



Atkinson Survey and Designs

11 Protea Hills, Maitland Street, Blanco, George, 6529. Tel 081 831 2469

21 October 2021

SUMMARY OF GEOTECHNICAL REPORTS

Overview

Samples of soil was taken within the proposed dam site at three different sites. These samples are representative of the different types of soil found at the various sites. The samples were sent to both Roadlab in Stikland and to Control Geosciences in Cape Town.

Clay content

CT 14977 was determined according to the SANS 6244:2006. The results were a clay content of 18.7% This is on the sample given.

Double Hydrometer test

CT 14977B was done according to ASTM D422 and the following results were obtained:

% Clay	24
% Silt	52
% Sand	24
% Gravel	0

95% of the partial size was smaller than 0.3mm.

The Plasticity Index is 12 and Liquid limit is 30.

The Clay percentage is 24% which falls at the bottom end of the Medium Potential Expansiveness.

Maximum Dry density/ Optimum Moisture content

The test was done according to SANS 3001 GR 30/ GR 31 /GR20

The maximum Dry Density Kg/m³ is 1937

The optimum Moisture content is 8.2%

Compaction and Mould Permeameter

The result is with 8.2% moisture a MDD of 93%

The average Permeability is 1.09E-4m/s

Summary

The tests were done on the samples of all types of soil found at these sites. It is important that it is understood that the dam construction will be done with the soil found in the dam basin and some of the material not suitable for dam building will be removed and used to rehabilitate the dams no longer in use. The whole basin and inner parts of the dam will be layered with clay to a thickness of at least 500mm. This will be done to ensure that the dam does not leak. The clay layer is starting only at a 2m depth.

Attached please find copies of original test results.



Roadlab Laboratories (Pty) Ltd

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 Cape Town ,7530

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CLIENT Swartvlei

ATTENTION: Mr Allan Atkinson

TEST REPORT: Aggregate Analysis: SANS 3001 (AG1; AG2; AG4; AG5; AG10; AG14; AG20; AG21 & SANS 5848)

Job No	CT14977 C
Ref. No	Not Specified
Date	09.07.2021
Tested/Sampled By:	Client
Date Sampled / Received	29.06.2021
Date Tested	29.06.2021
Sampling Method	As per client
Test Method	CLAY CONTENT (SANS 6244 : 2006)
Project	Swartvlei Equisition Estate
Sampled By	Client
Delivered By	Client
Temp. °C in Laboratory	25°C
Laboratory Tester	Client
Environmental Conditions	Sunny
Remarks / notes	None

Special instructions

None

Remarks:

1. Opinions & Interpretations are not included in our scope of works.
2. The samples were subjected to analysis according to test method (SANS) (TMH) (DOT) (ASTM).
3. The test results reported relate to the samples tested.
4. Further use of the above information is not the responsibility or liability of Roadlab.
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JOB NO: CT14977 C REF.: Not Specified Date: 09.07.2021

Customer : Swartvlei

Project : Swartvlei Equisition Estate

Date Received : 29.06.2021

Date Reported : 09.07.2021

Lab. Tester : Client

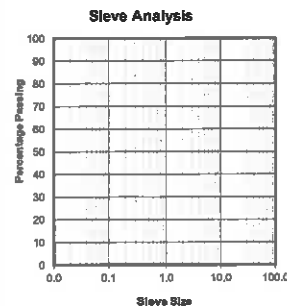
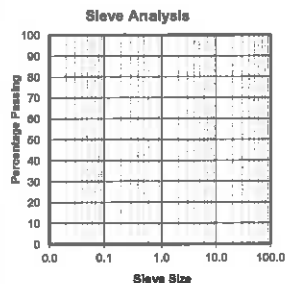
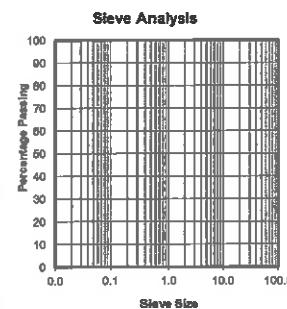
Sampling Method As per client

Attention : Mr Allan Atkinson

CLAY CONTENT (SANS 6244 :2006)

SIEVE ANALYSIS

Sample Position	Not Specified					
Depth	Not Specified					
Source	Not Specified					
Sample Number	53269					
Description of Materials	DK Yellowish Weathered Shale	Spec		Spec		Spec
Sieve Size						
75.0						
50.0						
37.5						
28.0						
20.0						
14.0						
10.0						
7.1						
5.0						
2.0						
1.0						
0.600						
0.425						
0.150						
0.075						
Clay Content	18.7					



MATERIAL PROPERTIES

ACV (Dry)					
ACV (Wet)					
10% FACT (Dry)					
10% FACT (Wet)					
FI					
ADB					
ALD					
ARD					
BRD					
W.A					
Sand Equivalent*					
Resistivity					
pH					
Conductivity					

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[Signature]
 Mr G Pollman
 Technical Signatory



Accreditation No.: T0507



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CLIENT Swartvlei Equision Estate

ATTENTION: Mr Allan Atkinson

TEST REPORT

Job No	CT14977 B
Ref. No	
Date	09.07.2021
Tested/Sampled By:	Client
Date Sampled / Received	29.06.2021
Date Tested	29.06.2021
Sampling Method	As per client
Test Method	ASTM D422
Project	Swartvlei
Test Type	Double Hydrometer
Sampled By	Client
Delivered By	Client
Temp. °C	25 °C
Laboratory Tester	Me. M. Pitus
Environmental Conditions	Sunny
Remarks / notes	None
Number of pages	2

Special instructions
None

Remarks:

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Swartvlei Equisition Estate

Project : Swartvlei
 Date Received : 29.06.2021
 Date Reported : 09.07.2021
 Req. Number :

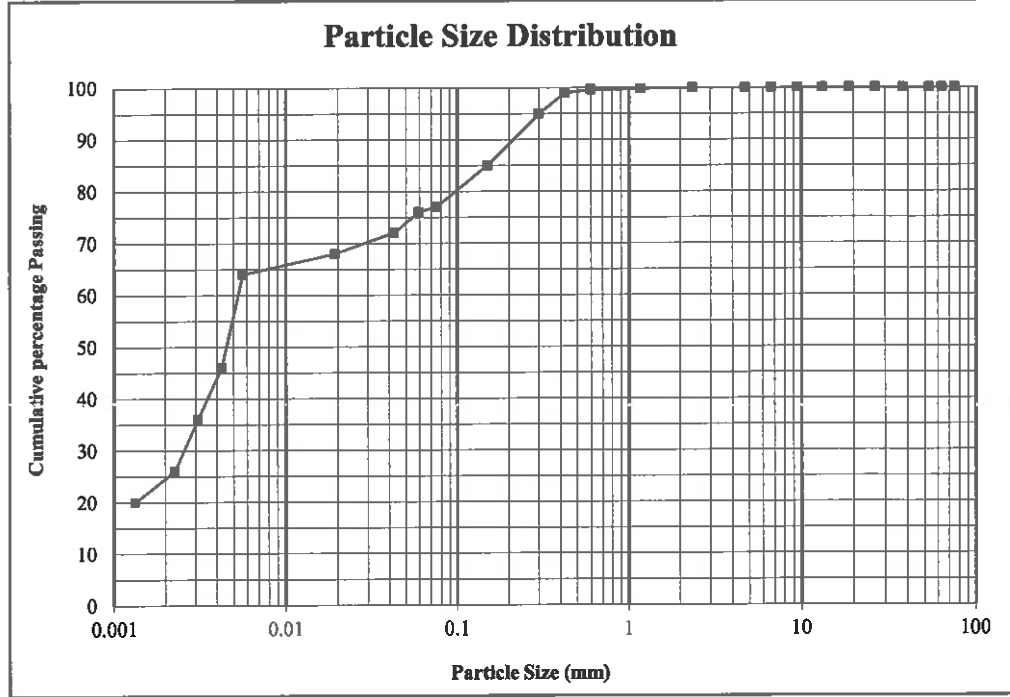
Customer :

Attention : Mr Allan Atkinson

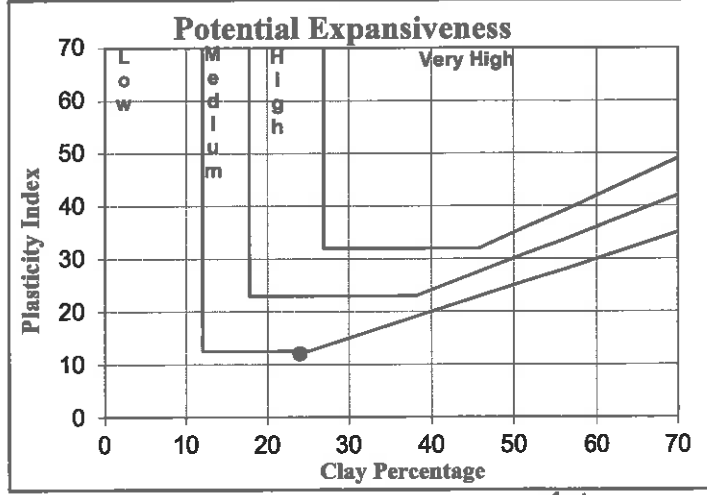
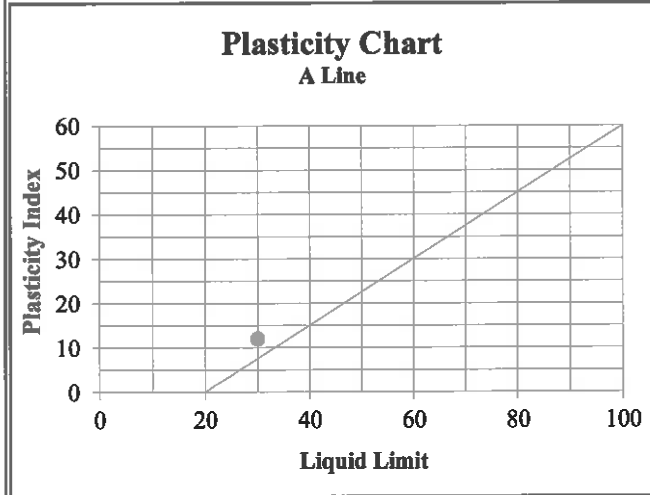
FOUNDATION INDICATOR - (TMH 1 Method A1(a)/A2-A3-A4-A5) & (ASTM Method D422)

Material Description:	DK Yellowish Weathered Shale (Hexa metaphosphate Ω)	Sample Number:	53269		
Position:	Sample 1	Liquid Limit	30	Linear Shrinkage	5.9
Depth:	-	Plasticity Index	12	Insitu M/C%	10

Sieve Size(mm)	% Passing
75.0	100
63.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	100
1.18	100
0.600	100
0.425	98
0.300	95
0.150	85
0.075	77
0.0592	76
0.0425	72
0.0193	68
0.0057	64
0.0043	46
0.0031	36
0.0023	26
0.0013	20



% Clay	24	% Silt	52	% Sand	24	% Gravel	0
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SG 2.575



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Project : Swartvlei
 Date Received : 29.06.2021
 Date Reported : 09.07.2021
 Req. Number : -

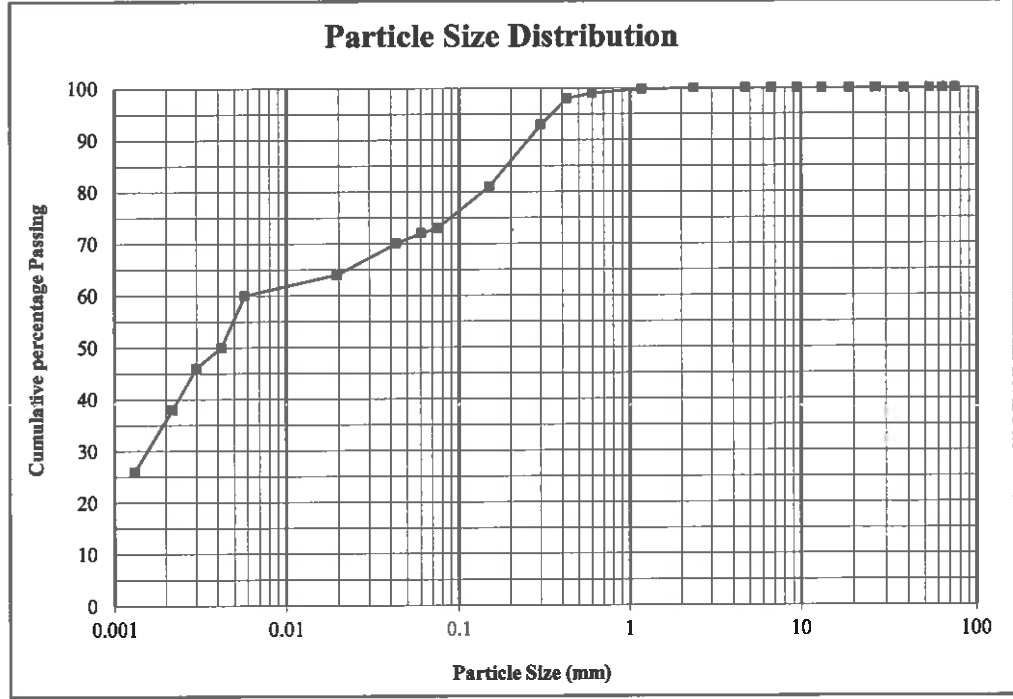
Customer :

Attention : Mr Allan Atkinson

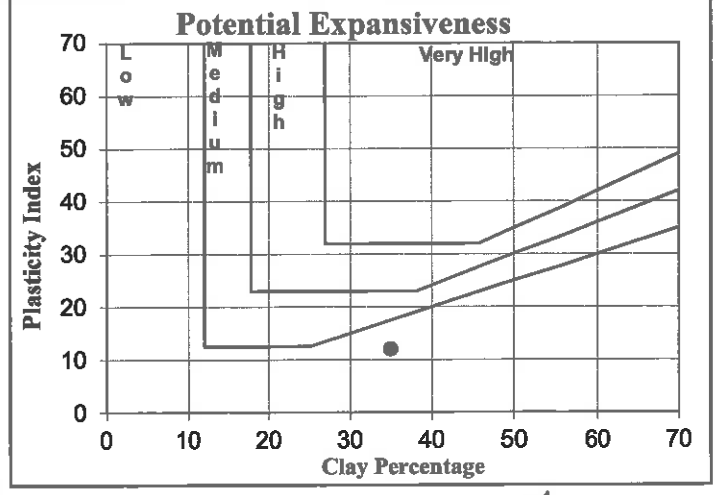
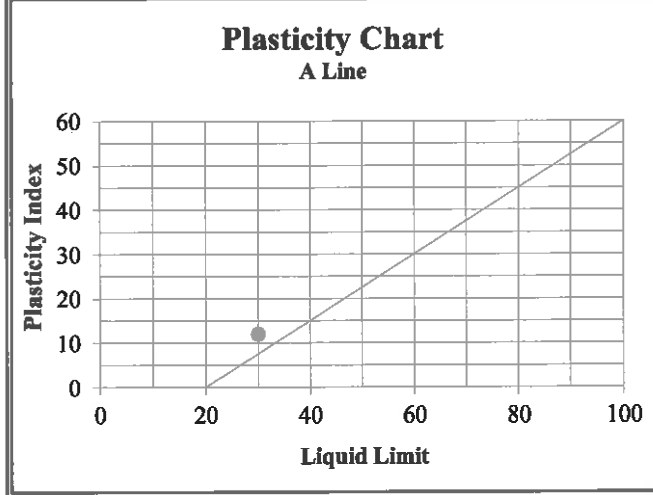
FOUNDATION INDICATOR - (TMH 1 Method A1(a)-A2-A3-A4-A5) & (ASTM Method D422)

Material Description:	DK Yellowish Weathered Shale (Water)	Sample Number:	53269		
Position:	Sample 1	Liquid Limit	30	Linear Shrinkage	5.9
Depth:	-	Plasticity Index	12	Insitu M/C%	10

Sieve Size(mm)	% Passing
75.0	100
63.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	100
1.18	100
0.600	99
0.425	98
0.300	93
0.150	81
0.075	73
0.0601	72
0.0429	70
0.0196	64
0.0057	60
0.0042	50
0.0030	46
0.0022	38
0.0013	26



% Clay	35	% Silt	37	% Sand	28	% Gravel	0
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Client: Swartvlei Equisition Estate
 Project: Swartvlei
 Attention: Mr Allan Atkinson
 Your Ref. No:
 Date Reported: 09.07.2021

TEST REPORT REFERENCE NUMBER / JOB NUMBER CT14977 A

Dear Sir / Madam

Herewith please find the original reports pertaining to the above mentioned project - All test conducted are in accordance with prescribed test methods.

Special Instruction (Proc 7.1.7) / Sub-contracting of tests (Proc 6.6)

None

Sampling Method Used

TMH5 MC1

Environmental Conditions

Sunny

Test/s Conducted

SANS 3001 GR30 / GR31 / GR20

Reported

Yes - Results Reported

Date Reported

09.07.2021

FINAL REPORT

We would like to take this opportunity to thank you for your valued support.
 Should you have any further enquiries please don't hesitate to contact us on 021 949 0701.

Yours Faithfully

Roadlab Laboratories Pty Ltd. - Western Cape

Information contained herein is confidential to Roadlab Laboratories Pty Ltd and the addressee, The attached results pertain only to the area or sample tested. Whilst every care is taken to ensure accurate reporting and testing Roadlab Laboratories Pty Ltd will not be held liable for any erroneous testing or reporting thereof. Report will not be reproduced except in full without the prior consent of Roadlab Laboratories Pty Ltd, Should there be any deviation from the prescribed test method comments will be made thereof, pertaining to the test on the relevant materials report. Test methods marked with (*) are not accredited Test methods.



Directors: Mr. D. Beekhuizen | Mr. N.W. Herbst | Mr. D. Juckers | Mr. J. Rooplall



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JOB NO:	CT14977 A	REFERENCE NO:	-	DATE:	09.07.2021
CLIENT	Swartvlei Equisition Estate	PROJECT	Swartvlei	POSITION / LAYER	Foundation
		KM / SV		SAMPLE NUMBER	53269
ATTENTION	Mr Allan Atkinson	MATERIAL DISCRIPTION			DK Yellowish Weathered Shale

MAXIMUM DRY DENSITY / OPTIMUM MOISTURE CONTENT SANS 3001 GR30 / 31, GR20

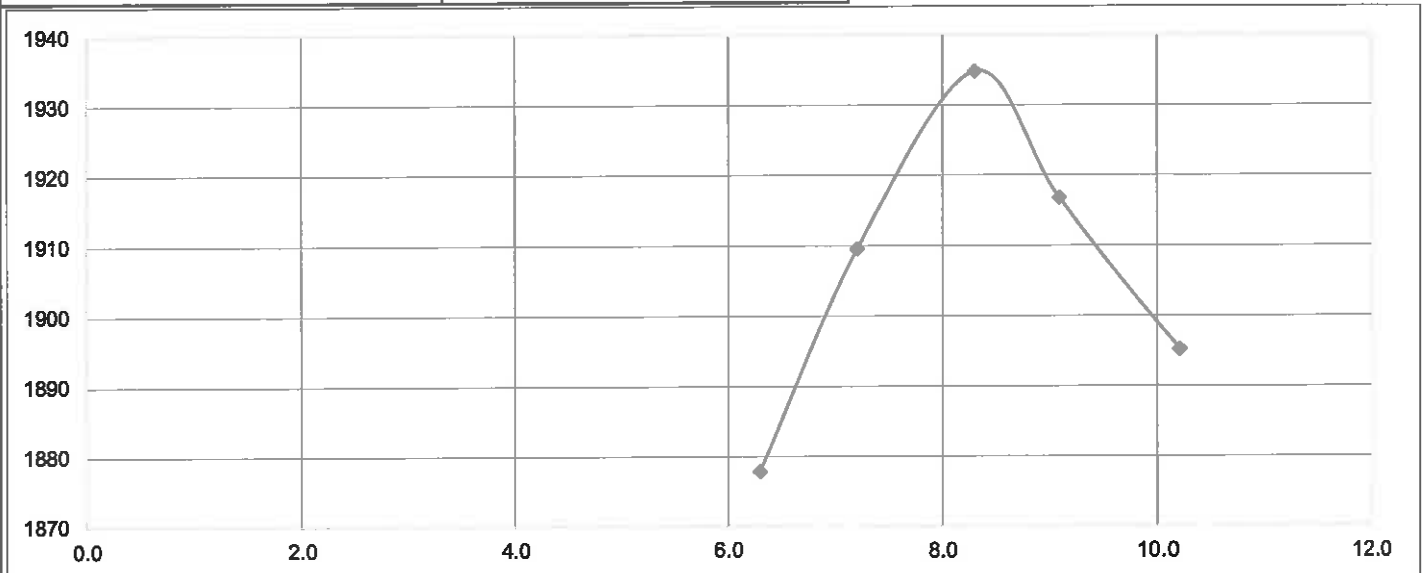
COMPACTION DATA

	4	5	6	7	8
Moisture Content %	280	350	420	490	560
Moisture Content ml	9151	9269	9381	9371	9365
Mass Mould & Wet Mat	4526	4526	4526	4526	4526
Mass Mould	4625	4743	4855	4845	4839
Mass of Wet Mat	43.2	43.2	43.2	43.2	43.2
Mould Factor	1919	1950	1977	1954	1934
Wet Density					

MOISTURE DATA

Mass Wet Mat	1041	1039	1074	1011	1033
Mass Dry Mat	996.4	987.2	1012.6	948.4	961.1
Mass Moisture	44.6	51.8	61.4	62.6	71.9
Hygroscopic Moisture Content %	2.3	2.2	2.3	2.1	2.2
Actual Moisture Content %	6.3	7.2	8.3	9.1	10.2
Dry Density	1878	1910	1935	1917	1895

MAXIMUM DRY DENSITY Kg/m3	1937
OPTIMUM MOISTURE CONTENT	8.2%



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CONTROL GEOSCIENCES (PTY) LTD

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Email: geosci@mweb.co.za

EAST LONDON

Unit 4 Kelly Court, Schafli Road, Kwelera, 5259
Tel: 0833102193/ 0842774444
Email: mlproudfoot@geosciences.co.za

LABORATORY TEST RESULTS

CLIENT : Roadlab
PROJECT NAME : Swartvlei

admin only
JOB NO : L210824
SAMPLE NO : 33820

COMPACTION MOULD PERMEAMETER

POSITION :
SOIL DESCRIPTION : red brown silty sand
PERMEANT USED : TAP WATER

SAMPLE DATA		
MDD (100%)	kg/m ³	1937
MDD (100%) moisture content	%	8,2
Percent of MDD specified	%	93
Dry density of soil required	kg/m ³	1801,41
Moisture content of sample	%	8,2
Length of sample	mm	125,00
Diameter of sample	mm	150,00
Area of sample	mm ²	17671,46
Volume of sample	mm ³	2208932,33
Mass of dry soil required	g	3979,19
Mass of wet soil required	g	4305,49

ACTUAL DATA		
Mould Number		P2
Mass of Mould	g	4863
Mass of Mould and wet soil	g	9168,49
Mass of wet soil	g	4305,49
moisture content	%	8,20
Bulk Density	kg/m ³	1949,13
Dry Density	kg/m ³	1801,41
Percentage MDD	%	93,00

TEST READINGS							
Test	Height	Start Test		End Test		Volume outflow	Comments
		Time	Time	Time	Time		
	mm	min	sec	min	sec	ml	
1	1600			0	20	500	
2	1600			0	20	500	
3	1600			0	20	500	
4	1600			0	21	500	

CALCULATIONS FOR CONSTANT HEAD		
Hydraulic gradient	Elapsed Time	COEFFICIENT OF PERMEABILITY
mm	sec	
12,80	20,00	1,11E-04
12,80	20,00	1,11E-04
12,80	20,00	1,11E-04
12,80	21,00	1,05E-04

Number of tests = 4

AVERAGE =	1,09E-04	m/s
AVERAGE =	1,09E-02	cm/s

Notes :