



# LABORATORY REPORT



4043

**Contract Number: PSL14/4019**

Client's Reference:

Report Date: 01 September 2014

Client Name: Stratus Environmental LTD  
3 Henley Office Park  
Doddington Road  
Lincoln  
LN6 3QR

**For the attention of: Adam Everson**

Contract Title: Hafod Quarry Landfill (cell 3 sidewall)

Date Received: 11/8/2014

Date Commenced: 11/8/2014

Date Completed: 1/9/2014

**Notes: Observations and Interpretations are outside the UKAS Accreditation**

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson  
(Director)

A Watkins  
(Director)

M Beastall  
(Laboratory Manager)

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(Senior Technician)

  
S Royle  
(Senior Technician)




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Page 1 of

## SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

## Professional Soils Laboratory

|   |          |   |          |   |          |
|---|----------|---|----------|---|----------|
| Compiled by   | Date     | Checked by  | Date     | Approved by   | Date     |
|  | 01/09/14 |  | 01/09/14 |  | 01/09/14 |
| HAFOD QUARRY LANDFILL.  |          |   |          | Contract No: PSL14/4019   |          |
|   |          |   |          | Client Ref: CE1005  |          |




## SUMMARY OF SOIL CLASSIFICATION TESTS

**(B.S. 1377 : PART 2 : 1990)**

[illegible]

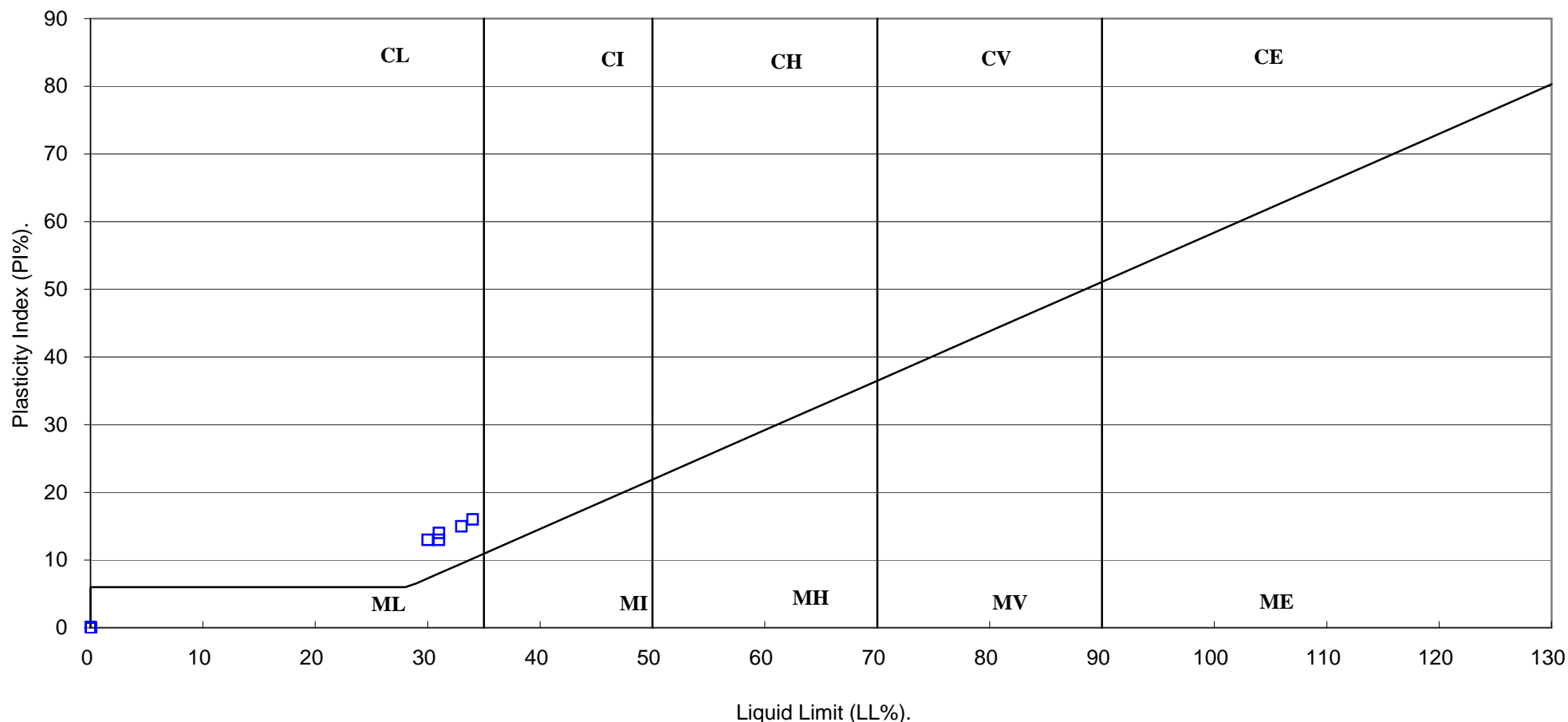
**SYMBOLS : NP : Non Plastic**

**\* : Liquid Limit and Plastic Limit Wet Sieved.**

|   |  |          |   |          |   |                   |
|---|--|----------|---|----------|---|-------------------|
| <div><div><b>PSL</b></div><div><b>Professional Soils Laboratory</b></div></div> | Compiled by  | Date     | Checked by  | Date     | Approved by   | Date              |
|   |  | 01/09/14 |  | 01/09/14 |  | 01/09/14          |
|   | <b>HAFOD QUARRY LANDFILL.</b>  |          |   |          | Contract No:  | <b>PSL14/4019</b> |
|   |  |          |   |          | Client Ref:   | <b>CE1005</b>     |

# PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)



**PSL**

**Professional Soils Laboratory**

Compiled by

*[Signature]*

Date

01/09/14

Checked by

*[Signature]*

Date

01/09/14

Approved by

*[Signature]*

Date

01/09/14

**HAFOD QUARRY LANDFILL.**

Contract No:

**PSL14/4019**

Client Ref:

**CE1005**

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

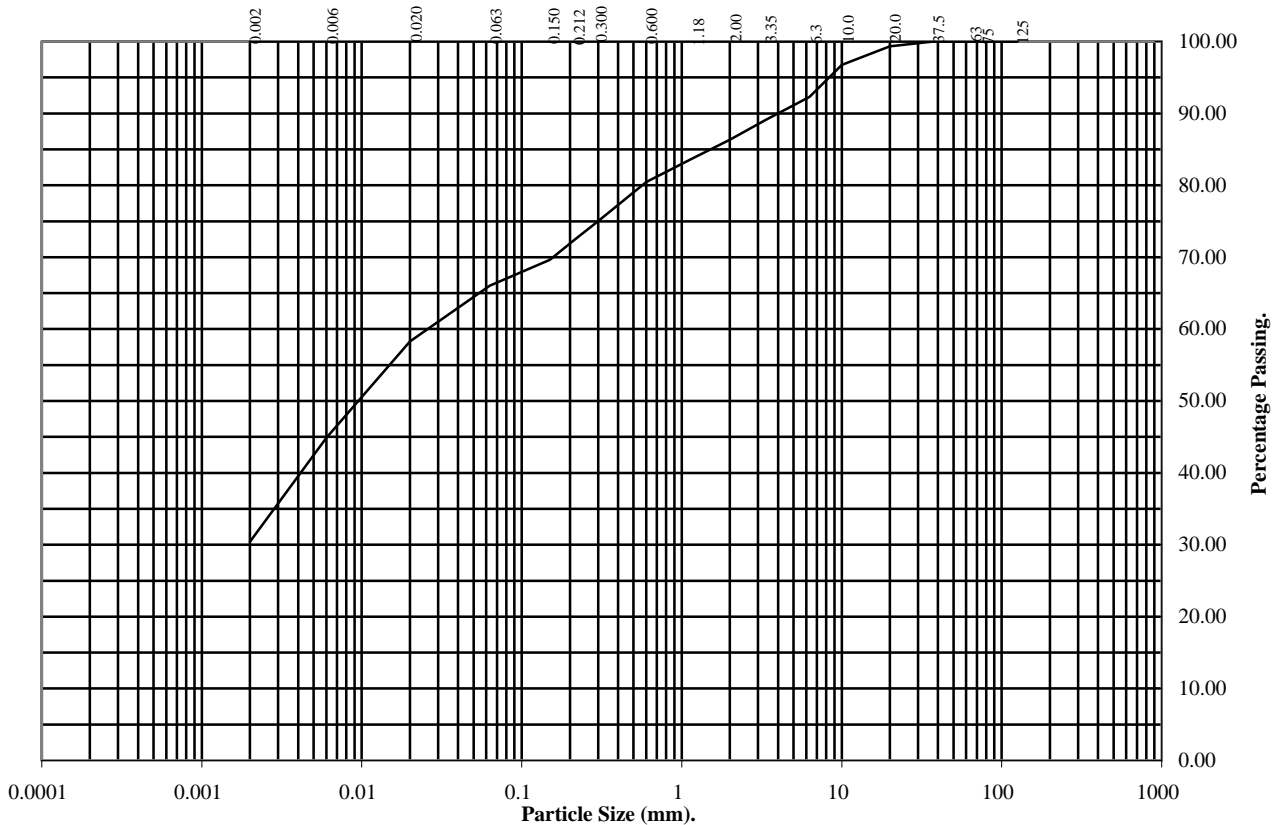
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Date Sampled: 4/8/14

Depth (m):

Sample Number: TL1/04

Sample Type: B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 99                 |
| 10            | 97                 |
| 6.3           | 92                 |
| 3.35          | 89                 |
| 2             | 86                 |
| 1.18          | 84                 |
| 0.6           | 80                 |
| 0.3           | 75                 |
| 0.212         | 72                 |
| 0.15          | 70                 |
| 0.063         | 66                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 58                 |
| 0.006             | 45                 |
| 0.002             | 30                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 14               |
| Sand          | 20               |
| Silt          | 36               |
| Clay          | 30               |

## Remarks:

See summary of soil descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 01/09/14 |             | 01/09/14 |

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Professional Soils Laboratory

HAFOD QUARRY LANDFILL.

Contract No.:  
PSL14/4019

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

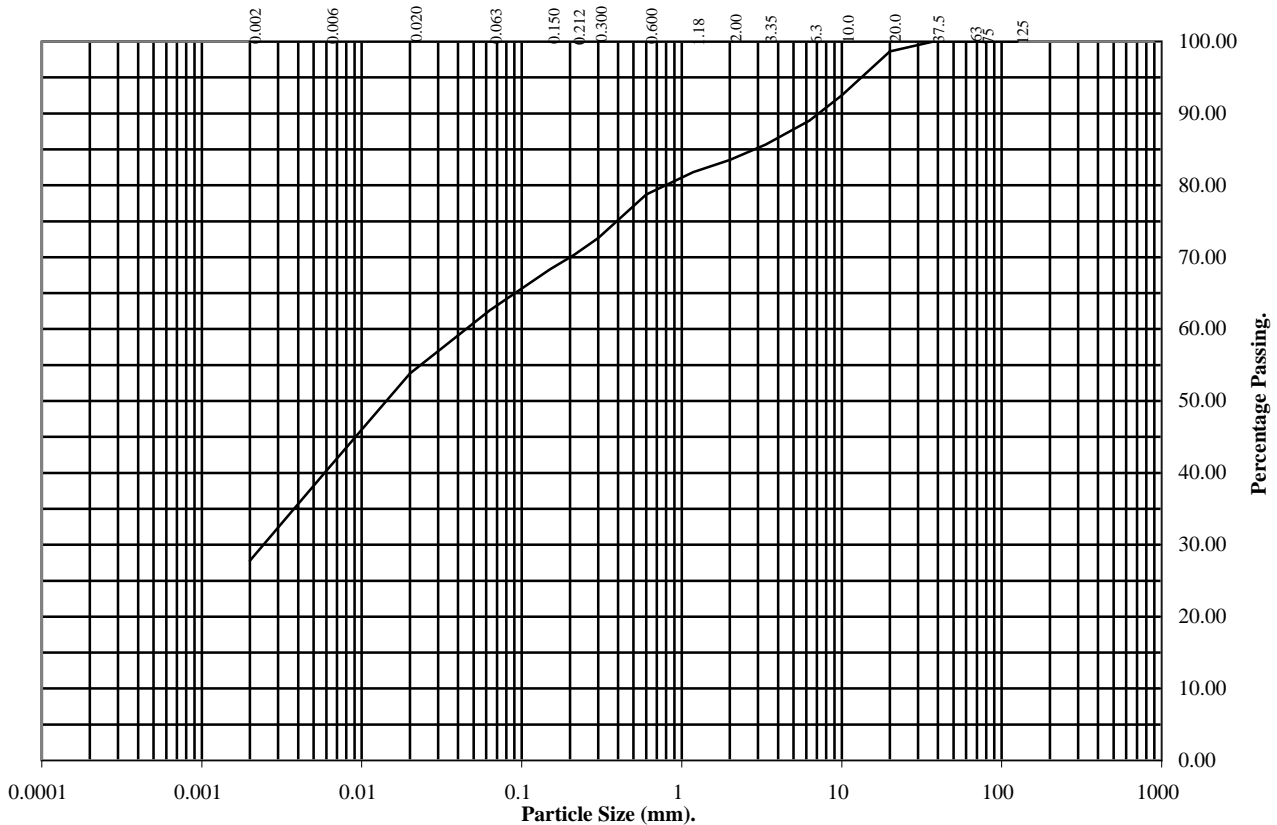
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Date Sampled: 4/8/14

Depth (m):

Sample Number: TL2/07

Sample Type: B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 99                 |
| 10            | 93                 |
| 6.3           | 89                 |
| 3.35          | 86                 |
| 2             | 84                 |
| 1.18          | 82                 |
| 0.6           | 79                 |
| 0.3           | 73                 |
| 0.212         | 70                 |
| 0.15          | 68                 |
| 0.063         | 63                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 54                 |
| 0.006             | 40                 |
| 0.002             | 28                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 16               |
| Sand          | 21               |
| Silt          | 35               |
| Clay          | 28               |

## Remarks:

See summary of soil descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 01/09/14 |             | 01/09/14 |

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HAFOD QUARRY LANDFILL.

Contract No.:  
PSL14/4019

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

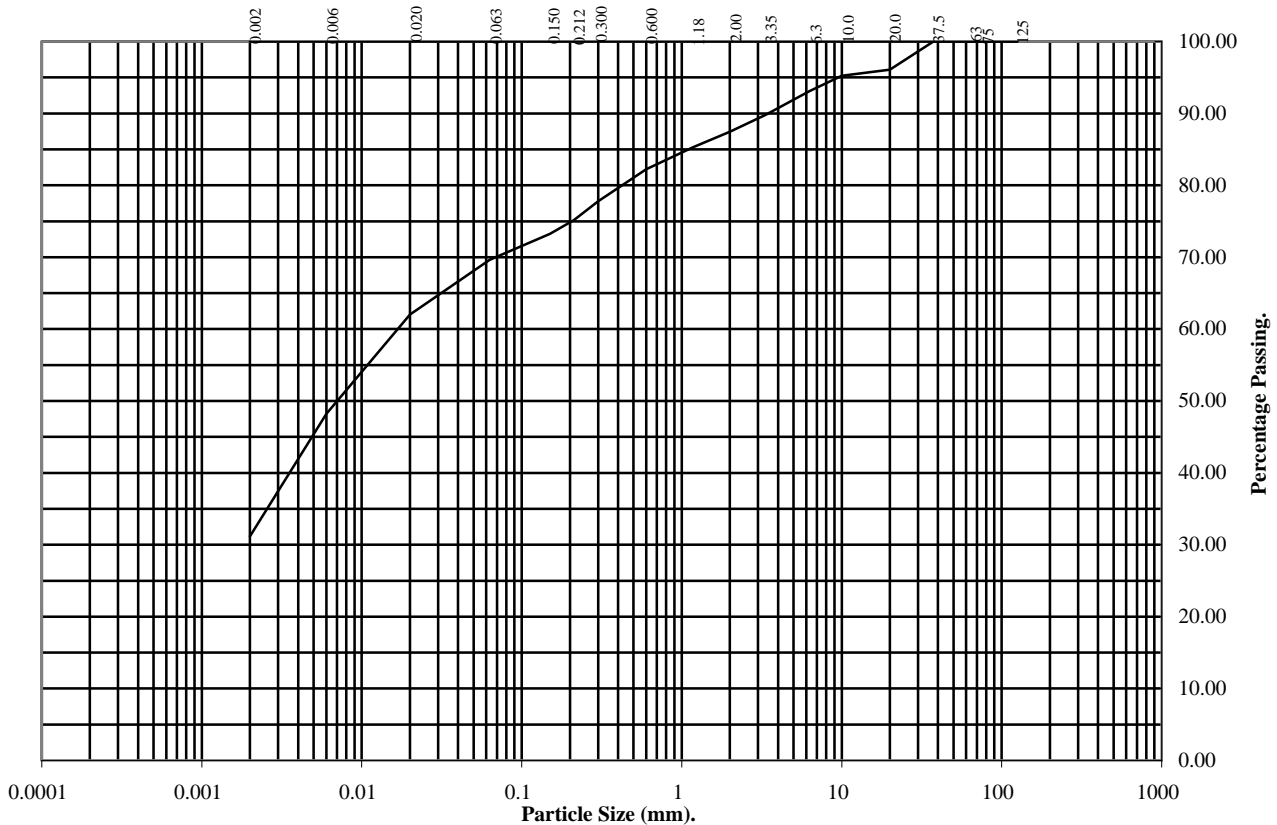
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Date Sampled: 6/8/14

Depth (m):

Sample Number: CL1/02

Sample Type: B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 96                 |
| 10            | 95                 |
| 6.3           | 93                 |
| 3.35          | 90                 |
| 2             | 87                 |
| 1.18          | 85                 |
| 0.6           | 82                 |
| 0.3           | 78                 |
| 0.212         | 75                 |
| 0.15          | 73                 |
| 0.063         | 70                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 62                 |
| 0.006             | 48                 |
| 0.002             | 31                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 13               |
| Sand          | 17               |
| Silt          | 39               |
| Clay          | 31               |

## Remarks:

See summary of soil descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 01/09/14 |             | 01/09/14 |

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Professional Soils Laboratory

HAFOD QUARRY LANDFILL.

Contract No.:  
PSL14/4019

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

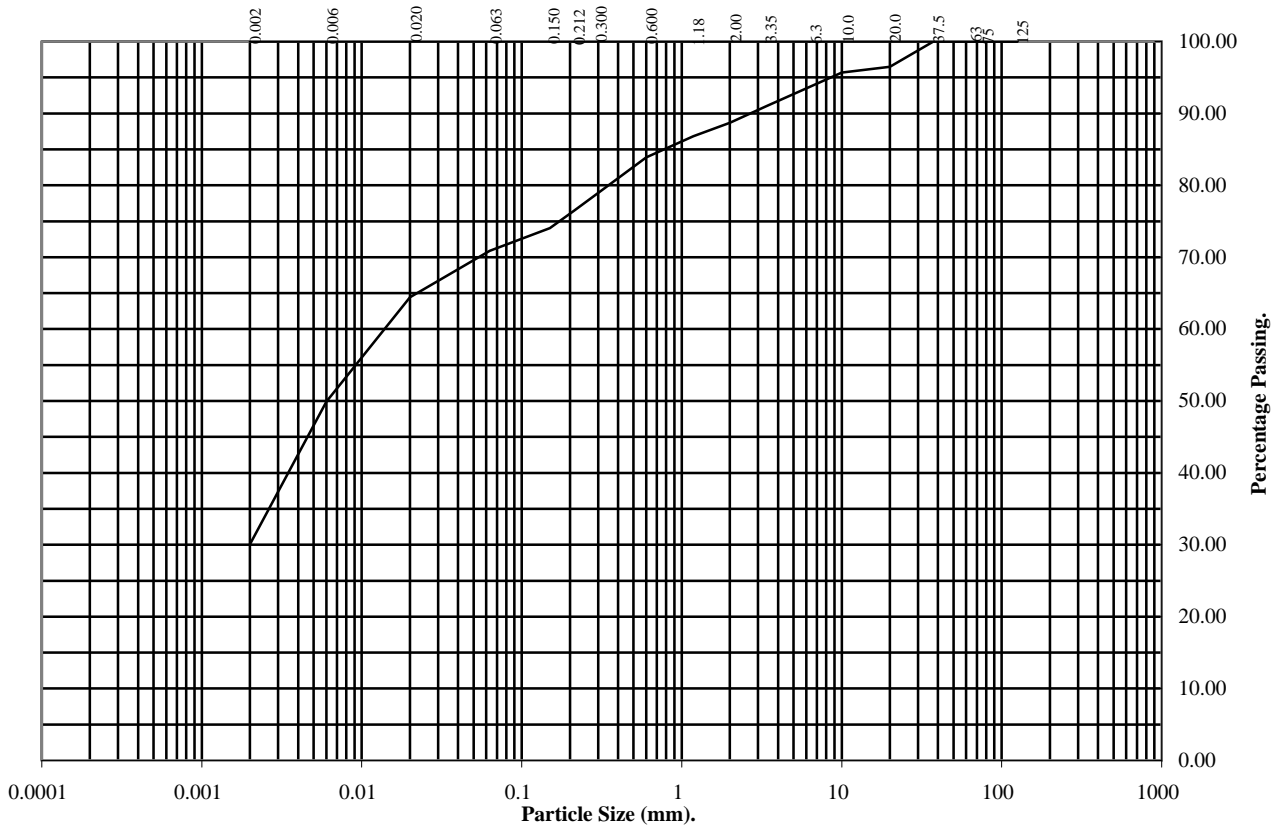
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Date Sampled: 6/8/14

Depth (m):

Sample Number: CL1/03

Sample Type: B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 96                 |
| 10            | 96                 |
| 6.3           | 94                 |
| 3.35          | 91                 |
| 2             | 89                 |
| 1.18          | 87                 |
| 0.6           | 84                 |
| 0.3           | 79                 |
| 0.212         | 76                 |
| 0.15          | 74                 |
| 0.063         | 71                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 64                 |
| 0.006             | 50                 |
| 0.002             | 30                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 11               |
| Sand          | 18               |
| Silt          | 41               |
| Clay          | 30               |

## Remarks:

See summary of soil descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 01/09/14 |             | 01/09/14 |

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Professional Soils Laboratory

HAFOD QUARRY LANDFILL.

Contract No.:  
PSL14/4019

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

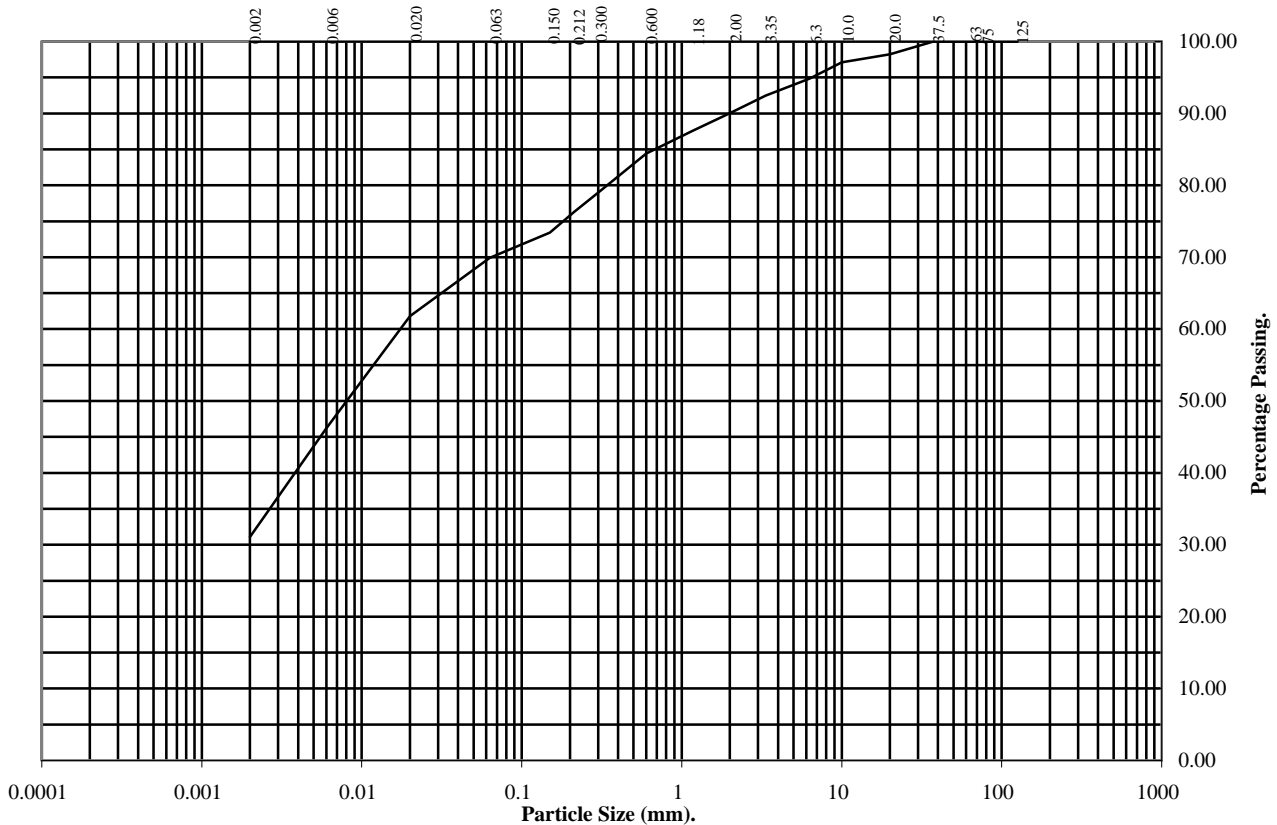
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Date Sampled: 6/8/14

Depth (m):

Sample Number: CL1/04

Sample Type: B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 98                 |
| 10            | 97                 |
| 6.3           | 95                 |
| 3.35          | 92                 |
| 2             | 90                 |
| 1.18          | 88                 |
| 0.6           | 84                 |
| 0.3           | 79                 |
| 0.212         | 76                 |
| 0.15          | 73                 |
| 0.063         | 70                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 62                 |
| 0.006             | 46                 |
| 0.002             | 31                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 10               |
| Sand          | 20               |
| Silt          | 39               |
| Clay          | 31               |

## Remarks:

See summary of soil descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 01/09/14 |             | 01/09/14 |

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Professional Soils Laboratory

HAFOD QUARRY LANDFILL.

Contract No.:  
PSL14/4019

# PARTICLE SIZE DISTRIBUTION TEST

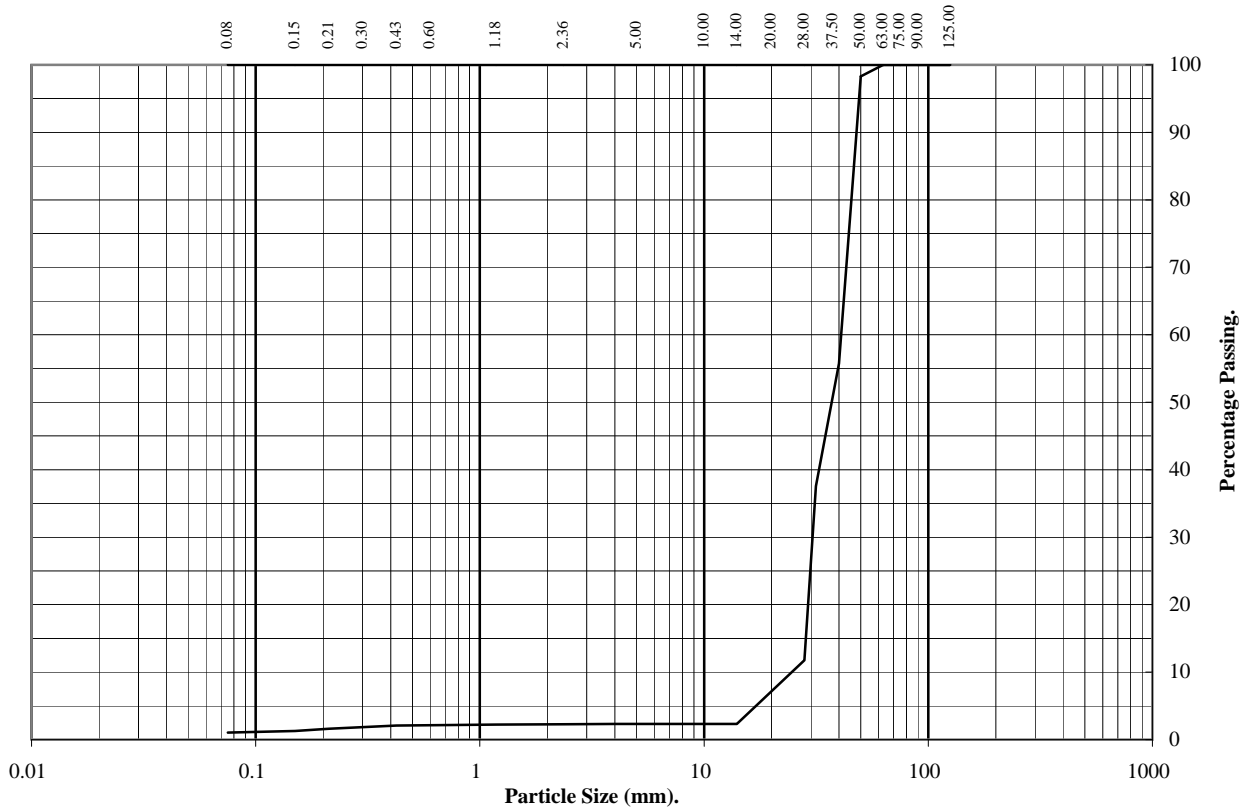
BS 812: Section 103.1 :1985

Wet Sieve, Clause 7.2

Sample Number:

DG/01

Depth (m):



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 90            | 100                |
| 75            | 100                |
| 63            | 100                |
| 50            | 98                 |
| 40            | 56                 |
| 31.5          | 38                 |
| 28            | 12                 |
| 14            | 2                  |
| 10            | 2                  |
| 4             | 2                  |

| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 2.36          | 2                  |
| 1.18          | 2                  |
| 0.6           | 2                  |
| 0.425         | 2                  |
| 0.3           | 2                  |
| 0.212         | 2                  |
| 0.15          | 1                  |
| 0.075         | 1                  |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 98               |
| Sand          | 1                |
| Silt/Clay     | 1                |

**Remarks:**

See summary of soil descriptions.

Checked and Approved By

Date

01/09/2014

**PSL**

Professional Soils Laboratory

HAFOD QUARRY LANDFILL.

Contract No.: PSL14/4019

Page of

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

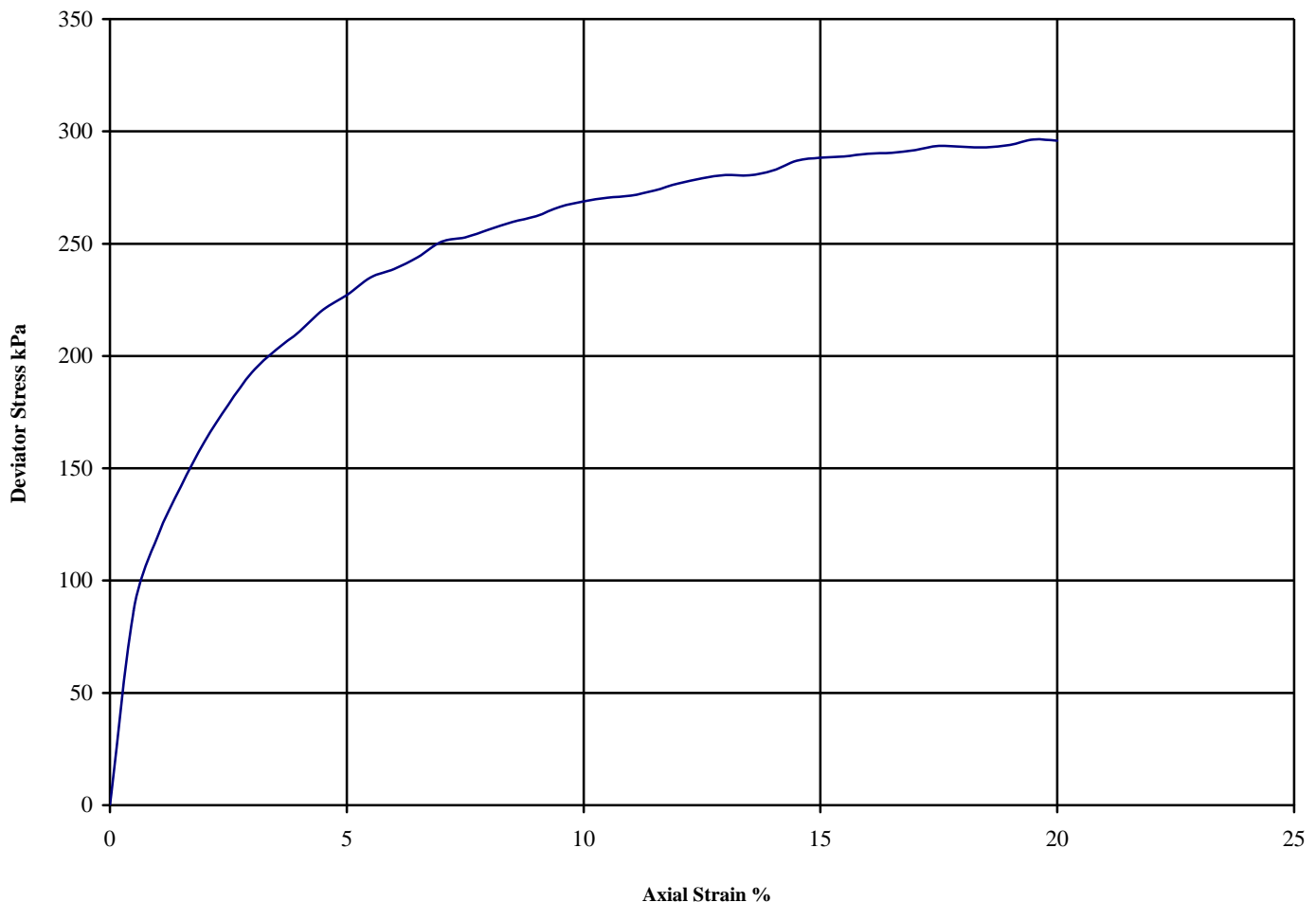
B.S. 1377 : Part 7 : Clause 8 : 1990



Hole Number: CL1 /02

Depth (m):

Date Sampled: 6/8/14

Sample Type: U



|  |                      |                      |                     |                                   |                                  |                         |                      |                 |   |          |   |          |
|--|----------------------|----------------------|---------------------|-----------------------------------|----------------------------------|-------------------------|----------------------|-----------------|---|----------|---|----------|
| Diameter (mm):                                   |                      | 100.0                | Height (mm):        |                                   | 200.0                            | Test:                   | 100 mm Single Stage. |                 | Undisturbed   |          |   |          |
| Specimen   | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)               | Corr. Max. Deviator Stress (kPa) | Shear Strength Cu (kPa) | Failure Strain (%)   | Mode of Failure | Remarks   |          |   |          |
|  |                      |                      |                     |                                   |                                  |                         |                      |                 | Sample taken from top of tube   |          |   |          |
|  |                      |                      |                     |                                   |                                  |                         |                      |                 | Rate of strain = 2 %/min  |          |   |          |
|  |                      |                      |                     |                                   |                                  |                         |                      |                 | Latex Membrane used 0.2 mm thickness, Correction applied 0.34 kPa                     |          |   |          |
| A  | 14                   | 2.14                 | 1.87                | 200                               | 296                              | 148                     | 19.5                 | Plastic         | See summary of soil descriptions.   |          |   |          |
|  |                      |                      |                     |                                   |                                  |                         |                      |                 | Checked   | Date     | Approved  | Date     |
|  |                      |                      |                     |                                   |                                  |                         |                      |                 |  | 01/09/14 |  | 01/09/14 |
|  |                      |                      |                     |                                   |                                  |                         |                      |                 |   |          |   |          |
| <div>PSL<br/>Professional Soils Laboratory</div> |                      |                      |                     | <div>HAFOD QUARRY LANDFILL.</div> |                                  |                         |                      |                 | <div>Contract No:<br/>PSL14/4019</div>  |          |   |          |

# Undrained Shear Strength in Triaxial Compression

without measurement of Pore Pressure

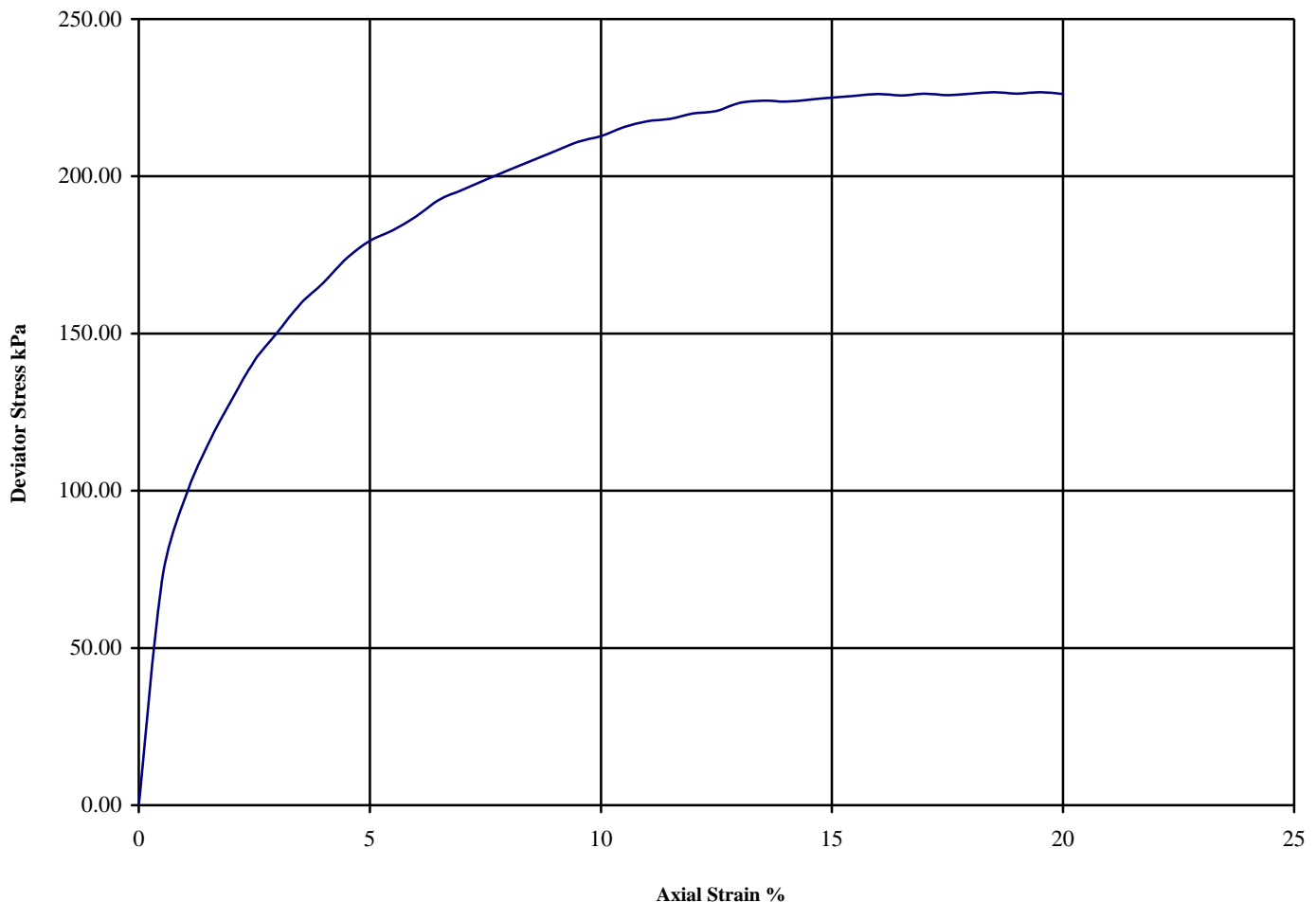
B.S. 1377 : Part7 : Clause 8 : 1990



Hole Number: CL1 /04

Depth (m):

Date Sampled: 6/8/14

Sample Type: U



|   |                      |                      |                     |                        |                                  |                         |                      |                 |   |          |   |          |
|---|----------------------|----------------------|---------------------|------------------------|----------------------------------|-------------------------|----------------------|-----------------|---|----------|---|----------|
| Diameter (mm):  |                      | 100.0                | Height (mm):        |                        | 200.0                            | Test:                   | 100 mm Single Stage. |                 | Undisturbed   |          |   |          |
| Specimen  | Moisture Content (%) | Bulk Density (Mg/m3) | Dry Density (Mg/m3) | Cell Pressure (kPa)    | Corr. Max. Deviator Stress (kPa) | Shear Strength Cu (kPa) | Failure Strain (%)   | Mode of Failure | Remarks   |          |   |          |
|   |                      |                      |                     |                        |                                  |                         |                      |                 | Sample taken from top of tube   |          |   |          |
|   |                      |                      |                     |                        |                                  |                         |                      |                 | Rate of strain = 2 %/min  |          |   |          |
|   |                      |                      |                     |                        |                                  |                         |                      |                 | Latex Membrane used 0.2 mm thickness, Correction applied 0.34 kPa                     |          |   |          |
| A   | 14                   | 2.17                 | 1.90                | 200                    | 227                              | 113                     | 18.5                 | Plastic         | See summary of soil descriptions.   |          |   |          |
|   |                      |                      |                     |                        |                                  |                         |                      |                 | Checked   | Date     | Approved  | Date     |
|   |                      |                      |                     |                        |                                  |                         |                      |                 |  | 01/09/14 |  | 01/09/14 |
| <div>PSL</div> <div>Professional Soils Laboratory</div> |                      |                      |                     | HAFOD QUARRY LANDFILL. |                                  |                         |                      |                 | Contract No:<br>PSL14/4019  |          |   |          |



# LABORATORY REPORT



4043

**Contract Number: PSL14/4518**

Client's Reference:

Report Date: 18 September 2014

Client Name: Stratus Environmental LTD  
4245 Park Approach  
Thorpe Park  
Leeds  
LS15 8GB

**For the attention of: Richard Clarke**

Contract Title: Hafod Quarry Landfill

Date Received: 8/9/2014

Date Commenced: 8/9/2014

Date Completed: 18/9/2014

**Notes: Observations and Interpretations are outside the UKAS Accreditation**

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson  
(Director)

A Watkins  
(Director)

M Beastall  
(Laboratory Manager)

D Lambe  
(Senior Technician)

  
S Royle  
(Senior Technician)




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awatkins@prosoils.co.uk

Page 1 of

## SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

## Professional Soils Laboratory

|   |          |   |          |   |            |
|---|----------|---|----------|---|------------|
| Compiled by   | Date     | Checked by  | Date     | Approved by   | Date       |
|  | 18/09/14 |  | 18/09/14 |  | 18/09/14   |
| HAFOD QUARRY LANDFILL SITE.   |          |   |          | Contract No:  | PSL14/4518 |
|   |          |   |          | Client Ref:   | CE1005     |





# SUMMARY OF SOIL CLASSIFICATION TESTS

(B.S. 1377 : PART 2 : 1990)

| Hole Number | Sample Number | Sample Type | Date Sampled | Moisture Content %<br>Clause 3.2 | Bulk Density Mg/m <sup>3</sup><br>Clause 7.2 | Dry Density Mg/m <sup>3</sup><br>Clause 7.2 | Particle Density Mg/m <sup>3</sup><br>Clause 8.2 | Liquid Limit %<br>Clause 4.3/4.4 | Plastic Limit %<br>Clause 5.3 | Plasticity Index %<br>Clause 5.4 | % Passing .425mm | Remarks                     |
|-------------|---------------|-------------|--------------|----------------------------------|--|---|--|----------------------------------|-------------------------------|----------------------------------|------------------|-----------------------------|
|             | CL2/07        | B           | 8/8/14       | 13                               |  |   | 2.62   | 35                               | 17                            | 18                               | 77               | Intermediate plasticity CL. |
|             | CL3/08        | B           | 11/8/14      | 19                               |  |   | 2.6  | 35                               | 18                            | 17                               | 68               | Intermediate plasticity CL. |
|             | CL3/12        | B           | 12/8/14      | 15                               |  |   | 2.61   | 34                               | 17                            | 17                               | 79               | Low plasticity CL.          |
|             | CL4/13        | B           | 13/8/14      | 15                               |  |   | 2.63   | 36                               | 18                            | 18                               | 76               | Intermediate plasticity CL. |
|             | CL4/15        | B           | 15/8/14      | 13                               |  |   | 2.63   | 34                               | 18                            | 16                               | 70               | Low plasticity CL.          |
|             | CL5/16        | B           | 15/8/14      | 13                               |  |   | 2.61   | 33                               | 16                            | 17                               | 78               | Low plasticity CL.          |
|             | CL5/18        | B           | 21/8/14      | 15                               |  |   | 2.6  | 35                               | 17                            | 18                               | 91               | Intermediate plasticity CL. |
|             | CL6/20        | B           | 2/8/14       | 16                               |  |   | 2.62   | 35                               | 18                            | 17                               | 87               | Intermediate plasticity CL. |
|             | CL6/23        | B           | 1/9/14       | 14                               |  |   | 2.64   | 34                               | 18                            | 16                               | 88               | Low plasticity CL.          |
|             | CL7/24        | B           | 1/9/14       | 15                               |  |   | 2.62   | 33                               | 17                            | 16                               | 86               | Low plasticity CL.          |
|             |               |             |              |                                  |  |   |  |                                  |                               |                                  |                  |                             |
|             |               |             |              |                                  |  |   |  |                                  |                               |                                  |                  |                             |
|             |               |             |              |                                  |  |   |  |                                  |                               |                                  |                  |                             |
|             |               |             |              |                                  |  |   |  |                                  |                               |                                  |                  |                             |
|             |               |             |              |                                  |  |   |  |                                  |                               |                                  |                  |                             |
|             |               |             |              |                                  |  |   |  |                                  |                               |                                  |                  |                             |
|             |               |             |              |                                  |  |   |  |                                  |                               |                                  |                  |                             |
|             |               |             |              |                                  |  |   |  |                                  |                               |                                  |                  |                             |
|             |               |             |              |                                  |  |   |  |                                  |                               |                                  |                  |                             |
|             |               |             |              |                                  |  |   |  |                                  |                               |                                  |                  |                             |

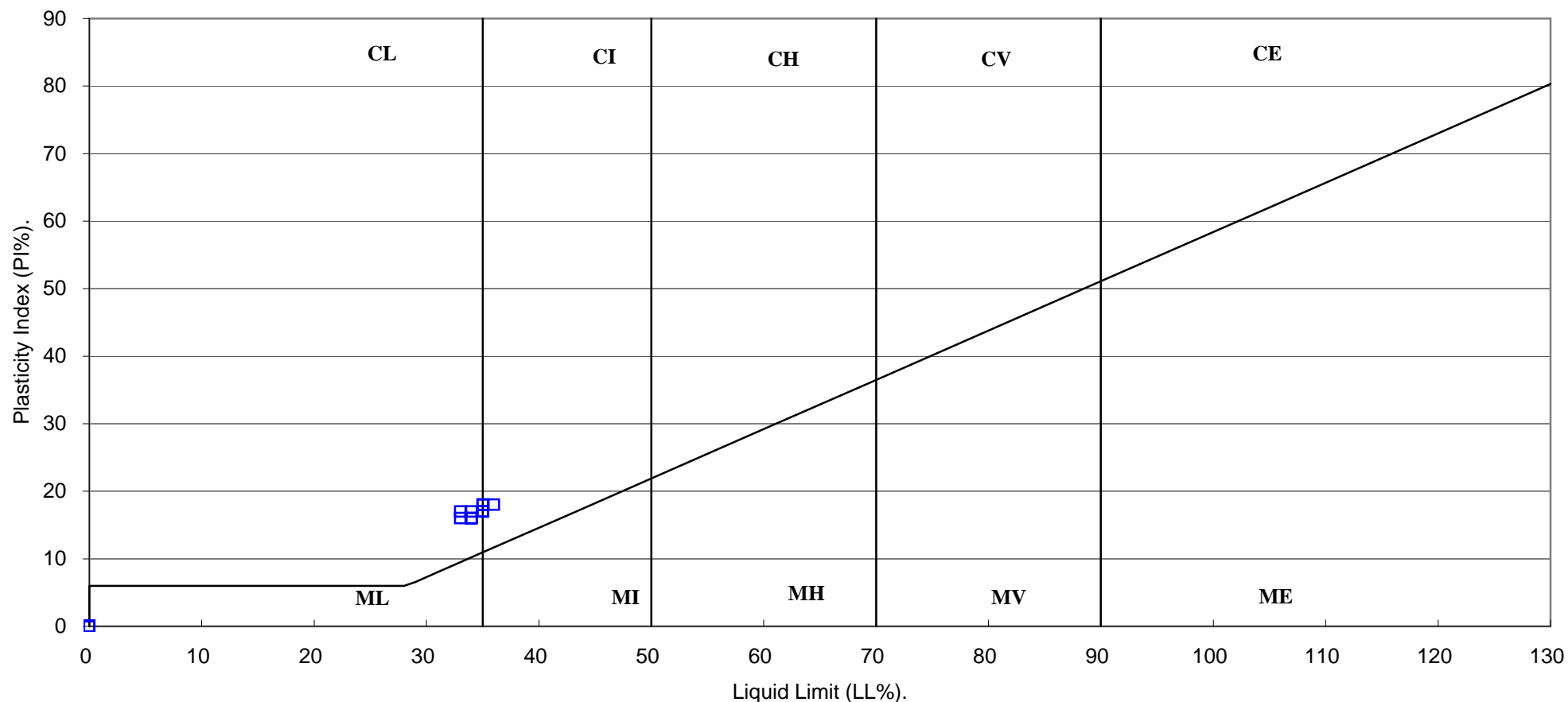
SYMBOLS : NP : Non Plastic

\* : Liquid Limit and Plastic Limit Wet Sieved.

|   |  |          |   |          |   |                         |
|---|--|----------|---|----------|---|-------------------------|
| <br><b>Professional Soils Laboratory</b> | Compiled by  | Date     | Checked by  | Date     | Approved by   | Date                    |
|   |  | 18/09/14 |  | 18/09/14 |  | 18/09/14                |
|   | HAFOD QUARRY LANDFILL SITE.  |          |   |          |   | Contract No: PSL14/4518 |
|   |  |          |   |          |   | Client Ref: CE1005      |

# PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)



**PSL**

**Professional Soils Laboratory**

Compiled by

*[Signature]*

Date

18/09/14

Checked by

*[Signature]*

Date

18/09/14

Approved by

*[Signature]*

Date

18/09/14

**HAFOD QUARRY LANDFILL SITE.**

Contract No:

**PSL14/4518**

Client Ref:

**CE1005**

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:

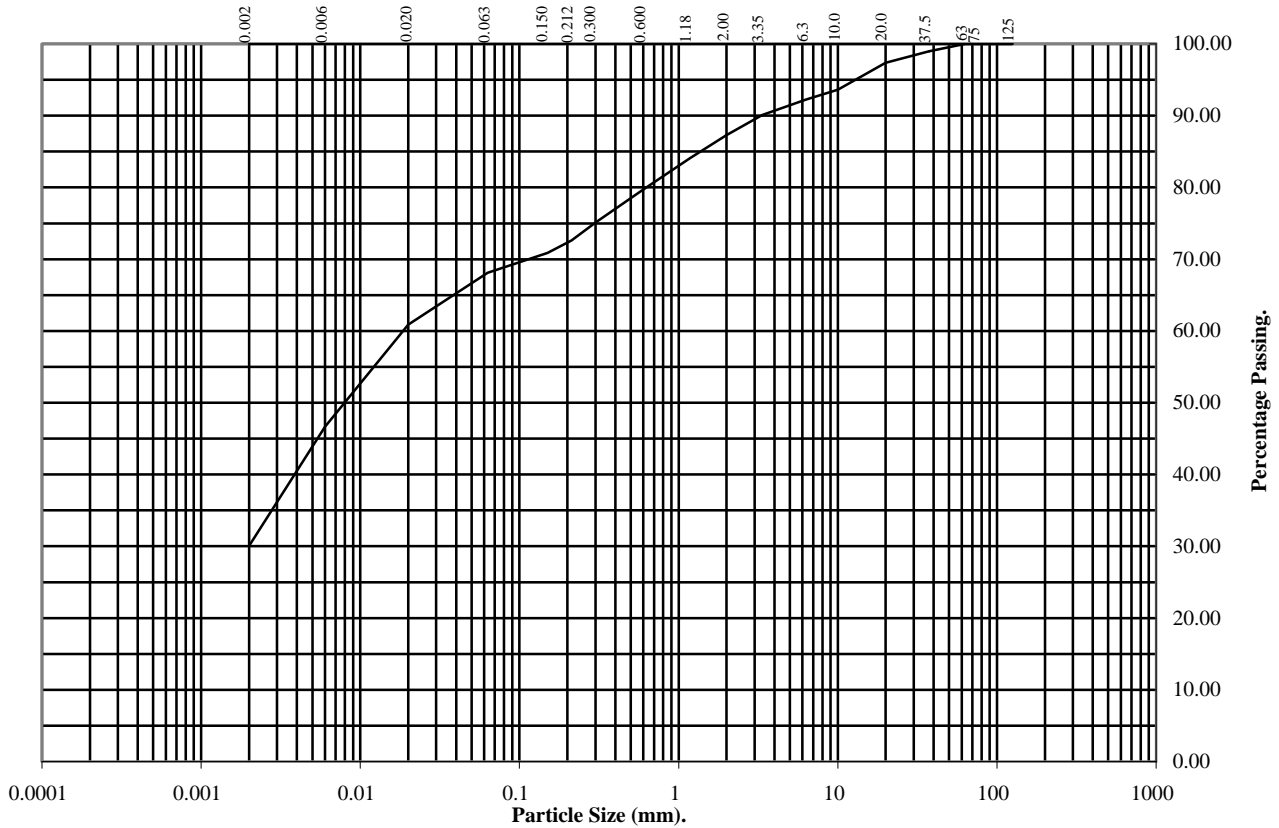
Date Sampled:

8/8/14

Sample Number: CL2/07

Sample Type:

B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 99                 |
| 20            | 97                 |
| 10            | 94                 |
| 6.3           | 92                 |
| 3.35          | 90                 |
| 2             | 87                 |
| 1.18          | 84                 |
| 0.6           | 80                 |
| 0.3           | 75                 |
| 0.212         | 73                 |
| 0.15          | 71                 |
| 0.063         | 68                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 61                 |
| 0.006             | 47                 |
| 0.002             | 30                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 13               |
| Sand          | 19               |
| Silt          | 38               |
| Clay          | 30               |

## Remarks:

See summary of soils descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 18/09/14 |             | 18/09/14 |

**PSL**

Professional Soils Laboratory

HAFOD QUARRY LANDFILL SITE.

Contract No.:  
PSL14/4518

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:

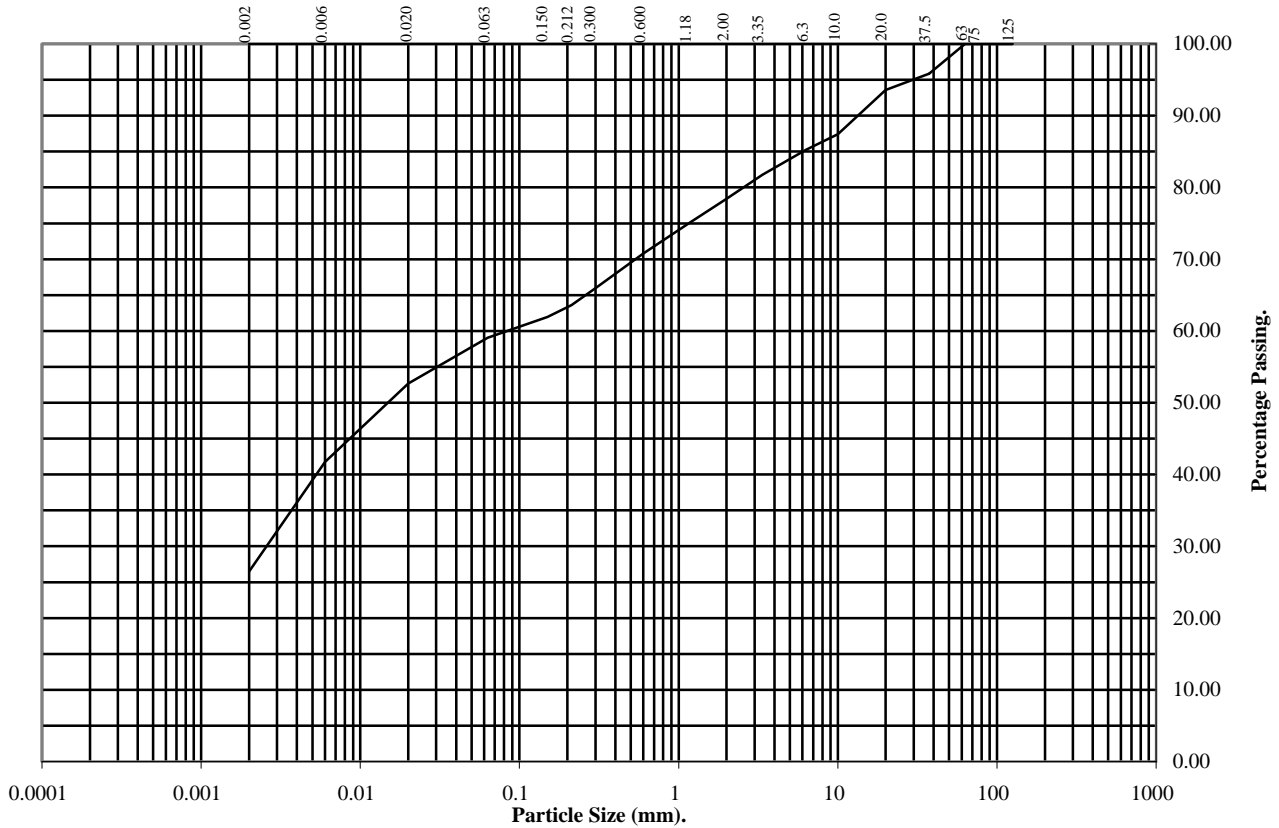
Date Sampled:

11/8/14

Sample Number: CL3/08

Sample Type:

B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 96                 |
| 20            | 94                 |
| 10            | 87                 |
| 6.3           | 85                 |
| 3.35          | 82                 |
| 2             | 78                 |
| 1.18          | 75                 |
| 0.6           | 71                 |
| 0.3           | 66                 |
| 0.212         | 64                 |
| 0.15          | 62                 |
| 0.063         | 59                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 53                 |
| 0.006             | 42                 |
| 0.002             | 26                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 22               |
| Sand          | 19               |
| Silt          | 33               |
| Clay          | 26               |

## Remarks:

See summary of soils descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 18/09/14 |             | 18/09/14 |

**PSL**

Professional Soils Laboratory

HAFOD QUARRY LANDFILL SITE.

Contract No.:  
PSL14/4518

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:

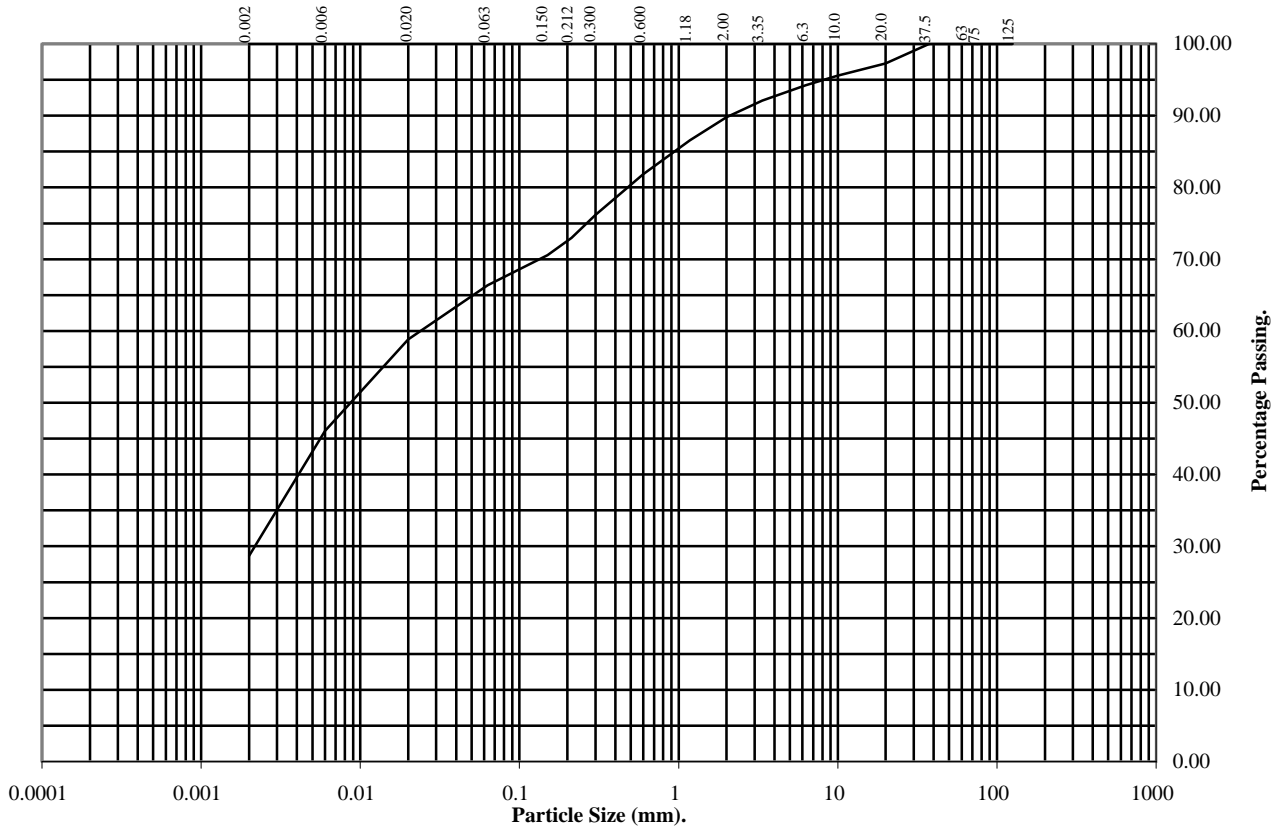
Date Sampled:

12/8/14

Sample Number: CL3/12

Sample Type:

B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 97                 |
| 10            | 96                 |
| 6.3           | 94                 |
| 3.35          | 92                 |
| 2             | 90                 |
| 1.18          | 87                 |
| 0.6           | 82                 |
| 0.3           | 76                 |
| 0.212         | 73                 |
| 0.15          | 71                 |
| 0.063         | 66                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 59                 |
| 0.006             | 46                 |
| 0.002             | 29                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 10               |
| Sand          | 24               |
| Silt          | 37               |
| Clay          | 29               |

## Remarks:

See summary of soils descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 18/09/14 |             | 18/09/14 |

**PSL**

Professional Soils Laboratory

HAFOD QUARRY LANDFILL SITE.

Contract No.:  
PSL14/4518

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:

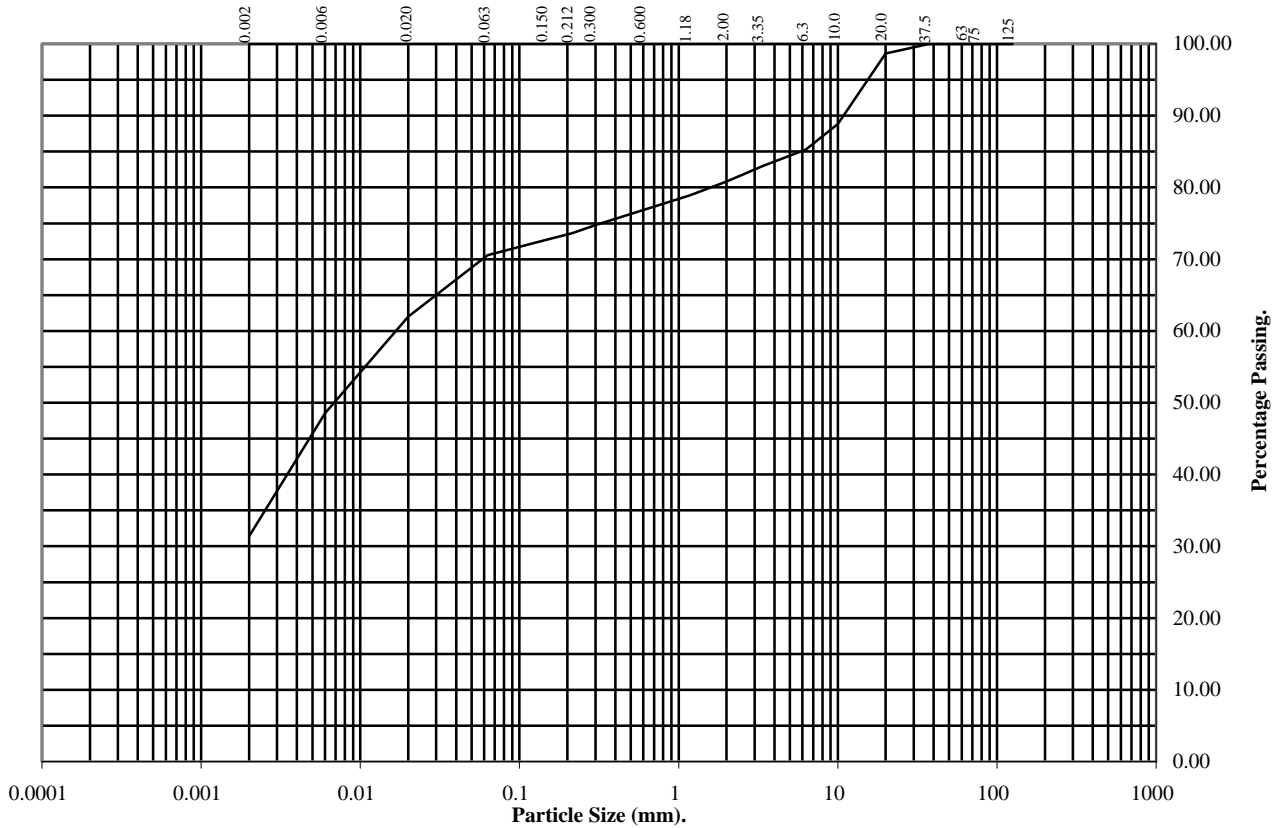
Date Sampled:

13/8/14

Sample Number: CL4/13

Sample Type:

B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 99                 |
| 10            | 89                 |
| 6.3           | 85                 |
| 3.35          | 83                 |
| 2             | 81                 |
| 1.18          | 79                 |
| 0.6           | 77                 |
| 0.3           | 75                 |
| 0.212         | 74                 |
| 0.15          | 73                 |
| 0.063         | 71                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 62                 |
| 0.006             | 49                 |
| 0.002             | 31                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 19               |
| Sand          | 10               |
| Silt          | 40               |
| Clay          | 31               |

## Remarks:

See summary of soils descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 18/09/14 |             | 18/09/14 |

**PSL**

Professional Soils Laboratory

HAFOD QUARRY LANDFILL SITE.

Contract No.:  
PSL14/4518

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:

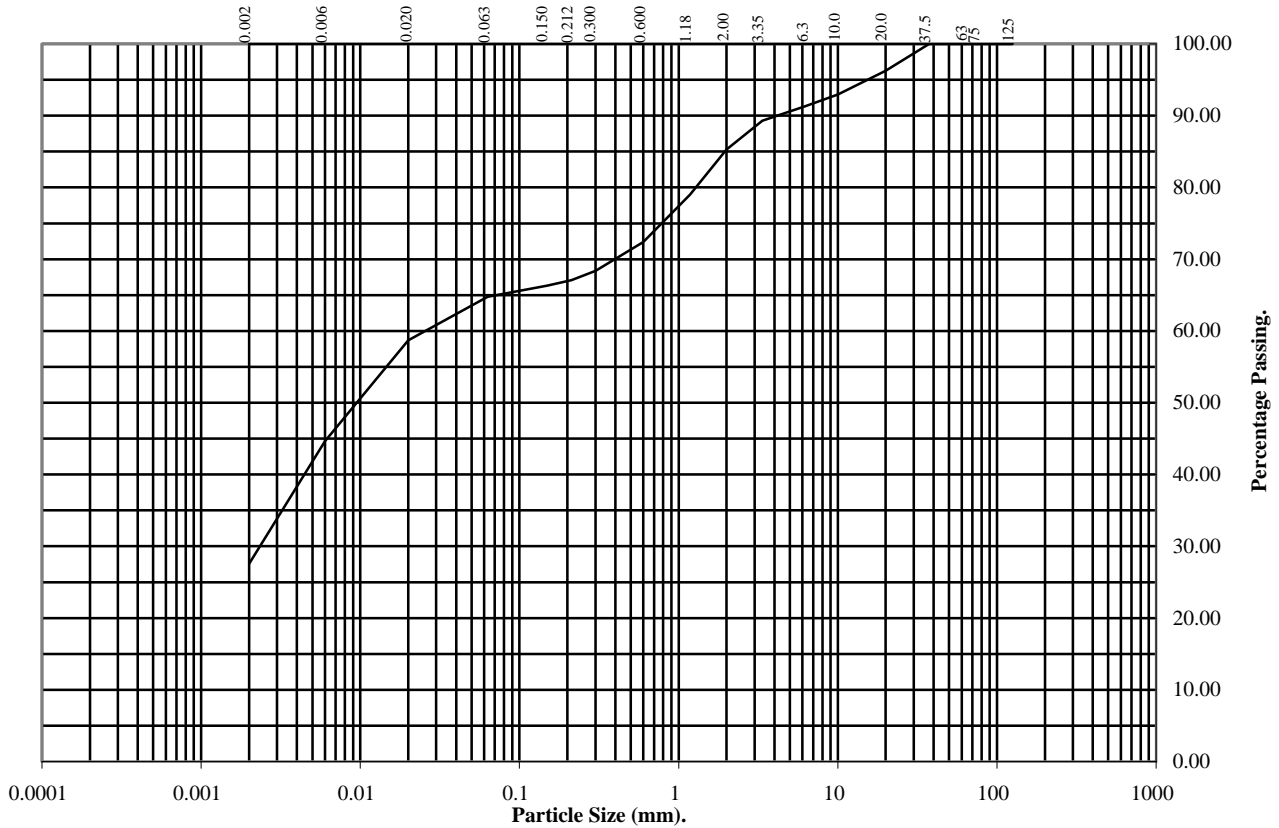
Date Sampled:

15/8/14

Sample Number: CL4/15

Sample Type:

B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 96                 |
| 10            | 93                 |
| 6.3           | 91                 |
| 3.35          | 89                 |
| 2             | 85                 |
| 1.18          | 79                 |
| 0.6           | 72                 |
| 0.3           | 68                 |
| 0.212         | 67                 |
| 0.15          | 66                 |
| 0.063         | 65                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 59                 |
| 0.006             | 45                 |
| 0.002             | 28                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 15               |
| Sand          | 20               |
| Silt          | 37               |
| Clay          | 28               |

## Remarks:

See summary of soils descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 18/09/14 |             | 18/09/14 |

**PSL**

Professional Soils Laboratory

HAFOD QUARRY LANDFILL SITE.

Contract No.:  
PSL14/4518

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:

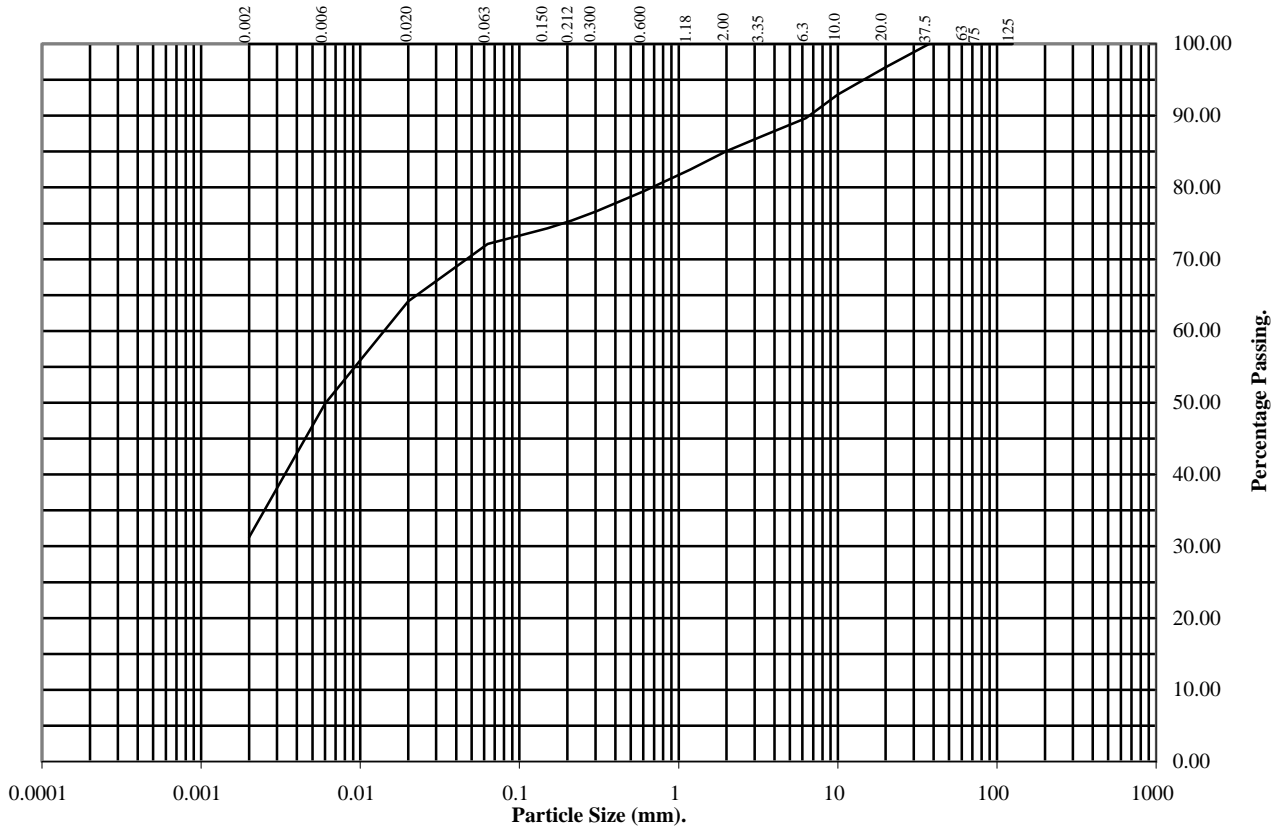
Date Sampled:

15/8/14

Sample Number: CL5/16

Sample Type:

B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 97                 |
| 10            | 93                 |
| 6.3           | 90                 |
| 3.35          | 87                 |
| 2             | 85                 |
| 1.18          | 82                 |
| 0.6           | 79                 |
| 0.3           | 77                 |
| 0.212         | 75                 |
| 0.15          | 74                 |
| 0.063         | 72                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 64                 |
| 0.006             | 50                 |
| 0.002             | 31                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 15               |
| Sand          | 13               |
| Silt          | 41               |
| Clay          | 31               |

## Remarks:

See summary of soils descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 18/09/14 |             | 18/09/14 |

**PSL**

Professional Soils Laboratory

HAFOD QUARRY LANDFILL SITE.

Contract No.:  
PSL14/4518

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:

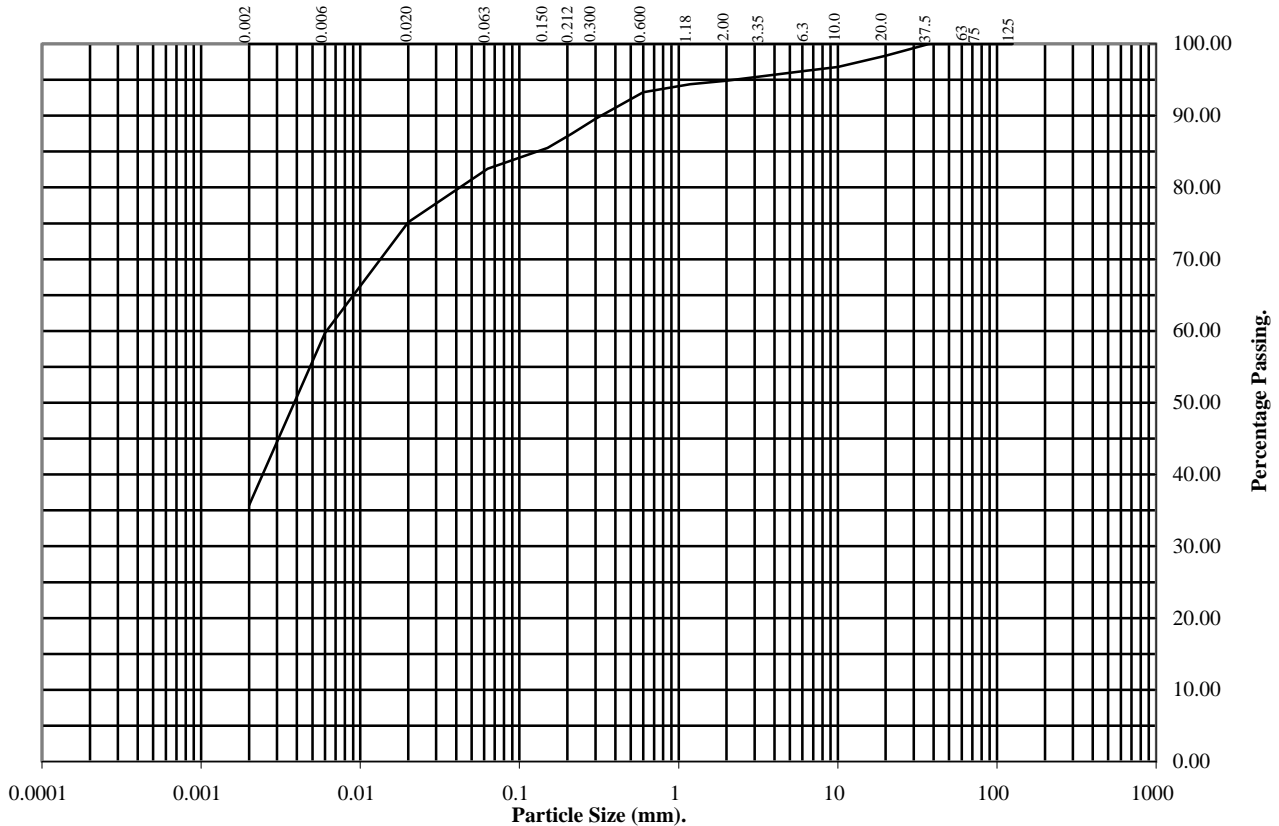
Date Sampled:

21/08/14

Sample Number: CL5/18

Sample Type:

B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 98                 |
| 10            | 97                 |
| 6.3           | 96                 |
| 3.35          | 96                 |
| 2             | 95                 |
| 1.18          | 94                 |
| 0.6           | 93                 |
| 0.3           | 90                 |
| 0.212         | 87                 |
| 0.15          | 86                 |
| 0.063         | 83                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 75                 |
| 0.006             | 60                 |
| 0.002             | 36                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 5                |
| Sand          | 12               |
| Silt          | 47               |
| Clay          | 36               |

## Remarks:

See summary of soils descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 18/09/14 |             | 18/09/14 |

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Professional Soils Laboratory

HAFOD QUARRY LANDFILL SITE.

Contract No.:  
PSL14/4518

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:

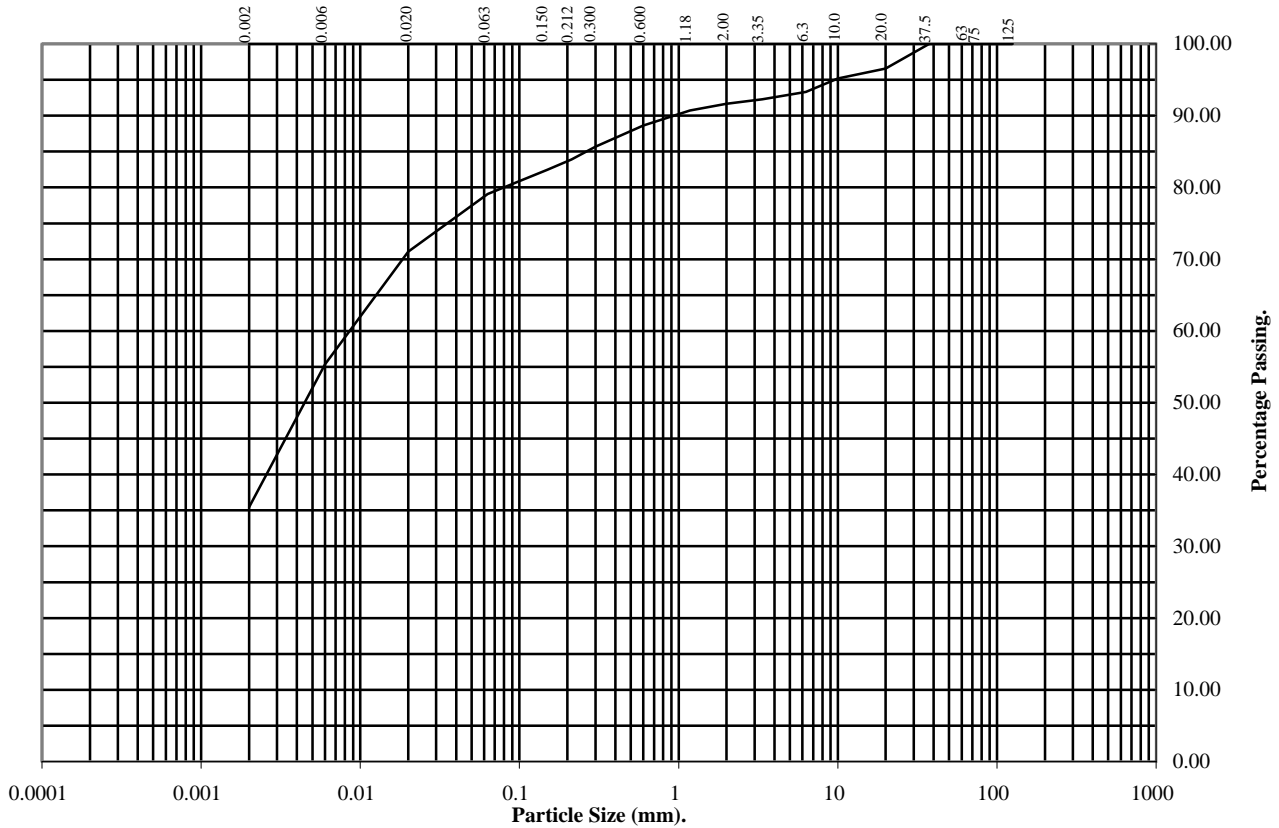
Date Sampled:

28/08/14

Sample Number: CL6/20

Sample Type:

B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 97                 |
| 10            | 95                 |
| 6.3           | 93                 |
| 3.35          | 92                 |
| 2             | 92                 |
| 1.18          | 91                 |
| 0.6           | 89                 |
| 0.3           | 86                 |
| 0.212         | 84                 |
| 0.15          | 82                 |
| 0.063         | 79                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 71                 |
| 0.006             | 55                 |
| 0.002             | 35                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 8                |
| Sand          | 13               |
| Silt          | 44               |
| Clay          | 35               |

## Remarks:

See summary of soils descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 18/09/14 |             | 18/09/14 |

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Professional Soils Laboratory

HAFOD QUARRY LANDFILL SITE.

Contract No.:  
PSL14/4518

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:

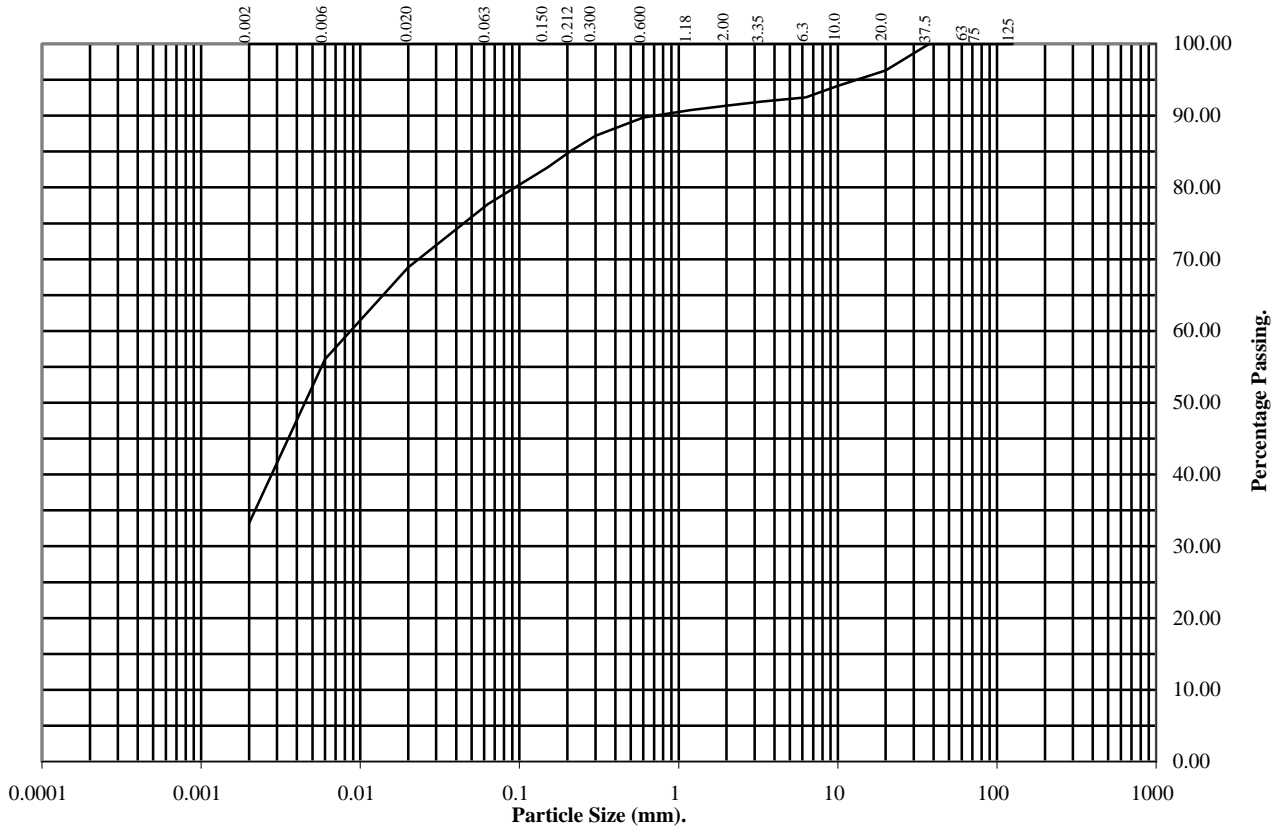
Date Sampled:

01/09/14

Sample Number: CL6/23

Sample Type:

B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 96                 |
| 10            | 94                 |
| 6.3           | 93                 |
| 3.35          | 92                 |
| 2             | 91                 |
| 1.18          | 91                 |
| 0.6           | 90                 |
| 0.3           | 87                 |
| 0.212         | 85                 |
| 0.15          | 83                 |
| 0.063         | 78                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 69                 |
| 0.006             | 56                 |
| 0.002             | 33                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 9                |
| Sand          | 13               |
| Silt          | 45               |
| Clay          | 33               |

## Remarks:

See summary of soils descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 18/09/14 |             | 18/09/14 |

**PSL**

Professional Soils Laboratory

HAFOD QUARRY LANDFILL SITE.

Contract No.:  
PSL14/4518

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:

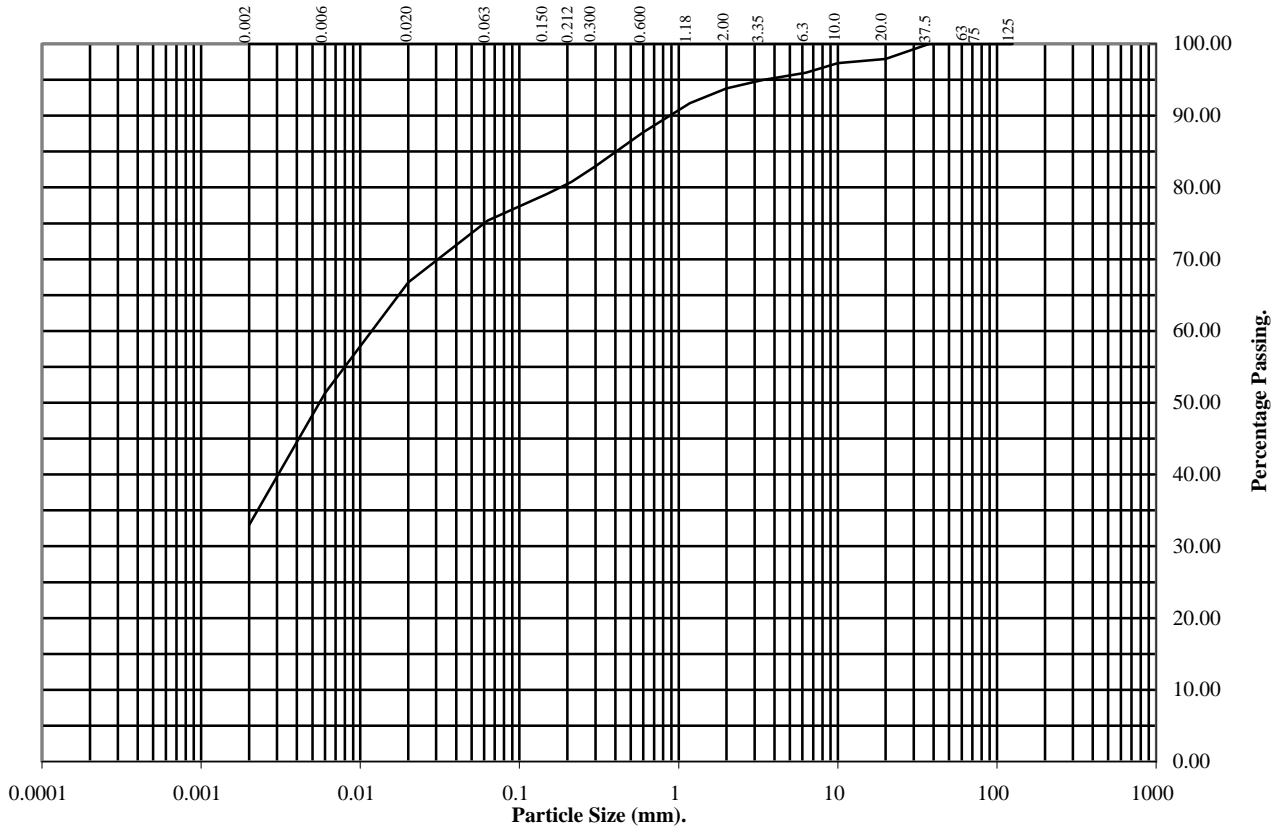
Date Sampled:

01/09/14

Sample Number: CL7/24

Sample Type:

B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 98                 |
| 10            | 97                 |
| 6.3           | 96                 |
| 3.35          | 95                 |
| 2             | 94                 |
| 1.18          | 92                 |
| 0.6           | 88                 |
| 0.3           | 83                 |
| 0.212         | 81                 |
| 0.15          | 79                 |
| 0.063         | 75                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 67                 |
| 0.006             | 51                 |
| 0.002             | 33                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 6                |
| Sand          | 19               |
| Silt          | 42               |
| Clay          | 33               |

## Remarks:

See summary of soils descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 18/09/14 |             | 18/09/14 |

**PSL**

Professional Soils Laboratory

HAFOD QUARRY LANDFILL SITE.

Contract No.:  
PSL14/4518



# LABORATORY REPORT



4043

**Contract Number: PSL14/4812**

Client's Reference:

Report Date: 25 September 2014

Client Name: Stratus Environmental LTD  
4245 Park Approach  
Thorpe Park  
Leeds  
LS15 8GB

**For the attention of: Richard Clarke**

Contract Title: Hafod Quarry Landfill

Date Received: 23/9/2014

Date Commenced: 23/9/2014

Date Completed: 25/9/2014

**Notes: Observations and Interpretations are outside the UKAS Accreditation**

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson  
(Director)

A Watkins  
(Director)

M Beastall  
(Laboratory Manager)

D Lambe  
(Senior Technician)


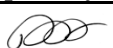


  
S Royle  
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,  
Doncaster DN4 0AR  
tel: +44 (0)844 815 6641  
fax: +44 (0)844 815 6642  
e-mail: rgunson@prosoils.co.uk  
awatkins@prosoils.co.uk

Page 1 of

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

| Hole Number | Sample Number | Sample Type | Date       | Description of Sample                          |
|-------------|---------------|-------------|------------|--|
|             | CL7/26        | B           | 03/09/2014 | Brown slightly gravelly sandy very silty CLAY. |
|             | CL7/26        | C           | 03/09/2014 | Brown slightly gravelly sandy very silty CLAY. |
|             | CL7/27        | C           | 03/09/2014 | Brown slightly gravelly sandy very silty CLAY. |
|             | CL8/28        | B           | 03/09/2014 | Brown slightly gravelly sandy very silty CLAY. |
|             | CL8/28        | C           | 03/09/2014 | Brown slightly gravelly sandy very silty CLAY. |
|             | CL8/29        | C           | 05/09/2014 | Brown slightly gravelly sandy very silty CLAY. |
|             | CL8/30        | B           | 05/09/2014 | Brown slightly gravelly sandy very silty CLAY. |
|             | CL8/30        | C           | 05/09/2014 | Brown slightly gravelly sandy very silty CLAY. |
|             | CL8/31        | C           | 05/09/2014 | Brown slightly gravelly sandy very silty CLAY. |
|             |               |             |            |  |
|             |               |             |            |  |
|             |               |             |            |  |
|             |               |             |            |  |
|             |               |             |            |  |
|             |               |             |            |  |
|             |               |             |            |  |
|             |               |             |            |  |
|             |               |             |            |  |
|             |               |             |            |  |
|             |               |             |            |  |

|   |  |          |   |          |   |            |
|---|--|----------|---|----------|---|------------|
| <br><b>Professional Soils Laboratory</b> | Compiled by  | Date     | Checked by  | Date     | Approved by   | Date       |
|   |  | 25/09/14 |  | 25/09/14 |  | 25/09/14   |
|   | HAFOD QUARRY LANDFILL SITE.  |          |   |          | Contract No:  | PSL14/4812 |
|   |  |          |   |          | Client Ref:   | -          |


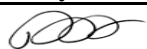


# SUMMARY OF SOIL CLASSIFICATION TESTS

(B.S. 1377 : PART 2 : 1990)

| Hole Number | Sample Number | Sample Type | Date       | Moisture Content %<br>Clause 3.2 | Bulk Density Mg/m <sup>3</sup><br>Clause 7.2 | Dry Density Mg/m <sup>3</sup><br>Clause 7.2 | Particle Density Mg/m <sup>3</sup><br>Clause 8.2 | Liquid Limit %<br>Clause 4.3/4.4 | Plastic Limit %<br>Clause 5.3 | Plasticity Index %<br>Clause 5.4 | % Passing .425mm | Remarks            |
|-------------|---------------|-------------|------------|----------------------------------|--|---|--|----------------------------------|-------------------------------|----------------------------------|------------------|--------------------|
|             | CL7/26        | B           | 03/09/2014 | 13                               |  |   | 2.63   | 32                               | 17                            | 15                               | 93               | Low plasticity CL. |
|             | CL7/26        | C           | 03/09/2014 | 14                               | 2.17   | 1.9   |  |                                  |                               |                                  |                  |                    |
|             | CL7/27        | C           | 03/09/2014 | 14                               | 2.24   | 1.96  |  |                                  |                               |                                  |                  |                    |
|             | CL8/28        | B           | 03/09/2014 | 13                               |  |   | 2.64   | 34                               | 18                            | 16                               | 91               | Low plasticity CL. |
|             | CL8/28        | C           | 03/09/2014 | 13                               | 2.16   | 1.91  |  |                                  |                               |                                  |                  |                    |
|             | CL8/29        | C           | 05/09/2014 | 13                               | 2.18   | 1.93  |  |                                  |                               |                                  |                  |                    |
|             | CL8/30        | B           | 05/09/2014 | 14                               |  |   | 2.63   | 35                               | 18                            | 17                               | 89               | Low plasticity CL. |
|             | CL8/30        | C           | 05/09/2014 | 15                               | 2.14   | 1.86  |  |                                  |                               |                                  |                  |                    |
|             | CL8/31        | C           | 05/09/2014 | 14                               | 2.21   | 1.94  |  |                                  |                               |                                  |                  |                    |
|             |               |             |            |                                  |  |   |  |                                  |                               |                                  |                  |                    |
|             |               |             |            |                                  |  |   |  |                                  |                               |                                  |                  |                    |
|             |               |             |            |                                  |  |   |  |                                  |                               |                                  |                  |                    |
|             |               |             |            |                                  |  |   |  |                                  |                               |                                  |                  |                    |
|             |               |             |            |                                  |  |   |  |                                  |                               |                                  |                  |                    |
|             |               |             |            |                                  |  |   |  |                                  |                               |                                  |                  |                    |
|             |               |             |            |                                  |  |   |  |                                  |                               |                                  |                  |                    |
|             |               |             |            |                                  |  |   |  |                                  |                               |                                  |                  |                    |
|             |               |             |            |                                  |  |   |  |                                  |                               |                                  |                  |                    |
|             |               |             |            |                                  |  |   |  |                                  |                               |                                  |                  |                    |
|             |               |             |            |                                  |  |   |  |                                  |                               |                                  |                  |                    |
|             |               |             |            |                                  |  |   |  |                                  |                               |                                  |                  |                    |
|             |               |             |            |                                  |  |   |  |                                  |                               |                                  |                  |                    |

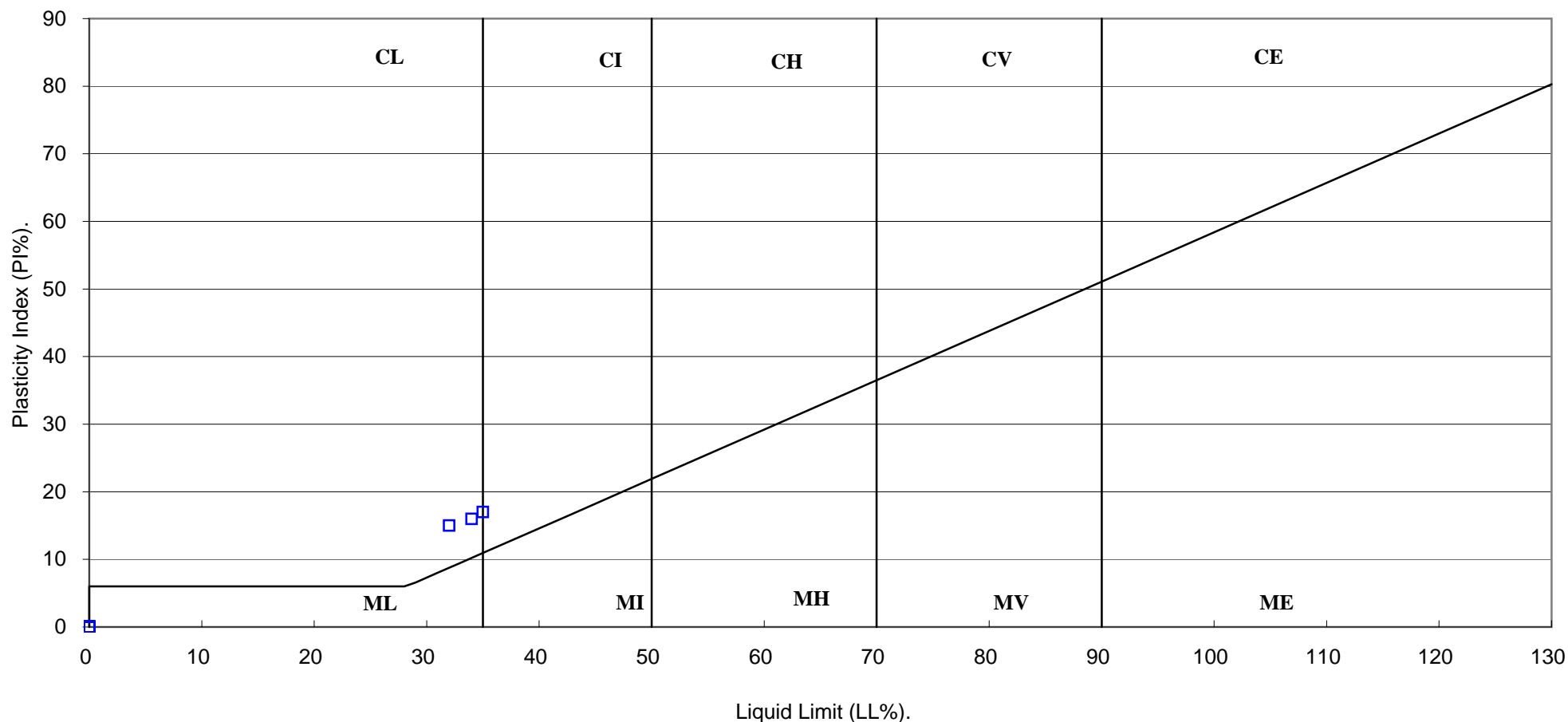
SYMBOLS : NP : Non Plastic

\* : Liquid Limit and Plastic Limit Wet Sieved.

|   |  |          |   |          |   |                         |
|---|--|----------|---|----------|---|-------------------------|
| <br><b>Professional Soils Laboratory</b> | Compiled by  | Date     | Checked by  | Date     | Approved by   | Date                    |
|   |  | 25/09/14 |  | 25/09/14 |  | 25/09/14                |
|   | HAFOD QUARRY LANDFILL SITE.  |          |   |          |   | Contract No: PSL14/4812 |
|   |  |          |   |          |   | Client Ref: -           |

# PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)



**PSL**

**Professional Soils Laboratory**

Compiled by

*[Signature]*

Date

25/09/14

Checked by

*[Signature]*

Date

25/09/14

Approved by

*[Signature]*

Date

25/09/14

**HAFOD QUARRY LANDFILL SITE.**

Contract No:

**PSL14/4812**

Client Ref:

-

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:

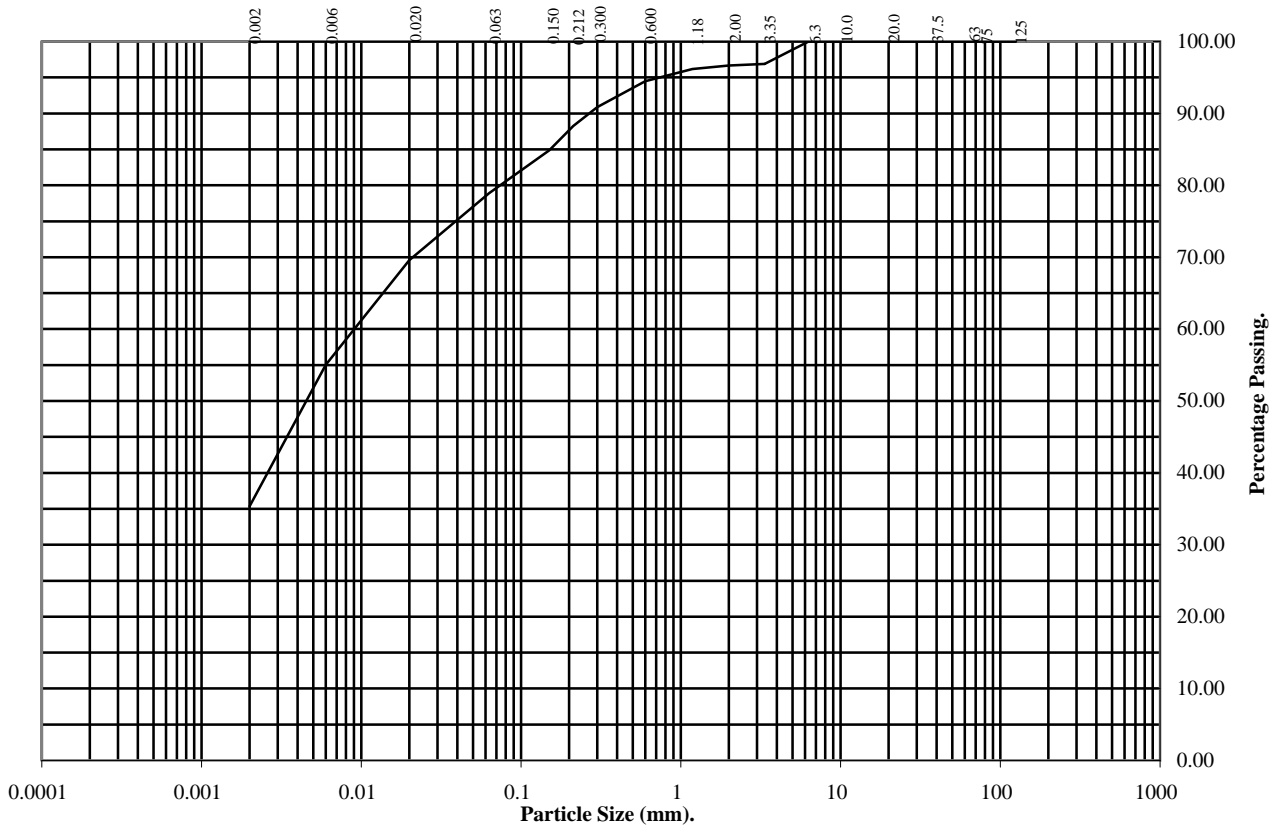
Date:

03/09/2014

Sample Number: CL7/26

Sample Type:

B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 100                |
| 10            | 100                |
| 6.3           | 100                |
| 3.35          | 97                 |
| 2             | 97                 |
| 1.18          | 96                 |
| 0.6           | 94                 |
| 0.3           | 91                 |
| 0.212         | 88                 |
| 0.15          | 85                 |
| 0.063         | 79                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 70                 |
| 0.006             | 55                 |
| 0.002             | 35                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 3                |
| Sand          | 18               |
| Silt          | 44               |
| Clay          | 35               |

**Remarks:**

See summary of soil descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 25/09/14 |             | 25/09/14 |

**PSL**

Professional Soils Laboratory

HAFOD QUARRY LANDFILL

Contract No.:  
PSL14/4812

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:

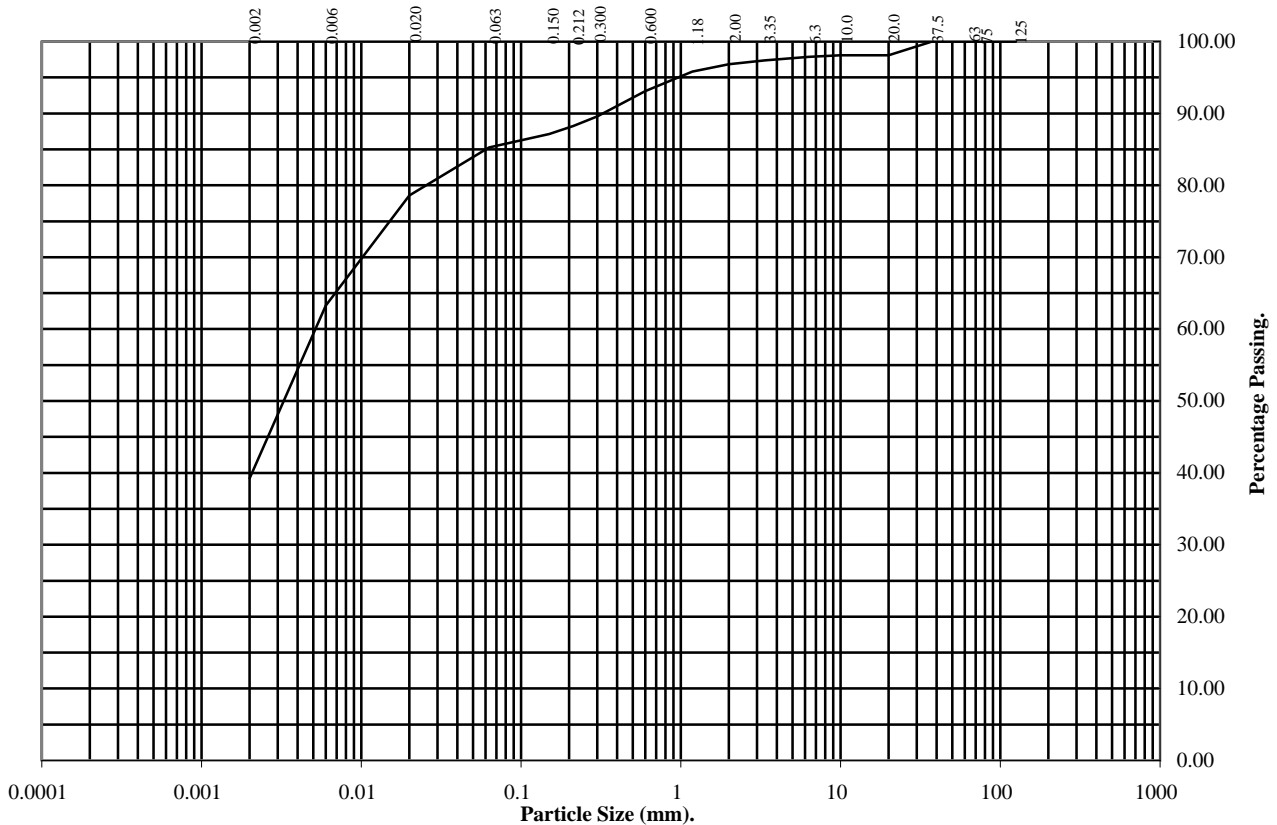
Date:

03/09/2014

Sample Number: CL8/28

Sample Type:

B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 98                 |
| 10            | 98                 |
| 6.3           | 98                 |
| 3.35          | 97                 |
| 2             | 97                 |
| 1.18          | 96                 |
| 0.6           | 93                 |
| 0.3           | 90                 |
| 0.212         | 88                 |
| 0.15          | 87                 |
| 0.063         | 85                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 79                 |
| 0.006             | 63                 |
| 0.002             | 39                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 3                |
| Sand          | 12               |
| Silt          | 46               |
| Clay          | 39               |

**Remarks:**

See summary of soil descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 25/09/14 |             | 25/09/14 |

**PSL**

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Contract No.:  
PSL14/4812

# Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:

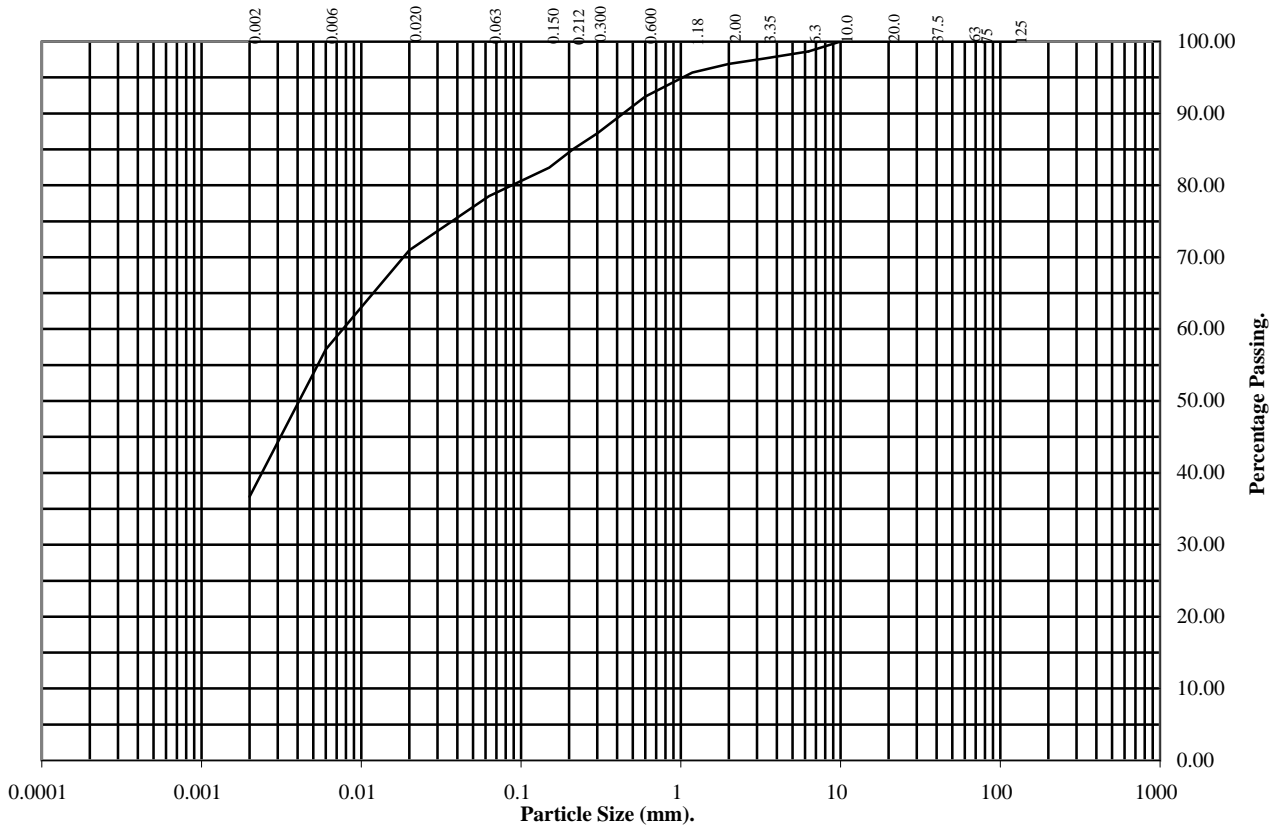
Date:

05/09/2014

Sample Number: CL8/30

Sample Type:

B



| BS Test Sieve | Percentage Passing |
|---------------|--------------------|
| 125           | 100                |
| 75            | 100                |
| 63            | 100                |
| 37.5          | 100                |
| 20            | 100                |
| 10            | 100                |
| 6.3           | 99                 |
| 3.35          | 98                 |
| 2             | 97                 |
| 1.18          | 96                 |
| 0.6           | 92                 |
| 0.3           | 87                 |
| 0.212         | 85                 |
| 0.15          | 82                 |
| 0.063         | 79                 |

| Particle Diameter | Percentage Passing |
|-------------------|--------------------|
| 0.02              | 71                 |
| 0.006             | 57                 |
| 0.002             | 37                 |

| Soil Fraction | Total Percentage |
|---------------|------------------|
| Cobbles       | 0                |
| Gravel        | 3                |
| Sand          | 18               |
| Silt          | 42               |
| Clay          | 37               |

## Remarks:

See summary of soil descriptions.

| Checked By | Date     | Approved By | Date     |
|------------|----------|-------------|----------|
|            | 25/09/14 |             | 25/09/14 |

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