Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Layer Number	1
Sample Number	TL1/C3B/L1
Grid Ref	T Pad
Sample Type	U
Date	18/03/2015
Disturbed / Undisturbed	Undisturbed

Description of Specimen

Reddish brown gravelly very sandy very silty CLAY.

Initial Specimen Conditions

Height	mm	100.00
Diameter	mm	100.00
Area	mm^2	7853.98
Volume	cm^3	785.40
Bulk Density	Mg/m^3	2.11
Dry Density	Mg/m^3	1.87
Moisture Content	%	13
Voids Ratio		0.416
Specific Gravity	Mg/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	14
Bulk Density	Mg/m^3	2.13
Dry Density	Mg/m^3	1.87

Test Setup

Date Started		05/03/2015
Date Finished		16/03/2015
Top Drain Used		Y
Base Drain Used		Y
Method of Saturation		By back pressure
Direction Of Flow		Vertically Downwards
Saturation Time	Days	4
Consolidation Time	Days	3
Permeability Time	Days	2

Checked and Approved By **Date 18/03/2015**

PSL Professional Soils Laboratory

HAFOD SIDEWALL.

Client Ref

-

Contract No

PSL15/0995.

Permeability in a Triaxial Cell

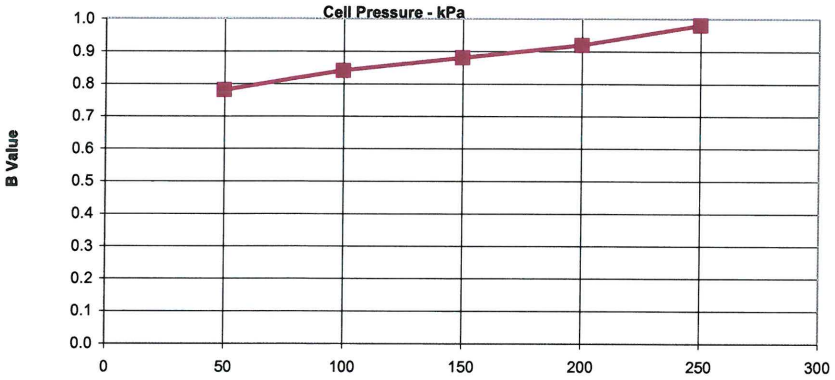
BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Layer Number	1
Sample No.	TL1/C3B/L1
Grid Ref	T Pad

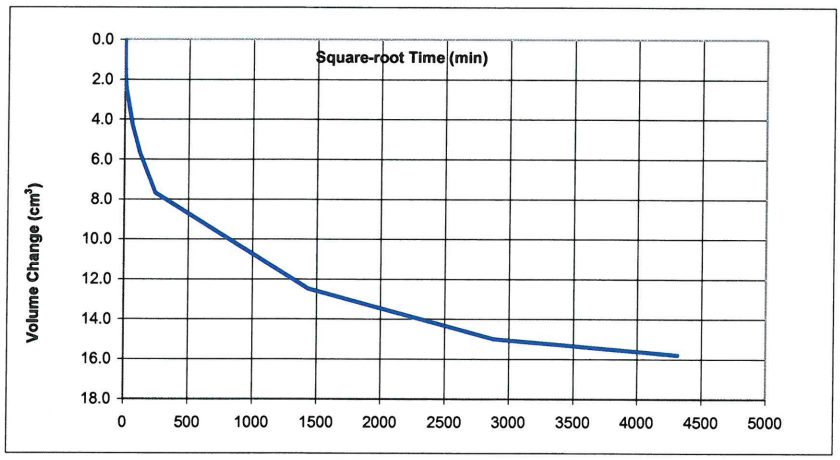
Saturation

Cell Pressure Incr.	kPa	50
Back Pressure Incr.	kPa	50
Differential Pressure	kPa	10
Final Cell Pressure	kPa	250
Final B Value		0.98



Consolidation

Effective Pressure	kPa	100
Cell Pressure	kPa	400
Back Pressure	kPa	300
Final PWP	kPa	303
PWP dissipation	%	97



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PSL15/0995.

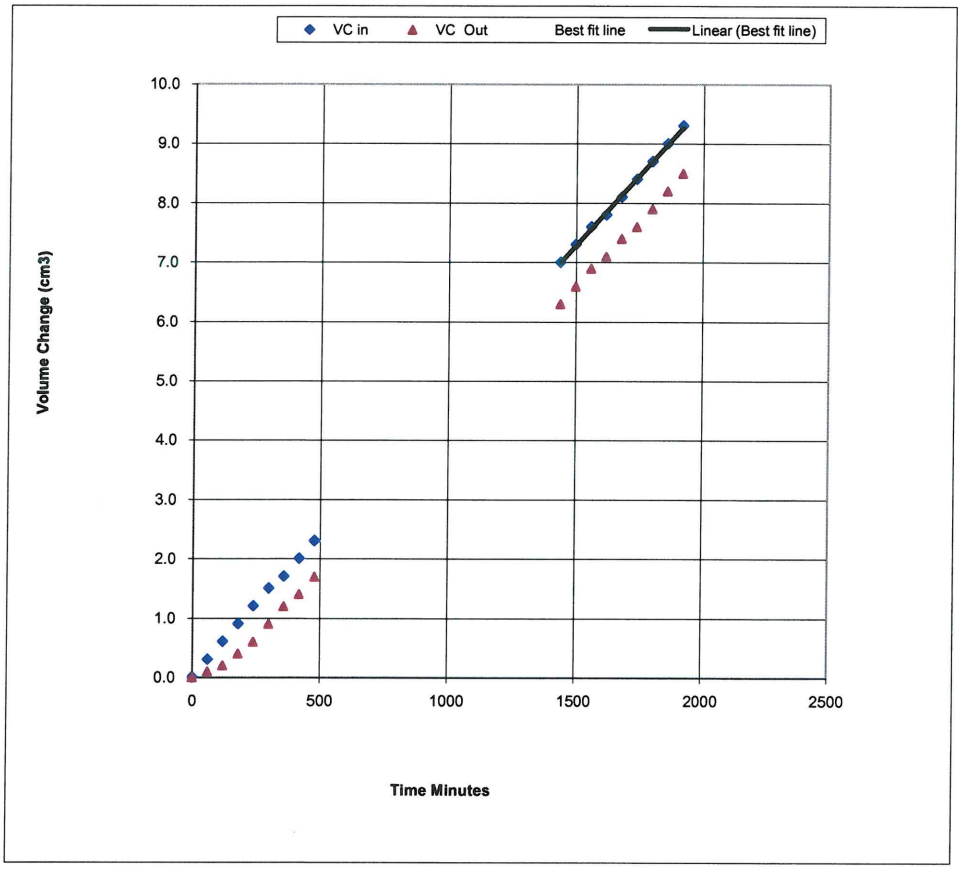
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Layer Number	1
Sample No.	TL1/C3B/L1
Grid Ref	T Pad

Permeability Stage



Cell Pressure	kPa	400
Mean Effective Stress	kPa	100
Back Pressure Diff.	kPa	20
Mean Rate of Flow	ml/min	0.0048
Average Temperature	'C	20
Vertical Permeability Kv	m/s	5.0×10^{-10}

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Layer Number	2
Sample Number	TL1/C6B/L2
Grid Ref	T Pad
Sample Type	U
Date	18/03/2015
Disturbed / Undisturbed	Undisturbed

Description of Specimen

Reddish brown gravelly very sandy very silty CLAY.

Initial Specimen Conditions

Height	mm	100.00
Diameter	mm	100.00
Area	mm^2	7853.98
Volume	cm^3	785.40
Bulk Density	Mg/m^3	2.13
Dry Density	Mg/m^3	1.86
Moisture Content	%	14
Voids Ratio		0.422
Specific Gravity	Mg/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	15
Bulk Density	Mg/m^3	2.14
Dry Density	Mg/m^3	1.86

Test Setup

Date Started		05/03/2015
Date Finished		14/03/2015
Top Drain Used		Y
Base Drain Used		Y
Method of Saturation		By back pressure
Direction Of Flow		Vertically Downwards
Saturation Time	Days	3
Consolidation Time	Days	3
Permeability Time	Days	2

Checked and Approved By **Date 18/03/2015**

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Permeability in a Triaxial Cell

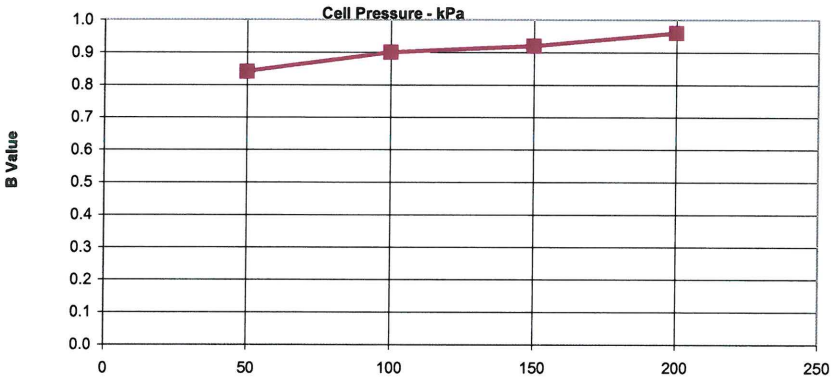
BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Layer Number	2
Sample No.	TL1/C6B/L2
Grid Ref	T Pad

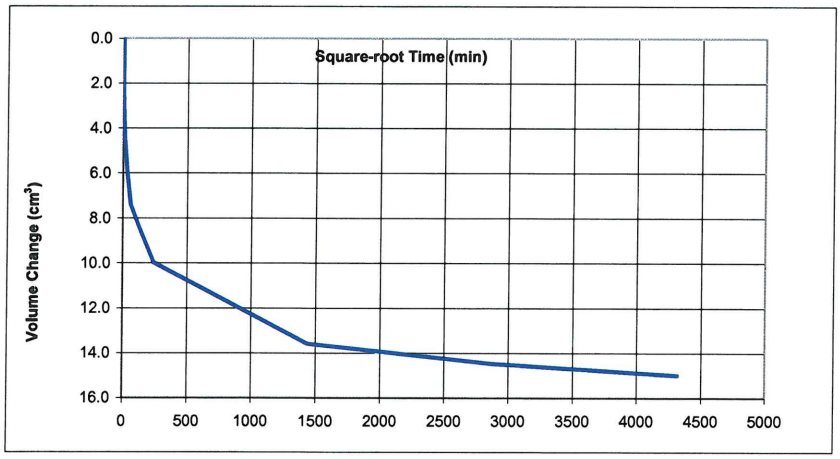
Saturation

Cell Pressure Incr.	kPa	50
Back Pressure Incr.	kPa	50
Differential Pressure	kPa	10
Final Cell Pressure	kPa	200
Final B Value		0.96



Consolidation

Effective Pressure	kPa	100
Cell Pressure	kPa	400
Back Pressure	kPa	300
Final PWP	kPa	302
PWP dissipation	%	99



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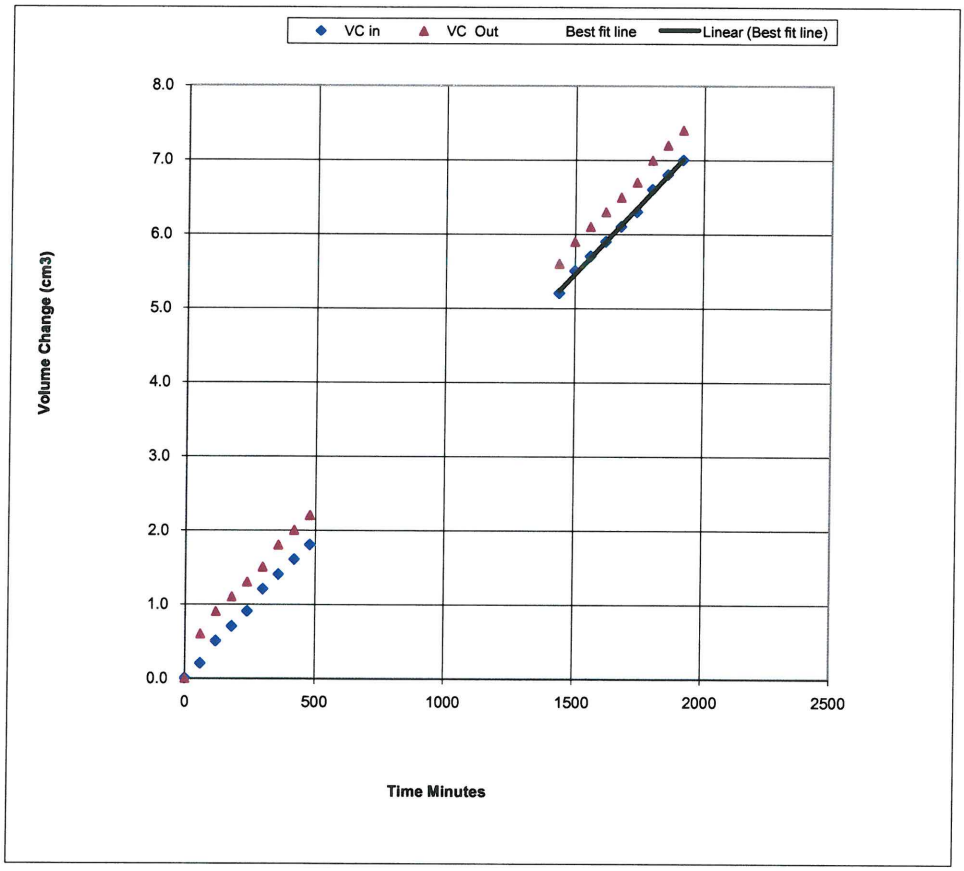
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Layer Number	2
Sample No.	TL1/C6B/L2
Grid Ref	T Pad

Permeability Stage



Cell Pressure	kPa	400
Mean Effective Stress	kPa	100
Back Pressure Diff.	kPa	20
Mean Rate of Flow	ml/min	0.0038
Average Temperature	'C	20
Vertical Permeability Kv	m/s	3.9×10^{-10}

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Layer Number	2
Sample Number	A3/L2/C14A
Grid Ref	A2
Sample Type	U
Date	18/03/2015
Disturbed / Undisturbed	Undisturbed

Description of Specimen

Reddish brown gravelly very sandy very silty CLAY.

Initial Specimen Conditions

Height	mm	100.00
Diameter	mm	100.00
Area	mm^2	7853.98
Volume	cm^3	785.40
Bulk Density	Mg/m^3	2.10
Dry Density	Mg/m^3	1.86
Moisture Content	%	13
Voids Ratio		0.423
Specific Gravity	Mg/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	14
Bulk Density	Mg/m^3	2.13
Dry Density	Mg/m^3	1.86

Test Setup

Date Started		05/03/2015
Date Finished		16/03/2015
Top Drain Used		Y
Base Drain Used		Y
Method of Saturation		By back pressure
Direction Of Flow		Vertically Downwards
Saturation Time	Days	5
Consolidation Time	Days	3
Permeability Time	Days	2

Checked and Approved By **Date 18/03/2015**

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HAFOD SIDEWALL.

Client Ref

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Contract No

PSL15/0995.

Permeability in a Triaxial Cell

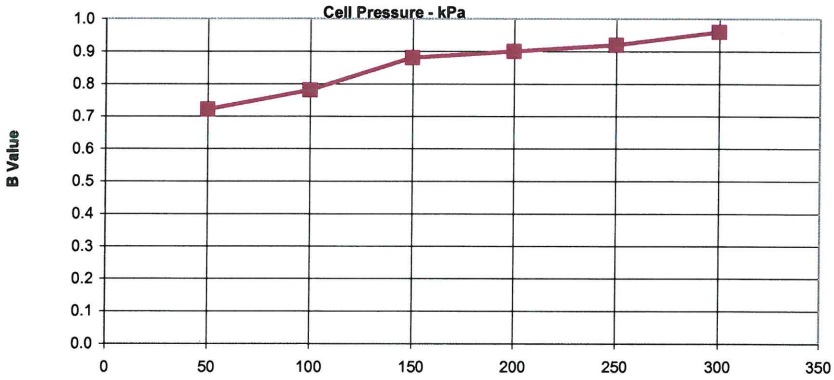
BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Layer Number	2
Sample No.	A3/L2/C14A
Grid Ref	A2

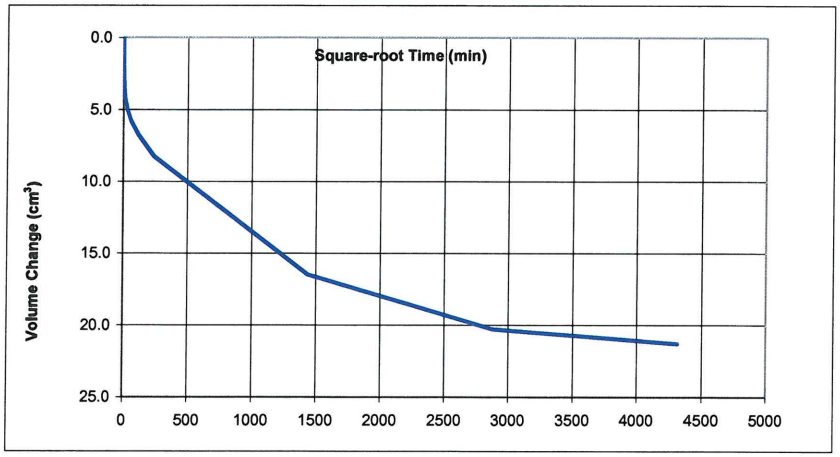
Saturation

Cell Pressure Incr.	kPa	50
Back Pressure Incr.	kPa	50
Differential Pressure	kPa	10
Final Cell Pressure	kPa	300
Final B Value		0.96



Consolidation

Effective Pressure	kPa	100
Cell Pressure	kPa	400
Back Pressure	kPa	300
Final PWP	kPa	303
PWP dissipation	%	98



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Contract No
PSL15/0995.

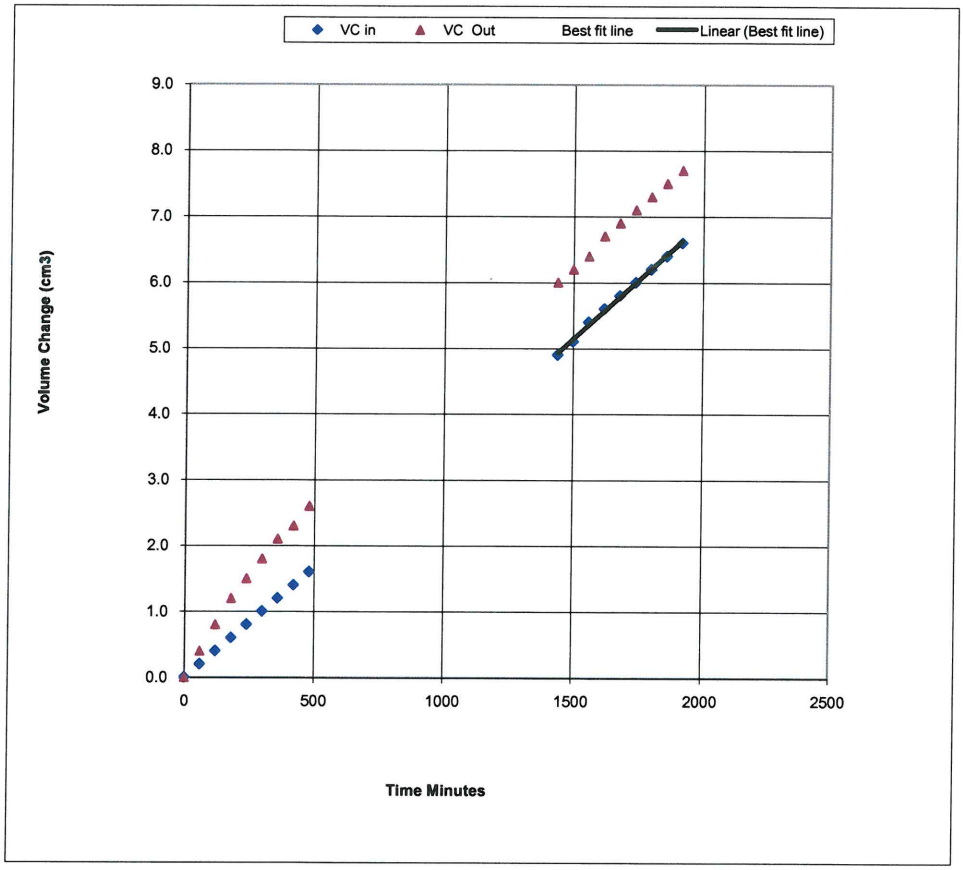
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Layer Number	2
Sample No.	A3/L2/C14A
Grid Ref	A2

Permeability Stage



Cell Pressure	kPa	400
Mean Effective Stress	kPa	100
Back Pressure Diff.	kPa	20
Mean Rate of Flow	ml/min	0.0035
Average Temperature	'C	20
Vertical Permeability Kv	m/s	3.7×10^{-10}

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HAFOD SIDEWALL.

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PSL15/0995.

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INDEPENDENT MATERIALS TESTING I DIAMOND DRILLING & SAWING

Stratus Environmental Limited
4245 Park Approach
Thorpe Park
Leeds

LS15 8GB

Date: 31 March 2015
Test Report Ref: STR 407589

Order No: 819/CE1005/Rclarke

Contract: Hafod Landfill - Western Upper Sidewall

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Coefficient of Permeability under constant head conditions in a Triaxial Cell in accordance with **BS 1377: Part 6 : 1990 : Clause 6.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S51811**
Client Ref. No:	**P1**
Date and Time of Sampling:	**09/03/2015**
Date of Receipt at Lab:	**17/03/2015**
Date of Start of Test:	**18/03/2015**
Sampling Location:	**Western Upper Sidewall**
Name of Source:	**Unknown**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown slightly gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

See attached

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

TEST RESULTS

Sample condition: **Undisturbed**

Method of Remoulding (If applicable): **N/A**

Specimen Details:	Initial:	Final:
Diameter:	100 mm	N/A
Height:	101 mm	N/A
Moisture Content:	15.6 %	15.2 %
Bulk density:	2.158 Mg/m^3	2.198 Mg/m^3
Dry density:	1.867 Mg/m^3	1.908 Mg/m^3

Saturation stage: **Performed in accordance with clause 5.4.3 - Saturation by increments of cell pressure and back pressure.**

Initial pore pressure coefficient,B:	0.68
Final pore pressure coefficient,B:	0.98
Duration of stage:	2 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	3 days

Permeability stage:

Pressure difference across specimen:	20 kPa
Mean effective stress:	90 kPa
Duration of stage	2 days

Coefficient of Permeability (k_v) at 20°C = 1.6×10^{-10} m/s

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INDEPENDENT MATERIALS TESTING I DIAMOND DRILLING & SAWING

Stratus Environmental Limited
4245 Park Approach
Thorpe Park
Leeds

LS15 8GB

Date: 31 March 2015
Test Report Ref: STR 407597

Order No: 819/CE1005/Rclarke

Contract: Hafod Landfill - Western Upper Sidewall

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Coefficient of Permeability under constant head conditions in a Triaxial Cell in accordance with **BS 1377: Part 6 : 1990 : Clause 6.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S51811**
Client Ref. No:	**P2**
Date and Time of Sampling:	**10/03/2015**
Date of Receipt at Lab:	**17/03/2015**
Date of Start of Test:	**18/03/2015**
Sampling Location:	**Western Upper Sidewall**
Name of Source:	**Unknown**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown slightly gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

See attached

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

TEST RESULTS

Sample condition: **Undisturbed**

Method of Remoulding (If applicable): **N/A**

Specimen Details:	Initial:	Final:
Diameter:	101 mm	N/A
Height:	106 mm	N/A
Moisture Content:	12.6 %	12.7 %
Bulk density:	2.253 Mg/m^3	2.293 Mg/m^3
Dry density:	2.001 Mg/m^3	2.035 Mg/m^3

Saturation stage: **Performed in accordance with clause 5.4.3 - Saturation by increments of cell pressure and back pressure.**

Initial pore pressure coefficient,B:	0.60
Final pore pressure coefficient,B:	1.00
Duration of stage:	2 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	3 days

Permeability stage:

Pressure difference across specimen:	20 kPa
Mean effective stress:	90 kPa
Duration of stage	2 days

Coefficient of Permeability (k_v) at 20°C = 1.1×10^{-10} m/s

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INDEPENDENT MATERIALS TESTING I DIAMOND DRILLING & SAWING

Stratus Environmental Limited
4245 Park Approach
Thorpe Park
Leeds

LS15 8GB

Date: 31 March 2015
Test Report Ref: STR 407608

Order No: 819/CE1005/Rclarke

Contract: Hafod Landfill - Western Upper Sidewall

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Coefficient of Permeability under constant head conditions in a Triaxial Cell in accordance with **BS 1377: Part 6 : 1990 : Clause 6.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S51811**
Client Ref. No:	**P3**
Date and Time of Sampling:	**16/03/2015**
Date of Receipt at Lab:	**17/03/2015**
Date of Start of Test:	**18/03/2015**
Sampling Location:	**Western Upper Sidewall**
Name of Source:	**Unknown**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown slightly gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

See attached

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

TEST RESULTS

Sample condition: **Undisturbed**

Method of Remoulding (If applicable): **N/A**

Specimen Details:	Initial:	Final:
Diameter:	101 mm	N/A
Height:	104 mm	N/A
Moisture Content:	13.1 %	14.2 %
Bulk density:	2.273 Mg/m^3	2.380 Mg/m^3
Dry density:	2.010 Mg/m^3	2.084 Mg/m^3

Saturation stage: **Performed in accordance with clause 5.4.3 - Saturation by increments of cell pressure and back pressure.**

Initial pore pressure coefficient,B:	0.36
Final pore pressure coefficient,B:	0.98
Duration of stage:	2 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	3 days

Permeability stage:

Pressure difference across specimen:	20 kPa
Mean effective stress:	90 kPa
Duration of stage	2 days

Coefficient of Permeability (k_v) at 20°C = 1.1×10^{-10} m/s