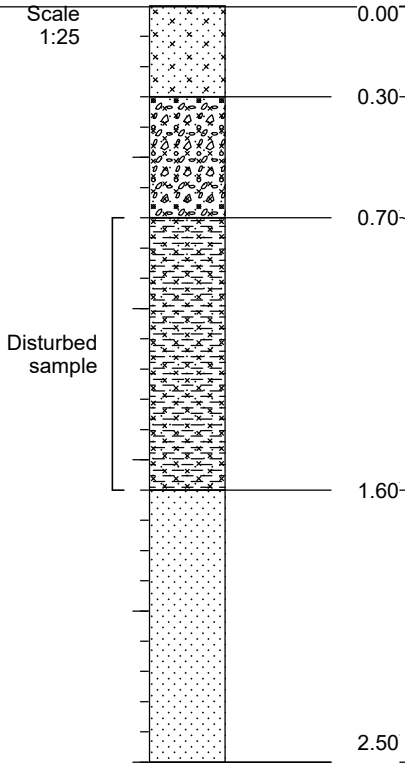
HOLE No: **C- TP108**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP109**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.30 Tightly packed, black and brown, fine to coarse, sub-rounded and sub-angular, ferruginised gravel in a slightly moist, light grey brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.70 Slightly moist, yellow brown blotched grey and red brown and stained black, STIFF, intact, sandy silty clay or sandy clayey silt containing abundant VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.

1.60 Highly weathered, yellow brown stained black, SOFT ROCK, fine grained tillite.

2.50

NOTES:

Refusal at 2.5 m on soft to medium hard tillite.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.7--1.6m (C-TP109/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290849
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/29/2019	*Y COORD:*	- 40597
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/29/2019		
	DURBAN-1ST.GPJ				

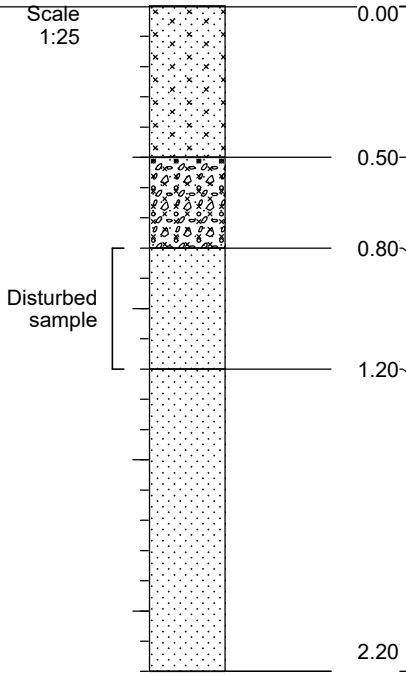
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Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP110**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.50 Tightly packed, black and brown, fine to coarse, sub-rounded and sub-angular, ferruginised gravel in a slightly moist, brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.80 Highly weathered to completely weathered, orange brown stained black,VERY SOFT to SOFT ROCK, fine grained tillite.

1.20 Highly weathered, yellow brown stained black, SOFT ROCK, fine grained tillite. Material is ferruginised.

2.20

NOTES:

Refusal at 2.2 m on soft to medium hard tillite.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.8--1.2 m (C-TP110/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290896
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/30/2019	*Y COORD:*	- 40029
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/30/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP110**

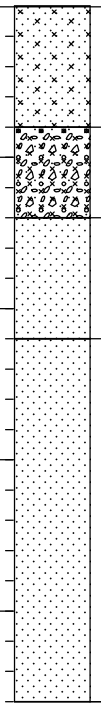
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Cato Ridge Land Development

HOLE No: **C- TP111**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25
Disturbed sample



0.00	Slightly moist, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.40	Tightly packed, black and brown, fine to coarse, sub-rounded and sub-angular, ferruginised gravel in a slightly moist, brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.
0.70	Highly weathered to completely weathered, orange brown stained black,VERY SOFT to SOFT ROCK, fine grained tillite.
1.10	Highly weathered, yellow brown stained black, SOFT ROCK, fine grained tillite. Material is ferruginised.
2.30	

NOTES:

Refusal at 2.3 m on soft to medium hard tillite.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0--0.4 m (C-TP111/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290868
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/30/2019	*Y COORD:*	- 39903
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/30/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP111**

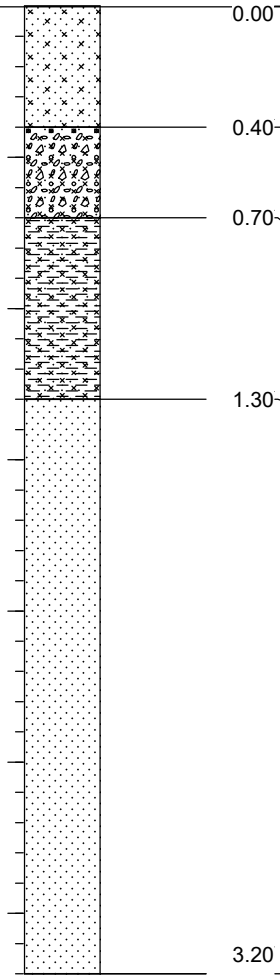
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Cato Ridge Land Development

HOLE No: **C- TP112**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.40	Tightly packed, black and brown, fine to coarse, sub-rounded and sub-angular, ferruginised gravel in a slightly moist, brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.
0.70	Slightly moist, orange brown stained black, STIFF, intact, sandy silty clay or sandy clayey silt containing abundant VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.
1.30	Highly to completely weathered, yellow brown stained black, SOFT ROCK to VERY SOFT ROCK, fine grained tillite. Material is ferruginised.
3.20	

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3290806
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/30/2019	*Y COORD:*	- 39748
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/30/2019		
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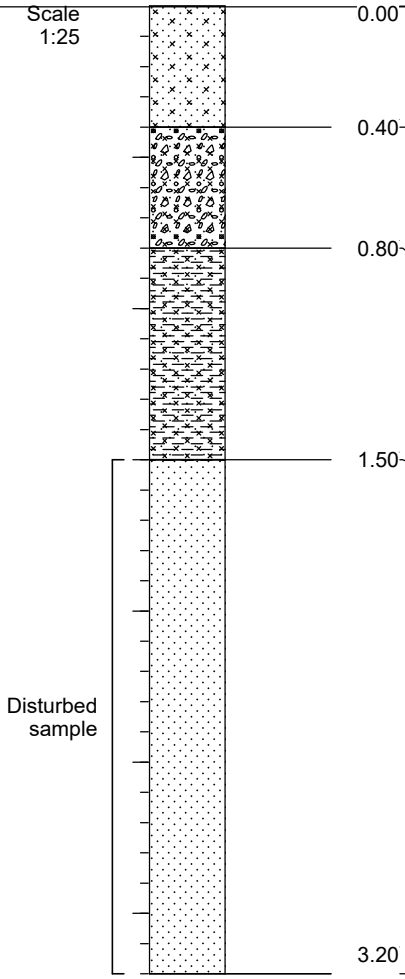
HOLE No: **C- TP112**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP113**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.40 Tightly packed, black and brown, fine to coarse, sub-rounded and sub-angular, ferruginised gravel with some cobbles in a slightly moist, grey brown, silty sand matrix (± 20%). Overall consistency is MEDIUM DENSE to DENSE. Ferricrete.

0.80 Slightly moist, red brown and yellow brown stained black, FIRM to STIFF, intact, sandy silty clay or sandy clayey silt containing abundant VERY SOFT to SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.

1.50 Highly to completely weathered, yellow brown stained black, VERY SOFT ROCK to SOFT ROCK (Containing some hard rock, cobble sized corestones), fine grained tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 1.5--3.2 m (C-TP113/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291060
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/30/2019	*Y COORD:*	- 39298
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/30/2019		
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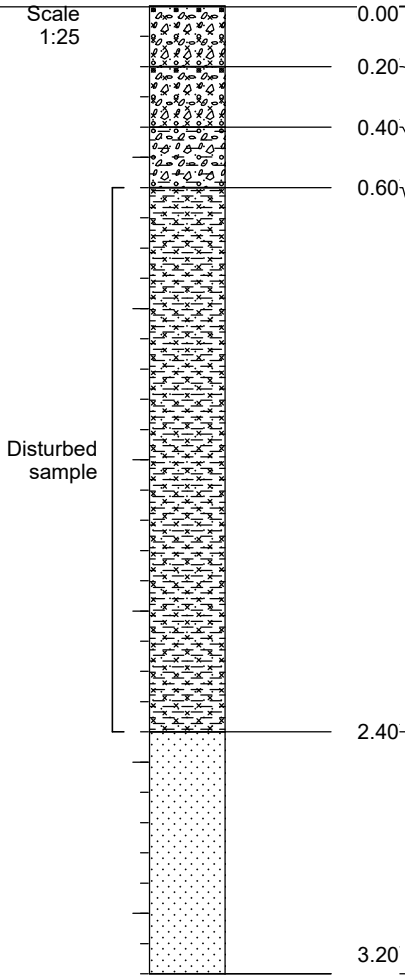
HOLE No: **C- TP113**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP114**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist, grey brown, DENSE, intact, gravelly silty sand with roots. Hillwash or Colluvium.

0.20 — Tightly packed, black and brown, fine to coarse, sub-rounded and sub-angular, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 20%). Overall consistency is MEDIUM DENSE to DENSE. Ferricrete.

0.40 — Tightly packed, brown, red brown and black, fine to coarse, sub-rounded and sub-angular, ferruginised gravel in a slightly moist, orange to red brown, sandy clay matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.60 — Moist, orange to red brown blotched yellow and stained black, FIRM, intact, sandy silty clay or sandy clayey silt with some VERY SOFT ROCK fragments. Material is ferruginised in places. Residual tillite.

2.40 — Highly to completely weathered, yellow brown stained black, VERY SOFT ROCK to SOFT ROCK, fine grained tillite.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.6--2.4 m (C-TP114/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3291222
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/30/2019	*Y COORD:*	- 39155
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/30/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP114**

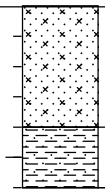
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

Cato Ridge Development Company
Cato Ridge Land Development

HOLE No: **C- TP121**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand contains some sub-rounded sandstone cobbles and boulders with abundant roots. Hillwash.

0.40 Loosely packed, black and red brown, sub-rounded to sub-angular, ferruginised gravel and some cobbles, orange to red brown, sandy clay matrix (± 40%). Overall consistency is DENSE. Ferricrete/ ferruginised residual.

0.60 0.6+ EOH, Refusal on boulder or hard rock sandstone.

NOTES:

Refusal at 0.6 m.
No groundwater or seepage encountered.
Sidewalls are stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	Hand dug	*DIAM:*		*X COORD:*	- 3290114
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/21/2019	*Y COORD:*	- 37538
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/21/2019		
	DURBAN-1ST.GPJ				

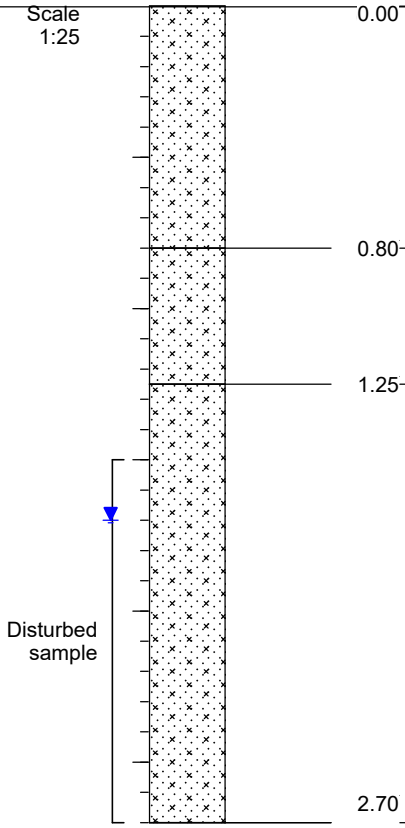
HOLE No: **C- TP121**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

Cato Ridge Development Company
Cato Ridge Land Development

HOLE No: **C- TP122**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist, brown, LOOSE, intact, silty fine sand with roots. Hillwash

0.80 — Slightly moist to moist, orange brown, LOOSE, intact, silty fine sand. Hillwash.

1.25 — Moist, orange to red brown, blotched grey, dense, intact, silty sand containing some VERY SOFT ROCK to SOFT ROCK sandstone fragments. Residual sandstone.

2.70+ EOH, Refusal on hard rock sandstone.

2.70

NOTES:

Refusal at 2.7 m.
Seepage encountered at 1.70 m.
Sidewalls satble.
FI and CBR sample taken at 1.50--2.70 m (C-TP122/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	Hand Dug	*DIAM:*		*X COORD:*	- 3289888
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/21/2019	*Y COORD:*	- 37829
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/27/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP122**

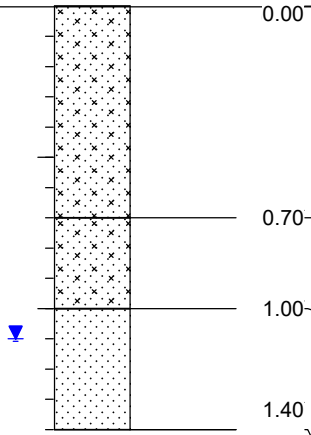
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP123**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.70 Moist, orange brown, LOOSE, intact, silty fine sand containing some boulders of up to 800 mm in diameter. Hillwash.

1.00 Tightly packed, brown to red brown and grey brown, sub-rounded to sub-angular, ferruginised sandstone gravel, cobbles and boulders in a moist brown, silty sand matrix. Overall consistency is DENSE.

1.40+ EOH, Refusal on boulders or hard rock sandstone.

1.40

NOTES:

Refusal at 1.40 m.
Slow water seepage at 1.10 m.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	Hand Dug	*DIAM:*		*X COORD:*	- 3289888
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/21/2019	*Y COORD:*	- 38015
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/21/2019		
	DURBAN-1ST.GPJ				

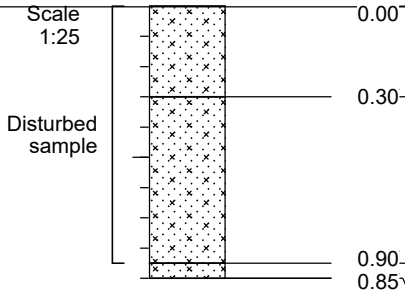
HOLE No: **C- TP123**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP124**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00	Slightly moist, brown, LOOSE, intact, silty fine sand with some gravel and roots. Hillwash
0.30	Slightly moist, brown, LOOSE, intact, silty fine sand, containing abundant sub-rounded to sub-angular, HARD ROCK sandstone, cobbles and boulders of up to 600 mm in diameter. Hillwash.
0.90	
0.85	Tightly packed, black and red brown, ferruginised gravel in a slightly moist, brown silty sand matrix (± 10%). Overall consistency is DENSE. Ferricrete. 0.9+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.9 m.
No groudwater or seepage encountered.
Sidewalls stable.
FI and CBR samples taken at 0--0.85 m (C-TP124/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	Hand Dug	*DIAM:*		*X COORD:*	- 3289688
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/21/2019	*Y COORD:*	- 38013
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/21/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP124**

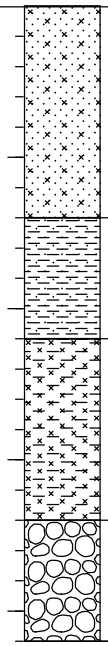
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP125**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, light and grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.70	Loosely packed, black and red brown, sub-rounded to sub-angular, ferruginised gravel and some cobbles in a moist, orange to red brown, sandy clay matrix (± 40%). Overall consistency is DENSE. Ferricrete or Ferruginised Residual.
1.10	Slightly moist, yellow brown, SOFT, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT ROCK fragments. Residual tillite.
1.70	Highly weathered, yellow brown, VERY SOFT ROCK to SOFT ROCK, fine grained tillite.
2.10	

NOTES:

Refusal at 2.10 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 8/21/2019
DATE PROFILED: 8/21/2019

ELEVATION:
X COORD: - 3289691
Y COORD: - 37827

HOLE No: **C- TP125**

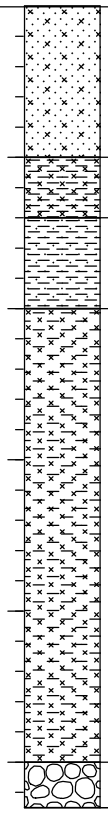
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Cato Ridge Land Development

HOLE No: **C- TP126**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to dry, light and grey brown, DENSE, intact, silty fine sand with roots. Hillwash.
0.50	
0.70	Slightly moist, dark brown, STIFF, intact, sandy silty clay. Colluvium or Residual tillite.
1.00	Loosely packed, black and red brown, sub-rounded to sub-angular, ferruginised gravel and some cobbles in a moist, orange to red brown, sandy clay matrix (± 40%). Overall consistency is DENSE. Ferricrete or Ferruginised residual tillite.
	Slightly moist, yellow brown, STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT ROCK to SOFT ROCK fragments. Residual tillite.
2.50	
2.65	Highly weathered, yellow brown, VERY SOFT ROCK to SOFT ROCK, fine grained tillite.

NOTES:

Refusal at 2.65 m.
No groundawater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	Hand dug	*DIAM:*		*X COORD:*	- 3289779
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/21/2019	*Y COORD:*	- 37539
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/21/2019		
	DURBAN-1ST.GPJ				

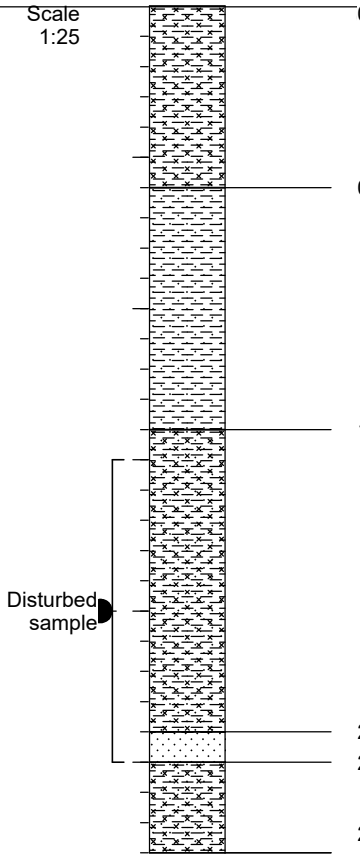
HOLE No: **C- TP126**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP127**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist to dry, dark brown, STIFF, shattered, silty clay with roots. Colluvium

0.60 Loosely packed, black and red brown, ferruginised, fine to coarse gravel in a dark brown to red brown sandy clay matrix. Overall consistency is DENSE.

1.40 Slightly moist, yellow brown, FIRM, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT fragments. Residual tillite.

2.40
2.50 Slightly moist, grey, FIRM, intact, sandy clayey silt or sandy silty clay containing some SOFT fragments. Residual tillite.

2.80 Highly weathered, yellow brown, VERY SOFT to SOFT ROCK, fine grained tillite.

2.8+ EOH, Refusal on soft rock tillite.

NOTES:

Refusal at 2.8 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 1.5--2.5 m (C-TP127/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3289600
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/20/2019	*Y COORD:*	- 37540
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/20/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP127**

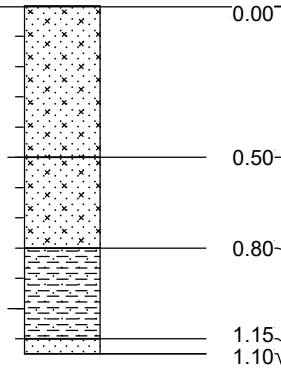
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HOLE No: **C- TP128**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, MEDIUM DENSE, silty fine sand with roots. Hillwash.

0.50 Slightly moist, grey brown, MEDIUM DENSE, silty fine sand with roots, containing ferruginised gravel. Hillwash.

0.80 Loosely packed, black and red brown, ferruginised fine to coarse gravel in a moist, orange brown, sandy clay matrix. Overall consistency is LOOSE.

1.15 Highly weathered, yellow brown , SOFT ROCK, bedded, fine grained sandstone.

1.10 1.15+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.15 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3289406
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/20/2019	*Y COORD:*	- 37530
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/20/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP128**

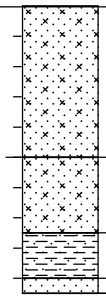
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Cato Ridge Land Development

HOLE No: **C- TP129**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, MEDIUM DENSE, silty fine sand with roots. Hillwash.

0.50 Slightly moist, grey brown, MEDIUM DENSE, silty fine sand with roots, containing ferruginised gravel. Containing some rounded hard rock sandsone cobbles. Hillwash.

0.75 Loosely packed, black an red brown, ferruginised fine to coarse gravel in a moist, orange brown, sandy clay matrix. Overall consistency is LOOSE.

0.95 Highly weathered, yellow brown , SOFT ROCK, bedded, fine grained sandstone.

0.90 EOH+, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.95 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3289402
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/20/2019	*Y COORD:*	- 37344
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/20/2019		
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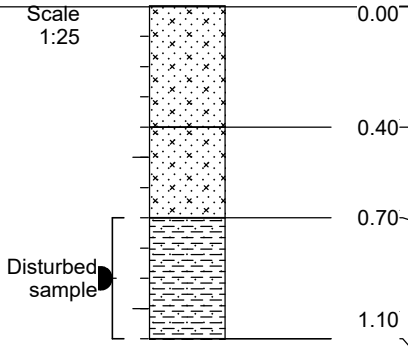
HOLE No: **C- TP129**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP130**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00	Slightly moist, grey brown, MEDIUM DENSE, silty fine sand with roots. Hillwash.
0.40	Slightly moist, grey brown, MEDIUM DENSE, silty fine sand with roots, containing ferruginised gravel. Hillwash.
0.70	Loosely packed, black an red brown, ferruginised fine to coarse gravel in a moist, orange brown, sandy clay matrix. Overall consistency is DENSE.
1.10	EOH+, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at0.7--1.1 m (C-TP130/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3289587
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/20/2019	*Y COORD:*	- 37344
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/20/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP130**

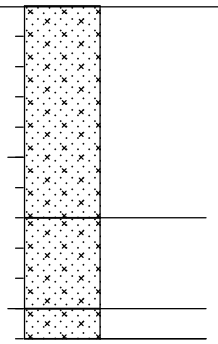
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Cato Ridge Development Company
Cato Ridge Land Development

HOLE No: **C- TP131**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.70 Moist, orange brown, LOOSE, silty fine sand and contains some sub-rounded HARD ROCK cobbles and boulders. Hillwash.

1.00

1.10 Loosely packed, black an red brown, ferruginised fine to coarse gravel in a moist, orange brown, silty sand matrix. Overall consistency is LOOSE. Ferricrete

EOH+, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3289500
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/20/2019	*Y COORD:*	- 37153
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/20/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP131**

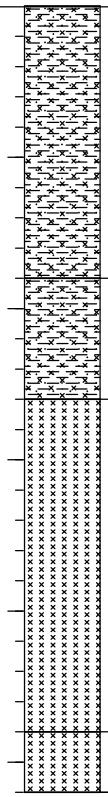
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Cato Ridge Land Development

HOLE No: **C- TP132**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, MEDIUM DENSE, sandy silty clay with roots. Hillwash.

0.90 Moist, dark brown, SOFT, sandy silty clay. Residual siltstone.

1.30 Moist, orange and red brown, STIFF with FIRM pockets, intact, sandy silty clay. Residual siltstone.

2.40 Moist, orange and red brown, STIFF with FIRM pockets, intact, sandy silty clay. Containing HARD ROCK sandstone cobbles and boulders. Residual siltstone.

2.60 2.6+ EOH, Refusal on hard rock siltstone.

NOTES:

Refusal at 2.6 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3289306
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/20/2019	*Y COORD:*	- 37140
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/20/2019		
	DURBAN-1ST.GPJ				

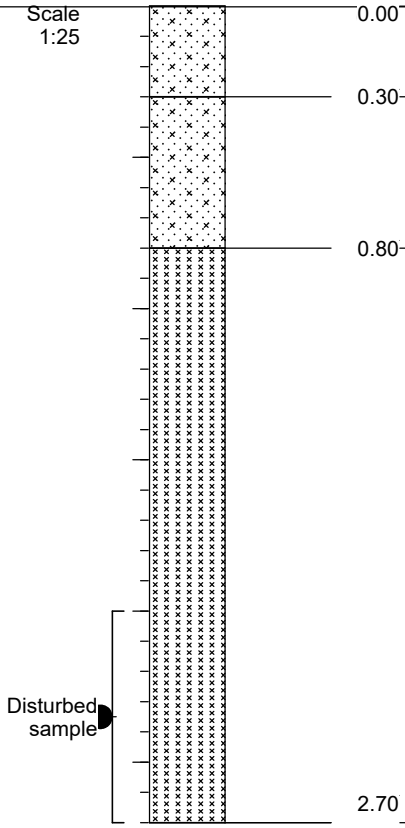
HOLE No: **C- TP132**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP133**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist to dry, light grey brown, LOOSE, intact, silty fine sand with roots. Hillwash

0.30 Slightly moist to dry, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash

0.80 Moist, red to orange brown, streaked grey and stained black, STIFF, intact, sandy silt or sandy silty clay. Residual siltstone.

2.7+ EOH, Refusal on hard rock siltstone.

2.70

NOTES:

Refusal at 2.7 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 2.0--2.7 m (C-TP133/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3289306
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/20/2019	*Y COORD:*	- 36963
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/20/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP133**

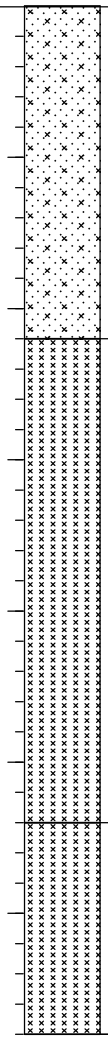
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Cato Ridge Land Development

HOLE No: **C- TP134**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to moist, grey brown, LOOSE to MEDIUM DENSE, intact, silty fine sand with roots. Hillwash.

1.10 Slightly moist, orange to red brown blotched black, FIRM to STIFF, intact, sandy silty clay. Residual siltstone.

2.70 Slightly moist to moist, khakhi and yellow brown, STIFF, intact, sandy clayey silt. Residual siltstone.

3.40

NOTES:

No refusal - pit stopped at 3.4 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3289109
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/20/2019	*Y COORD:*	- 37146
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/20/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP134**

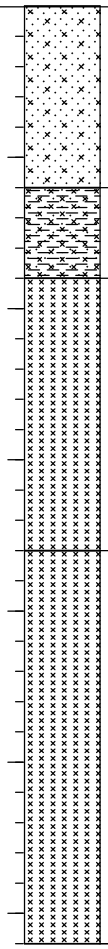
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP135**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, LOOSE, intact, silty fine sand with roots.

0.60 Moist, dark brown, SOFT, intact, sandy silty clay. Residual siltstone.

0.90 Moist, red to orange brown, streaked grey and stained black, FIRM, intact, sandy silt or sandy silty clay. Residual siltstone.

1.80 Moist, dark red brown and grey, STIFF, intact, sandy silty clay. Residual siltstone.

Undisturbed sample

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 2.9--3.1 m (C-TP135/1).
FI sample taken at 2.9--3.1 m (C-TP135/2).
Undisturbed sample.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3289130
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/20/2019	*Y COORD:*	- 36937
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/20/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP135**

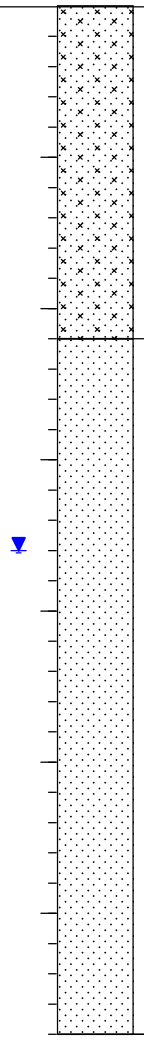
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP135A**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

1.10 Moist, orange brown, intact, silty sand containing VERY SOFT ROCK fragments and some HARD ROCK cobbles and boulders from 3.0 m. Residual Sandstone.

3.40

NOTES:

Partial refusal on hard rock sandstone material (boulders) at 3.40 m.
Water seepage at 1.8 m and 2.1 m.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288884
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/13/2019	*Y COORD:*	- 36946
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/13/2019		
	DURBAN-1ST.GPJ				

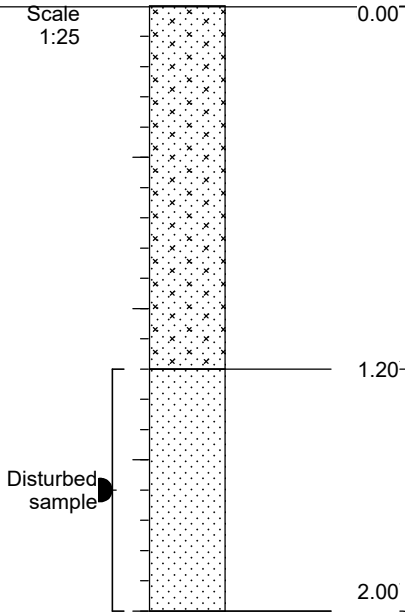
HOLE No: **C- TP135A**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP136**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

1.20 Moist, orange brown,DENSE, intact, silty sand containing VERY SOFT ROCK fragments. Some rounded coarse gravel inclusions noted. . Residual Sandstone.

2.00 2.0+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 2.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 1.2--2.0 m (C-TP136/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288827
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/20/2019	*Y COORD:*	- 36838
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/20/2019		
	DURBAN-1ST.GPJ				

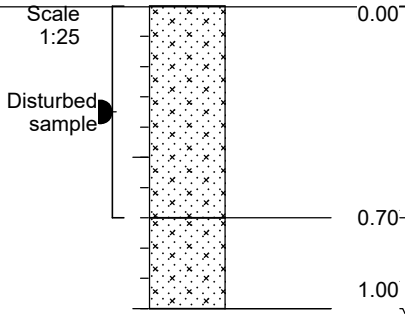
HOLE No: **C- TP136**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP137**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist to dry, light grey brown, LOOSE, intact, silty fine sand with some boulders of up to 600 mm and abundant roots. Hillwash.

0.70 Highly to completely weathered, orange to red brown, VERY SOFT to SOFT sandstone with pockets of slightly moist, red brown loose silty sand. Overall consistency is LOOSE to MEDIUM DENSE.

1.00 1.0+ EOH, Refusal on highly weathered hard rock.

NOTES:

Refusal at 1.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0--0.7 m (C-TP137/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288902
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/16/2019	*Y COORD:*	- 36755
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/16/2019		
	DURBAN-1ST.GPJ				

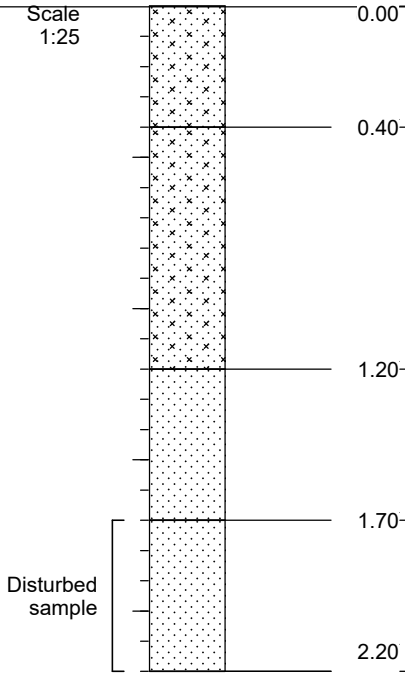
HOLE No: **C- TP137**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP138**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00	Slightly moist, brown, LOOSE, intact, silty fine sand with roots. Hillwash.
0.40	Moist, brown, LOOSE, intact, silty fine sand with roots and contains boulders of up to 1000 mm in diameter. Hillwash.
1.20	Highly to completely weathered, grey stained yellow brown, VERY SOFT ROCK, fine grained sandstone. Recovered mostly as very SOFT ROCK fragments and silty sand.
1.70	Highly weathered, orange to red brown, VERY SOFT to SOFT ROCK, fine grained sandstone.
2.20	2.20+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 2.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 1.7--2.2 m (C-TP138/1).

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 9/2/2019
DATE PROFILED: 9/2/2019

ELEVATION:
X COORD: - 3288686
Y COORD: - 36761

HOLE No: **C- TP138**

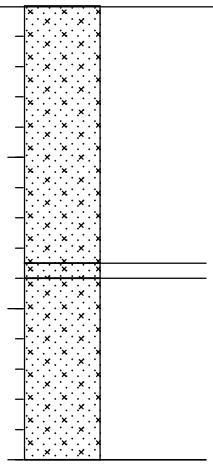
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Cato Ridge Land Development

HOLE No: **C- TP139**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown, LOOSE, intact, silty fine sand containing some boulders of up to 700 mm in diameter and with roots. Hillwash.
0.85	
0.90	Loosely packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, brown, silty sand matrix (± 40%). Overall consistency is LOOSE. Ferricrete.
1.50	Slightly moist, grey and orange brown, LOOSE, silty sand containing some SOFT ROCK to HARD ROCK sandstone fragments (cobble to boulders sized). Residual or completely weathered sandstone. 1.50+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.5 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288591
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/2/2019	*Y COORD:*	- 36952
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/2/2019		
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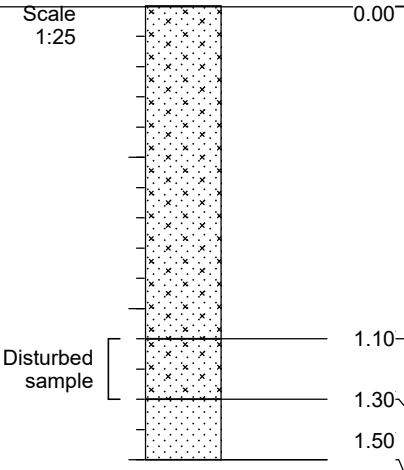
HOLE No: **C- TP139**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP140**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, brown, LOOSE, intact, silty fine sand with some gravel and roots up to 0.4 m. Hillwash

1.10 Loosely packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist , brown, silty sand matrix (± 40%). Overall consistency is LOOSE. Ferricrete.

1.30

1.50 Tightly packed, black and grey brown, stained orange brown HARDPAN ferricrete.

1.50+ EOH, Refusal on hardrock sandstone.

NOTES:

Refusal at 1.5 m.
No undergroundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 1.10--1.30 m (C-TP140/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288499
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/2/2019	*Y COORD:*	- 36845
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/2/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP140**

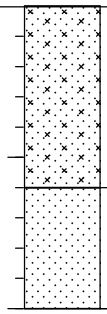
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Cato Ridge Land Development

HOLE No: **C- TP141**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to moist, brown, LOOSE, intact, silty fine sand with roots. Hilllwash

0.60 Highly to completely weathered, grey stained yellow brown, VERY SOFT ROCK, fine grained sandstone. Recovered mostly as VERY SOFT ROCK fragments and silty sand.

1.00 1.00+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No sample taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288501
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/2/2019	*Y COORD:*	- 36659
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/2/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP141**

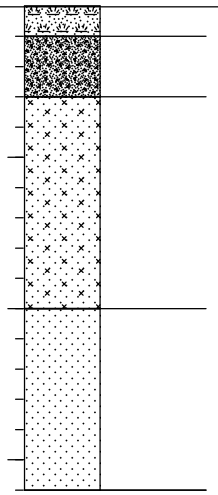
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP142**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	
0.10	Slightly moist, brown, LOOSE, intact, silty sand with abundant grass roots. Topsoil.
0.30	Concrete or made ground.
	Slightly moist, dark brown to black, DENSE, intact, clayey silty sand. Hillwash.
1.00	
	Highly to completely weathered, grey stained yellow brown, VERY SOFT, fine grained sandstone. Recovered mostly as VERY SOFT ROCK fragments and silty sand.
1.60	
	1.60+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.6 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.
Excavated near old manholes.
Scattered boulders in the vicinity.

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 8/2/2019
DATE PROFILED: 8/2/2019

ELEVATION:
X COORD: - 3288302
Y COORD: - 36859

HOLE No: **C- TP142**

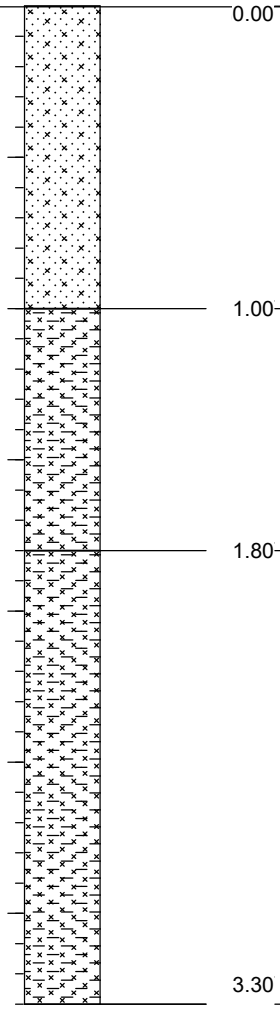
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Cato Ridge Land Development

HOLE No: **C- TP143**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to wet, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

1.00 Moist, dark red brown blotched grey and stained black, FIRM, intact, sandy clayey silt containing some ferruginised gravel and is generally strongly ferruginised. Ferricrete or residual siltstone.

1.80 Moist, red brown and grey stained, red brown and black in places, FIRM, intact, sandy clayey silt. Material is ferruginised in places. Residual siltstone.

3.30

NOTES:

No refusal - pit stopped at 3.30 m.
Perched water seepage at 1.20 m.
Sidewalls stable.
FI sample taken at 1.0--1.8 m (C-TP143/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288298
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/2/2019	*Y COORD:*	- 36668
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/2/2019		
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HOLE No: **C- TP143**

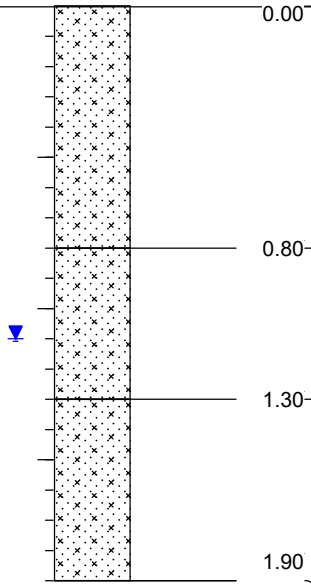
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Cato Ridge Land Development

HOLE No: **C- TP144**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.
0.80	Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Containing abundant hardrock sandstone boulders of up to 1000mm. Hillwash.
1.30	Highly to completely weathered, orange to reddish brown, VERY SOFT to SOFT ROCK , fine grained sandstone with pockets of wet, orange to red brown, LOOSE, silty sand.
1.90	1.10+ EOH, Refusal on soft rock sandstone.

NOTES:

Refusal at 1.9 m.
Water seepage from 1.10 m.
Sidewalls unstable with removal of boulders.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288297
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/16/2019	*Y COORD:*	- 36466
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/16/2019		
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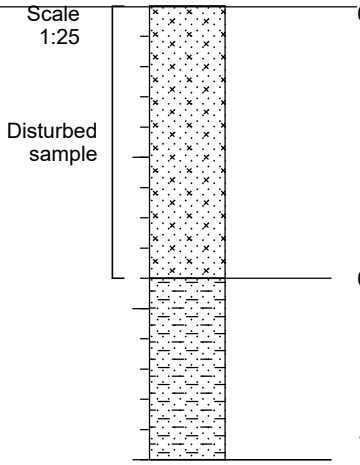
HOLE No: **C- TP144**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP145**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist to moist, brown, LOOSE, intact, silty fine sand with roots up to 0.4 m. Hillwash.

0.90 Moist, yellow to orange brown blotched grey and stained red brown and black, LOOSE to MEDIUM DENSE, clayey sand and silty sand. Ferruginised in some places. Residual siltstone.

1.50 1.50+ EOH, Refusal on medium hard to hard rock siltstone.

NOTES:

Refusal at 1.5 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0--0.9 m (C-TP145/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288110
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/2/2019	*Y COORD:*	- 36666
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/2/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP145**

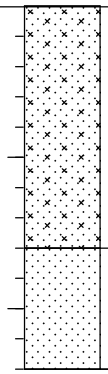
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Cato Ridge Land Development

HOLE No: **C- TP146**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to moist, brown to orange brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.80 Highly to completely weathered, yellow grey and orange brown, stained black, fine grained, sandstone. Recovered partly as HARD ROCK fragments with pockets of silty sand. Overall consistency is DENSE. Material is strongly ferruginised.

1.20 1.20+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
No sample taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288101
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/2/2019	*Y COORD:*	- 36851
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/2/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP146**

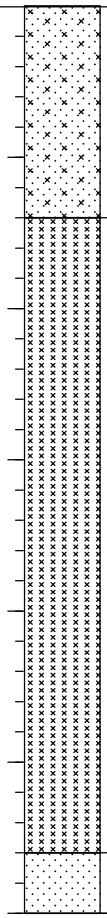
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP147**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, grey brown and dark brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.70 Moist, yellow to orange brown and stained black and red brown, stiff, intact, sandy silty clay. Residual siltstone

2.80 Moist, yellow to orange brown and stained black and red brown yellow grey, stiff, intact, sandy silty clay. Contains abundant VERY SOFT ROCK sandstone rock fragments. Thin bedding observed in places. Residual siltstone

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287914
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/16/2019	*Y COORD:*	- 36852
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/16/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP147**

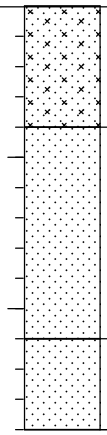
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP148**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist to moist , brown, LOOSE, intact, silty fine sand with roots. Hillwash.
0.40	Slightly moist to moist , brown, LOOSE, intact, silty fine sand containing sub-rounded to sub-angular, HARD ROCK sandstone boulders of up to 750 mm in diameter. Hillwash.
1.10	Loosely packed, brown and black stained orange brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a moist, brown, silty sand matrix (± 40%). Overall consistency is LOOSE. Ferricrete.
1.40	1.40+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.40 m.
No groundwater or seepage encountered.
Sidewalls unstable when boulders are removed.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287913
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/2/2019	*Y COORD:*	- 36672
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/2/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP148**

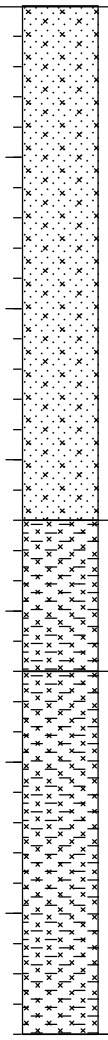
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP149**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00

Slightly moist to moist, light grey brown, LOOSE to MEDIUM DENSE, intact, silty fine sand with roots. HIllwash.

1.70

Moist, dark red brown, blotched grey and stained black, FIRM, intact, sandy clayey silt with pockets of sandy silty clay containing some ferruginised gravel and is generally strongly ferruginised. Ferricrete or residual siltstone.

2.20

Moist, orange brown blotched grey, red brown and black in places, FIRM, intact, sandy clayey silt. Material is ferruginised in places with some very soft rock fragments. Residual siltstone.

Disturbed sample

3.40

NOTES:

No refusal - pit stopped at 3.4 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample 2.20--3.40 m (C-TP149/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287986
PROFILED BY:	N . Khanyile	*DATE DRILLED:*	8/2/2019	*Y COORD:*	- 36459
TYPE SET BY:	M Moromane	*DATE PROFILED:*	8/2/2019		
	DURBAN-1ST.GPJ				

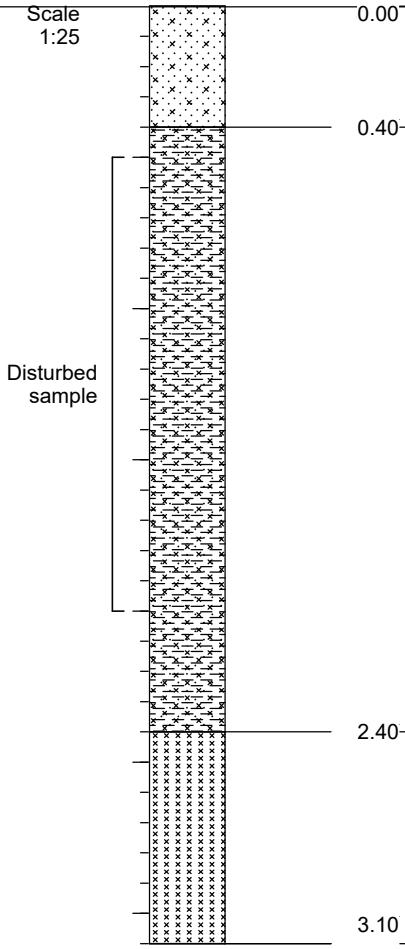
HOLE No: **C- TP149**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP150**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist to dry, grey brown and dark brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.40 Moist, yellow to orange brown and stained black and red brown, STIFF, intact, sandy silty clay. Residual siltstone

2.40 Moist, yellow to orange brown and stained black and red brown yellow grey, STIFF, intact, sandy silty clay. Contains abundant VERY SOFT ROCK sandstone rock fragments. Thin bedding observed in places. Residual siltstone

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0.5--2.0 m (C-TP150/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287899
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/16/2019	*Y COORD:*	- 36341
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/16/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP150**

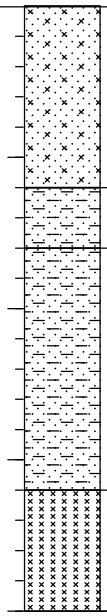
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Cato Ridge Land Development

HOLE No: **C- TP151**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.60 Slightly moist, dark brown, MEDIUM DENSE to DENSE, intact, clayey sand. Hillwash.

0.80 Moist, orange to red brown blotched dark grey or black, DENSE, silty sand with pockets of SOFT sandy clay sand. Contains some very soft rock fragments and is partly ferruginised. Residual siltstone interbedded with residual sandstone.

1.60 Moist, yellow brown, DENSE, silty sand with pockets of SOFT clayey sand. Contains some VERY SOFT ROCK fragments and is primarily ferruginised. Completely weathered siltstone or sandstone. Overall consistency is DENSE. Residual siltstone interbedded with sandstone.

2.00 2.0+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 2.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287790
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/3/2019	*Y COORD:*	- 36611
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/3/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP151**

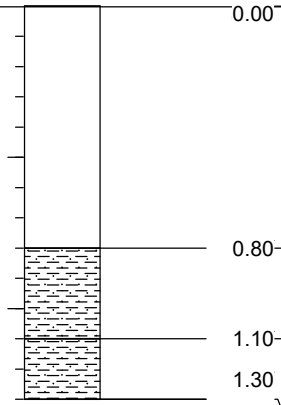
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Cato Ridge Land Development

HOLE No: **C- TP152**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown to grey brown, LOOSE, intact, silty fine sand with roots up to 0.3m. Hillwash.
0.80	Moist, yellow brown streaked black, SOFT, intact, sand clay. Hillwash.
1.10	Loosely packed, black and red brown, sub-rounded to sub-angular, ferruginised gravel in a yellow to orange brown, sand clay matrix. Overall consistency is DENSE. Ferricrete or ferruginised residual.
1.30	1.3+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287685
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/19/2019	*Y COORD:*	- 36745
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/19/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP152**

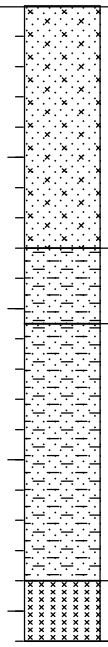
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Cato Ridge Land Development

HOLE No: **C- TP153**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, light grey brown, LOOSE, intact, silty fine sand with roots up to 0.3 m. Hillwash.

0.80 Slightly moist, dark brown, MEDIUM DENSE to DENSE, intact, clayey sand. Hillwash.

1.05 Moist, orange to red brown blotched dark grey or black, LOOSE, silty sand with pockets of SOFT sandy clay. Contains some VERY SOFT ROCK fragments and is partly ferruginised. Residual siltstone interbedded with residual sandstone.

1.90 Moist, yellow brown, DENSE, silty sand with pockets of SOFT clayey sand. Contains some very soft rock fragments and is primarily ferruginised. Completely weathered siltstone or sandstone. Oversal consistency is DENSE. Residual Siltstone interbedded with sandstone.

2.10 2.10+ EOH, Refusal on hardrock sandstone.

NOTES:

Refusal at 2.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0.8--1.05 m (C-TP153/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287501
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/3/2019	*Y COORD:*	- 36724
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/3/2019		
	DURBAN-1ST.GPJ				

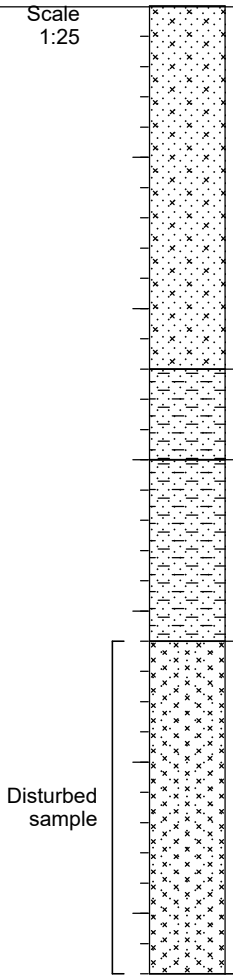
HOLE No: **C- TP153**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP154**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist to dry, light grey brown, DENSE, intact, silty fine sand with roots up to 0.4 m. Hillwash.

1.20 Slightly moist, dark brown, MEDIUM DENSE to DENSE, intact, clayey sand. Hillwash.

1.50 Moist, orange to red brown blotched dark grey or black, DENSE, silty sand with pockets of SOFT sandy clay. Contains some very soft rock fragments and is partly ferruginised. Residual siltstone interbedded with residual sandstone.

2.10 Slightly moist, yellow brown and grey, STIFF, intact, clayey sandy silt with some very soft rock fragments. Residual siltstone or completely weathered rock.

3.20

NOTES:

No refusal - pit stopped at 3.20 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 2.10--3.20 m (C-TP154/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287491
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/2/2019	*Y COORD:*	- 36539
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/2/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP154**

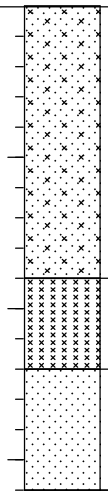
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP155**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand. Hillwash.

0.90 Moist, dark brown, SOFT, intact, sandy clay. Residual silstone.

1.20 Highly to completely weathered, orange and yellow brown streaked black, VERY SOFT ROCK, (With some cobbles and boulders sized up to 600 mm), HARD ROCK sandstone or siltstone, some clay pockets (Black material).

1.60 1.6+ EOH, Refusal on hard rock siltstone.

NOTES:

Refusal at 1.6 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287497
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/19/2019	*Y COORD:*	- 36381
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/19/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP155**

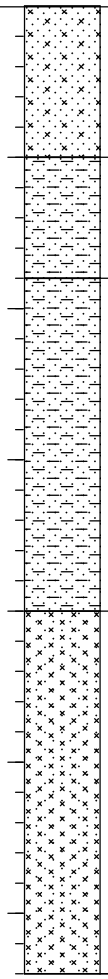
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Cato Ridge Land Development

HOLE No: **C- TP156**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.50 Slightly moist, dark brown, DENSE, intact, clayey sand. Hillwash.

0.90 Moist, orange to red brown blotched dark grey or black, MEDIUM DENSE, silty sand with pockets of SOFT sandy clay. Occasionally contains some hard rock fragments and is partly ferruginised. Residual siltstone interbedded with residual sandstone.

2.00 Slightly moist, yellow brown and grey, STIFF, intact, clayey sandy silt with some very soft rock fragments. Residual siltstone or completely weathered rock.

3.20

NOTES:

No refusal - pit stopped at 3.20 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287499
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/2/2019	*Y COORD:*	- 36149
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/2/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP156**

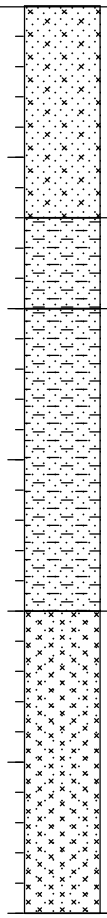
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Cato Ridge Land Development

HOLE No: **C- TP157**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.70 Slightly moist, dark brown, DENSE, intact, clayey sand. Hillwash.

1.00 Moist, orange to red brown blotched dark grey or black, MEDIUM DENSE, silty sand with pockets of SOFT sandy clay. Occasionally contains some hard rock fragments and is partly ferruginised. Residual siltstone interbedded with residual sandstone.

2.00 Slightly moist, orange brown, STIFF, intact, clayey sandy silt with some very soft rock fragments. Residual siltstone or completely weathered rock.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 9/8/2019
DATE PROFILED: 9/8/2019

ELEVATION:
X COORD: - 3287302
Y COORD: - 36150

HOLE No: **C- TP157**

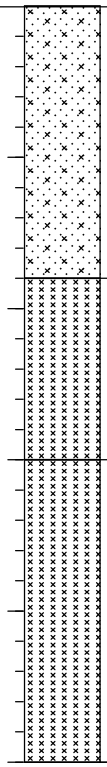
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP158**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to moist, grey brown, LOOSE, intact, silty fine sand. Hillwash.

0.90 Moist, orange to red brown, stained black, FIRM, intact, sandy silty clay containing some ferruginised gravel and is ferruginised in places. Residual siltstone.

1.50 Moist, yellow brown stained blacked, stained black, FIRM, intact, sandy silty clay containing some ferruginised gravel and is ferruginised in places. Residual siltstone.

2.5+ EOH, Refusal on hard rock sandstone or siltstone.

2.50

NOTES:

Refusal at 2.5 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287299
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/16/2019	*Y COORD:*	- 36349
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/16/2019		
	DURBAN-1ST.GPJ				

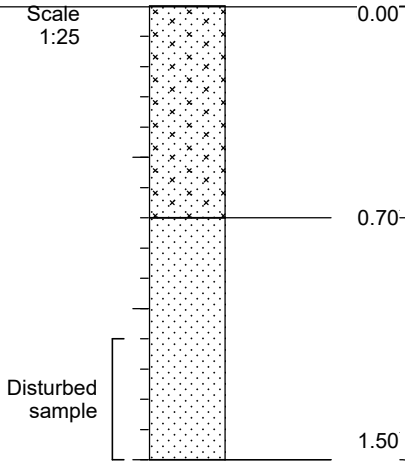
HOLE No: **C- TP158**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP159**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, brown, LOOSE, intact, silty fine sand with roots up to 0.5 m. Hillwash.

0.70 Highly to completely weathered, orange to red brown, VERY SOFT to SOFT sandstone with pockets of slightly moist, red brown, loose silty sand. Overall consistency is LOOSE to MEDIUM DENSE.

1.50 1.5+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.5 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 1.1--1.5 m (C-TP159/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287304
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/19/2019	*Y COORD:*	- 36717
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/19/2019		
	DURBAN-1ST.GPJ				

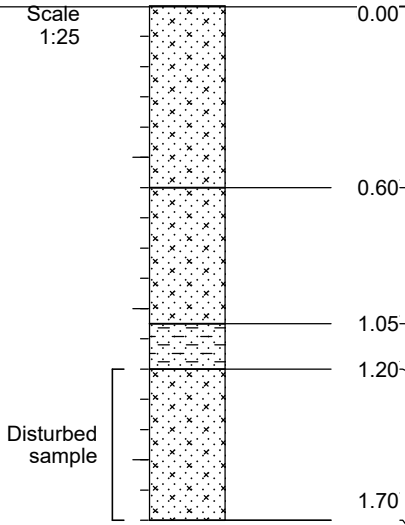
HOLE No: **C- TP159**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP160**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.60 Moist, grey brown, LOOSE, intact, silty fine sand. Hillwash.

1.05 Slightly moist, dark brown, MEDIUM DENSE to DENSE, intact, clayey sand. Hillwash.

1.20 Moist, orange to red brown, MEDIUM DENSE, intact, silty sand containing some VERY SOFT ROCK to SOFT ROCK and occasionally HARD ROCK boulders. Residual sandstone.

1.70 1.70+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.70 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR samples taken at 1.20--1.70 m (C-TP160/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287298
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/3/2019	*Y COORD:*	- 36905
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/3/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP160**

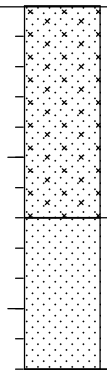
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP161**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, LOOSE, intact, silty fine sand with roots up to 0.5 m. Hillwash.

0.70 Highly to completely weathered, orange to reddish brown, VERY SOFT to SOFT ROCK, fine grained sandstone with pockets of slightly moist, orange to red brown, loose silty sand.

1.20 1.2+ EOH, Refusal on hard rock sandstone.

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 1.1--2.3 m (C-TP13/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287299
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/16/2019	*Y COORD:*	- 37080
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/16/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP161**

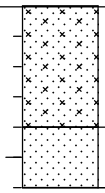
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP162**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, LOOSE, intact, silty fine sand containing some gravel and with roots. Hillwash.

0.40 Highly weathered, pinkish brown, MEDIUM HARD to HARD ROCK, fine grained sandstone. Recovered as sub-angular gravel and cobble sized fragments in a slightly moist, brown, silty clay matrix (± 30%).

0.60 0.60+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.6 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.
Scattered boulders and outcrop in vicinity.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287108
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/4/2019	*Y COORD:*	- 37091
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/4/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP162**

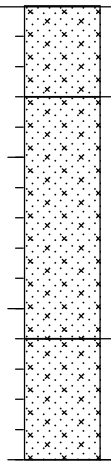
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP163**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, light grey brown, LOOSE, intact, silty fine sand with abundant roots. Hillwash.

0.30 Slightly moist, light grey brown, LOOSE, intact, silty fine sand containing abundant sub-rounded to sub-angular, HARD ROCK, cobbles and boulders of up to 1200 mm in diameter. Hillwash.

1.10 Moist,orange brown to brown, LOOSE, intact, silty sand with some VERY SOFT ROCK to SOFT ROCK fragments. Residual sandstone.

1.50 1.50+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.5 m.
No groundwater or seepage encountered.
Sidewalls become unstable with the removal of boulders.
No samples taken.
Excavated near an illegally sand mined area.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287113
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/4/2019	*Y COORD:*	- 36914
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/4/2019		
	DURBAN-1ST.GPJ				

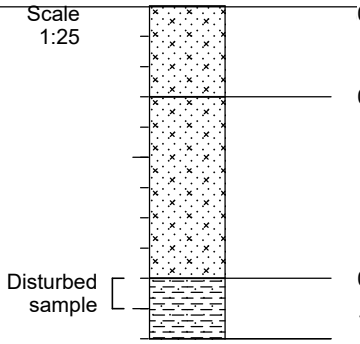
HOLE No: **C- TP163**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP164**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.30 Moist, brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.90 Moist, dark brown to black and yellow brown stained red brown, SOFT, intact, sandy clay with pockets of silty sand and containing some ferruginised gravel and occasional sub-rounded cobbles. Material is ferruginised in places. Residual siltstone or residual sandstone.

1.10

NOTES:

Refusal at 1.10 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0.9--1.0 m (C-TP164/1).

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 9/4/2019
DATE PROFILED: 9/4/2019

ELEVATION:
X COORD: - 3287106
Y COORD: - 36712

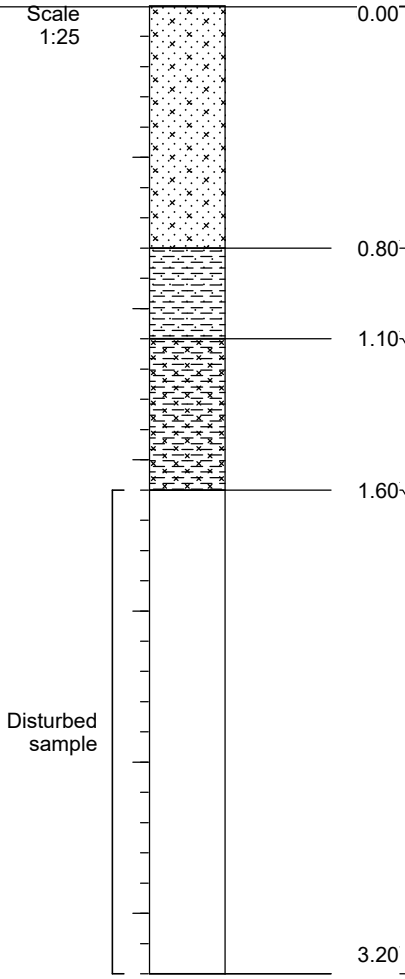
HOLE No: **C- TP164**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP165**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.80 Moist, dark brown to black and yellow brown, stained red brown, SOFT, intact, sandy clay with pockets of silty sand containing some ferruginised gravel and occassional sub-rounded cobbles. Material is ferruginised in places. Residual siltstone or residual sandstone.

1.10 Moist, orange and red brown stained black, FIRM, intact, sandy silty clay or sandy clayey silt, with some VERY SOFT ROCK fragments. Material is ferruginised. Residual siltstone.

1.60 Moist, yellow to orange brown stained black, sandy clayey silt or clayey silty clay with some VERY SOFT ROCK to SOFT ROCk fragments. Residual siltstone.

3.20

NOTES:

No refusal - pit stopped at 3.20 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 1.6--3.2 m (C-TP165/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287106
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/4/2019	*Y COORD:*	- 36527
TYPE SET BY:	M Moromane	*DATE PROFILED:*	9/4/2019		
	DURBAN-1ST.GPJ				

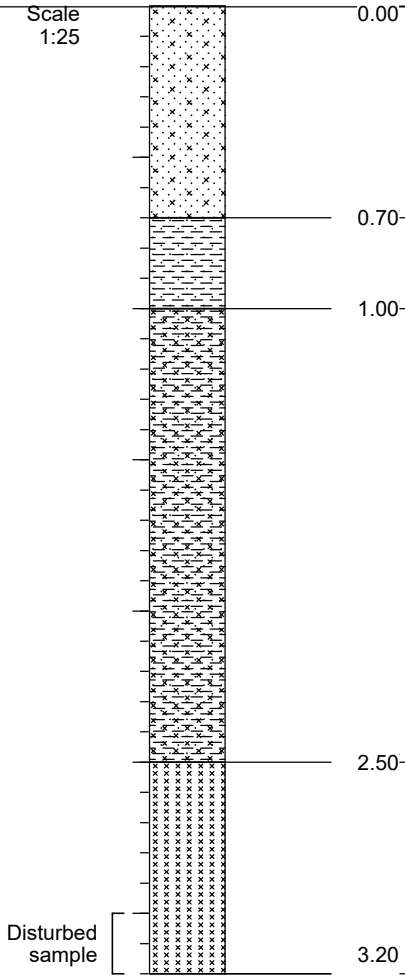
HOLE No: **C- TP165**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP166**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots up to 0.3 m. Hillwash.

0.70 Moist, dark brown streaked yellow brown, SOFT, intact, sandy clay. Residual siltstone.

1.00 Moist, dark red brown to grey stained black, STIFF, intact, sandy silty clay. Material is ferruginised in places. Residual siltstone.

2.50 Moist, yellow brown and grey, FIRM, intact, sandy silt. Residual or completely weathered siltstone.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 3.0--3.2 m (C-TP166/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287111
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/19/2019	*Y COORD:*	- 36341
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/19/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP166**

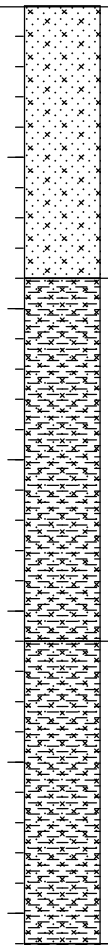
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP167**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.90 Moist, dark red brown stained black, STIFF,sandy silty clay. Material is ferruginised in places. Residual siltstone.

2.10 Moist, orange to red brown and grey brown, STIFF, sandy silty clay. Residual siltstone.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287114
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/16/2019	*Y COORD:*	- 36142
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/16/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP167**

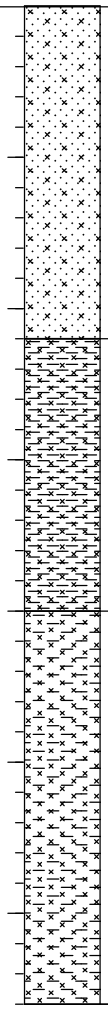
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP168**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, light grey brown and light brown, DENSE, intact, silty fine sand with roots. Hillwash.

1.10 Slightly moist to moist, dark red brown and orange brown stained black, STIFF, intact, sandy silty clay or sandy clayey silt. Material is ferruginised and contains occassional cobbles and boulders of up to 500 mm in diameter. Residual siltstone.

2.00 Slightly moist to dry, red brown and grey, STIFF, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to SOFT fragments. Residual siltstone.

Disturbed and undisturbed sample.

3.30

NOTES:

No refusal - pit stopped at 3.30 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 2.00--3.30 m (C-TP168/1).
Undisturbed sample at 20.0--3.30 m (C-TP168/2).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286840
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/4/2019	*Y COORD:*	- 36333
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/4/2019		
	DURBAN-1ST.GPJ				

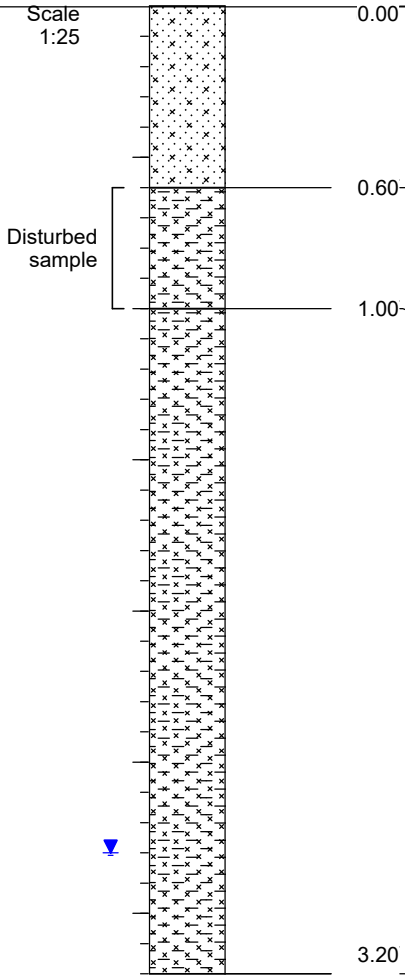
HOLE No: **C- TP168**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP169**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, light grey brown, DENSE, intact, silty fine sand with roots. Hillwash.

0.60 Moist, yellow brown and grey, FIRM, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT to HARD ROCK fragments. Material is partially ferruginised. Residual siltstone or ferricrete.

1.00 Moist, yellow to orange brown, FIRM to STIFF, intact, sandy clayey silt or sandy silty clay containing abundant VERY SOFT to SOFT RCOK fragments. Residual siltstone.

3.20

NOTES:

No refusal - pit stopped at 3.2 m.
Water seepage at 2.8 m.
Sidewalls stable.
FI sample taken at 0.6--1.0 m (C-TP169/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286921
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/4/2019	*Y COORD:*	- 36530
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/4/2019		
	DURBAN-1ST.GPJ				

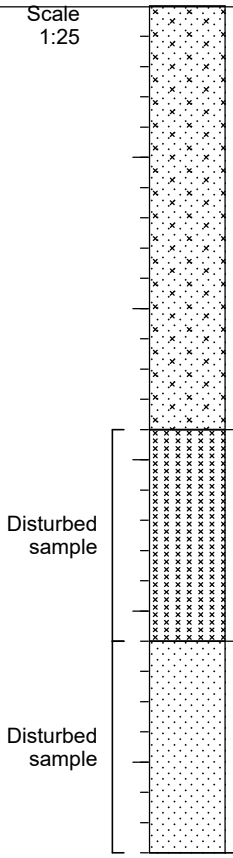
HOLE No: **C- TP169**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP170**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist to dry, light grey brown, DENSE, intact, silty fine sand. Hillwash.

1.40 Moist, orange to red brown, streaked black and grey, STIFF, intact, sandy silty clay or sandy clayey silt. Material is ferruginsed in places. Residual siltstone.

2.10 Slightly moist to moist, orange brown, DENSE, intact, silty sand. Material is ferruginised in places and contains some hard rock (boulders) fragments. Residual sandstone.

2.80 2.8+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 2.8 m.
No groundwater or seepage encountered.
Sidewalls stable.
Lump test sample taken at 1.4--2.1 m (C-TP170/1).
FI and CBR sample taken at 2.1--2.8 m (C-TP170/2).
Test pit dug on excavated area (illegal mining) 0.7 m below ground level

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286919
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/19/2019	*Y COORD:*	- 36726
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/19/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP170**

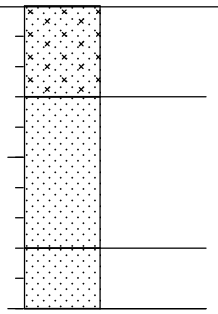
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP171**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown, LOOSE, silty fine sand with abundant grass roots. Hillwash.
0.30	Highly weathered, pinkish brown, MEDIUM HARD to HARD ROCK, fine grained sandstone with abundant roots. Recovered as sub-angular gravel and cobble sized fragments in a slightly moist, brown, silty clay matrix (± 30%).
0.80	
1.00	Highly weathered, orange brown to pinkish brown, SOFT ROCK, fine grained sandstone.
	1.00+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.0 m.
No groundwater or seepage encountered.
Sidewalls are stable but can become unstable with removal of boulders.
No samples taken.

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 9/4/2019
DATE PROFILED: 9/4/2019

ELEVATION:
X COORD: - 3286925
Y COORD: - 36912

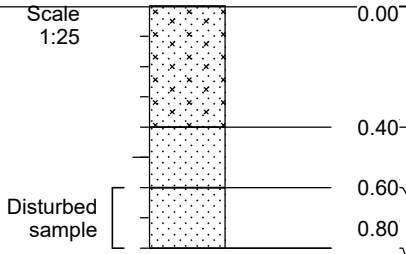
HOLE No: **C- TP171**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP172**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, brown, LOOSE, silty fine sand with abundant grass roots. Hillwash.

0.40 Highly weathered, pinkish brown, MEDIUM HARD to HARD ROCK, fine grained sandstone with abundant roots. Recovered as sub-angular gravel and cobble sized fragments in a slightly moist, brown, silty clay matrix (± 30%).

0.60 Highly weathered, orange brown to pinkish brown, SOFT ROCK, fine grained sandstone.

0.80 0.8+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.8 m.
No groundwater or seepage encountered.
Sidewalls are stable but can be unstable with removal of boulders.
FI and CBR sample taken at 0.6--0.8 m (C-TP172/1).

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286892
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/4/2019	*Y COORD:*	- 37084
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/4/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP172**

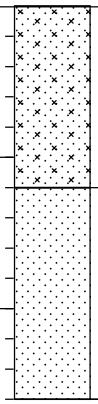
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

Cato Ridge Development Company
Cato Ridge Land Development

HOLE No: **C- TP173**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.60 Tightly packed, orange to red brown and black, fine to coarse, sub-angular to sub-rounded, ferruginised gravel in a slightly moist matrix. Material is cemented and the overall consistency is DENSE. Ferricrete.

1.30 1.3+ EOH, Refusal on hardpan ferricrete.

NOTES:

Refusal at 1.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.6--1.30 m (C-TP173/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286725
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/16/2019	*Y COORD:*	- 36907
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/16/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP173**

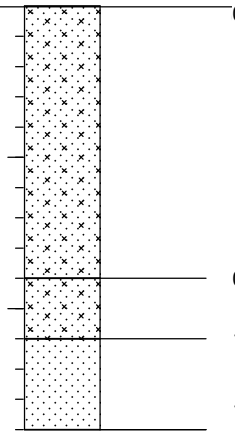
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP174**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.90 Slightly moist, orange brown, LOOSE, intact, silty fine sand with roots. Hillwash.

1.10 Highly to completely weathered, orange to red brown, VERY SOFT to SOFT sandstone with pockets of slightly moist, red brown loose silty sand. Overall consistency is LOOSE to MEDIUM DENSE.

1.40 1.4+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.4 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286712
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/19/2019	*Y COORD:*	- 36719
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/19/2019		
	DURBAN-1ST.GPJ				

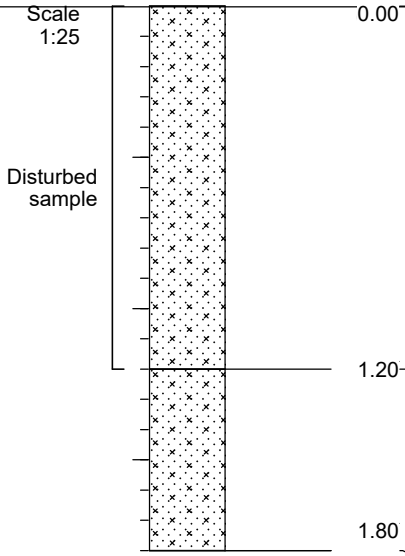
HOLE No: **C- TP174**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP175**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, light brown, LOOSE, intact, silty fine sand with roots. Hillwash.

1.20 Slightly moist, orange brown to brown stained red brown, MEDIUM DENSE to DENSE, intact, silty sand containing some VERY SOFT to SOFT ROCK fragments. Residual sandstone.

1.80 1,80+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.80 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR samples taken at 0--0.12m (C-TP175/1).

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 9/4/2019
DATE PROFILED: 9/4/2019

ELEVATION:
X COORD: - 3286715
Y COORD: - 36528

HOLE No: **C- TP175**

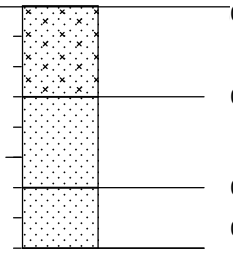
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP176**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown, LOOSE, silty fine sand with abundant grass roots. Hillwash.
0.30	Highly weathered, pinkish brown, MEDIUM HARD to HARD ROCk, fine grained sandstone with abundant roots. Recovered as sub-angular gravel and cobble and sub-angular boulder sized (of up to 500 mm in diameter) fragments in a slightly moist, brown, silty clay matrix (± 30%).
0.60	Highly weathered, orange brown to pinkish brown, SOFT ROCK, fine grained sandstone.
0.80	0.8+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.8 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286531
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/4/2019	*Y COORD:*	- 36722
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/4/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP176**

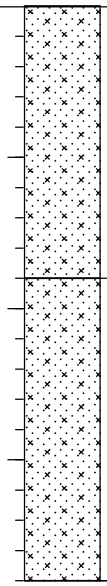
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Cato Ridge Land Development

HOLE No: **C- TP177**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, LOOSE, silty fine sand containing rounded boulders up to 650 mm. Hillwash.

0.90 Highly to completely weathered sandstone, recovered as cobble to boulder sized sub-angular HARD ROCK fragments (up to 900 mm in diameter) with pockets of slight moist orange to red brown, LOOSE, silty sand.

1.90+ EOH, Refusal on hard rock sandstone

1.90

NOTES:

Refusal at 1.9 m.
No groundwater or seepage encountered.
Sidewalls become unstable with the removal of boulders.
No samples taken.

CONTRACTOR:
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 9/4/2019
DATE PROFILED: 9/4/2019

ELEVATION:
X COORD: - 3286528
Y COORD: - 36913

HOLE No: **C- TP177**

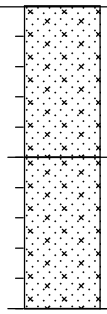
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Cato Ridge Development Company
Cato Ridge Land Development

HOLE No: **C- TP178**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, LOOSE, silty fine sand with abundant grass roots. Hillwash.

0.50 Highly to completely weathered sandstone, recovered as cobble to boulder sized sub-angular HARD ROCK fragments (up to 500 mm in diameter) with pockets of slight moist orange to red brown, LOOSE, silty sand.

1.00 1.00+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286328
PROFILED BY:	N. khanyile	*DATE DRILLED:*	9/4/2019	*Y COORD:*	- 36916
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/4/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP178**

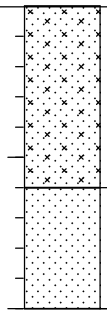
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Cato Ridge Land Development

HOLE No: **C- TP179**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, LOOSE, silty fine sand with abundant grass roots. Hillwash.

0.60 Highly weathered, orange brown to pinkish brown, SOFT ROCK, fine grained sandstone.

1.00

NOTES:

Refusal at 1.0 m.
No groundwater or seepage encountered.
Sidewalls stable but can become unstable with cobble removal.
No samples taken.

CONTRACTOR:		*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286331
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/4/2019	*Y COORD:*	- 36717
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/4/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP179**

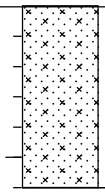
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP180**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00

Tightly packed, light reddish brown and grey brown, sub-angular, HARD ROCK, cobbles and boulders up to 1000 mm in a slightly moist, orange, LOOSE, silty fine sand matrix. Overall consistency is DENSE. Roots of up to 0.3 m. Hillwash.

0.60

0.6+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.6 m.
No groundwater or seepage encountered.
Sidewalls unstable due to removal of boulders.
No sample taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286152
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	8/16/2019	*Y COORD:*	- 36820
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	8/16/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP180**

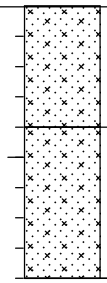
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP181**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, LOOSE, intact, silty fine sand with some gravel and roots. Hillwash.

0.40 Gravel, cobbles and boulders, pinkish brown and orange brown, SOFT to HARD ROCK, sub-angular with pockets of slightly moist, brown, silty sand (Contamination from above). Overall consistency is DENSE.

0.90 0.90+ EOH, Refusal on hard rock sandstone.

NOTES:

No refusal - pit stopped at 0.9 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285930
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/5/2019	*Y COORD:*	- 36606
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/5/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP181**

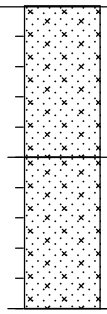
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Cato Ridge Land Development

HOLE No: **C- TP182**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, LOOSE, intact, silty fine sand with some gravel and roots. Hillwash.

0.50 Gravel, cobbles and boulders, pinkish brown and orange brown, SOFT to HARD ROCK, sub-angular with pockets of slightly moist, brown, silty sand (Contamination from above). Overall consistency is DENSE.

1.00 1.00+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.0 m.
No groundwater or seepage encountered.
Sidewalls become unstable with the removal of cobbles and boulders.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286152
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/5/2019	*Y COORD:*	- 36599
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/5/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP182**

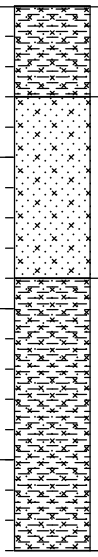
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP183**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, light grey brown, DENSE, intact, sandy silty clay with roots. Hillwash.
0.30	Slightly moist, grey blotched yellow brown, DENSE, intact, silty sand containing some VERY SOFT to SOFT ROCK fragments. Residual sandstone.
0.90	Moist, yellow brown and grey, SOFT to FIRM, sandy clayey silt or sandy silty clay containing some VERY SOFT ROCK fragments. Residual siltstone.
	1.80+ EOH, Refusal on hard rock siltstone.
1.80	

Disturbed sample

NOTES:

Refusal at 1.8 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 0.9--1.8 m (C-TP183/1).
Excavated within illegally mined area.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286348
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/5/2019	*Y COORD:*	- 36516
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/5/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP183**

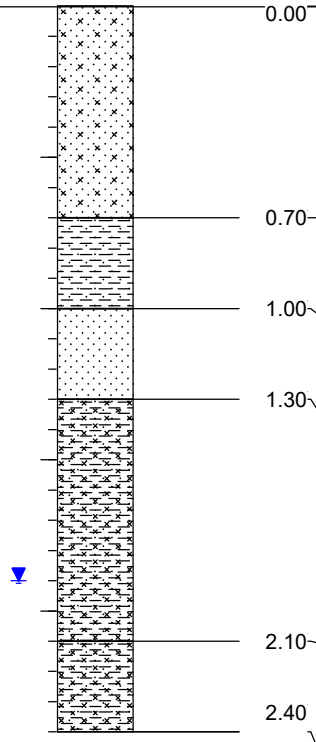
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP184**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, light to dark brown, LOOSE to MEDIUM DENSE, silty fine sand with some roots. Hillwash.
0.70	Tightly packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, sandy clay matrix (± 30%). Overall consistency is DENSE. Ferricrete.
1.00	Slightly moist, yellow brown and grey stained red brown, DENSE with loose pockets and contains VERY SOFT to SOFT ROCK fragments, material is partly ferruginised. Residual sandstone.
1.30	Moist, yellow brown blotched grey in places, SOFT to FIRM, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Residual siltstone.
2.10	Moist, yellow brown blotched grey in places, STIFF, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Residual siltstone.
2.40	2.40+ EOH, Refusal on hard rock siltstone.

NOTES:

Refusal at 2.40 m.
Groundwater seepage at 1.9 m.
Sidewalls stable.
No samples taken.
Excavated on previously illegally mined land.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286519
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/5/2019	*Y COORD:*	- 36490
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/5/2019		
	DURBAN-1ST.GPJ				

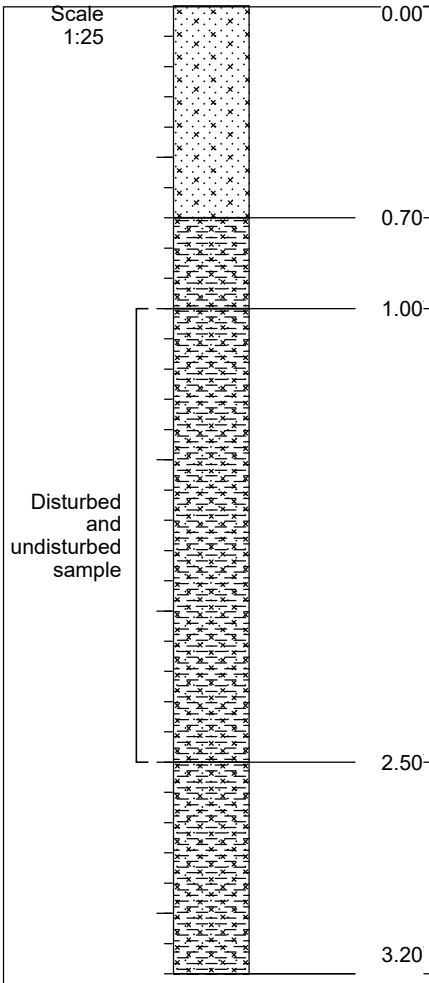
HOLE No: **C- TP184**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP185**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist, light grey brown, DENSE, intact, silty fine sand with some roots. Hillwash.

0.70 — Moist, black stained red brown, STIFF, intact, sandy silty clay. Material is ferruginised. Ferricrete.

1.00 — Moist, dark red brown blotched grey and orange brown and stained black, FIRM to STIFF,intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised. Residual tillite.

2.50 — Slightly moist to moist, yellow brown blotched grey, FIRM, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Residual tillite.

3.20

NOTES:

No refusal - pit stopped at 3.20 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 1.0--2.3 m (C-TP185/1).
Undisturbed sample taken at 1.0--2.5 m (C-TP185/2).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286717
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/5/2019	*Y COORD:*	- 36318
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/5/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP185**

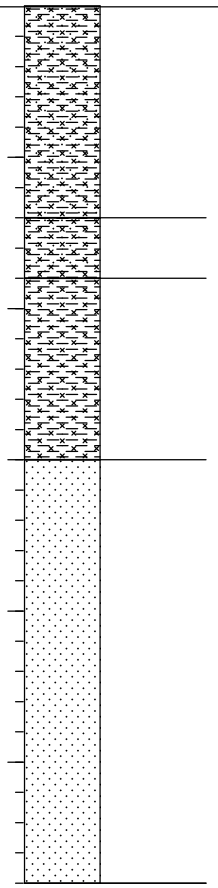
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP186**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, dark brown to black, DENSE shattered, sandy silty clay with some gravel and roots. Colluvium.
0.70	Loosely packed, brown and orange to red brown, sub-rounded to sub-angular gravel and cobbles in a matrix (± 30%) of slightly moist, dark brown, sandy silty clay. Overall consistency is DENSE. Ferricrete.
0.90	Moist, yellow to red brown and grey stained black, STIFF, intact, silty clay containing some VERY SOFT to SOFT ROCK fragments and HARD ROCk corestones. Residual tillite.
1.50	Highly to completely weathered, yellow brown stained black in places,STIFF, VERY SOFT to SOFT ROCK, fine grained tillite.
	2.90+ EOH, Refusal on hard rock siltstone.
2.90	

NOTES:

Refusal at 2.9 m.
No groundwater or seepage encountered.
Sidewalls stable
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286532
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/5/2019	*Y COORD:*	- 36322
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/5/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP186**

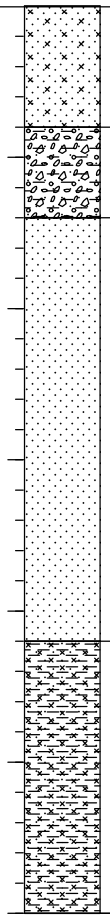
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Cato Ridge Land Development

HOLE No: **C- TP187**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, light to dark brown, LOOSE to MEDIUM DENSE, silty fine sand with some roots. Hillwash.

0.40 Tightly packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, sandy clay matrix (± 30%). Overall consistency is DENSE. Ferricrete.

0.70 Slightly moist, yellow brown and grey stained red brown, DENSE with loose pockets and conatins VERY SOFT to SOFT ROCK fragments, material is partly ferruginised. Residual sandstone.

2.10 Moist, yellow brown blotched grey in places, SOFT to FIRM, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK fragments. Residual siltstone.

3.00

NOTES:

No refusal - pit stopped at 3.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286345
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/5/2019	*Y COORD:*	- 36322
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/5/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP187**

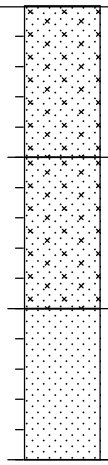
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP188**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown, LOOSE to MEDIUM DENSE, intact, silty fine sand with roots. Colluvium.
0.50	Loosely packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and cobbles in a slightly moist, brown, silty sand matrix. Overall consistency is LOOSE. Ferricrete.
1.00	Moist, yellow brown and grey brown, LOOSE, intact, silty sand with some clayey pockets and containing some sub-angular VERY SOFT to HARD ROCK fragments (up to 500 mm in diameter). Material is partly ferruginised. Residual sandstone or siltstone.
1.50	1.50+ EOH, refusal on hard rock sandstone.

NOTES:

Refusal at 1.50 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286163
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/6/2019	*Y COORD:*	- 36315
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/6/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP188**

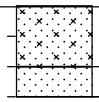
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP189**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown, LOOSE, intact, silty fine sand with abundant roots. Hillwash.
0.20	Pinkish grey brown and orange brown, sub-angular, HARD ROCK sandstone gravel, cobble and boulder sized ROCK fragments contained within a slightly moist, brown, LOOSE, silty sand. Overall consistency is DENSE with loose pockets.
0.30	0.30+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.
Excavated in area with extensive rock outcrop.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285923
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/6/2019	*Y COORD:*	- 36326
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/6/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP189**

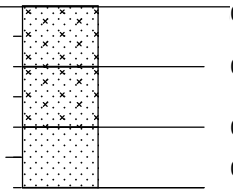
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP190**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown, LOOSE, intact, silty fine sand with abundant roots. Hillwash.
0.20	Slightly moist, brown, LOOSE, intact, silty fine sand with abundant roots, containing abundant sub-rounded, HARD ROCK cobbles and boulders of up to 250 mm in diameter. Hillwash.
0.40	Highly weathered, light brown stained orange brown, SOFT to MEDIUM HARD ROCK, fine grained sandstone.
0.60	0.60+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.6 m.
Water seepage at 2.8 m.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285736
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/6/2019	*Y COORD:*	- 36504
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/6/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP190**

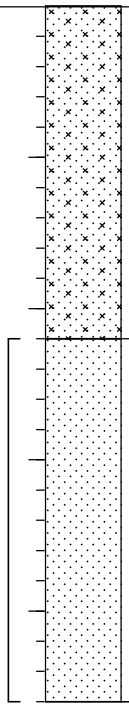
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Cato Ridge Land Development

HOLE No: **C- TP191**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00

Slightly moist, brown, LOOSE, intact, silty fine sand with abundant roots. Hillwash.

1.10

Disturbed sample

Moist, red brown stained orange brown, LOOSE, intact, silty sand containing some angular, hard rock cobbles and boulders of up to 1000 mm in diameter. Residual sandstone.

2.30+ EOH, Refusal on hard rock sandstone.

2.30

NOTES:

Refusal at 2.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 1.1--2.3 m (C-TP191/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285732
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/6/2019	*Y COORD:*	- 36319
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/6/2019		
	DURBAN-1ST.GPJ				

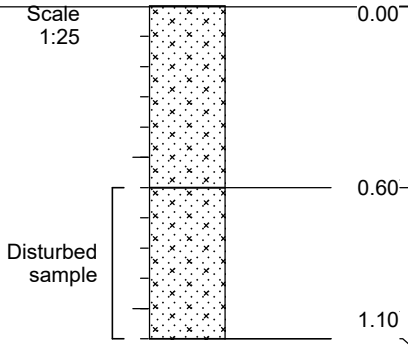
HOLE No: **C- TP191**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP192**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, brown to orange brown, LOOSE, intact, silty fine sand with abundant roots. Hillwash.

0.60 Loosely packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and cobbles and boulders of up to 650 mm in diameter in a moist, orange brown, silty sand matrix. Ferricrete.

1.10 1.10+ EOH, Refusal on hardrock sandstone.

NOTES:

Refusal at 1.1 m.
No groundwater or seepage encountered.
Sidewalls are stable
FI and CBR sample taken at 0.6--1.1 m (C-TP192/1).
Excavated within area surrounded by extensive rock outcrop.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285550
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/6/2019	*Y COORD:*	- 36332
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/6/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP192**

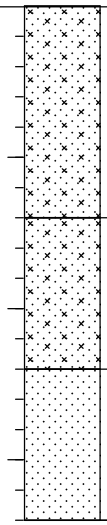
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HOLE No: **C- TP193**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown to orange brown, LOOSE, intact, silty fine sand with abundant roots. Hillwash.
0.70	Loosely packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and cobbles and boulders of up to 650 mm in diameter in a moist, orange brown, silty sand matrix. Ferricrete.
1.20	Highly weathered, orange brown stained black and red brown, VERY SOFT to SOFT ROCK, fine grained sandstone.
1.70	1.70+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.70 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285303
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/6/2019	*Y COORD:*	- 36164
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/6/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP193**

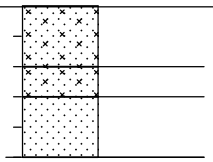
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Cato Ridge Land Development

HOLE No: **C- TP194**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown to orange brown, LOOSE, intact, silty fine sand with abundant roots. Hillwash.
0.20	Loosely packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and cobbles and boulders of up to 650 mm in diameter in a moist, orange brown, silty sand matrix. Ferricrete.
0.30	Highly weathered, orange brown stained black and red brown, VERY SOFT to SOFT ROCK, fine grained sandstone.
0.50	0.50+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.5 m.
No groundwater or seepage encountered.
Sidewalls are stable but can become unstable with removal of boulders.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285522
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/6/2019	*Y COORD:*	- 36145
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/6/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP194**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP195**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown, LOOSE, intact, silty fine sand with abundant grass.
0.30	Pinkish grey brown and orange brown, sub-angular, HARD ROCK sandstone gravel, cobble and boulder sized ROCK fragments contained within a slightly moist, brown, LOOSE, silty sand. Overall consistency is DENSE with loose pockets.
1.10	Highly weathered, light grey brown and orange brown, SOFT ROCK, fine grained sandstone. 1.70+ EOH, Refusal on hard rock sandstone.
1.70	

NOTES:

Refusal at 1.7 m.
No groundwater or seepage encountered.
Sidewalls stable
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285731
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/6/2019	*Y COORD:*	- 36141
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/6/2019		
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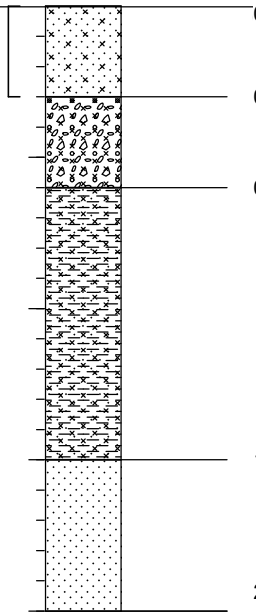
HOLE No: **C- TP195**

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HOLE No: **C- TP196**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00	Slightly moist, brown, LOOSE shattered, silty fine sand with roots. Hillwash.
0.30	Loosely packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel with occasional cobbles and boulders in a matrix (± 40%) of slightly moist, brown, silty sand. Overall consistency is LOOSE. Ferricrete.
0.60	Moist, orange brown stained yellow and red brown, FIRM, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT ROCK fragments. Residual siltstone.
1.50	Tightly packed, orange, brown and pinkish grey, fine to coarse, sub-angular to sub-rounded, strongly ferruginised gravel and some HARD ROCK cobbles and boulders of up to 650 mm in diameter in a moist, orange brown matrix (± 20%). Overall consistency is DENSE. Strongly ferruginised ferricrete.
2.00	2.0+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 2.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0--0.3 m (C-TP196/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285925
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/6/2019	*Y COORD:*	- 36141
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/6/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP196**

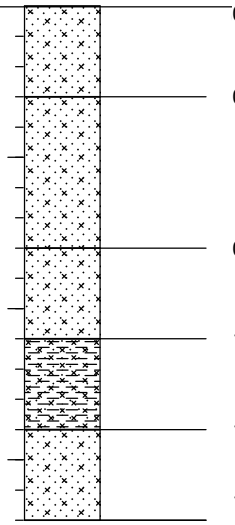
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Cato Ridge Land Development

HOLE No: **C- TP197**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown, LOOSE, intact, silty fine sand with roots. Hillwash.
0.30	Slightly moist, grey brown, LOOSE, intact, silty fine sand containing some ferruginised gravel. Hillwash.
0.80	Loosely packed, yellow brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, brown, silty sand matrix (± 30%). Overall consistency is LOOSE. Ferricrete.
1.10	Moist, orange brown stained yellow and red brown, FIRM, intact, sandy clayey silt or sandy silty clay containing some VERY SOFT ROCK fragments. Residual siltstone.
1.40	Orange brown, stained red brown, angular, SOFT to HARD ROCK, cobbles and boulders within pockets of ferruginised orange to red brown silty sand. Overall consistency is DENSE. Highly to completely weathered sandstone.
1.70	1.7+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.7 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286153
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/9/2019	*Y COORD:*	- 36129
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/9/2019		
	DURBAN-1ST.GPJ				

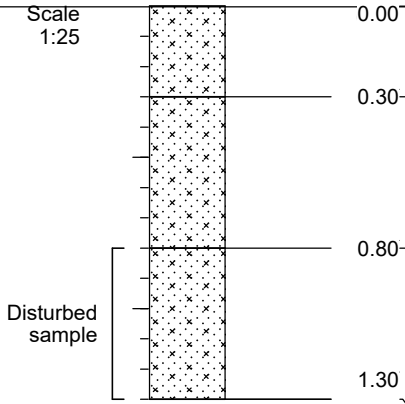
HOLE No: **C- TP197**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP198**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist, brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.30 — Slightly moist, grey brown, MEDIUM DENSE, intact, silty fine sand containing some roots. Hillwash.

0.80 — Tightly packed, red and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, grey brown, silty sand matrix (± 20%). Overall consistency is DENSE.

1.30 — 1.30+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.8--1.30 m (C-TP198/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286350
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/9/2019	*Y COORD:*	- 36126
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/9/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP198**

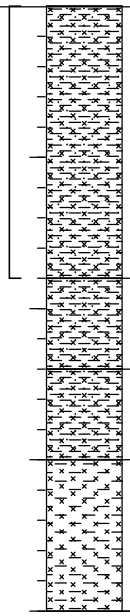
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Cato Ridge Land Development

HOLE No: **C- TP199**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to dry, black to dark brown, STIFF, shattered, sandy silty clay with some roots. Hillwash.

0.90 Slightly moist, dark and yellow brown, STIFF, shattered, sandy silty clay with some roots. Hillwash.

1.20 Tightly packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, brown and orange brown clayey silty sand matrix (± 20%). Overall consistency is MEDIUM DENSE to DENSE. Ferricrete.

1.50 Moist, yellow brown blotched dark brown, FIRM, intact, sandy silty clay or sandy clayey silt containing some ferruginised gravel, cobbles and boulders of up to 600 mm. Residual siltstone.

2.00 2.0+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 2.0 m.
No groundwater or seepage encountered.
Sidewalls stable but can become unstable with boulder removal.
FI sample taken at 0--0.4 m (C-TP199/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286529
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/9/2019	*Y COORD:*	- 36125
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/9/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP199**

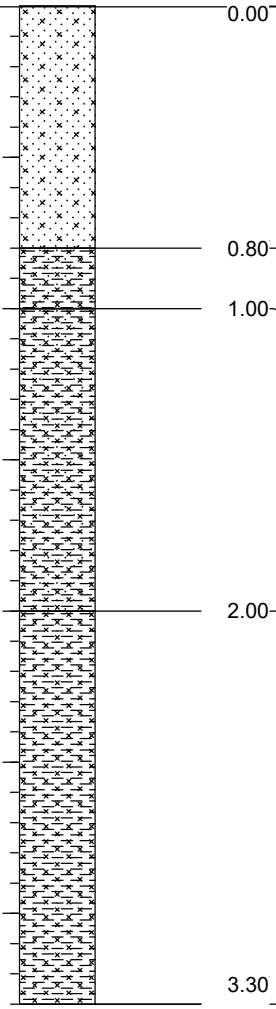
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Cato Ridge Land Development

HOLE No: **C- TP200**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.80 Moist, grey to black and yellow brown, SOFT, intact, sandy silty clay. Hillwash.

1.00 Moist, black and red, FIRM to STIFF, intact, sandy silty clay or sandy clayey silt containing some HARD ROCK cobbles. Material is ferruginised. Residual siltstone.

2.00 Moist, grey and red brown, FIRM, intact, silty clay or sandy clayey silt containing occasional sub-rounded hard rock sandstone boulders of up to 600 mm. Residual sandstone.

3.30

NOTES:

No refusal - pit stopped at 3.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 1.0--2.0 m (C-TP200/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286720
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/9/2019	*Y COORD:*	- 36125
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/9/2019		
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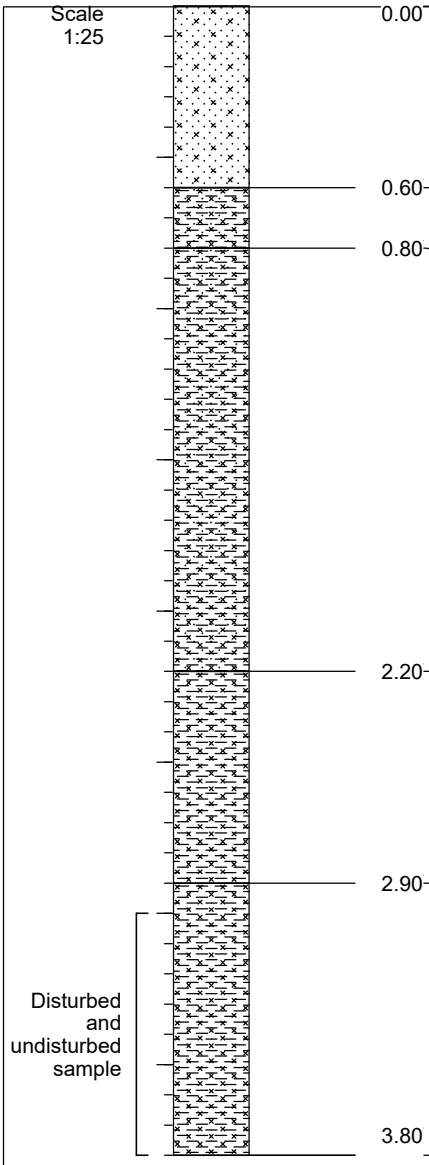
HOLE No: **C- TP200**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP201**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.60 Moist, grey to black and yellow brown, SOFT, intact, sandy silty clay. Hillwash.

0.80 Moist, black and red, FIRM to STIFF, intact, sandy silty clay or sandy clayey silt. Material is ferruginised. Residual siltstone.

2.20 Moist, grey and red brown, FIRM, intact, silty clay or sandy clayey silt. Residual sandstone.

2.90 Moist, grey and yellow brown, FIRM to STIFF, intact, silty clay or sandy clayey silt. Residual sandstone.

3.80

NOTES:

No refusal - pit stopped at 3.8
No groundwater or seepage encountered.
Sidewalls stable.
FI sample taken at 3.0--3.8 m (C-TP201/1).
Undisturbed sample taken at 3.0--3.2 m (C-TP201/2).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286923
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/9/2019	*Y COORD:*	- 36119
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/9/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP201**

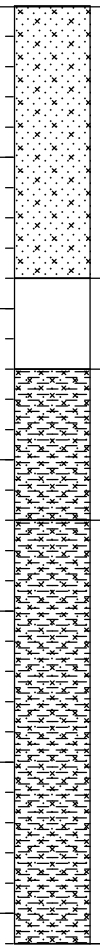
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Cato Ridge Land Development

HOLE No: **C- TP202**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Dry, light grey brown, DENSE, intact, silty fine sand with roots. Note: Partially includes boulder rubble. Hillwash
0.90	Dry to slightly moist, grey to black and yellow brown, STIFF, intact, sandy silty clay. Hillwash.
1.20	Dry to slightly moist, black and red, STIFF, intact, sandy silty clay or sandy clayey silt. Material is ferruginised. Residual siltstone.
1.70	Slightly moist, yellow brown, STIFF, intact, sandy silty clay or sandy clayey silt with some VERY SOFT fragments. Residual siltstone.
3.10	

Disturbed sample

NOTES:

No refusal - pit stopped at 3.1m
No groundwater seepage.
Sidewalls unstable where fill occurs stable from 1.0--3.1 m.
FI sample taken at 1.7--3.10 m (C-TP202/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287304
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/9/2019	*Y COORD:*	- 35919
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/9/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP202**

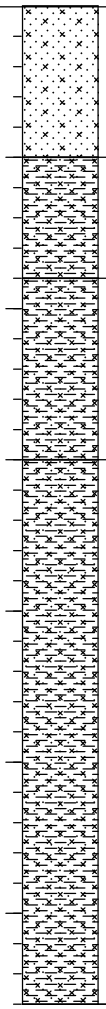
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Cato Ridge Land Development

HOLE No: **C- TP203**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.
0.50	Moist, grey to black and yellow brown, STIFF, intact, sandy silty clay. Hillwash.
0.90	Moist, black and red, FIRM to STIFF, intact, sandy silty clay or sandy clayey silt containing some HARD ROCK cobbles. Material is ferruginised. Residual siltstone.
1.50	Moist, orange brown, FIRM, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK and occasional cobble sized, HARD ROCK fragments. Residual siltstone.
3.30	

NOTES:

No refusal - pit stopped at 3.30 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3287119
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/9/2019	*Y COORD:*	- 35935
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/9/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP203**

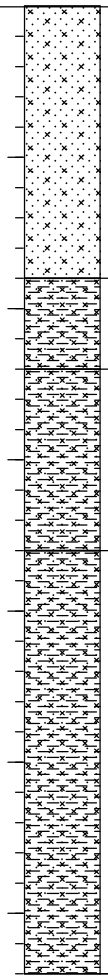
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Cato Ridge Land Development

HOLE No: **C- TP204**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.
0.90	Moist, grey to black and yellow brown, STIFF, intact, sandy silty clay. Hillwash.
1.20	Moist, black and red, FIRM to STIFF, intact, sandy silty clay or sandy clayey silt containing some HARD ROCK cobbles. Material is ferruginised. Residual siltstone.
1.80	Moist, orange brown, FIRM, intact, sandy silty clay or sandy clayey silt containing some VERY SOFT to SOFT ROCK and occasional cobble sized, HARD ROCK fragments. Residual siltstone.
3.20	

NOTES:

No refusal - pit stopped at 3.2 m.
No groundwater or seepage encountered.
Sidewalls stable
No samples taken.

CONTRACTOR: Executive Plant Hire
MACHINE: TLB
PROFILED BY: N. Khanyile
TYPE SET BY: M. Moromane
DURBAN-1ST.GPJ

INCLINATION:
DIAM:
DATE DRILLED: 9/9/2019
DATE PROFILED: 9/10/2019

ELEVATION:
X COORD: - 3286913
Y COORD: - 35931

HOLE No: **C- TP204**

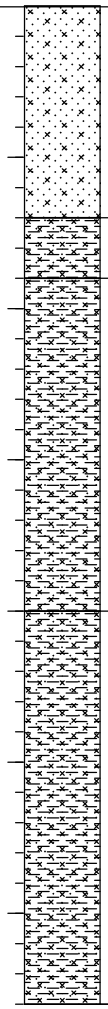
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP205**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.70 Moist, grey to black and yellow brown, SOFT, intact, sandy silty clay. Hillwash.

0.90 Moist, black and red, FIRM, intact, sandy silty clay or sandy clayey silt. Material is ferruginised. Residual siltstone.

2.00 Moist, grey and red brown, FIRM, intact, sandy silty clay or sandy clayey silt. Residual sandstone.

3.30

NOTES:

No refusal - pit stopped at 3.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286710
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35926
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP205**

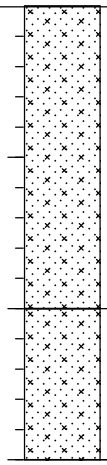
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP206**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist to moist, brown, LOOSE to MEDIUM DENSE, intact, silty fine sand with roots. Hillwash.

1.00 Loosely packed, orange brown and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel cobbles and boulders of up to 500 mm in a moist, brown, silty sand matrix (± 40%). Overall consistency is LOOSE. Ferricrete.

1.50 1.50+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.50 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286537
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35929
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

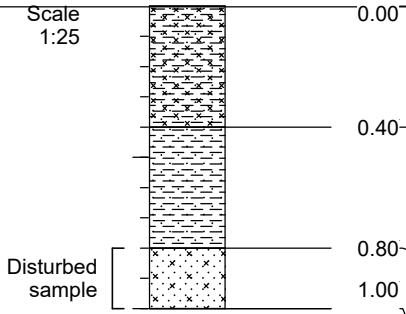
HOLE No: **C- TP206**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP207**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist, dark grey brown, SOFT, becoming stiff with depth, micro-shattered, sandy silty clay with roots. Colluvium.

0.40 — Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.

0.80 — Slightly moist, yellow to orange brown stained red brown, LOOSE to MEDIUM DENSE, silty sand containing some VERY SOFT to SOFT ROCK fragments. Residual sandstone.

1.00 — 1.0+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.0 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR sample taken at 0.8--1.0 m.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286343
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35941
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP207**

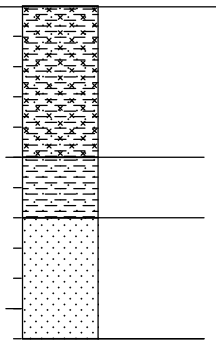
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP208**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, dark grey brown, SOFT, becoming stiff with depth, micro-shattered, sandy silty clay with roots. Colluvium.
0.50	
0.70	Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.
1.10	Highly weathered, grey brown to orange brown, SOFT to MEDIUM HARD, fine grained sandstone.
	1.0+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286143
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35930
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP208**

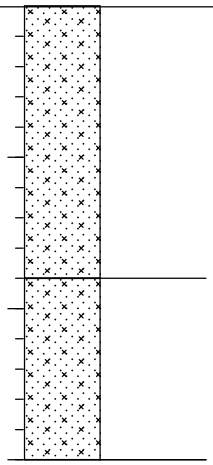
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Cato Ridge Development Company
Cato Ridge Land Development

HOLE No: **C- TP209**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, intact, silty fine sand with roots. Hillwash.

0.90 Tightly packed, yellow brown stained red brown, fine to coarse, sub-angular, ferruginised gravel in a slightly moist, yellow brown, silty sand matrix (± 10%). Overall consistency is DENSE. Residual sandstone.

1.50 1.50+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.5 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.
Excavated near sand mined area.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285928
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/11/2019	*Y COORD:*	- 35939
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/11/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP209**

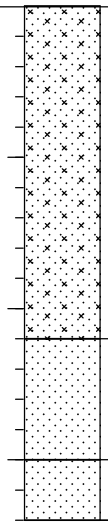
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP210**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, LOOSE, intact, silty fine sand with roots. Hillwash.

1.10 Tightly packed, yellow to orange brown stained red brown, fine to coarse, sub-angular, sandstone gravel, cobbles and occasional boulders of up to 460 mm in a moist, orange silty sand. Overall consistency is DENSE. Material is ferruginised. Residual sandstone.

1.50

1.70 Highly weathered, grey to yellow brown stained red brown, SOFT to MEDIUM HARD ROCK, fine grained sandstone.

1.7+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.7 m.
No groundwater or seepage encountered.
Sidewalls are stable
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285798
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35910
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/11/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP210**

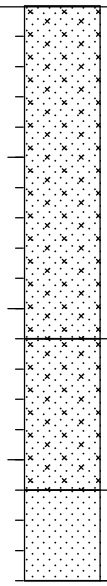
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Cato Ridge Land Development

HOLE No: **C- TP211**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

1.10 Loosely packed, yellow brown stained red brown, fine to coarse, sub-angular, ferruginised gravel in a slightly moist, yellow brown, silty sand matrix (± 15%). Overall consistency is LOOSE. Residual.

1.60 Tightly packed, dark red brown and brown, fine to coarse, sub-angular to sub-rounded, ferruginised gravel in a slightly moist, clayey sand matrix (± 15%). Overall consistency is DENSE. Residual sandstone.

1.90 1.90+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.90 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285601
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35919
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

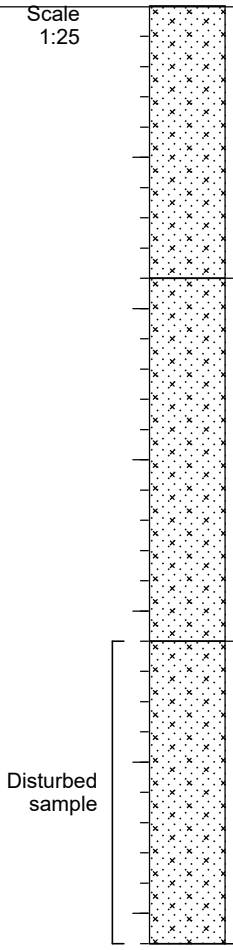
HOLE No: **C- TP211**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP212**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 — Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.90 — Slightly moist, yellow brown stained red, MEDIUM DENSE to DENSE, intact, silty sand containing some ferruginised gravel. Residual sandstone.

2.10 — Slightly moist, yellow brown and red brown, DENSE, intact, silty sand. Material is strongly ferruginised.

3.10

NOTES:

No refusal - pit stopped at 3.1 m.
No groundwater or seepage encountered.
Sidewalls are stable.
FI sample taken at 2.10--3.10 m (C-TP212/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285401
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35922
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP212**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

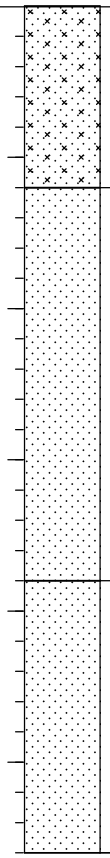
aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP213**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25

Disturbed sample



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash.

0.60 Slightly moist, yellow brown stained red, MEDIUM DENSE to DENSE, intact, silty sand containing some ferruginised gravel. Residual sandstone.

1.90 Slightly moist, yellow brown and red brown, DENSE, intact, silty sand. Material is strongly ferruginised.

2.8+ EOH, Refusal on hard rock sandstone

2.80

NOTES:

Refusal at 2.8 m.
No groundwater or seepage encountered.
Sidewalls stable
FI and CBR sample taken at 0--0.6 m (C-TP213/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285170
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/12/2019	*Y COORD:*	- 35950
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/12/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP213**

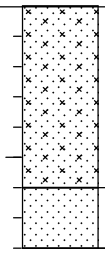
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Cato Ridge Land Development

HOLE No: **C- TP214**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, LOOSE, intact, silty fine sand with roots.

0.60 Tightly packed,brown, black orange brown, fine to coarse, sub-angular to sub-rounded, ferruginised gravel with some HARD ROCK sandstone in a slightly moist, brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.80

0.8+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.8 m.
No groundwater or seepage encountered.
Sidewalls stable but unstable wih boulder removal.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285342
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/12/2019	*Y COORD:*	- 35769
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/12/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP214**

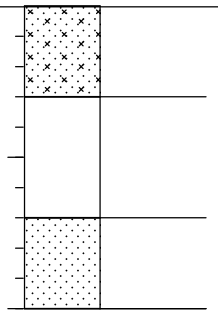
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Cato Ridge Land Development

HOLE No: **C- TP215**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown, LOOSE, intact, silty fine sand with roots.
0.30	Tightly packed,brown, black orange brown, fine to coarse, sub-angular to sub-rounded, ferruginised gravel with some HARD ROCK sandstone in a slightly moist, brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete. Contains some boulders up to 700 mm in diameter.
0.70	Highly weathered, grey brown to orange brown stained red brown, SOFT to MEDIUM HARD, fine grained sandstone.
1.00	1.0+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.0 m.
No groundwater or seepage encountered.
Sidewalls unstable with removal of boulders..
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285520
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35666
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP215**

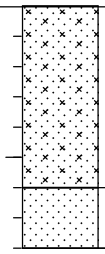
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP216**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, LOOSE, intact, silty fine sand with roots.

0.60 Tightly packed,brown, black orange brown, fine to coarse, sub-angular to sub-rounded, ferruginised gravel with some HARD ROCK sandstone in a slightly moist, brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.80 0.8+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.8 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285754
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35684
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP216**

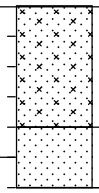
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Cato Ridge Land Development

HOLE No: **C- TP217**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, brown, LOOSE, intact, silty fine sand with roots.

0.40 Tightly packed,brown, black orange brown, fine to coarse, sub-angular to sub-rounded, ferruginised gravel with some roots and HARD ROCK sandstone in a slightly moist, brown, silty sand matrix (± 20%). Overall consistency is DENSE. Ferricrete.

0.60 0.6+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.6 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285714
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35467
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP217**

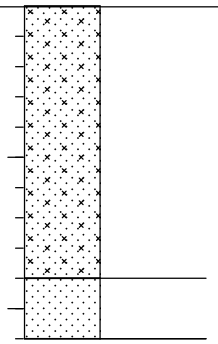
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP218**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown LOOSE, silty fine sand containing abundant hard rock sandstone cobbles and boulders of up to 900 mm and contains roots. Hillwash.

0.90 Tightly packed, yellow to orange brown stained red brown, fine to coarse, sub-angular, sandstone gravel, cobbles and occasional boulders of up to 460 mm in a moist, orange silty sand. Overall consistency is DENSE. Material is ferruginised. Residual sandstone.

1.10 1.1+ EOH, Refusal on hard rock sandstone

NOTES:

Refusal at 1.1 m.
No groundwater or seepage encountered.
Sidewalls become unstable with the removal of cobbles and boulders.
FI and CBR sample taken at 0.9--1.1 m, only fine component sampled (No boulders).
Excavated within a sand mined area.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285954
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35630
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/11/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP218**

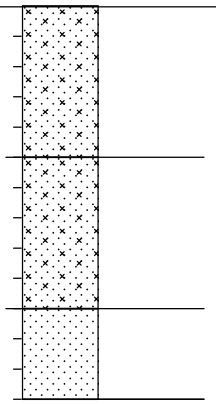
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HOLE No: **C- TP219**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots. Hillwash
0.50	Tightly packed, pinkish grey to orange brown and black, fine to coarse, sub-angular and sub-rounded ferruginsed gravel, cobbles and boulders of up to 800 mm diameter in a slightly moist, brown, silty sand matrix. Overall consistency is LOOSE to DENSE.
1.00	Highly to completely weathered, pinkish grey to orange brown, SOFT to HARD ROCK, fine grained sandstone. Recovered as SOFT to HARD ROCK fragments with LOOSE silty sand pockets.
1.30	1.30+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.3 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3285957
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35458
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP219**

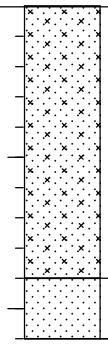
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HOLE No: **C- TP220**
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JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand containing some sub-angular to sub-rounded, HARD ROCK sandstone boulders of up to 850 mm in diameter. Hillwash.

0.90 Loosely packed, Brown and red brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, brown, silty sand matrix (± 30%). Overall consistency is MEDIUM DENSE. Ferricrete.

1.10 1.1+ EOH, refusal on hard rock sandstone

NOTES:

Refusal at 1.1 m.
No groundwater or seepage encountered.
Sidewalls unstable due to removal of boulders.
No samples taken.
Excavated near illegally mined area, scattered boulders in the area.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286120
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35759
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP220**

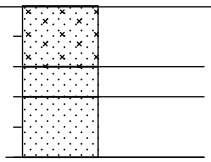
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Cato Ridge Development Company
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HOLE No: **C- TP221**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, LOOSE, intact, silty fine sand containing some sub-angular to sub-rounded, HARD ROCK sandstone boulders of up to 550 mm in diameter. Hillwash.
0.20	Loosely packed, Brown and red brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel in a slightly moist, brown, silty sand matrix (± 30%). Overall consistency is MEDIUM DENSE. Ferricrete.
0.30	Highly to completely weathered, grey brown to orange brown, SOFT to HARD ROCK, fine grained sandstone. Recovered as sub-angular, HARD ROCK, cobble and boulder sized (up to 500 mm).
0.50	0.50+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.5 m.
No groundwater or seepage encountered.
Sidewalls stable but can become unstable with removal of boulders.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286105
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35543
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
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HOLE No: **C- TP221**

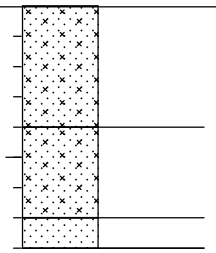
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HOLE No: **C- TP222**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, brown, LOOSE, intact, silty fine sand with roots. Hillwash.
0.40	Tightly packed, brown and orange brown,coarse to fine, sub-angular to sub-rounded, ferruginised sandstone gravel in a slightly moist, brown silty sand matrix (± 30%). Overall consistency is DENSE, contains abundant roots.
0.70	Highly to completely weathered, orange to red brown, VERY SOFT to SOFT ROCK, fine grained sandstone.
0.80	0.8+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.8 m.
No groundwater or seepage encountered.
Sidewalls stable
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286346
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35758
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

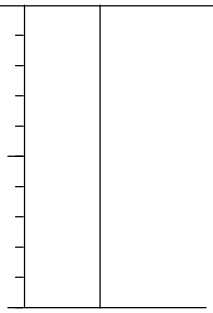
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Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP223**
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JOB NUMBER: **505788**



CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP223**

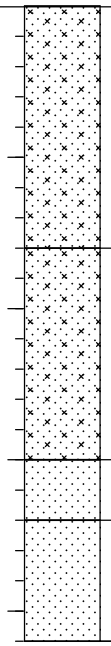
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HOLE No: **C- TP224**
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JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey bown, LOOSE to MEDIUM DENSE, intact, silty fine sand with roots.
0.80	Tightly packed, black and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and occasional cobbles in a slightly moist, grey brown, silty sand matrix (± 20%). Overall consistency is MEDIUM DENSE to DENSE. Ferricrete.
1.50	Moist, brown and orange brown, DENSE, intact, silty sand containing some VERY SOFT to SOFT ROCK fragments. Material is ferruginised. Residual sandstone.
1.70	Highly to completely weathered, orange brown stained red brown, VERY SOFT to SOFT ROCK with some cobble to boulder sized (up to 600 mm in diameter) HARD ROCK fragments, fine grained sandstone.
2.10	2.1+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 2.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286536
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35545
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP224**

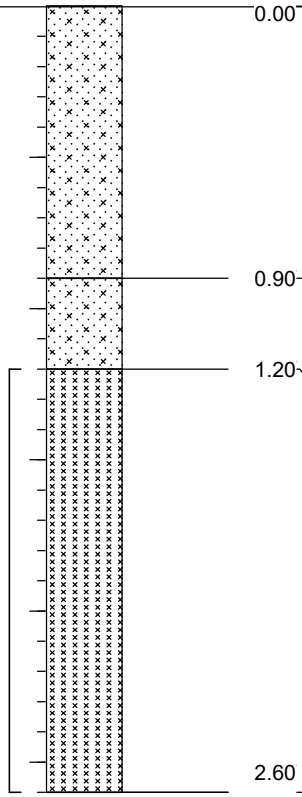
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Cato Ridge Land Development

HOLE No: **C- TP225**
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JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey bown, LOOSE to MEDIUM DENSE, intact, silty fine sand with roots.

0.90 Tightly packed, black and brown, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and occasional cobbles in a slightly moist, grey brown, silty sand matrix (± 20%). Overall consistency is MEDIUM DENSE to DENSE. Ferricrete.

1.20 Slightly moist, orange brown stained grey and red brown, intact, sandy clayey silt containing some VERY SOFT ROCK fragments. Material is ferruginised. Residual siltstone becoming completely weathered from 2.10 m.

2.6+ EOH, Refusal on hard rock sandstone.

2.60

NOTES:

Refusal at 2.6 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR samples taken at 1.2--2.6 m (C-TP225/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3286706
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/10/2019	*Y COORD:*	- 35740
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/10/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP225**

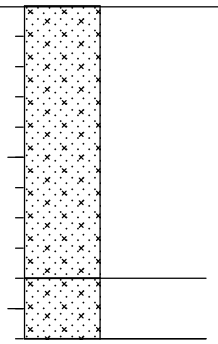
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HOLE No: **C- TP226**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots up to 0.4m. Hillwash

0.90 Tightly packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and some cobbles in a slightly moist, grey brown to brown silty sand matrix (± 20%). Overall consistency is MEDIUM DENSE to DENSE. Ferricrete.

1.10 1.10+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.1 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288109
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/12/2019	*Y COORD:*	- 36220
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/12/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP226**

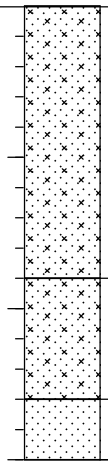
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Cato Ridge Land Development

HOLE No: **C- TP227**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots up to 0.4m. Hillwash

0.90 Tightly packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and some cobbles in a slightly moist, grey brown to brown silty sand matrix (± 20%). Overall consistency is MEDIUM DENSE to DENSE. Ferricrete.

1.30

1.50 Highly to completely weathered, orange and grey brown, HARD ROCK (with pockets of LOOSE, silty sand), fine grained sandstone.

1.5+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.5 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.
Scattered boulders on surface.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288089
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/12/2019	*Y COORD:*	- 35999
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/12/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP227**

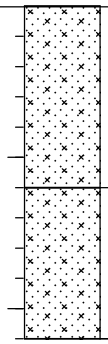
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HOLE No: **C- TP228**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots up to 0.4m. Also contains sub-rounded boulders of up to 500 mm in diameter. Hillwash

0.60 Tightly packed, brown and black, fine to coarse, sub-rounded to sub-angular, ferruginised gravel and some cobbles in a slightly moist, grey brown to brown silty sand matrix (± 20%). Overall consistency is MEDIUM DENSE to DENSE. Contains abundant HARD ROCK sandstone boulders of up to 450 mm in diameter. Ferricrete.

1.10 1.10+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.1 m.
No groundwater or seepage encountered.
Sidewalls are stable
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288308
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/12/2019	*Y COORD:*	- 35985
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/12/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP228**

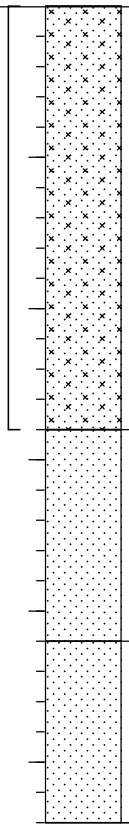
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Cato Ridge Land Development

HOLE No: **C- TP229**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots up to 0.6m. Hillwash

1.40 Slightly moist, grey brown stained orange to red brown, DENSE, intact silty sand containing some ferruginised gravel and occasional cobbles. Residual sandstone.

2.10 Slightly moist, orange brown stained red brown, STIFF, intact, sandy silt. Material is partly ferruginised. Remnant bedding still visible. Completely weathered.

2.70 2.70+ EOH, Refusal on medium hard to hard sandstone.

NOTES:

Refusal at 2.70 m.
No groundwater or seepage encountered.
Sidewalls stable.
FI and CBR samples taken at 0-1.4 m (C-TP229/1).
Excavated near rock outcrop.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288312
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/13/2019	*Y COORD:*	- 36203
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/13/2019		
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HOLE No: **C- TP229**

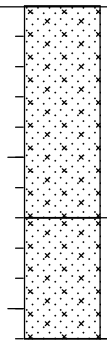
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Cato Ridge Land Development

HOLE No: **C- TP230**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots up to 0.4m. Hillwash

0.70 Tightly packed, brown and black, fine to coarse, sub-rounded to sub-angular , ferruginised gravel and some cobbles in a slightly moist, grey brown to brown silty sand matrix (± 20%). Overall consistency is MEDIUM DENSE to DENSE. Ferricrete. Also with occasional boulders of up to 300 mm.

1.10 1.1+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.1 m.
No groundwater or seepage encountered.
Sidewalls are stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288514
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/13/2019	*Y COORD:*	- 36423
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/13/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP230**

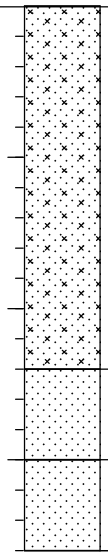
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aurecon **Cato Ridge Development Company**
Cato Ridge Land Development

HOLE No: **C- TP231**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots up to 0.4m. Hillwash

1.20 Tightly packed, brown and black, fine to coarse, sub-rounded to sub-angular , ferruginised gravel and some cobbles and boulders of up to 600 mm in diameter in a slightly moist, grey brown to brown silty sand matrix (± 20%). Overall consistency is MEDIUM DENSE to DENSE.

1.50 Highly weathered to completely weathered, reddish brown and pinkish grey, soft to occasionally HARD ROCK, fine grained sandstone.

1.80 1.8+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.8 m.
No groundwater or seepage encountered.
Sidewalls stable
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288493
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/13/2019	*Y COORD:*	- 36199
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/13/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP231**

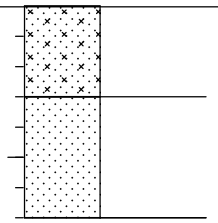
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Cato Ridge Development Company
Cato Ridge Land Development

HOLE No: **C- TP232**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00	Slightly moist, grey brown, LOOSE, intact, silty fine sand with roots up to 0.4m. Hillwash
0.30	Tightly packed, brown and black, fine to coarse, sub-rounded to sub-angular , ferruginised gravel and some cobbles and boulders of up to 350 mm in diameter in a slightly moist, grey brown to brown silty sand matrix (± 20%). Overall consistency is MEDIUM DENSE to DENSE.
0.70	0.7+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.7 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.
Rock outcrop observed.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288483
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/13/2019	*Y COORD:*	- 35969
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/13/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP232**

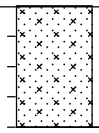
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP233**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00

Slightly moist grey brown, LOOSE, silty fine sand with roots. Hillwash.

0.40

0.4+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 0.4 m.
No groundwater or seepage encountered.
Sidewalls stable.
No samples taken.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288657
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/13/2019	*Y COORD:*	- 36183
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/13/2019		
	DURBAN-1ST.GPJ				

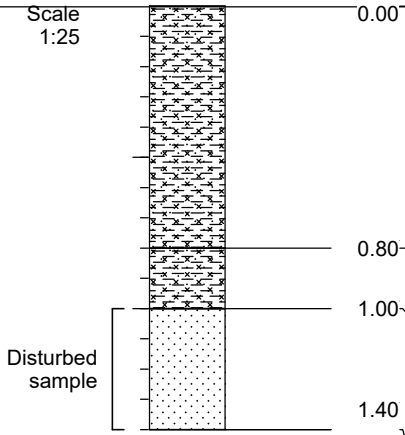
HOLE No: **C- TP233**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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HOLE No: **C- TP234**
Sheet 1 of 1

JOB NUMBER: **505788**



0.00 Slightly moist, dark grey brown, SOFT, becoming STIFF with depth, micro-shattered, sandy silty clay with roots. Colluvium.

0.80 Loosely packed, grey brown black, sub-angular to sub-rounded, fine to coarse, ferruginised gravel in a matrix of slightly moist, grey brown, fine sandy clay. Overall consistency is LOOSE. Ferricrete.

1.00 Highly to completely weathered, orange brown and grey brown, generally VERY SOFT to SOFT and occasionally HARD ROCK, fine grained sandstone. Recovered as angular sub-angular gravel, cobbles and boulders of up to 250mm and pockets of silty sand.

1.40 1.4+ EOH, Refusal on hard rock sandstone.

NOTES:

Refusal at 1.4 m.
No groundwater or seepage encountered.
Sidewalls stable but can become unstable with boulder removal.
FI and CBR sample taken at 1.0--1.4 m (C-TP234/1).

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288728
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/13/2019	*Y COORD:*	- 36398
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/13/2019		
	DURBAN-1ST.GPJ				

HOLE No: **C- TP234**

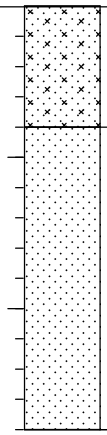
Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

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Cato Ridge Land Development

HOLE No: **C- TP235**
Sheet 1 of 1

JOB NUMBER: **505788**

Scale 1:25



0.00 Slightly moist, grey brown, LOOSE, intact, silty fine sand containing some gravel and abundant grass roots. Hillwash

0.40 Highly to moderately weathered , purplish grey, hard rock, fine grained sandstone. Recovered as angular cobbles and boulders of up to 600mm.

1.4+ EOH, Refusal on hard rock sandstone.

1.40

NOTES:

Refusal at 1.4 m.
No groundwater or seepage encountered.
Sidewalls stable but unstable with boulder removal.
No samples taken.
Observed scattered boulders.

CONTRACTOR:	Executive Plant Hire	*INCLINATION:*		*ELEVATION:*	
MACHINE:	TLB	*DIAM:*		*X COORD:*	- 3288873
PROFILED BY:	N. Khanyile	*DATE DRILLED:*	9/13/2019	*Y COORD:*	- 36577
TYPE SET BY:	M. Moromane	*DATE PROFILED:*	9/13/2019		
	DURBAN-1ST.GPJ				

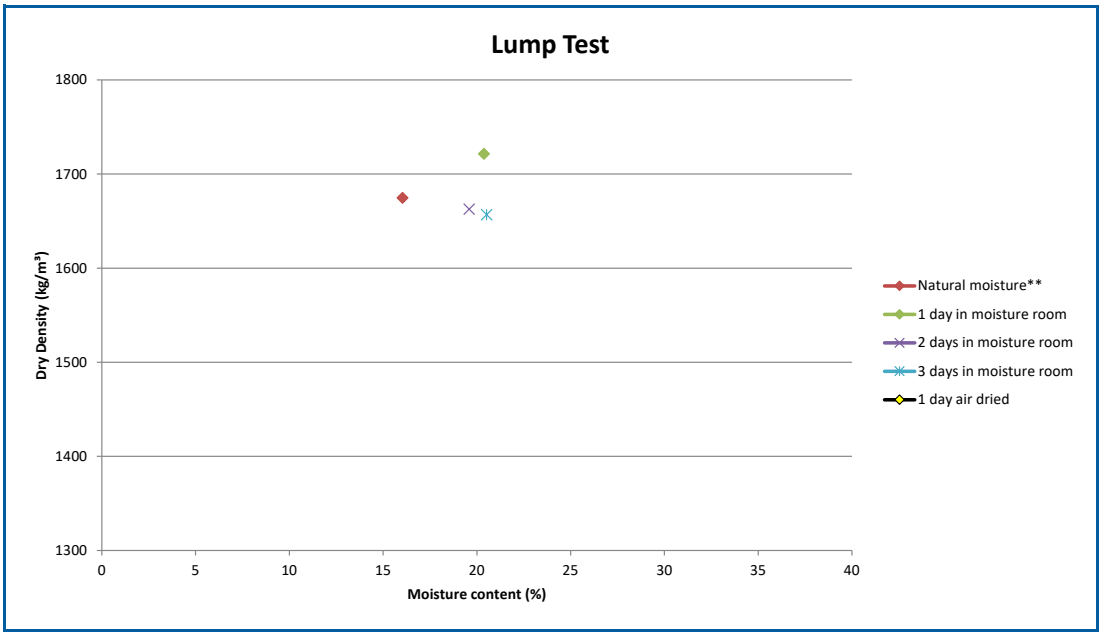
HOLE No: **C- TP235**

Report ID: _ZA TRAIL PIT LOG-CT || Project: DURBAN-1ST.GPJ || Library: GINT STD AGS 4_0_SA.GLB || Date: December 20, 2019

Pidgeon Lump Test

Project:	Cato Ride Township Development
Client:	Sgs Metrolab
Soillab Job Nr:	S19-2300
Sample :	TP 104/3-1100-1600

Sample	Moisture	Bulk Density	Dry Density
	%	kg/m³	kg/m³
Natural moisture**	16.0	1943	1675
1 day air dried	6.7	1261	1182
1 day in moisture room	20.4	2072	1722
2 days in moisture room	19.6	1989	1663
3 days in moisture room	20.5	1997	1657



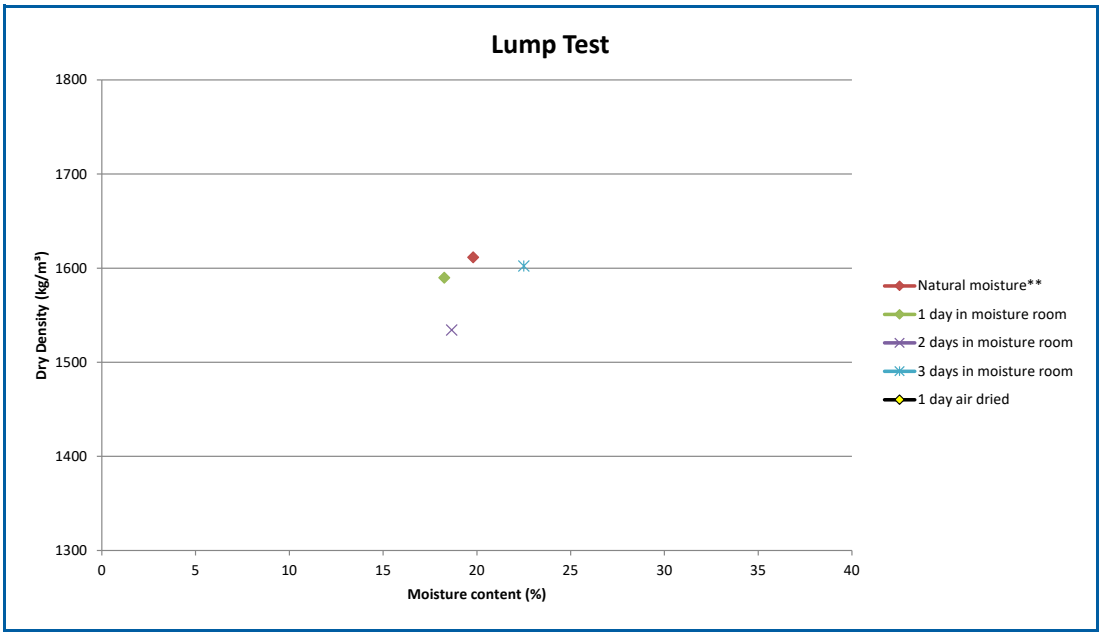
GEOLAB
Part of the SMEC Group

Geotechnical Laboratory
T +27 12 813 4936
E Tinus.Grobler@smec.com
Geolab
www.soillab.co.za

Pidgeon Lump Test

Project:	Cato Ride Township Development
Client:	Sgs Metrolab
Soillab Job Nr:	S19-2300
Sample :	TP 170/1-1400-2100

Sample	Moisture	Bulk Density	Dry Density
	%	kg/m³	kg/m³
Natural moisture**	19.8	1931	1612
1 day air dried	6.8	1940	1817
1 day in moisture room	18.3	1880	1590
2 days in moisture room	18.7	1820	1534
3 days in moisture room	22.5	1963	1602



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