Hafod Quarry Landfill Site

Phase 2 Capping & Restoration

CQA Validation Report

Report prepared for	Cory Environmental
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CQA INTERNATIONAL LIMITED

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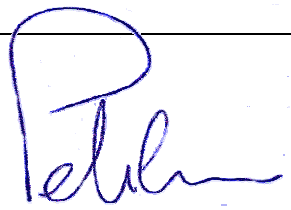
Signature	

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1. Introduction

1.1 Terms of Reference

CQA International Ltd (CQA) was appointed by Cory Environmental (Central) Limited to provide construction quality assurance services for the Phase 2 capping & restoration works at Hafod Quarry Landfill Site. This validation report covers both phases and provides validation that the works were carried out in accordance with the CQA Plan.

1.2 Site Location

Hafod Quarry Landfill Site is operated by Cory Environmental (Central) Limited. It is located to the east of Johnstown, with an approximate OS grid reference SJ 3086 4554. The site entrance is located on southern side of the B5426 Bangor Road.

1.3 Works Programme

The Phase 2 capping, which has been tied into the northern boundary of the Phase 1 cap, was split into two phases for construction purposes. Phase 2A to the east was undertaken in 2015 based upon an area of approximately 7,000 m^2, while Phase 2B to the west was undertaken in 2016 based upon an area of approximately of 15,500 m^2. The location of the works is shown on Drawing Ref: 8747a in Appendix C.

The Phase 2A works were undertaken between 7 April 2015 and 29 May 2015. The Phase 2B works were undertaken between 1 June 2016 and 6 September 2016.

1.4 Capping Detail

The capping was installed after the waste had reached final levels and had been profiled and compacted to form an even surface for the works. The capping comprises three soil layers which are, from top to bottom:

Layer	Minimum thickness
Protection layer over the mineral capping layer	300 mm
Compacted mineral-soil capping layer	1000 mm
Regulating layer	300 mm

2. Construction Quality Assurance (CQA)

CQA mobilised a suitably qualified and experienced CQA Engineer to site during the construction of the permanent mineral capping system. The CQA Engineer was required to independently confirm that the works were carried out in accordance with the requirements of the CQA Plan (CQAP): "Hafod quarry landfill, Capping CQA plan, March 2010", prepared by Cory Environmental (Central) Ltd.

The requirements of the CQAP for the testing frequency and properties of the mineral capping material are tabulated below.

Property	Test Method (BS 1377:1990)	Required Value	Compliance Testing Frequency (per m^3 clay placed)	No. of tests required Phase 2A 7,000 m^2	No. of tests required Phase 2B 15,500 m^2
Classification Testing					
Liquid Limit	Part 2: Method 4.3	≤ 90%	500	14	31
Plastic Limit	Part 2: Method 5.3	-			
Plasticity Index	Part 2: Method 5.4	11% - 64%			
Particle Size Distribution	Part 2: Method 9.2	≤ 125 mm			
Clay Content	Part 2 : Method 9.4	≥ 10%			
Particle Density	Part 2: Method 8.2	-			
Compaction Testing					
Density/ Moisture Content	Part 9: Method 2.4	As per Figure 2	250	28	62
Air Voids Content	-	≤ 5%			
2.5kg Compaction	Part 4: Method 3.4	-	5,000	2	3
Permeability Testing					
Constant Head Triaxial	Part 6: Method 6	≤ 1 x 10-9 m/s	1,000	7	16
Shear Strength Testing					
Hand Shear Vane	Part 9: Method 4.4	≥ 55 kN/m2	250	28	62
Undrained Triaxial	Part 7: Method 8	≥ 55 kN/m2	5,000	2	3

The CQA Engineer completed a daily log of site activities during the capping works. A copy is included in Appendix A.

The CQA Engineer kept a photographic record of site activities during the capping works. A selection of indicative photographs for each task is included in Appendix B.

Drawings that show the extent of the works and the grid used for sample location are included in Appendix C.

3. Regulating layer

3.1 Site Preparation

Prior to placement of the regulating layer, the waste surface was profiled and compacted to produce a stable and even working surface.

3.2 Placement

The regulating material was a clayey soil derived from site excavations and stockpiles, which was placed and compacted following the requirements of Section 2.0 of the CQAP.

The CQA Engineer inspected and approved the surface of the regulating layer before the installation of the mineral cap.

The CQA Engineer verified that the minimum required thickness (300mm) of the regulating layer had been achieved by performing trial pits at a frequency not less than 1 per 1,000 m^2. In total 8 trial pits were undertaken on Phase 2A and 16 trial pits were undertaken on Phase 2B. Compliance was achieved in all cases.

4. Engineered Mineral Cap

4.1 Material Source

The mineral cap was constructed from weathered mudstones of the Carboniferous-age Ruabon Formation which was sourced on site, mainly from stockpiles. The strata had previously been excavated as a source material for ceramic products, thereby producing the void which is being infilled as the landfill site.

The capping material has previously been approved and used on site for the construction of mineral liners for the waste disposal cells and for the capping in Phase 1. The properties and behaviour of the material is well documented in previous test results and validation reports.

The soil in the stockpiles was transported to the capping construction area for immediate use, where it was spread to shape by a bulldozer and then compacted by a self-propelled vibrating sheep foot roller.

The material was placed in four layers, each spread to a thickness of approximately 300-350mm by the bulldozer, in order to guarantee a minimum of thickness of 250mm for each layer.

Fragments larger than 125mm which did not break up during spreading were removed from the clay liner before compaction, in compliance with the requirements of the CQAP.

The CQA Engineer observed the material preparation, transportation and placement procedure throughout the works. The CQA Engineer' initial visual inspection of the source material indicated that it was suitable for the proposed use.

4.2 Compaction Trial Pads

Compaction trials were carried out to confirm the control parameters and the choice of methodology. One compaction trial pad was carried out in accordance with the CQAP Prior to commencement of Phase 2A. Two trial pads were undertaken at the start of the Phase 2B. The additional trial was performed because of concerns over some low moisture content values and high values of dry density in the first trial pad. This issues seems to be related to the characteristics of the material and does not affect its suitability as a capping material, as discussed later in this report.

The dimensions of the trial pads were approximately 20m by 6m. The trial pads comprised two layers of compacted clay, i.e. half the design thickness of liner.

In all instances, for layer 1 of the trial pad, the clay was excavated from the stockpile and was spread by bulldozer into a thickness of 300mm. It was then compacted by 4 passes of a vibrating pad-foot roller. Three core samples were taken for site tests. The test pad

was subjected to a further two passes by the compacted and another three core samples were taken for site tests. Finally, another two passes of the compactor were applied and another three core samples were taken for site tests. This process was repeated for layer 2. In addition, bulk and core samples were taken from both layers for laboratory testing.

Upon completion, an excavator was used to cut into the trial pads to check for cohesion between the layers and unsure no "peeling" took place. The trial pads proved compliant by forming a cohesive body with no separation of layers evident.

The core samples for site tests were used to determine the moisture content and density of the clay after compaction following different numbers of passes. The additional samples were despatched to the laboratory for index testing and permeability tests.

The laboratory and field test results are tabulated and presented graphically in Appendix G.

The results indicated that the compliance envelope was suitable and that the selected placement methodology was suitable for the materials.

4.3 Clay Capping Installation

The clay capping progressed after completion of the trial pads. The CQA Engineer observed the placement of the clay capping, spreading in thin layers and compaction by vibrating roller. The CQA Engineer carried out the field density tests and sampling for off-site testing. The conditioning of the material was observed.

The placement of the clay was observed to produce good quality material, with a smooth, moist, homogenous texture and lack of fissures.

The clay capping was observed to be tied into the existing clay capping in Phase 1 with a benched connection to enable each individual layer to be tied in correctly.

CQA confirms that the capping was installed in accordance with the methodology in the CQAP and that the required thickness of 1m was achieved over the required area.

4.4 Testing Regime

Prior to works commencing, the surface of the regulation layer was surveyed by StafSurv to provide a benchmark and to provide works areas for facilitating testing. An area of 7,000 m^2 for Phase 2A and 15,500 m^2 for Phase 2B was provided for the capping works areas. Sample grids were compiled to assist with material sampling and testing and are presented in Appendix C.

Upon completion of the works, the surface of the clay capping was surveyed by StafSurv to ensure that the correct thicknesses and dimensions were achieved.

As-constructed surveys show the actual area for the two phases to be slightly less than originally surveyed resulting in slightly increased testing over the required minimum. Final areas were confirmed to be 6,300 m^2 for Phase 2A and 14,500 m^2 for Phase 2B. Drawing Ref: 8747a in Appendix C shows the As-Constructed capping areas.

4.5 Classification Tests

Samples were taken from the mineral capping during placement to determine whether the material met the material specification summarised above. The laboratory classification tests carried out were:

Plastic Limit

Liquid Limit

Plasticity Index

Clay content

In addition, Particle Density tests were carried out to provide a representative value for this necessary parameter for the interpretation of core density tests.

The samples were tested by the independent laboratory, Celtest Ltd, of Bangor, Wales.

The tests were carried out in accordance with BS 1377:1990, part 2: Methods 4.3 (Liquid limit), 5.3 (Plastic limit), 5.4 (Plasticity index), 9.2 (Particle size distribution), 9.4 (Clay content) and 8.2 (Particle density). A summary of the test results is included in Appendix D. The laboratory test sheets are included in Appendix E.

The results of the classification tests are tabulated below. These confirm full compliance with the material specification requirements: The minimum quantity of tests was slightly exceeded as capping areas were split up into smaller manageable segments and all results were within the required ranges.

Summary of classification test results							
	Quantity		Test values				Result
	Required	Actual	Required	Actual			
				min	max	mean	
Phase 2A							
Plastic limit, %	14	15	-	14	17	16	NA
Liquid limit, %	14	15	≤ 90	35	45	40	Fully compliant
Plasticity index, %	14	15	11-64	20	28	24	Fully compliant
Clay content, %	14	15	≥ 10	19.3	36.0	30.6	Fully compliant
Particle density, Mg/m^3	14	15	-	2.70	2.74	2.71	NA
Phase 2B							
Plastic limit, %	31	33	-	13	18	16	NA
Liquid limit, %	31	33	≤ 90	27	38	32	Fully compliant
Plasticity index, %	31	33	11-64	13	21	16	Fully compliant
Clay content, %	31	33	≥ 10	13.5	37.7	24.6	Fully compliant
Particle density, Mg/m^3	31	33	-	2.69	2.74	2.72	NA

4.6 Compaction Properties

The dry density and moisture content relationship of the clay soils derived from the Ruabon formation have been determined for previously landfill liner and capping construction works on this site.

The relationship was confirmed by two additional compaction tests in Phase 2A and three additional tests in Phase 2B. The result sheets are included in Appendix F. The results of the tests in Phase 2 were very similar to previous results and are tabulated below.

The similarity of the compaction results with previous phases is the basis for continuing to use the same compliance envelope limits for moisture content and dry density results that were used in previous phases, namely moisture contents in the range of 12% to 20%, with a maximum calculated air voids of 5%.

The compliance envelope is wider than the range of compaction test results because of the nature of the materials and how conditioning can modify properties by creating a cohesive soil from originally lithified material. The compliance envelope has been validated by the results of permeability and strength testing.

Phase	Sample	Optimum Moisture Content, %	Maximum Dry Density, Mg/m^3
2A	SS1	12	1.97
2A	SS2	14	1.90
2B	SS3	11	1.95
2B	SS4	12	1.98
2B	SS5	12	1.98
Mean		**12.2**	**1.96**
Phase 1 mean		*12.2*	*1.96*

4.7 Clay Capping Density Tests

A total of 28 core density samples were taken during Phase 2A and 78 core density samples were taken during Phase 2B. The trial pad in Phase 2A was very large, covering three grid squares, and so the core density results were counted as quality control tests.

The results are tabulated and presented graphically in Appendix G.

The moisture content results ranged from 11.7% to 14.7% in Phase 2A (including trial pad cores) and from 12.1% to 21.1% in Phase 2B.

The calculated dry densities ranged from 1.772 to 2.044 Mg/m^3 in Phase 2A and from 1.756 to 2.087 Mg/m^3 in Phase 2B.

The theoretical percentage of air voids can be calculated using the mean value of particle density of 2.72.

The calculated air voids for Phase 2A result from -1.2% to 8.83%, with three cores producing values greater than the 5% criterion. Two trial pad cores had lower air voids until compacted with further passes of the roller. Two results were negative, which is not uncommon and a result of difference between natural soils and the simpler soil model used to derive the standard equations. Such results are typical of the more complex characteristics of clay that is derived from the conditioning of lithified mudrock.

The calculated air voids for Phase 2B result from -0.6% to 8.4%, with one core producing a value greater than the 5% criterion. Thirty two results were negative, for reasons described above.

The moisture contents, densities and air voids determined from laboratory test cores show the same ranges as the field samples, providing confirmation of the results.

These results confirm that the compaction achieved for the clay capping meets the requirements of the CQAP.

4.8 Clay Capping Permeability Tests

The hydraulic conductivity of the clay liner was measured by laboratory tests on core samples obtained during placement of the clay. The result sheets for the laboratory tests are presented in Appendix H.

8 tests were carried out on samples from Phase 2A and 15 from Phase 2B, compared to (5 and 16) required by the CQAP. The total number of tests is 23, which exceeds the requirement of 21 in the CQAP. The quantity of testing is deemed to be compliant with the CQAP.

The results in Phase 2A ranged from $7.40x10^{-11}$ m/s to $3.50xX10^{-10}$ m/s. The results in Phase 2B ranged from $1.50x10^{-10}$ m/s to $7.50x10^{-10}$ m/s. All of these results are compliant with the CQAP, being less than the required maximum value of $1x10^{-9}$ m/s.

The capping is demonstrated to be compliant in terms of hydraulic conductivity.

4.9 Clay Capping Strength Tests

The strength of the clay liner was measured by laboratory tests on core samples obtained during placement of the clay and by in-situ vane-shear tests made after each layer was completed.

The result sheets for the laboratory tests are presented in Appendix I. The in-situ vane shear tests for Phase 2A and for 2B are tabulated in Appendix J.

The laboratory shear strength tests for Phase 2A were 142 and 154 kPa for moisture contents of 14.3% and 11.9%. The Phase 2B tests ranged from 77 to 202 kPa with moisture contents from 14.6% to 10.7%. The number of tests was compliant with the CQAP requirements. These results show that the minimum shear strength required by the CQAP was achieved by the source material.

The vane shear test results for Phase 2A ranged from 116 kPa to off-scale readings (greater than 225 kPa). The vane shear test results for Phase 2B ranged from 69 kPa to off-scale readings (greater than 208 kPa). The tests were carried out at each core location and so the number of tests was compliant with the CQAP requirements. These results show that the minimum shear strength required by the CQAP was achieved in all locations tested.

The capping is demonstrated to be compliant in terms of shear strength.

4.10 Protection Layer

The protection layer, with a minimum 300mm thickness, consisted of a layer of clayey soil which was spread on top of the clay cap. The purpose was to protect the clay cap from desiccation and to provide a smooth landform to promote even water runoff.

The clay material used for the protection layer was sourced from the same area as the mineral cap and regulating layer. The source material was inspected and verified by the CQA Engineer.

The placement of the protection layer was observed and verified by the CQA Engineer.

5. Conclusion

CQA International Ltd is satisfied that the capping of Phase 2 at Hafod Quarry Landfill Site was carried out in accordance with the requirements of the CQAP. The results of all field and laboratory testing demonstrate compliance with these requirements.

The three layers (regulating, mineral cap and protection) achieved the minimum required thicknesses.

The materials used were compliant with the specification in the CQAP.

The placement and compaction were compliant with the methodology required by the CQAP.

The performance of the clay cap, as determined by in-situ and laboratory testing, is compliant with the requirements of the CQAP.

Appendix A CQA Engineers Daily Log

Hafod Landfill Site
Capping works Phase 2A

CQA Engineer's Daily Report

Week commencing: 6th April 2015 **Week No.** 1

Wednesday 8th ***Working Times:*** 0700-1700

Weather: Mild, sunny and calm

Plant:
2 x 25t Dumper
1 x 21t Excavator

Personnel:
Oscar Diaz (CQA International Ltd)

Visitors:
Darren Bland (CQA International Ltd), Richard Pawly (StafSurv Surveying)

Operations:
Site induction and site walkover with Ian Craven. Looked at area to be capped and StafSurv surveyed area to ascertain the extent of the area ready for capping, and also to highlight any depressions which will require additional filling prior to final regulation layer being placed.

Sampling & Testing:

Thursday 9th ***Working Times:*** 07:00-17:00

Weather: *Sunny with some clouds*

Plant:
2 x 25t Dumper 1 x 21t Excavator
1 x CAT Sheep-foot Roller 1 x 25t Excavator

Personnel:
Oscar Diaz (CQA International Ltd)

Operations:
Walk with Ian Craven around site. Start the exposure of existing clay from the crest of the cell for future connection. Regulation layer was mostly installed the previous week, without the presence of the current CQA Engineer.
Stockpiling of clay (for capping layer) starts on the SE landfill site. This clay will be used for the clay capping layer and the protection layer. The clay is not spread because there is not any bulldozer on site.
Celtest delivery with cores and sample bags, arrived on site.

Sampling & Testing:

Friday 10th ***Working Times:*** 07:00-17:00

Weather: Sunny with some clouds

Plant:
2 x 25t Dumper 1 x 21t Excavator 1 x CAT D6R Bulldozer
1 x CAT Sheep-foot Roller 1 x 25t Excavator

Personnel:
Oscar Diaz (CQA International Ltd)

Operations:
Clay exposure stopped in the morning due to excavator being used in a different location for pump set up. It restarted after 1pm.
Presence of groundwater bubbles on the lowest lake, few meters from the current clay pit. The constant groundwater flow suggests a confined aquifer (under pressure) which is currently liberating pressure in the lake. The clay pit was moved to the bottom of the cell, where the clay has better quality, less stony.
Five trial pits in regulating layer showing 300mm thickness minimum at each location tested on random basis.

Trial Pit Number	Location (Reference)	Depth to waste
1	E6	335mm
2	D5	375mm
3	B5	315mm
4	B3	340mm
5	E4	345mm

Clay layer is spread with the help of dozer on the SE corner of the landfill. Compaction with sheepfoot roller + vibration in 4 passes. Some stones were found after compaction, but with particle size lower than the maximum 125 mm required. Hand shear vane in situ measurements are high, from 90 to 130 Kpa. On Monday, weather permitted, the compaction trial with 6 and 8 passes will be performed.

Sampling & Testing:

Hafod Landfill Site
Capping works Phase 2A

CQA Engineer's Daily Report

Week commencing: 13th April 2015 **Week No.** 2

Monday:	13th	***Working Times:***	07:00-17:00

Weather Overcast

Plant:

1 x 25t Dumper	1 x 21t Excavator	1 x CAT D6R Bulldozer
1 x CAT Sheep-foot Roller	1 x 25t Excavator	

Personnel:
Oscar Diaz (CQA International Ltd)
Visitors:
Darren Bland (CQA International Ltd)
Operations:
Spreading first 250 mm clay layer continues.
Exposure of previous clay continues.
Bentonite around gas wells is confirmed (photo).

Sampling & Testing:

Tuesday	14th	***Working Times:***	07:00-17:00

Weather: Sunny with some clouds. Warm pm

Plant:

2 x 25t Dumper	1 x 21t Excavator	1 x CAT D6R Bulldozer (Brocken after lunch)
1 x CAT Sheep-foot Roller	1 x 25t Excavator	

Personnel:
Oscar Diaz (CQA International Ltd)
Visitors:
Darren Bland (CQA International Ltd)
Operations:
Spreading first 250 mm clay layer ends. Compaction regime is 6 passes.
Compaction with sheepfoot roller continues with 6 and 8 passes (Trial Pad).
Spreading second layer 300 mm clay for Trial Pad layer starts.
Ian Craven informed about the area of capping works. The area is 4,500 m^2 however it is hoped to complete an additional area of approximately 2500m^2 within the next month.

Sampling & Testing:
Cores for Moisture content: C1-C9 from first layer (Trial Pad), after 4, 6 and 8 passes.

Wednesday	15th	***Working Times:***	07:00-17:00

Weather: Cloudy with sunny spells am. Overcast pm.

Plant:

3 x 25t Dumper	1 x 21t Excavator	1 x CAT D6R Bulldozer (under repair)
1 x CAT Sheep-foot Roller	1 x 25t Excavator	

Personnel:
Oscar Diaz (CQA International Ltd)
Operations:
Site oven results for the first 300mm clay layer of the Trial Pad, show 6 passes as the best compaction regime, with an average moisture content of 14% compared with the drier samples from 4 and 8 passes.
Spreading second layer 300 mm clay layer stopped due to broken dozer.
Works stopped due to issues with dumper drivers.

Sampling & Testing:

Thursday	16th	***Working Times:***	07:00-17:00

Weather: Sunny with some clouds

Plant:

3 x 25t Dumper	1 x 21t Excavator	1 x CAT D6R Bulldozer
1 x CAT Sheep-foot Roller	1 x 25t Excavator	

Personnel:
Oscar Diaz (CQA International Ltd)
Operations:
Spreading second layer 300 mm clay layer for Trial Pad is completed. Compaction with sheepfoot roller is completed, doing 4, 6 and 8 passes. Three cores for moisture content were taken for each compaction regime.
Spreading second layer 250 mm clay layer continues and compacted with 6 passes.

Trial pit on Trial Pad showing the >500 mm thickness of the two clay layers (photo).

Sampling & Testing:

Cores for moisture content: C10-C18, after 4, 6 and 8 passes on the second layer of Trial Pad.
1xBulk sample and 1xPermeability core taken for test near core C14, after 6 passes.

Friday 17th | ***Working Times***: 07:00-17:00

Weather: Cloudy

Plant:

2 x 25t Dumper	1 x 21t Excavator	1 x CAT D6R Bulldozer (broken from 9am to 3pm)
1 x CAT Sheep-foot Roller	1 x 25t Excavator	

Personnel:

Oscar Diaz (CQA International Ltd)

Operations:

Site oven results from second clay layer of the Trial Pad show a different pattern of values compared with the first clay layer, because second clay layer is softer than the first layer (mixture of stiff and soft clay), being higher in moisture content, especially with 4 passes. The three samples (C10-C12) taken after 4 passes are within the acceptance envelope, i.e., this may be the compaction regime for the third and fourth clay layer, if clay source is the same.
Second 250mm clay layer completed and compacted with 4 passes.
Tipping clay for the third clay layer begins. After repair, dozer begins to spread the third clay layer.
Celtest´s courier picked the samples up.

Sampling & Testing:

Hafod Landfill Site
Capping works Phase 2A

CQA Engineer's Daily Report

Week commencing: 20th April 2015 **Week No.** 3

Monday:	20th	***Working Times:***	07:00-17:00
Weather	Sunny with some clouds		

Plant:

3 x 25t Dumper	1 x 21t Excavator	1 x CAT D6R Bulldozer (exchanged for a new one)
1 x CAT Sheep-foot Roller	1 x 25t Excavator	

Personnel:
Oscar Diaz (CQA International Ltd)
Operations:
Tipping and spreading clay for the third layer continues. Compaction regime is 4 passes.
At 15:30, the bulldozer driver left site, so stop clay spreading and only clay stockpiling.

Sampling & Testing:
Core C19 for moisture content from the third clay layer.
1 x Bulk and 1x Perm for test from the third clay layer.

Tuesday	21st	***Working Times:***	07:00-19:00 (2 extra hours).
Weather:	Sunny and warm		

Plant:

3 x 25t Dumper	1 x 21t Excavator	1 x CAT D6R Bulldozer
1 x CAT Sheep-foot Roller	1 x 25t Excavator	

Personnel:
Oscar Diaz (CQA International Ltd)
Operations:
Spreading and compaction (4 passes) for the third clay layer is completed.
Fourth clay layer begins to be spread and compacted (4 passes).

Sampling & Testing:
4 cores for moisture content (C20-C23) from the third clay layer.
2xBulks and 1xPerms from the first clay layer (north-eastern corner).
2xBulks and 1xPerms from the second clay layer
2xBulks and 1xPerms from the third clay layer

Wednesday	22nd	***Working Times:***:	07:00-17:00
Weather:	Sunny and warm		

Plant:

3 x 25t Dumper	1 x 21t Excavator	1 x CAT D6R Bulldozer
1 x CAT Sheep-foot Roller	1 x 25t Excavator	

Personnel:
Oscar Diaz (CQA International Ltd)
Visitors:
Adam Pickering (StafSurv)
Operations:
Clay source was moved to a different position to get better clay.
Spreading and compaction of the fourth clay layer is completed.
Survey for the entire capping layer completed.

Sampling & Testing:
4 cores for moisture content (C24-C27) from the fourth clay layer.
3xBulks, 1xPerm from the fourth clay layer.
1xBulk (2.5 kg compaction CP1) and 1x Perm (Undrained Triaxial SS1-U38) .

Thursday	23rd	***Working Times***:	07:00-17:00
Weather:	Sunny		

Plant:

3 x 25t Dumper	1 x 21t Excavator	1 x CAT D6R Bulldozer (driver worked until 4pm)
1 x CAT Sheep-foot Roller	1 x 25t Excavator	

Personnel:
Oscar Diaz (CQA International Ltd)
Operations:
Placement of the protection layer on top of the fourth clay layer begins with a thickness of minimum 300 mm.
At the end of the day, half of the entire area was covered with the protection clay layer.

Hafod Landfill Site
Capping works Phase 2A

CQA Engineer's Daily Report

Sampling & Testing:			
Friday 24th	***Working Times***: 07:00-17:00		
Weather: Cloudy			
Plant:			
3 x 25t Dumper	1 x 21t Excavator	1 x CAT D6R Bulldozer	
1 x CAT Sheep-foot Roller	1 x 25t Excavator		
Personnel:			
Oscar Diaz (CQA International Ltd)			
Operations:			
Placement of the protection clay layer is completed.			
Sampling & Testing:			

Hafod Landfill Site
Capping works Phase 2A

CQA Engineer's Daily Report

Week commencing: 18th May 2015 **Week No.** 4

Thursday 21st | ***Working Times***: 07:00-17:00

Weather: Cloudy and mild am. Sunny and warm pm

Plant:

2 x 25t Dumper 1 x 21t Excavator 1 x CAT D6R Bulldozer
1 x CAT Sheep-foot Roller 1 x 25t Excavator

Personnel:

Oscar Diaz (CQA International Ltd)

Visitors:

Richard Pawly (StafSurv Surveying)

Operations:

Second part of Phase 2a of capping works begins.
Regulation layer installation is done already in some parts of the phase 2. South side is too steep for the roller, so excavator has trimmed part of the waste to get a less steep slope.
Regulation layer clay stockpiling because dozer is on repair.
A quick shower at 1pm.
Dozer starts working at 15:30, spreading the clay regulation layer.
The phase 2 capping area is 2500 m².

Sampling & Testing:

Friday 22nd | ***Working Times***: 07:00-17:00

Weather: Overcast am. Cloudy pm with light rain from 4pm

Plant:

2 x 25t Dumper 1 x 21t Excavator 1 x CAT D6R Bulldozer
1 x CAT Sheep-foot Roller 1 x 25t Excavator

Personnel:

Oscar Diaz (CQA International Ltd)

Visitors:

Alistair Holl (Hafod Landfill Director)

Operations:

Regulation layer is completely installed with a minimum thickness of 300 mm. Three trial pits were excavated and confirmed this thickness.

Trial Pit Number	Location (Reference)	Depth to waste
6	E6	325mm
7	D5	365mm
8	B5	315mm

Most of the first 250mm clay layer is installed and compacted with 4 passes, before the rain started.

Sampling & Testing:

Hafod Landfill Site
Capping works Phase 2A

CQA Engineer's Daily Report

Week commencing: 25th May 2015 **Week No.** 5

Tuesday	26th	***Working Times:***	07:00-17:00
Weather:	Overcast and windy		

Plant:

2 x 25t Dumper	1 x 21t Excavator	1 x CAT D6R Bulldozer
1 x CAT Sheep-foot Roller	1 x 25t Excavator	

Personnel:
Oscar Diaz (CQA International Ltd).

Operations:
Placement of first clay layer is completed.
Most of the second clay layer is installed and compacted. Using same compaction regime as previously.

Sampling & Testing:
Bulk samples (B11, B12 and CP2). Permeability samples (P6) and Compaction (SS2).
Cores: C29, C30, C31, C32, C33.

Wednesday	27th	***Working Times:***	07:00-17:00
Weather:	Cloudy with sunny spells am. Overcast and windy pm with a quick shower at 15:30		

Plant:

2 x 25t Dumper	1 x 21t Excavator	1 x CAT D6R Bulldozer
1 x CAT Sheep-foot Roller	1 x 25t Excavator	

Personnel:
Oscar Diaz (CQA International Ltd)

Operations:
Placement of the second clay layer is completed.
Installation of third clay layer is completed.
Fourth clay layer placement has started.
At 3pm the 25t excavator moved to the tip face, therefore no more clay placement.

Sampling & Testing:
Bulk samples (B13, B14). Permeability samples (P7).
Cores: (C34, C35, C36)

Thursday	28th	***Working Times:***	07:00-17:00
Weather:	Rain overnight. Cloudy with sunny spells with a quick shower am. Cloudy with sunny spells pm		

Plant:

2 x 25t Dumper	1 x 21t Excavator	1 x CAT D6R Bulldozer
1 x CAT Sheep-foot Roller	1 x 25t Excavator	

Personnel:
Oscar Diaz (CQA International Ltd)

Operations:
Installation of the fourth clay layer is completed.
Placement of protection layer is completed.

Sampling & Testing:
Bulk samples (B15). Permeability samples (P8).
Cores: (C37, C38)

Date	**Wednesday, 01 June 2016**		**Day No**	**1**
Weather	Overnight	Dry		
	am	Dry		
	pm	Dry		
Site Hours	07:00-16:30			
Personnel	Jason Bland (CQA International Ltd) (CQA International Ltd) Peter Stevens (CQA International Ltd)			
Plant utilised	1 x 210, 2 x Dumper A30, 1 x Dozer, 1 x tractor and bowser, 1 x padfoot roller			
Operations	Preparation of subgrade 300mm depth. Clay stockpile being excavated, clay placement to start 2/6/2016 Site walk around with Ian Craven and Peter Stevens			
Sampling & Testing	N/A			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Thursday, 02 June 2016**		**Day No**	**2**
Weather	Overnight	Dry		
	am	Dry		
	pm	Dry		
Site Hours	07:00-16:30			
Personnel	Jason Bland (CQA International Ltd) (CQA International Ltd)			
Plant utilised	1 x 210, 2 x Dumper A30, 1 x Dozer, 1 x tractor and bowser, 1 x padfoot roller			
Operations	Layer 1 of clay capping system placement started including layer 1 of trial pad. Core samples taken from trial pad, layer 2 placed for trial pad and cores taken, including permeability and bulk samples.			
Sampling & Testing	Trial Pad layer 1 and 2, 18 cores. Permeability and bulk			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Friday, 03 June 2016**		**Day No**	**3**
Weather	Overnight	Dry		
	am	Dry		
	pm	Dry		
Site Hours	07:00-16:00			
Personnel	Jason Bland (CQA International Ltd) (CQA International Ltd) (CQA International Ltd)			
Plant utilised	1 x 210, 2 x Dumper A30, 1 x Dozer, 1 x tractor and bowser, 1 x padfoot roller			
Operations	No works on capping today, Ian Craven asked for waste to be moved and prepared for capping works to resume on Monday. Moisture content results came back below envelope of 12-20% - Trial pad to be repeated on Monday.			
Sampling & Testing	Moisture content			
Meetings	N/A			
Health & Safety	No Issues			

Comments	

Date	**Monday, 06 June 2016**		**Day No**	**4**
Weather	Overnight	Dry		
	am	Dry		
	pm	Dry		
Site Hours	07:00-16:30			
Personnel	Jason Bland (CQA International Ltd), Darren Bland (CQA International Ltd)			
Plant utilised	1 x 210, 2 x Dumper A30, 1 x Dozer, 1 x tractor and bowser, 1x padfoot roller			
Operations	Trial pad 2 had to be removed, the clay reworked and watered with bowser, then reworked before padfoot roller could be used to start trial pad 3. Trial pad 3 layer 1 undertaken. Water being placed on area which includes layer 1.			
Sampling & Testing	9 core samples taken from trial pad layer 1			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Tuesday, 07 June 2016**		**Day No**	**5**
Weather	Overnight	Dry		
	am	Sunny and warm		
	pm	Sunny and warm		
Site Hours	07:00-16:30			
Personnel	Jason Bland (CQA International Ltd) Oscar Diaz (CQA International Ltd) Steve Amis (Site Manager)			
Plant utilised	1 x 210, 2 x Dumper A30, 1 x Dozer, 1 x tractor and bowser, 1 x pad foot roller			
Operations	Layer 2 of trail pad undertaken, 9 core samples taken. Layer 1 complete – core samples x 4 taken from layer 1 Layer 2 starting to be placed. Tractor and bowser continuing to place water on placed clay. Hand over from Jason Bland (CQA International Ltd). Completing the second layer of the trial pad. At the end of the day, starts first clay layer being spread. Trial Pad is located on F4 and F5 of the 32m sample grid, representing each square 250m^3.			
Sampling & Testing	9 x core layer 2 trial pad 4 x core layer 1 over all grid area Moisture content from layer 1 trial pad – 15-17%			
Meetings	N/A			
Health & Safety	No Issues			
Comments	1 x dumper out of use to mechanical issues, replacement to arrive 7/6/2016			

Date	**Wednesday, 08 June 2016**		**Day No**	**6**
Weather	Overnight	Dry		
	am	Sunny and warm		
	pm	Sunny and warm		
Site Hours	07:00-17:00			
Personnel	Oscar Diaz (CQA International) Steve Amis (Site Manager)			
Plant utilised	1xVolvo 1xDozer 1xExcavator 1x water bowser 1x sheepfoot roller			

Operations	Spreading second clay layer on the capping area (4500m2). On site lab results from second layer of trial pad indicate pass values of moisture content. The ideal compaction is with 6 passes. Third clay layer starts being spread on the South slope. Dozer driver always working from 7am to 4pm. From 4-5pm, dumpers stockpiling for the next day.
Sampling & Testing	C25 to C28.
Meetings	N/A
Health & Safety	No Issues
Comments	

Date	**Thursday, 09 June 2016**		**Day No**	**7**
Weather	Overnight	Dry		
	am	Sunny and warm		
	pm	Sunny and warm		
Site Hours	07:00-17:00			
Personnel	Oscar Diaz (CQA International) Steve Amis (Site Manager)			
Plant utilised	2x25t Dumpers (Volvo+ CAT) 1xDozer 1xExcavator 1xSheepfoot roller			
Operations	Spreading third clay layer continues. Rolling the clay layer and taking samples.			
Sampling & Testing	C29, C30, C31 for moisture content. P11, B22, B23.			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Friday, 10 June 2016**		**Day No**	**8**
Weather	Overnight	Rain		
	am	Light rain		
	pm	Showers		
Site Hours	07:00-17:00			
Personnel	Oscar Diaz (CQA International) Ian Craven (Regional Manager)+ Steve Amis (Site Manager)			
Plant utilised	3x25t Dumpers 1xDozer 1xExcavator 1xSheepfoot roller			
Operations	Spreading third clay layer but too wet to be rolled, so the compaction will be performed when dry conditions occur. Using a drier material from a different location (closer to the weighbridge), to create the 300mm regulation layer on a triangular area (D3) of around 1000m^2. First clay layer was spread and rolled, taking one moisture content sample. The total capping works now are approximately 5500m^2.			
Sampling & Testing	C32			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Monday, 13 June 2016**		**Day No**	**9**
Weather	Overnight	Rain		
	am	Light rain		

	pm	Showers
Site Hours	07:00-17:00	
Personnel	Oscar Diaz (CQA International) Ian Craven (Regional Manager) Steve Amis (Site Manager)	
Plant utilised	2x25t Dumpers 1xDozer 1xExcavator 1xSheepfoot roller	
Operations	Second clay layer on the triangular area of D3 is completed and rolled. Third clay layer is completed and rolled. Fourth clay layer starts being spread Moving pipes around C3 and C4 area, so tomorrow may the regulation layer be spread.	
Sampling & Testing	Moisture content cores: C33, C34 and C35 Bulks B24 and B25, Perm P12	
Meetings	N/A	
Health & Safety	No Issues	
Comments		

Date	**Tuesday, 14 June 2016**		**Day No**	**10**
Weather	Overnight	Rain		
	am	Overcast		
	pm	Showers		
Site Hours	07:15-17:00			
Personnel	Oscar Diaz (CQA International) Steve Amis (Site Manager) from 9am			
Plant utilised	2x25t Dumpers (from 9am) 1xDozer (new driver) 1xExcavator 1xSheepfoot roller			
Operations	Fourth clay layer is completed and rolled. Regulation layer is spread around the areas C3 and C4, with approximately 1000 m^2. Moisture results from on-site lab show a drop in the moisture content to 12.5%. This can be explained by the more sandy clay material used at the stockpile near the weighbridge, compared with the more clayey material from the stockpile (SE) near the capping works. First clay layer is completed and rolled on the area C3, C4, B3, B4. Gas wells, which are on the capping works, were vertically extended.			
Sampling & Testing	C36			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Wednesday, 15 June 2016**		**Day No**	**11**
Weather	Overnight	Rain		
	am	Cloudy with sunny spells.		
	pm	Overcast		
Site Hours	07:00-17:00			
Personnel	Oscar Diaz (CQA International) Steve Amis (Site Manager)			
Plant utilised	2x25t Dumpers (from 9am) 1xDozer (old driver back) 1xExcavator 1xSheepfoot roller			
Operations	Second clay layer is completed and rolled. Removing the wind frames from capping works (C2 area), so the area is ready for regulation layer.			
Sampling & Testing	C37			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Thursday, 16 June 2016**		**Day No**	**12**
Weather	Overnight	Rain		
	am	Overcast with a shower		
	pm	Overcast		
Site Hours	07:00-13:15			
Personnel	Oscar Diaz (CQA International) Ian Craven (Regional Manager)+ Steve Amis (Site Manager)			
Plant utilised	2x25t Dumpers (from 9am) 1xDozer (old driver back) 1xExcavator 1xSheepfoot roller			
Operations	**AREA 3**. Third clay layer is completed and rolled. Using the clay pit near the weighbridge, with a mix of wet and dry material. Fourth clay layer is placed and rolled, only half of the area.			
Sampling & Testing	C38, B27, P13			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Friday, 17 June 2016**		**Day No**	**13**
Weather	Overnight	Rain		
	am	Overcast		
	pm	Cloudy with sunny spells.		
Site Hours	07:00-16:30			
Personnel	Oscar Diaz (CQA International) Ian Craven (Regional Manager)+ Steve Amis (Site Manager)			
Plant utilised	2x25t Dumpers 1xDozer 1xExcavator 1xSheepfoot roller			
Operations	**AREA 3** Fourth clay layer is placed and rolled on area 3. **AREA 4** Regulation layer on areas B1, B2, B3 and B4 is placed and rolled, using the weighbridge clay pit. First clay layer starts on a small area. Moisture content samples will be taken on Monday, once the layer is completed.			
Sampling & Testing	None			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Monday, 20 June 2016**		**Day No**	**14**
Weather	Overnight	Rain		
	am	Rain		
	pm	Overcast with showers		
Site Hours	07:15-16:45			
Personnel	Oscar Diaz (CQA International) Steve Amis (Site Manager)			
Plant utilised	2x25t Dumpers 1xDozer 1xExcavator 1xSheepfoot roller			
Operations	**AREA 4:** First clay layer completed and rolled, using the dry clay, being wetted with the rain. Second clay layer starts being spread, covering most of the area, being rolled.			
Sampling & Testing	SS3, B28, B29, P14			
Meetings	N/A			
Health & Safety	No Issues			

Comments	

Date	**Tuesday, 21 June 2016**		**Day No**	**15**
Weather	Overnight	Dry		
	am	Cloudy with sunny spells		
	pm	Cloudy with sunny spells		
Site Hours	07:00-17:00			
Personnel	Oscar Diaz (CQA International) Ian Craven (Regional Manager)+ Steve Amis (Site Manager)			
Plant utilised	2x25t Dumpers 1xDozer 1xExcavator (John) 1xSheepfoot roller			
Operations	**Area 4**: Because the client wants to connect gas wells as soon as possible, the capping works moved to area 1, so can be completed due to good weather. **Area 1**: The small area of third clay layer was rolled. Half of the fourth clay layer was spread and rolled. Only one dumper bringing clay from SE clay pit to the Area 1 as the other dumper was serviced until 10am. Dozer broken from 09:00 to 13:45. due to a problem with one of the tracks. Digging the edge of the capping works, so new cap can join previous one.			
Sampling & Testing	C44, C45, C46, B30, P15			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Wednesday, 22 June 2016**		**Day No**	**16**
Weather	Overnight	Dry		
	am	Cloudy with sunny spells.		
	pm	Cloudy with sunny spells.		
Site Hours	07:00-17:00			
Personnel	Oscar Diaz (CQA International) Steve Amis (Site Manager)			
Plant utilised	2x25t Dumpers 1xDozer 1xExcavator (John) 1xSheepfoot roller			
Operations	**Area 1**: The entire fourth clay layer was spread and rolled. **Area 5**: Regulation layer spread and rolled on an area of around 1800 m^2. Spreading stones on the access road for the dumpers around Area 4 until 08:30. Excavator working at the cell bottom moving generators from 11am to 12pm, so no dumpers delivering clay. Digging the edge of the capping works, so new cap can join previous one.			
Sampling & Testing	C47, C48, B31, B32.			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Thursday, 23 June 2016**		**Day No**	**17**
Weather	Overnight	Dry		
	am	Sunny with some clouds		
	pm	Sunny with some clouds		
Site Hours	07:00-17:00			
Personnel	Oscar Diaz (CQA International) Ian Craven (Regional Manager) Steve Amis (Site Manager)			
Plant utilised	2x25t Dumpers 1xDozer 1xExcavator (John) 1xSheepfoot roller			

Operations	Ian decided to go to Area 5 (B4-C4 on grid) so pipes can be connected at Area 1 and disconnected at Area 4. Clay is coming from SE clay pit. **Area 5.** First clay layer spread and rolled.
Sampling & Testing	C49, C50, B33
Meetings	N/A
Health & Safety	No Issues
Comments	

Date	**Friday, 24 June 2016**		**Day No**	**18**
Weather	Overnight	Dry		
	am	Cloudy with sunny spells.		
	pm	Cloudy with sunny spells.		
Site Hours	07:15-17:00			
Personnel	Oscar Diaz (CQA International) Steve Amis (Site Manager)			
Plant utilised	2x25t Dumpers 1xDozer 1xExcavator (John) 1xSheepfoot roller			
Operations	**Area 5:** Second clay layer spread and rolled. **Area 6**: Regulation layer just started to be spread on grid areas A1, B1.			
Sampling & Testing	C51, C52, B34, P16.			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Monday, 27 June 2016**		**Day No**	**19**
Weather	Overnight	Heavy rain then dying out		
	am	Dry with sunny spells		
	pm	Dry with sunny spells		
Site Hours	07:15-17:00			
Personnel	Darren Bland (CQA International) Steve Amis (Site Manager)			
Plant utilised	2x25t Dumpers 1xDozer 1xExcavator (John) 1xSheepfoot roller			
Operations	**Area 5:** Most of the third clay layer was spread and rolled. **Area 6**: Regulation layer completed and compacted before layer 1 placed across areas A1-A4. First clay layer completed and rolled.			
Sampling & Testing	C53, C54, B35, P17.			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Tuesday, 28 June 2016**		**Day No**	**20**
Weather	Overnight	Dry		
	am	Overcast		
	pm	Rain		
Site Hours	07:00-17:00			
Personnel	Oscar Diaz (CQA International) Steve Amis (Site Manager)			

Plant utilised	3x25t Dumpers 1xDozer 1xExcavator (John) 1xSheepfoot roller
Operations	**Area 5:** Third clay layer is completed and rolled. Most of the fourth clay layer is spread and rolled.
Sampling & Testing	C55 to C58, B36, B37, P18
Meetings	N/A
Health & Safety	No Issues
Comments	

Date	**Wednesday, 29 June 2016**		**Day No**	**21**
Weather	Overnight	Rain		
	am	Rain		
	pm	Rain.		
Site Hours	07:00-13:30			
Personnel	Oscar Diaz (CQA International) Steve Amis (Site Manager)			
Plant utilised	2x25t Dumpers 1xDozer 1xExcavator (John) 1xSheepfoot roller			
Operations	**Area 5:** Fourth clay layer is completed and rolled. **Area 6:** stockpiling clay. From 09:30 works stopped due to heavy rain. At 13:00, it was decided to stop capping works until next day.			
Sampling & Testing	None			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Thursday, 30 June 2016**		**Day No**	**22**
Weather	Overnight	Dry		
	am	Sunny with some clouds		
	pm	Overcast		
Site Hours	07:00-17:00			
Personnel	Oscar Diaz (CQA International) Ian Craven (Regional Manager) Steve Amis (Site Manager)			
Plant utilised	3x25t Dumpers 1xDozer 1xExcavator (John) 1xSheepfoot roller			
Operations	Ian Craven changed the clay pit source, digging now on a place between the SE clay pit and the weighbridge clay pit. This pit will feed Area 6. **Area 6:** Second clay layer completed and rolled. Half of the third clay layer was spread and rolled. **Area 5:** Connecting gas well pipes.			
Sampling & Testing	C59, C60, B38, SS4.			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Friday, 01 July 2016**		**Day No**	**23**
Weather	Overnight	Rain		
	am	Cloudy with sunny spells.		
	pm	Cloudy with sunny spells.		

Site Hours	07:00-17:00
Personnel	Oscar Diaz (CQA International) Steve Amis (Site Manager) Bob Stevens (CQA International)
Plant utilised	3x25t Dumpers 1xDozer 1xExcavator (John) 1xSheepfoot roller
Operations	**Area 6:** Third clay layer is completed and rolled. Fourth clay layer is completed and rolled. Bob Stevens on site at 14:45. Handing over of the capping works to Bob.
Sampling & Testing	C61 to C64. B39 and B40. P19
Meetings	N/A
Health & Safety	No Issues
Comments	

Date	**Monday, 04 July 2016**		**Day No**	**24**
Weather	Overnight	Dry		
	am	Dry and sunny		
	pm	Dry and sunny		
Site Hours	07:00 to 17:00			
Personnel	Bob Stevens (CQA International) Ian Craven (Regional Manager)			
Plant utilised	3 x 25t Dumpers 1 x Dozer 2 x Excavators 1 x Sheepfoot roller			
Operations	Continued excavating clay from location between the SE clay pit and the weighbridge clay pit. Disconnected and moved gas extraction lines that ran across **Area 4**. Placing and compacting layers 3 and 4 in **Area 4.** Finished Area 4. **Area 7** encompasses an area where leachate is ponding, a temporary pumping point has to be installed to remove this before and capping works can proceed.			
Sampling & Testing	C65 – C68, B41 & B42, P20			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Tuesday, 05 July 2016**		**Day No**	**25**
Weather	Overnight	Light rain		
	am	Dry		
	pm	Dry		
Site Hours	08:00 to 11:00			
Personnel	Bob Stevens (CQA International)			
Plant utilised	3 x 25t Dumpers 1 x Dozer 2 x Excavators 1 x Sheepfoot roller			
Operations	Weighed clay samples taken yesterday confirming clay suitability. Started block tipping protection soils on top of clay liner.			
Sampling & Testing	None			
Meetings	N/A			
Health & Safety	No Issues			
Comments				

Date	**Monday, 05 September 2016**		**Day No**	**26**
Weather	Overnight	Dry		
	am	Overcast		
	pm	Overcast		
Site Hours	07:00-17:00			
Personnel	Darren Bland (CQA International), Francesca Evans (CQA International)			
Plant utilised	2 x 25t Dumpers 1 x Dozer 2 x Excavators 1 x Sheepfoot roller			
Operations	Completing NW corner of capping works. Tie in to crest of basal engineering exposed and keyed in in layers ready for final clay placement as was the edge of the other capped areas. Remaining area's surface roughened up using dozer to allow cohesion of clay to existing surface. Area of leachate collection on top of uncapped area pumped away and contaminated material removed to active tip. Exposure of very corner of capping area where the edge of the cell and the concrete road/gate met. Excavation of waste and overburden took place until edge of cell containment engineering found, this was then extended SW which required a fence to be removed to tie the new cap into the basal engineering and the previous capping. This may have also been an area of water ingress as the road foundations were constructed on crushed tile and this extended into the cell area with a positive flow of groundwater noticed. Clay placement undertaken in area 7, 2 layers placed.			
Sampling & Testing	C69 - C74 B43 - B45 P21 & P22			
Meetings	None			
Health & Safety	No Issues			
Comments				

Date	**Tuesday, 06 September 2016**		**Day No**	**27**
Weather	Overnight	Dry		
	am	Cloudy, sunny spells		
	pm	Warm and sunny spells		
Site Hours	07:00-17:00			
Personnel	Darren Bland (CQA International), Bob Stevens (CQA International)			
Plant utilised	2 x 25t Dumpers 1 x Dozer 2 x Excavators 1 x Sheep foot roller			
Operations	Clay placement continues on area 7 with third and fourth layers being placed. SW corner and tie in to cell and existing cap fully excavated until a satisfactory tie in was achieved. Tie in keyed and clay placed. Mineral liner now completed and soil placement commences to place 300mm restoration soil layer.			
Sampling & Testing	C75 – C80 B46 - B48 P23			
Meetings	None			
Health & Safety	No Issues			
Comments	Capping works now completed.			

Appendix B Site Photographs

Photographic Record

Phase 2A

1. Source clay excavation area.

2. Example of rolled clay surface

Photographic Record

3. Example of clay emplacement and distribution to 300mm thickness using bulldozer.

4. Example of trail pit excavated to prove 300mm thickness of regulation layer.

Photographic Record

5. Example of tie-in to previously engineered basal clay.

6. Example of clay emplacement, compaction and testing. N.B. Hand Shear Vane amongst sampling kit.

Photographic Record

7. Photograph of emplacement of clay. Note clay thickness of new lift shown.

8. Clay lift No. 3 of capping area tying into Phase 1 Cap.

Photographic Record

9. Example of lift No. 4 using 4 No. passes of the roller.

Photographic Record

Phase 2B

1. Placement of regulation layer over compacted waste

2. Trial pit in regulation layer soils to ensure 300mm thickness achieved.

Photographic Record

3. Construction of tie-in in to Phase 1 cap and basal engineering in SW corner of capping area. Water was from tile sub base to road.

4. Clay spreading and compaction

Photographic Record

5. Clay compaction

6. Tie-in area detail in SW corner where water was penetrating through road sub base into waste.

Photographic Record

7. Tie-in area completed and protection soils placed to east.

Appendix C Drawings

REV -

DRAWING NUMBER DWG-NO

(26-11-14) Head Ht:107.5m
Top Of Ring Ht:106.7m

GW SWR SWR1 SWR1B KOP BH10 TANK

F E D C B A

8 9 10 1 2 3 4 5 6 7

REV		DR	CH	PA	DATE	NOTES
						EACH SQUARE REPRESENTS 250m2

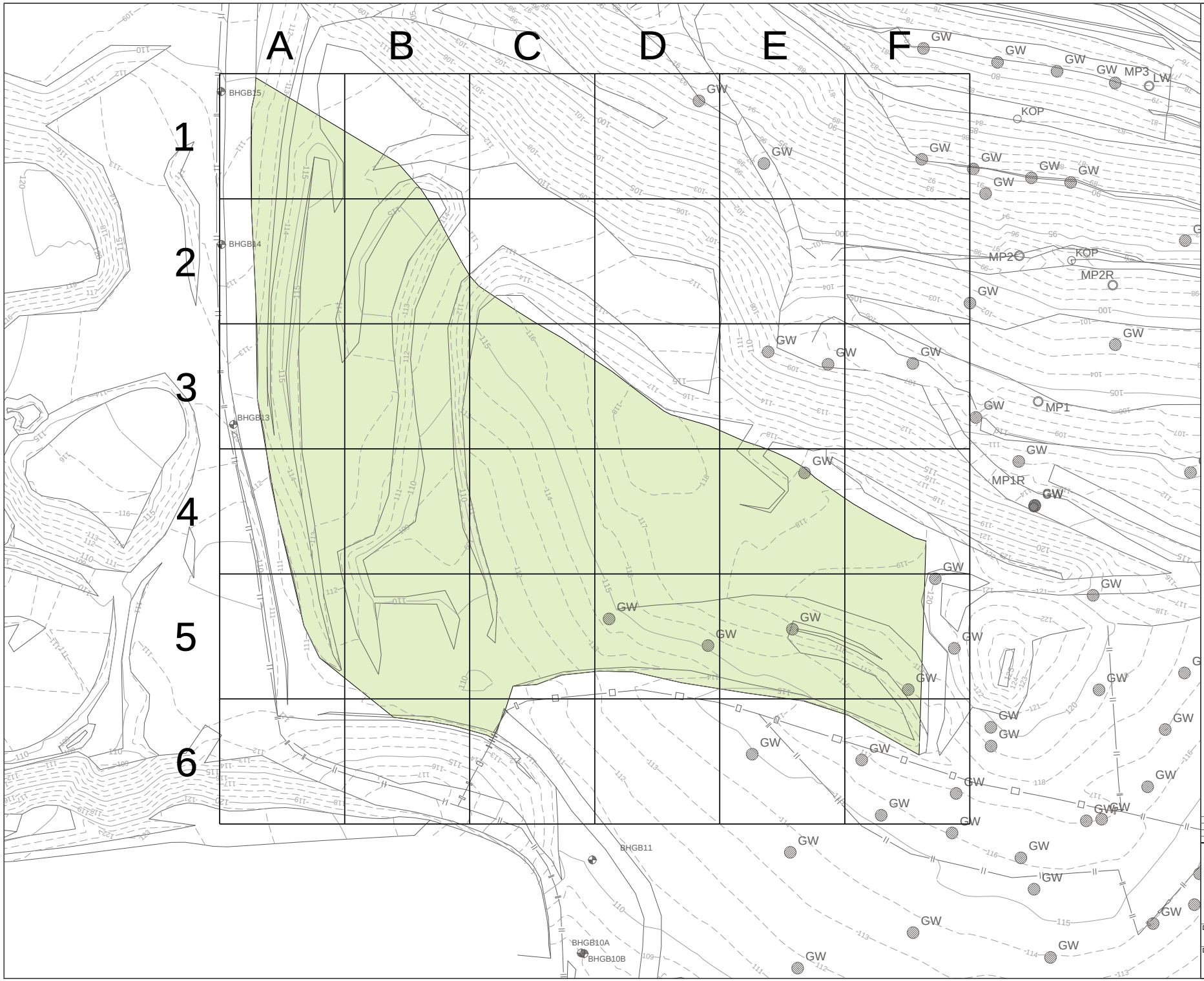
30237

2015
CLAY CAPPING
HAFOD LANDFILL SITE

DESIGNED	DRAWN	APPROVED	PM	DATE	SCALES @ A3
DMB	DMB	PFS		08/04/2015	NTS

CQA
CQA International limited

DRAWING NUMBER	REV
30237-01	-



Key

Area 1 (15,500m^2)

CORY environmental

Units 3-6 Greyfriars Business Park,
Frank Foley Way, Stafford,
ST16 2ST
Tel: 01785 251555

Revision:	Details:

Site: HAFOD

Title: Capping Area and 32m Sample Grid

Drawn	Date:	Scale @A4:
TJG	2-6-16	1:1250

Drawing number: HAF142a

BANGOR ROAD

OFFICE

WEIGHBRIDGE

TANK

TANK

TANK

Water Lvl. 89.5m (09/03/09)

2016 14,500m²

2015 JUNE 2,300m²

2015 FEBRUARY 4,000m²

PRE 2015 16,400m²

SITE Hafod Landfill Site	SCALE 1:1000 @ A1	CORY ENVIRONMENTAL	Greyfriars Business Park Frank Foley Way Greyfriars Stafford ST16 2RF
PROJECT Site Survey & Capping Areas	DATE 16/09/2016		
	DRAWING No. 8747a Rev.2		

NOTES

Levels Relate To : SITE DATUM

Co-ordinates : SITE GRID

stafsurv LAND SURVEYORS

www.stafsurv.com

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Appendix D Laboratory Test Result Summary

Hafod Landfill Site
Capping works Phase 2A/2B

Summary of laboratory test results

CQA

Phase 2A																
Ref.	Lab No.	Grid	Layer	Atterberg Limits			Clay Content	Particle Density	Compaction Test		Permeability			Shear Strength		
				PL	LL	PI			OMC	Max dry density	k	Dry density	Moisture Content	Cu	Dry density	Moisture Content
				%	%	%	%	Mg/m³	%	Mg/m³	m/s	Mg/m³	%	kPa	Mg/m³	%
B1	242602	C3	1	16	43	27	26.9	2.72								
P1	242604	B2	1								$8.6x10^{-11}$	2.327	13.7			
B2	242605	B3	1	15	37	22	32.1	2.70								
P2	242606	C3	1								$1.3x10^{-10}$	2.305	12.7			
B3	242607	B2	1	15	39	24	32.7	2.71								
B4	242608	B3	2	16	42	26	35.6	2.71								
B5	242609	B4	2	15	38	23	32.6	2.72								
P3	242610	C5	2								$2.3x10^{-10}$	2.290	13.4			
B6	242611	A5	3	16	43	27	35.8	2.71								
B7	242612	C4	3	14	36	22	31.5	2.70								
P4	242613	D5	3								$7.4x10^{-11}$	2.290	13.5			
CP1	242614	A1	2						12	1.970						
SS1	242615	A4	3											154	1.923	11.9
B8	242616	A5	4	15	40	25	32.9	2.71								
B9	242617	B4	4	15	38	23	30.1	2.73								
B10	242618	D4	4	14	35	21	36.0	2.74								
P5	242619	D4	4								$1.1x10^{-10}$	2.267	13.4			

Hafod Landfill Site
Capping works Phase 2A/2B

Summary of laboratory test results

CQA

Phase 2A

Ref.	Lab No.	Grid	Layer	Atterberg Limits			Clay Content	Particle Density	Compaction Test		Permeability			Shear Strength		
				PL	LL	PI			OMC	Max dry density	k	Dry density	Moisture Content	Cu	Dry density	Moisture Content
				%	%	%	%	Mg/m³	%	Mg/m³	m/s	Mg/m³	%	kPa	Mg/m³	%
B11	242620	B9	1	16	40	24	28.9	2.72								
P6	242621	B9	1								$1.3x10^{-10}$	2.284	13.5			
B12	242622	C10	2	17	45	28	29	2.73								
CP2	242623	C1	2						14	1.900						
SS2	242624	B10	2											142	1.916	14.3
B13	242625	D9	3	17	44	27	31	2.7								
B14	242626	D1	3	16	43	27	24.6	2.71								
P7	242627	D10	3								$3.5x10^{-10}$	2.295	12.5			
B15	242628	B1	4	16	36	20	19.3	2.7								
P8	242629	C2	4								$2.9x10^{-10}$	2.000	13.7			

Phase 2B

Ref.	Lab No.	Grid	Layer	Atterberg Limits			Clay Content	Particle Density	Compaction Test		Permeability			Shear Strength		
				PL	LL	PI			OMC	Max dry density	k	Dry density	Moisture Content	Cu	Dry density	Moisture Content
				%	%	%	%	Mg/m³	%	Mg/m³	m/s	Mg/m³	%	kPa	Mg/m³	%
P9	212502										$7.5x10^{-10}$	2.003	13.9			

Hafod Landfill Site
Capping works Phase 2A/2B

Summary of laboratory test results

Phase 2B																
Ref.	Lab No.	Grid	Layer	Atterberg Limits			Clay Content	Particle Density	Compaction Test		Permeability			Shear Strength		
				PL	LL	PI			OMC	Max dry density	k	Dry density	Moisture Content	Cu	Dry density	Moisture Content
				%	%	%	%	Mg/m³	%	Mg/m³	m/s	Mg/m³	%	kPa	Mg/m³	%
B16	212503			16	33	17	18.6	2.74								
B17	212504			16	32	16	23.1	2.73	12.0	1.98						
B18	212505			17	35	18	28.4	2.73	11.0	1.95						
B19	212506	E5	1	17	35	18	21.0	2.72								
P10	212507	D5	2								$2.5x10^{-10}$	1.878	15.0			
B20	212508	F5	2	17	35	18	16.0	2.71								
B21	212509	E4	2	17	32	15	18.6	2.71								
P11	212510	D4	3								$2.3x10^{-10}$	2.003	13.9			
B22	212511	F4	3	18	35	17	18.3	2.73								
B23	212512	F6	3	17	34	17	21.3	2.72								
B24	212513	D3	2	14	28	14	14.3	2.72								
B25	212514	D3	4	14	29	15	15.6	2.73								
P12	212515	D3	4								$2.3x10^{-10}$	2.043	11.4			
B26	212516	C4	2	17	35	18	20.0	2.70								
B27	212517	C3	4	16	33	17	16.6	2.71								
P13	212518	C3	4								$2.4x10^{-10}$	1.953	13.3			
SS3	212519	B2	1											202.0	2.022	10.7

Hafod Landfill Site
Capping works Phase 2A/2B

Summary of laboratory test results

CQA

Phase 2B																
Ref.	Lab No.	Grid	Layer	Atterberg Limits			Clay Content	Particle Density	Compaction Test		Permeability			Shear Strength		
				PL	LL	PI			OMC	Max dry density	k	Dry density	Moisture Content	Cu	Dry density	Moisture Content
				%	%	%	%	Mg/m³	%	Mg/m³	m/s	Mg/m³	%	kPa	Mg/m³	%
B28	212520	B3	1	14	29	15	16.7	2.71								
P14	212521	B1	2								$2.8x10^{-10}$	2.121	10.4			
B29	212522	B4	2	16	35	19	30.0	2.70								
B30	212523	D5	4	16	32	16	13.5	2.70								
P15	212524	D4	4								$3.4x10^{-10}$	1.926	14.9			
B31	212525	E5	4	16	35	19	31.4	2.71								
B32	212526	F5	4	17	38	21	37.7	2.72								
B33	212527	B4	1	15	30	15	18.0	2.72								
B34	212528	C4	2	16	32	16	32.3	2.72								
P16	212529	C4	2								$2.0x10^{-10}$	2.072	11.1			
B35	212530	A2	1	15	32	17	29.6	2.71								
P17	212531	A2	1								$2.3x10^{-10}$	2.001	13.2			
B36	212532	B4	3	16	32	16	33.4	2.72								
B37	212533	C5	4	16	33	17	35.1	2.72								
P18	212534	C4	4								$2.0x10^{-10}$	1.983	14.6			
B38	212535	A1	2	15	31	16	32.1	2.73	12.0	1.98						
SS4	212536	A3	2											77.0	1.885	14.6

Hafod Landfill Site
Capping works Phase 2A/2B

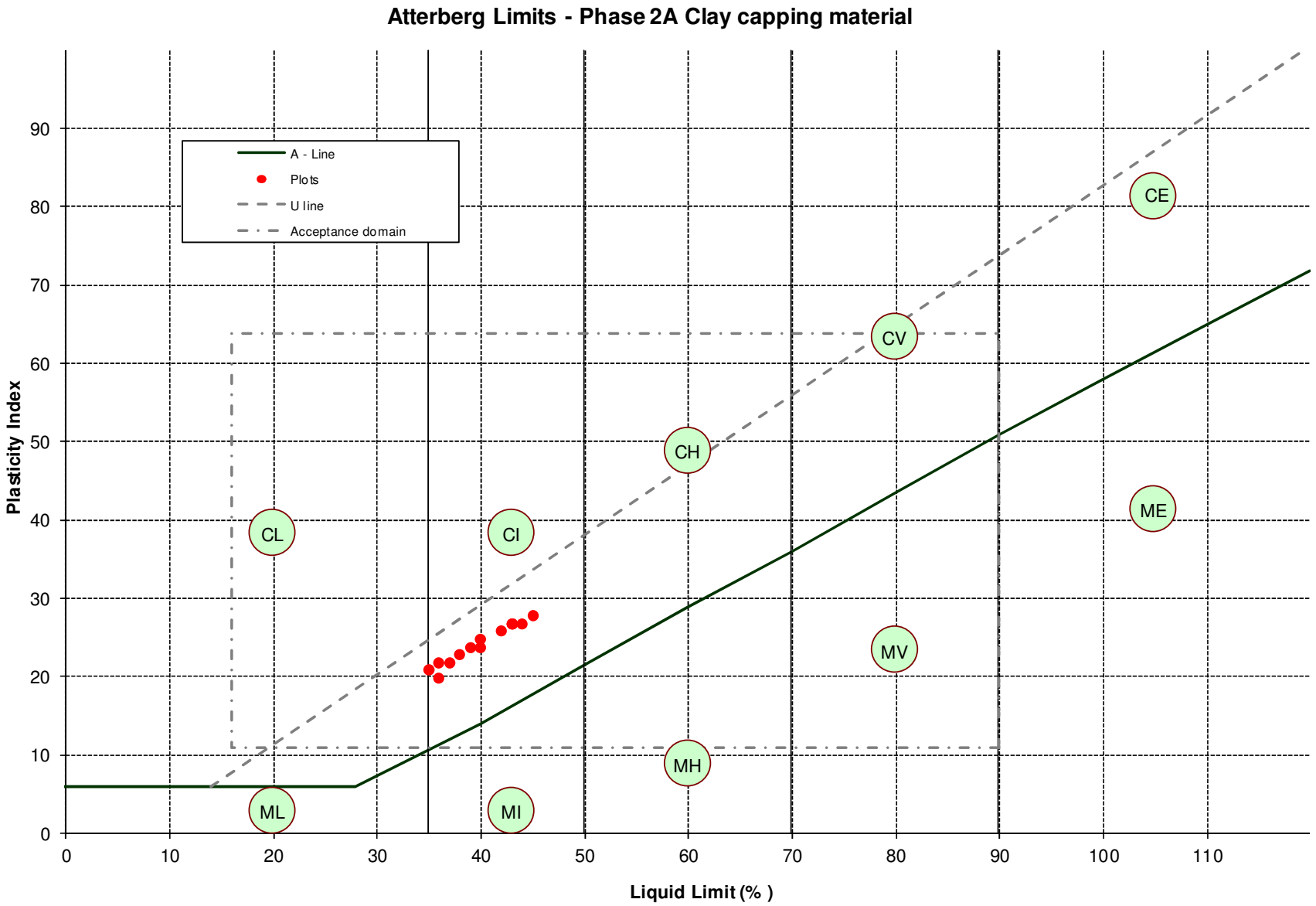
Summary of laboratory test results

Phase 2B																
Ref.	Lab No.	Grid	Layer	Atterberg Limits			Clay Content	Particle Density	Compaction Test		Permeability			Shear Strength		
				PL	LL	PI			OMC	Max dry density	k	Dry density	Moisture Content	Cu	Dry density	Moisture Content
				%	%	%	%	Mg/m³	%	Mg/m³	m/s	Mg/m³	%	kPa	Mg/m³	%
B39	212537	A2	3	16	33	17	31.5	2.73								
P19	212538	A1	3								$1.5x10^{-10}$	2.067	13.7			
B40	212539	A3	4	15	28	13	23.1	2.70								
B41	212540	A4	3	15	30	15	19.9	2.70								
B42	212541	A4	4	15	30	15	19.8	2.69								
P20	212542	A4	4								$2.3x10^{-10}$	2.029	13.1			
B43	212543	A4	1	14	28	14	35	2.73								
P21	212544	A4	1													
B44	212545	B6	1	13	27	14	26	2.72			$2.1x10^{-10}$	1.885	14.4			
SS5	247656	A5	2											121.0	2.006	11.8
B45	212546	A5	2	14	29	15	30	2.72								
P22	212547	A5	2													
B46	212548	B6	3	14	28	14	28	2.70			$2.8x10^{-10}$	2.001	13.0			
B47	212549	A4	3	14	29	15	26	2.71								
P23	212550	A4	3													
B48	247657	B5	4	15	30	15	31	2.71			$2.6x10^{-10}$	2.014	12.6			

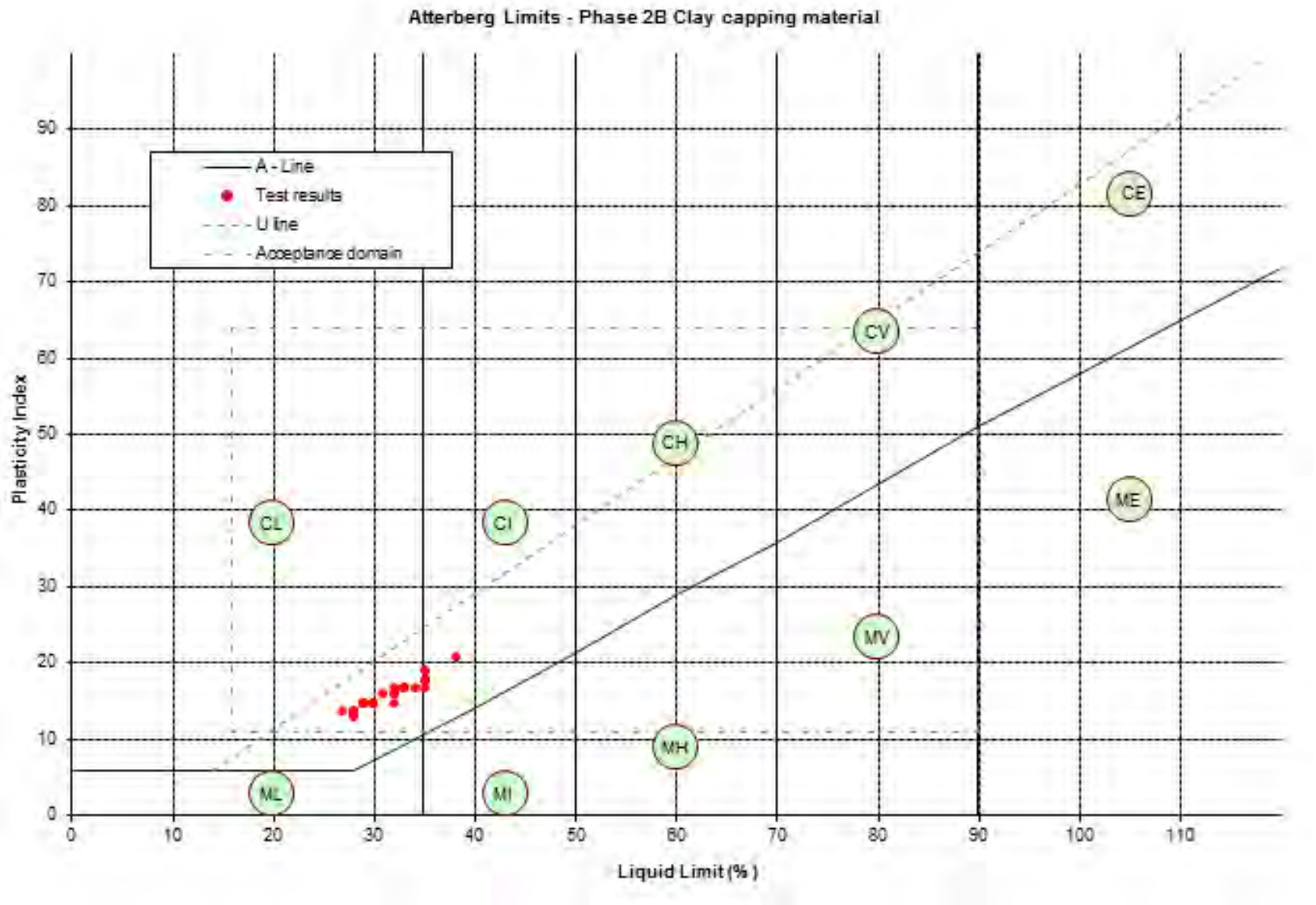
Appendix E Laboratory Classification Test Results

Hafod Landfill Site
Capping works Phase 2A/2B

Summary of Classification tests



Summary of Classification tests



CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411028

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52321 / 242602**
Client Ref. :	**HAF/CAP/CLA/B/1**
Date and Time of Sampling:	**16/04/2015**
Date of Receipt at Lab:	**20/04/2015**
Date of Start of Test:	**24/04/2015**
Sampling Location:	**Trial Pad - C3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**67**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**43**
Plasticity Index	**=**	**27**

Comments
None

Certificate Prepared by:-
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Assistant Laboratory Manager

Approved by:
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33 Rodney Road

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Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411315

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242605**
Client Ref. :	**HAF/CAP/CLA/B2**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**28/04/2015**
Sampling Location:	**B3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**86**
Plastic Limit	**=**	**15**
Liquid Limit	**=**	**37**
Plasticity Index	**=**	**22**

Comments
None

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GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411319

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242607**
Client Ref. :	**HAF/CAP/CLA/B3**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**28/04/2015**
Sampling Location:	**B2 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**85**
Plastic Limit	**=**	**15**
Liquid Limit	**=**	**39**
Plasticity Index	**=**	**24**

Comments
None

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GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411322

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242608**
Client Ref. :	**HAF/CAP/CLA/B4**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**28/04/2015**
Sampling Location:	**B3 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**87**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**42**
Plasticity Index	**=**	**26**

Comments
None

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Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411325

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242609**
Client Ref. :	**HAF/CAP/CLA/B5**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**28/04/2015**
Sampling Location:	**B4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**87**
Plastic Limit	**=**	**15**
Liquid Limit	**=**	**38**
Plasticity Index	**=**	**23**

Comments
None

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33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411329

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242611**
Client Ref. :	**HAF/CAP/CLA/B6**
Date and Time of Sampling:	**21/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**28/04/2015**
Sampling Location:	**A5 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**88**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**43**
Plasticity Index	**=**	**27**

Comments
None

Certificate Prepared by:-
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33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411332

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242612**
Client Ref. :	**HAF/CAP/CLA/B7**
Date and Time of Sampling:	**21/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**28/04/2015**
Sampling Location:	**C4 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**85**
Plastic Limit	**=**	**14**
Liquid Limit	**=**	**36**
Plasticity Index	**=**	**22**

Comments
None

Certificate Prepared by:-
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Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411669

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52409 / 242616**
Client Ref. :	**HAF/CAP/CLA/B/8**
Date and Time of Sampling:	**22/04/2015**
Date of Receipt at Lab:	**24/04/2015**
Date of Start of Test:	**05/05/2015**
Sampling Location:	**A5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**83**
Plastic Limit	**=**	**15**
Liquid Limit	**=**	**40**
Plasticity Index	**=**	**25**

Comments
None

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Approved by:
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Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411672

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52409 / 242617**
Client Ref. :	**HAF/CAP/CLA/B/9**
Date and Time of Sampling:	**22/04/2015**
Date of Receipt at Lab:	**24/04/2015**
Date of Start of Test:	**05/05/2015**
Sampling Location:	**B4 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**87**
Plastic Limit	**=**	**15**
Liquid Limit	**=**	**28**
Plasticity Index	**=**	**23**

Comments
None

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33 Rodney Road

Cheltenham
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GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411675

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52409 / 242618**
Client Ref. :	**HAF/CAP/CLA/B/10**
Date and Time of Sampling:	**22/04/2015**
Date of Receipt at Lab:	**24/04/2015**
Date of Start of Test:	**05/05/2015**
Sampling Location:	**D4 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**89**
Plastic Limit	**=**	**14**
Liquid Limit	**=**	**35**
Plasticity Index	**=**	**21**

Comments
None

Certificate Prepared by:-
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Approved by:
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The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415841

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52903 / 242620**
Client Ref. :	**HAF/CAP/CLA/B/11**
Date and Time of Sampling:	**26/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**03/06/2015**
Sampling Location:	**B9 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**85**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**40**
Plasticity Index	**=**	**24**

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415846

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52903 / 242622**
Client Ref. :	**HAF/CAP/CLA/B/12**
Date and Time of Sampling:	**26/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**03/06/2015**
Sampling Location:	**C10 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**77**
Plastic Limit	**=**	**17**
Liquid Limit	**=**	**45**
Plasticity Index	**=**	**28**

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
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Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415856

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52903 / 242625**
Client Ref. :	**HAF/CAP/CLA/B/13**
Date and Time of Sampling:	**27/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**03/06/2015**
Sampling Location:	**D9 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**72**
Plastic Limit	**=**	**17**
Liquid Limit	**=**	**44**
Plasticity Index	**=**	**27**

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

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The Keele Centre
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ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415859

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52903 / 242626**
Client Ref. :	**HAF/CAP/CLA/B/14**
Date and Time of Sampling:	**27/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**03/06/2015**
Sampling Location:	**D1 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**82**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**43**
Plasticity Index	**=**	**27**

Comments
None

Certificate Prepared by:-
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Assistant Laboratory Manager

Approved by:
Eric Goulden
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Date: 18 June 2015
Test Report Ref: STR 416315

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S52966 / 242628**
Client Ref. :	**HAF/CAP/CLA/B/15**
Date and Time of Sampling:	**28/05/2015**
Date of Receipt at Lab:	**02/06/2015**
Date of Start of Test:	**05/06/2015**
Sampling Location:	**B1 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**~~Natural state~~/After wet sieving**
% Materials passing 425µm	**=**	**72**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**36**
Plasticity Index	**=**	**20**

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

CQA Ltd.
33 Rodney Road

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Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411030

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52321 / 242602**
Client Ref. No:	**HAF/CAP/CLA/B/1**
Date and Time of Sampling:	**16/04/2015**
Date of Receipt at Lab:	**20/04/2015**
Date of Start of Test:	**21/04/2015**
Sampling Location:	**Trial Pad - C3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy very 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

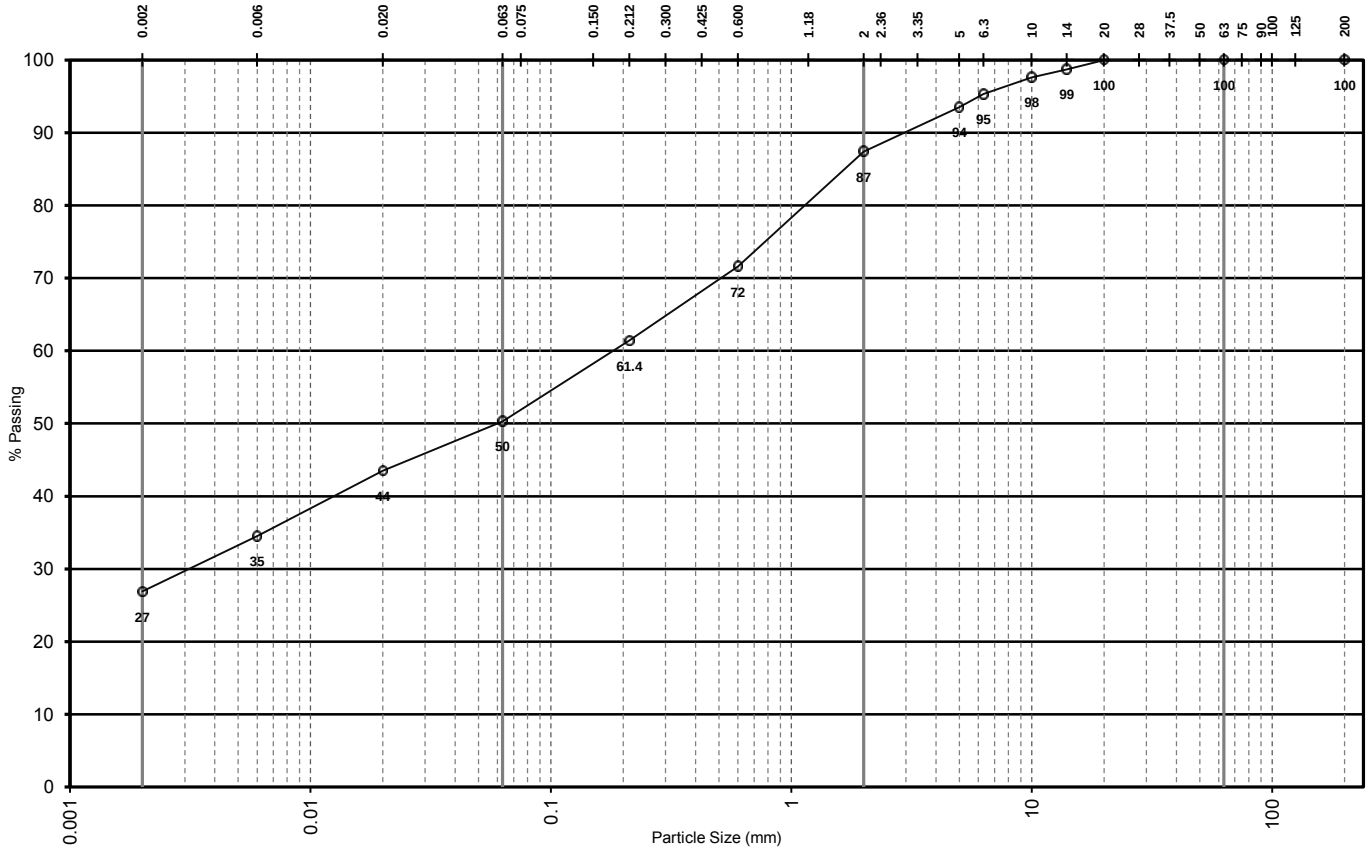
MATERIAL DESCRIPTION

Red/brown gravelly very sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	87.4
90		1.18	
75		0.600	71.6
63	100.0	0.425	
50		0.300	
37.5		0.212	61.4
28		0.150	
20	100.0	0.075	
14	98.7	0.063	50.3
10	97.6	0.020	43.5
6.3	95.3	0.006	34.5
5.0	93.5	0.002	26.9

Cobbles	0.0
Gravel	12.6
Sand	37.1
Silt	23.4
Clay	26.9



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411317

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242605**
Client Ref. No:	**HAF/CAP/CLA/B2**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**23/04/2015**
Sampling Location:	**B3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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 Report Ref: STR 411317: Page 2 of 2

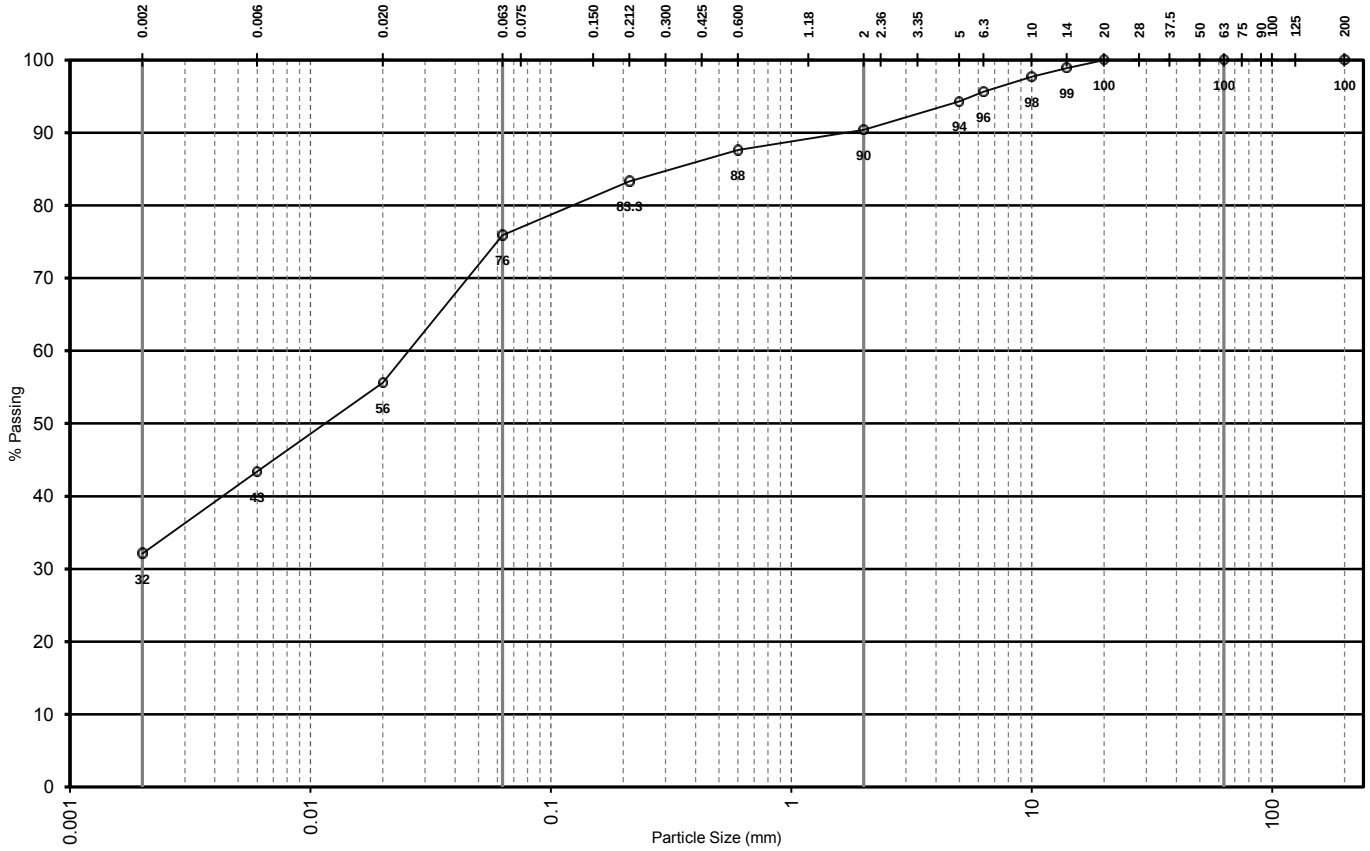
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	90.4
90		1.18	
75		0.600	87.6
63	100.0	0.425	
50		0.300	
37.5		0.212	83.3
28		0.150	
20	100.0	0.075	
14	98.9	0.063	75.9
10	97.7	0.020	55.6
6.3	95.6	0.006	43.4
5.0	94.3	0.002	32.1

Cobbles	0.0
Gravel	9.6
Sand	14.5
Silt	43.8
Clay	32.1



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA Ltd.
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GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411321

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242607**
Client Ref. No:	**HAF/CAP/CLA/B3**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**23/04/2015**
Sampling Location:	**B2 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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

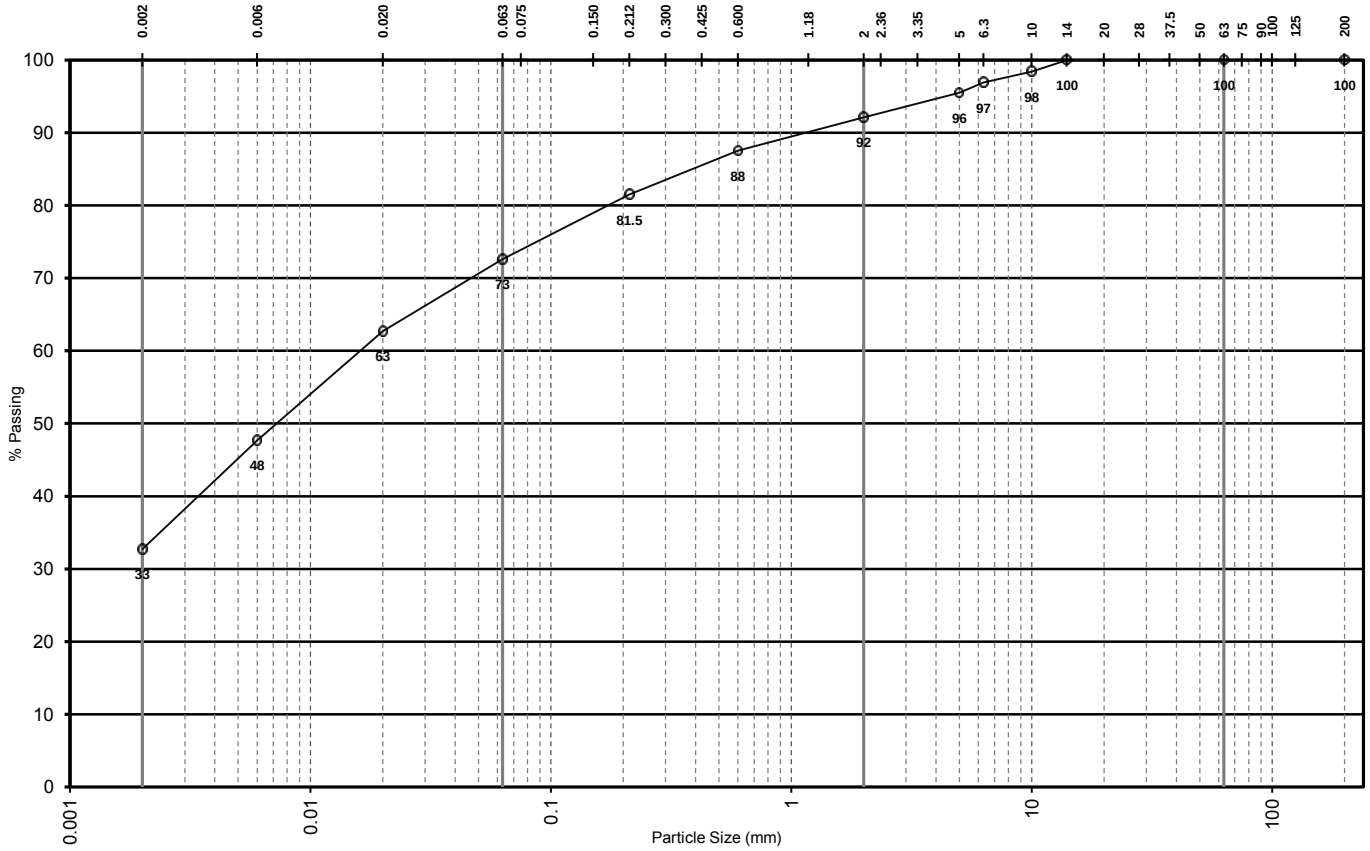
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	92.1
90		1.18	
75		0.600	87.5
63	100.0	0.425	
50		0.300	
37.5		0.212	81.5
28		0.150	
20		0.075	
14	100.0	0.063	72.6
10	98.4	0.020	62.7
6.3	96.9	0.006	47.7
5.0	95.5	0.002	32.7

Cobbles	0.0
Gravel	7.9
Sand	19.5
Silt	39.9
Clay	32.7



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA Ltd.
33 Rodney Road

Cheltenham
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GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411324

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242608**
Client Ref. No:	**HAF/CAP/CLA/B4**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**23/04/2015**
Sampling Location:	**B3 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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 Report Ref: STR 411324: Page 2 of 2

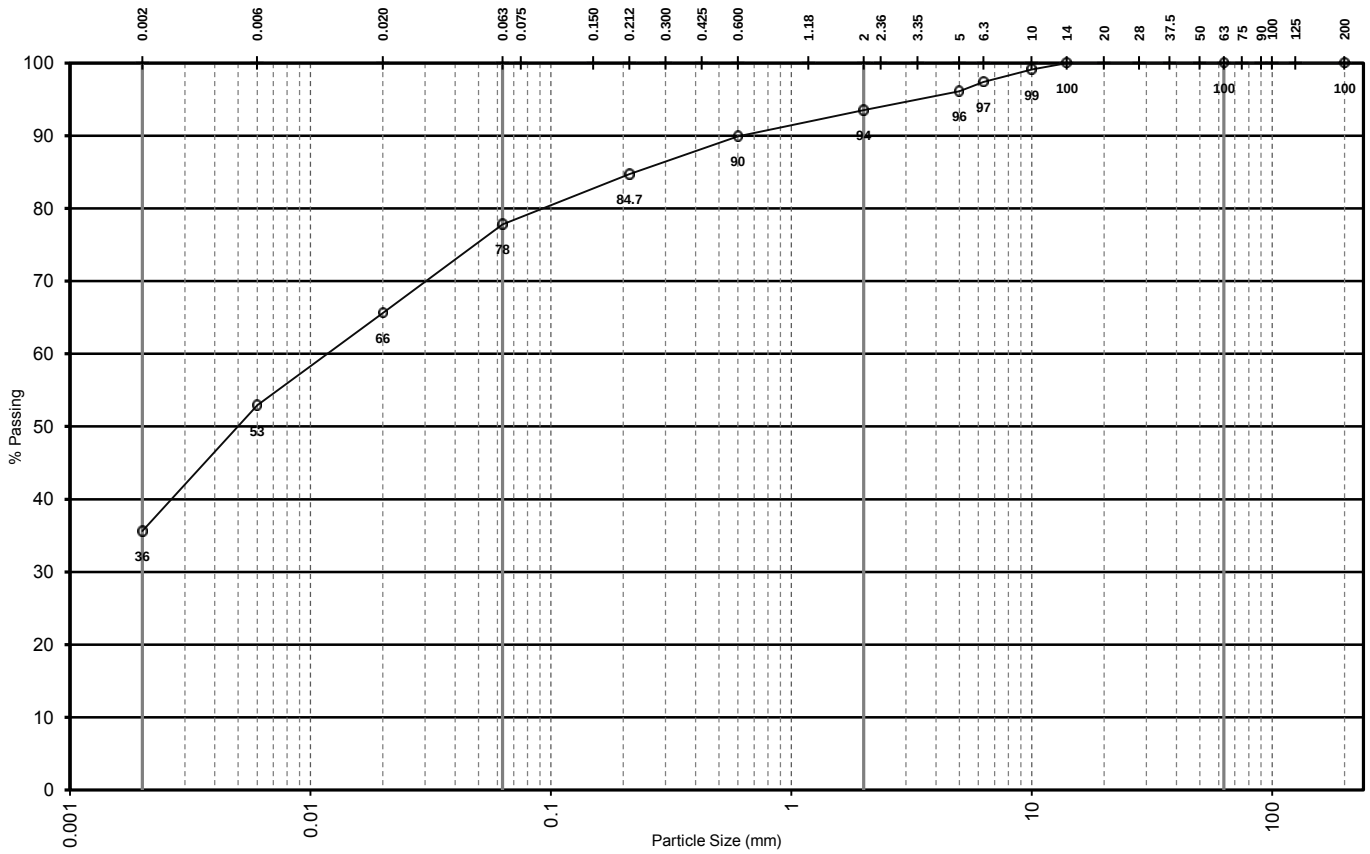
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	93.5
90		1.18	
75		0.600	89.9
63	100.0	0.425	
50		0.300	
37.5		0.212	84.7
28		0.150	
20		0.075	
14	100.0	0.063	77.8
10	99.1	0.020	65.6
6.3	97.4	0.006	52.9
5.0	96.1	0.002	35.6

Cobbles	0.0
Gravel	6.5
Sand	15.7
Silt	42.2
Clay	35.6



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA Ltd.
33 Rodney Road

Cheltenham
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GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411327

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242609**
Client Ref. No:	**HAF/CAP/CLA/B5**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**23/04/2015**
Sampling Location:	**B4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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

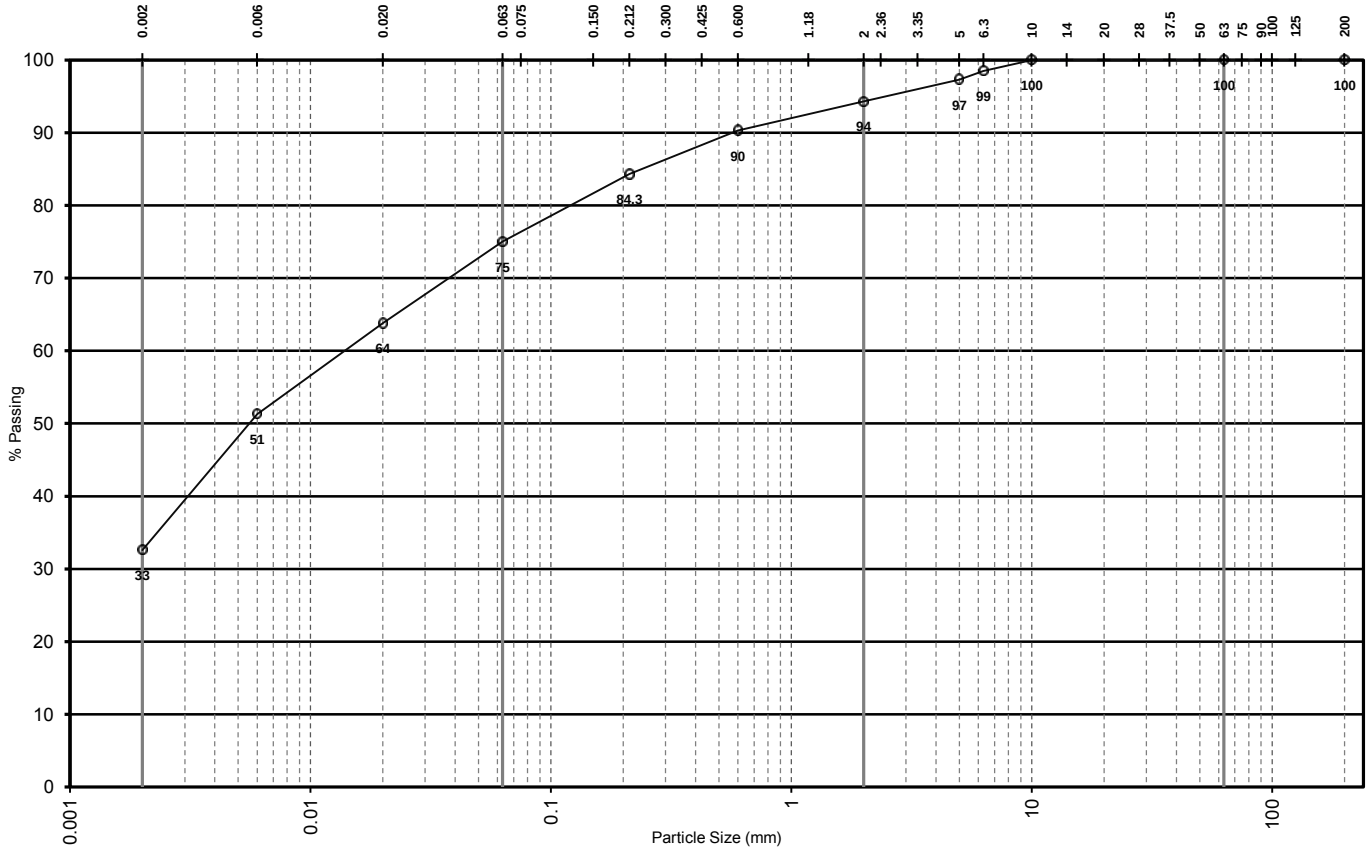
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	94.3
90		1.18	
75		0.600	90.3
63	100.0	0.425	
50		0.300	
37.5		0.212	84.3
28		0.150	
20		0.075	
14		0.063	75.0
10	100.0	0.020	63.8
6.3	98.5	0.006	51.3
5.0	97.3	0.002	32.6

Cobbles	0.0
Gravel	5.7
Sand	19.3
Silt	42.4
Clay	32.6



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411331

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242611**
Client Ref. No:	**HAF/CAP/CLA/B6**
Date and Time of Sampling:	**21/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**23/04/2015**
Sampling Location:	**A5 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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

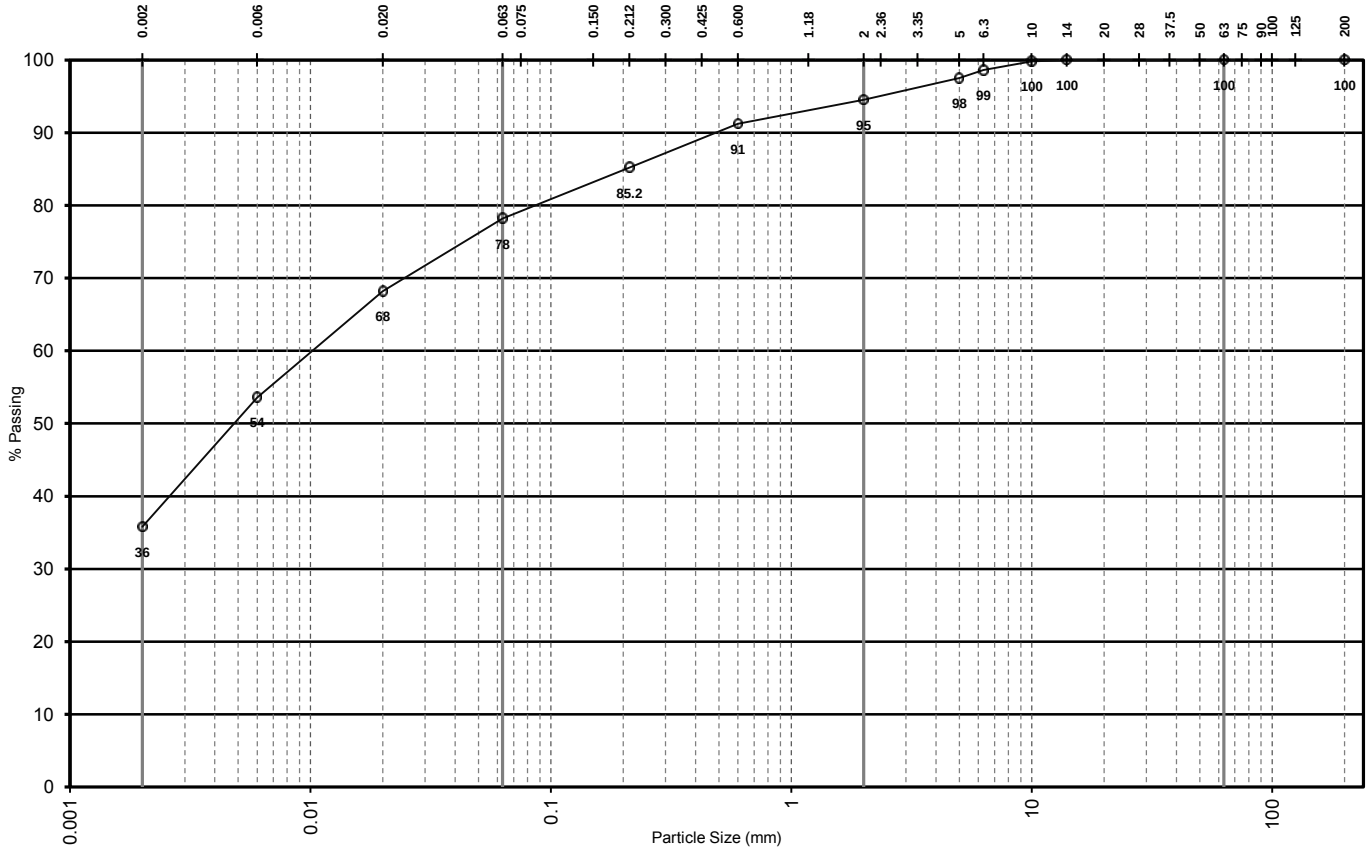
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	94.5
90		1.18	
75		0.600	91.2
63	100.0	0.425	
50		0.300	
37.5		0.212	85.2
28		0.150	
20		0.075	
14	100.0	0.063	78.2
10	99.8	0.020	68.2
6.3	98.6	0.006	53.6
5.0	97.5	0.002	35.8

Cobbles	0.0
Gravel	5.5
Sand	16.3
Silt	42.4
Clay	35.8



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0 6.3		20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA Ltd.
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Cheltenham
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GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411334

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242612**
Client Ref. No:	**HAF/CAP/CLA/B7**
Date and Time of Sampling:	**21/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**23/04/2015**
Sampling Location:	**C4 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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

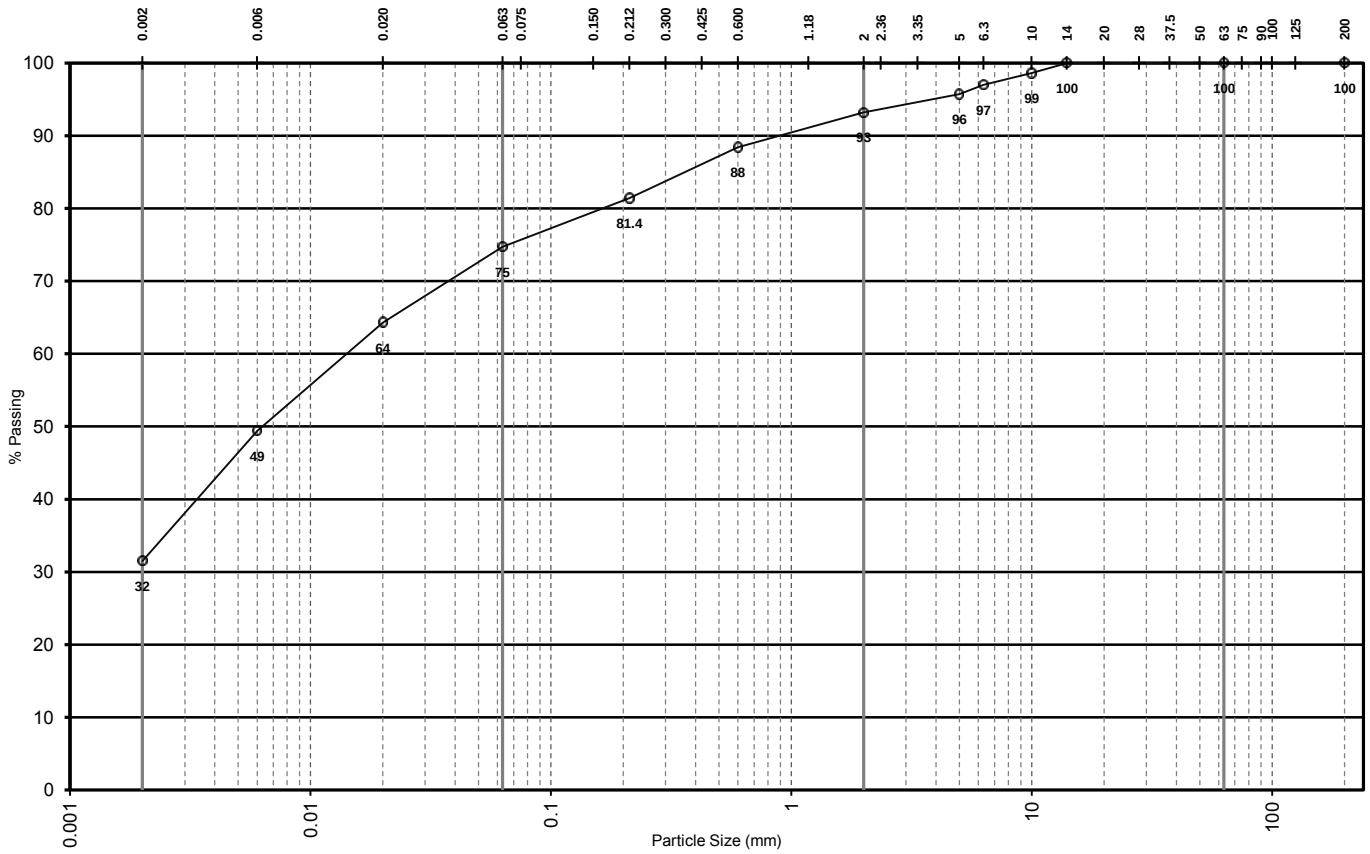
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	93.2
90		1.18	
75		0.600	88.4
63	100.0	0.425	
50		0.300	
37.5		0.212	81.4
28		0.150	
20		0.075	
14	100.0	0.063	74.7
10	98.6	0.020	64.3
6.3	97.0	0.006	49.4
5.0	95.7	0.002	31.5

Cobbles	0.0
Gravel	6.8
Sand	18.5
Silt	43.2
Clay	31.5



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411671

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52409 / 242616**
Client Ref. No:	**HAF/CAP/CLA/B/8**
Date and Time of Sampling:	**22/04/2015**
Date of Receipt at Lab:	**24/04/2015**
Date of Start of Test:	**27/04/2015**
Sampling Location:	**A5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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

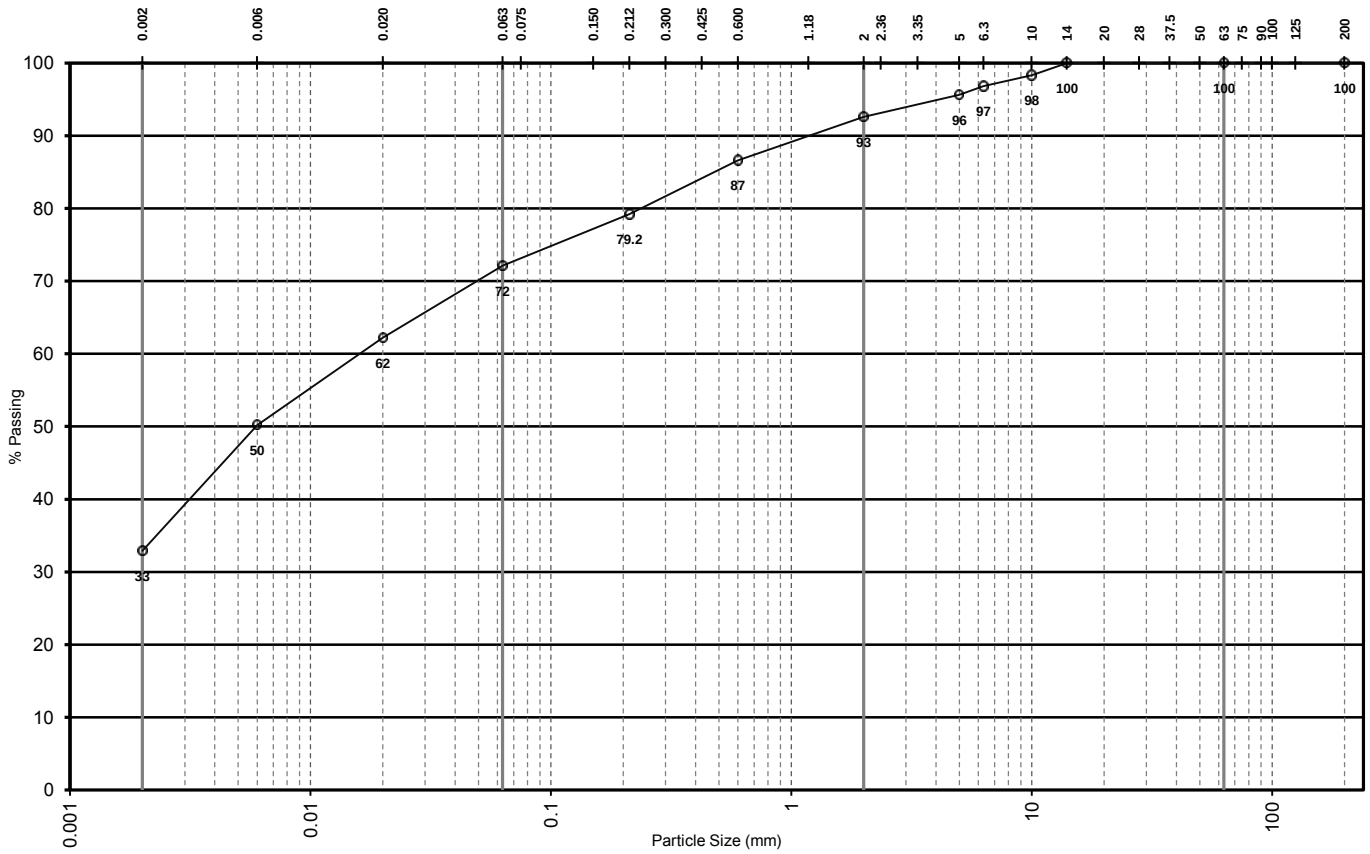
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	92.6
90		1.18	
75		0.600	86.6
63	100.0	0.425	
50		0.300	
37.5		0.212	79.2
28		0.150	
20		0.075	
14	100.0	0.063	72.1
10	98.3	0.020	62.2
6.3	96.8	0.006	50.2
5.0	95.6	0.002	32.9

Cobbles	0.0
Gravel	7.4
Sand	20.5
Silt	39.2
Clay	32.9



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411674

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52409 / 242617**
Client Ref. No:	**HAF/CAP/CLA/B/9**
Date and Time of Sampling:	**22/04/2015**
Date of Receipt at Lab:	**24/04/2015**
Date of Start of Test:	**27/04/2015**
Sampling Location:	**B4 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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

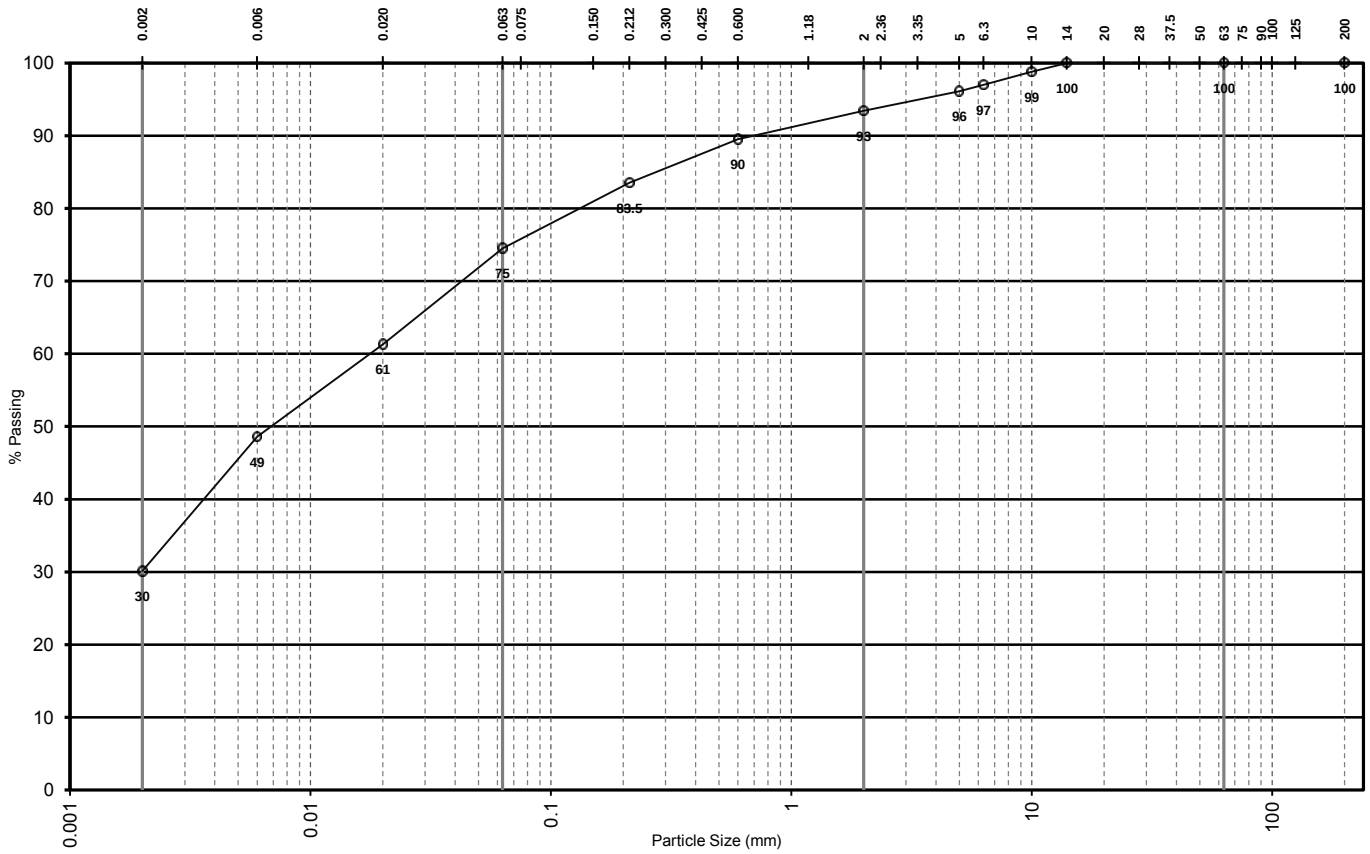
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	93.4
90		1.18	
75		0.600	89.5
63	100.0	0.425	
50		0.300	
37.5		0.212	83.5
28		0.150	
20		0.075	
14	100.0	0.063	74.5
10	98.8	0.020	61.3
6.3	97.0	0.006	48.6
5.0	96.1	0.002	30.1

Cobbles	0.0
Gravel	6.6
Sand	18.9
Silt	44.4
Clay	30.1



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411677

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52409 / 242618**
Client Ref. No:	**HAF/CAP/CLA/B/10**
Date and Time of Sampling:	**22/04/2015**
Date of Receipt at Lab:	**24/04/2015**
Date of Start of Test:	**27/04/2015**
Sampling Location:	**D4 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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

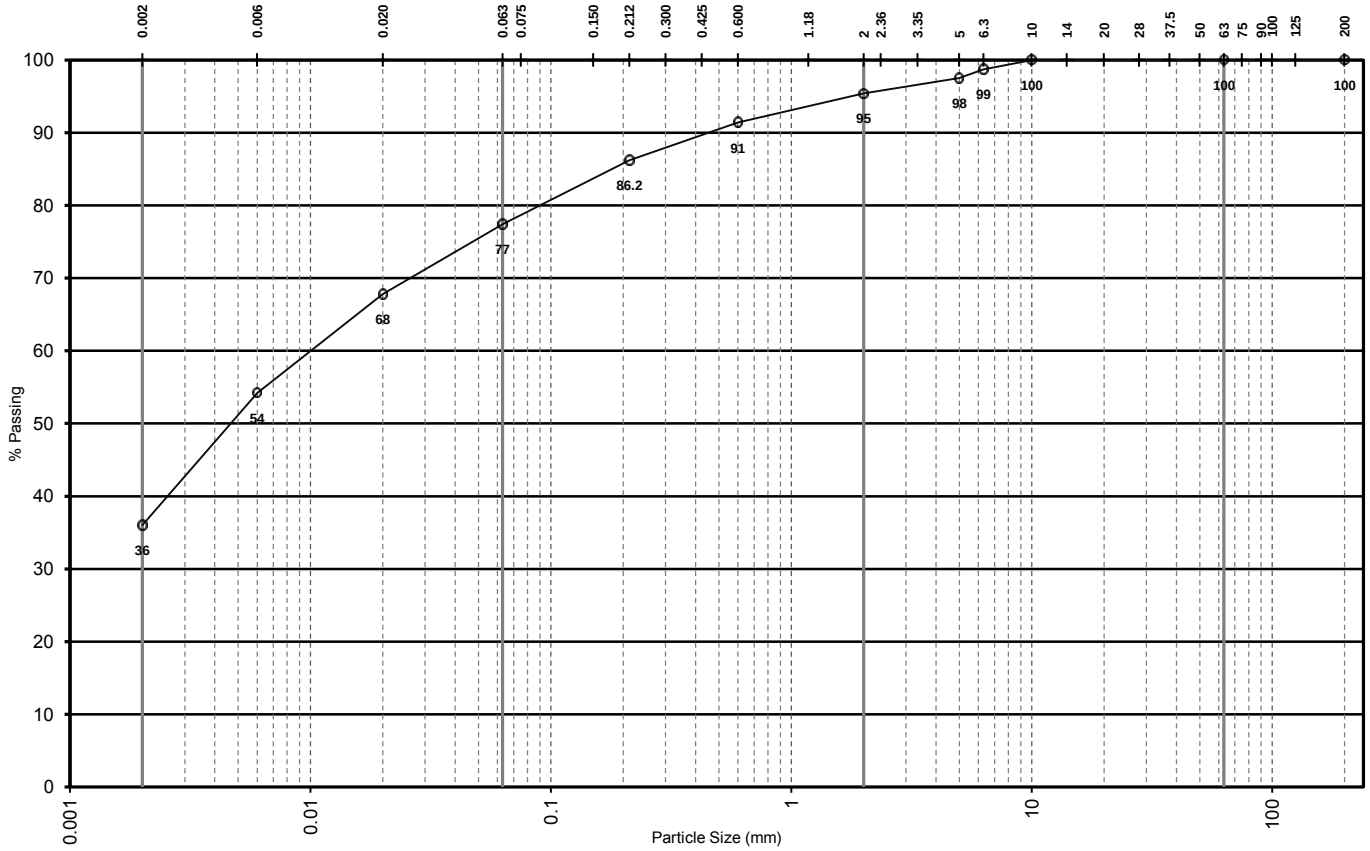
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	95.4
90		1.18	
75		0.600	91.4
63	100.0	0.425	
50		0.300	
37.5		0.212	86.2
28		0.150	
20		0.075	
14		0.063	77.4
10	100.0	0.020	67.8
6.3	98.7	0.006	54.2
5.0	97.5	0.002	36.0

Cobbles	0.0
Gravel	4.6
Sand	18.0
Silt	41.4
Clay	36.0



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415843

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52903 / 242620**
Client Ref. No:	**HAF/CAP/CLA/B/11**
Date and Time of Sampling:	**26/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**02/06/2015**
Sampling Location:	**B9 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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

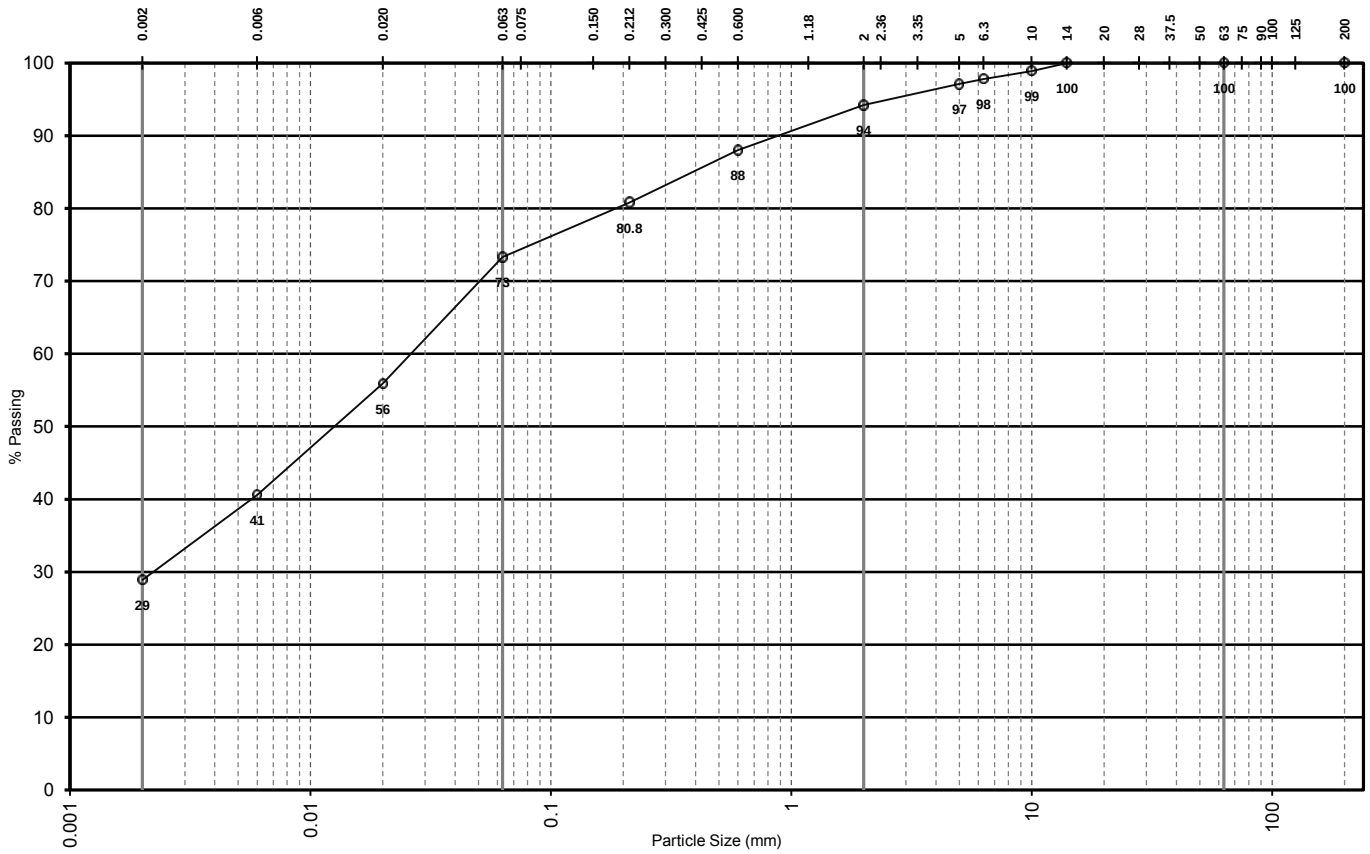
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	94.2
90		1.18	
75		0.600	88.0
63	100.0	0.425	
50		0.300	
37.5		0.212	80.8
28		0.150	
20		0.075	
14	100.0	0.063	73.3
10	98.9	0.020	55.9
6.3	97.8	0.006	40.6
5.0	97.1	0.002	28.9

Cobbles	0.0
Gravel	5.8
Sand	20.9
Silt	44.4
Clay	28.9



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415849

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52903 / 242622**
Client Ref. No:	**HAF/CAP/CLA/B/12**
Date and Time of Sampling:	**26/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**02/06/2015**
Sampling Location:	**C10 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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

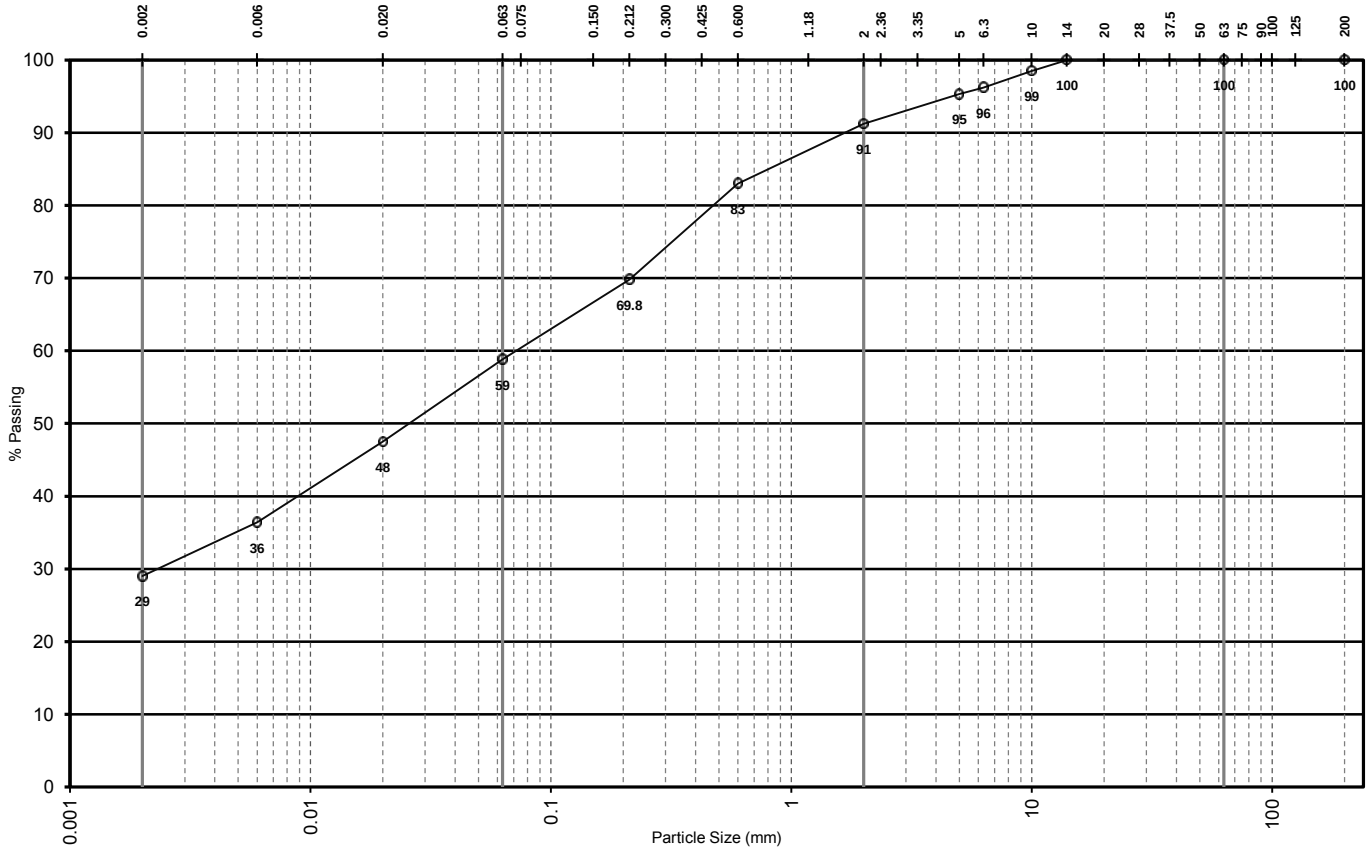
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	91.2
90		1.18	
75		0.600	83.0
63	100.0	0.425	
50		0.300	
37.5		0.212	69.8
28		0.150	
20		0.075	
14	100.0	0.063	58.8
10	98.5	0.020	47.5
6.3	96.2	0.006	36.4
5.0	95.3	0.002	29.0

Cobbles	0.0
Gravel	8.8
Sand	32.4
Silt	29.8
Clay	29.0



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415858

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52903 / 242625**
Client Ref. No:	**HAF/CAP/CLA/B/13**
Date and Time of Sampling:	**27/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**02/06/2015**
Sampling Location:	**D9 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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

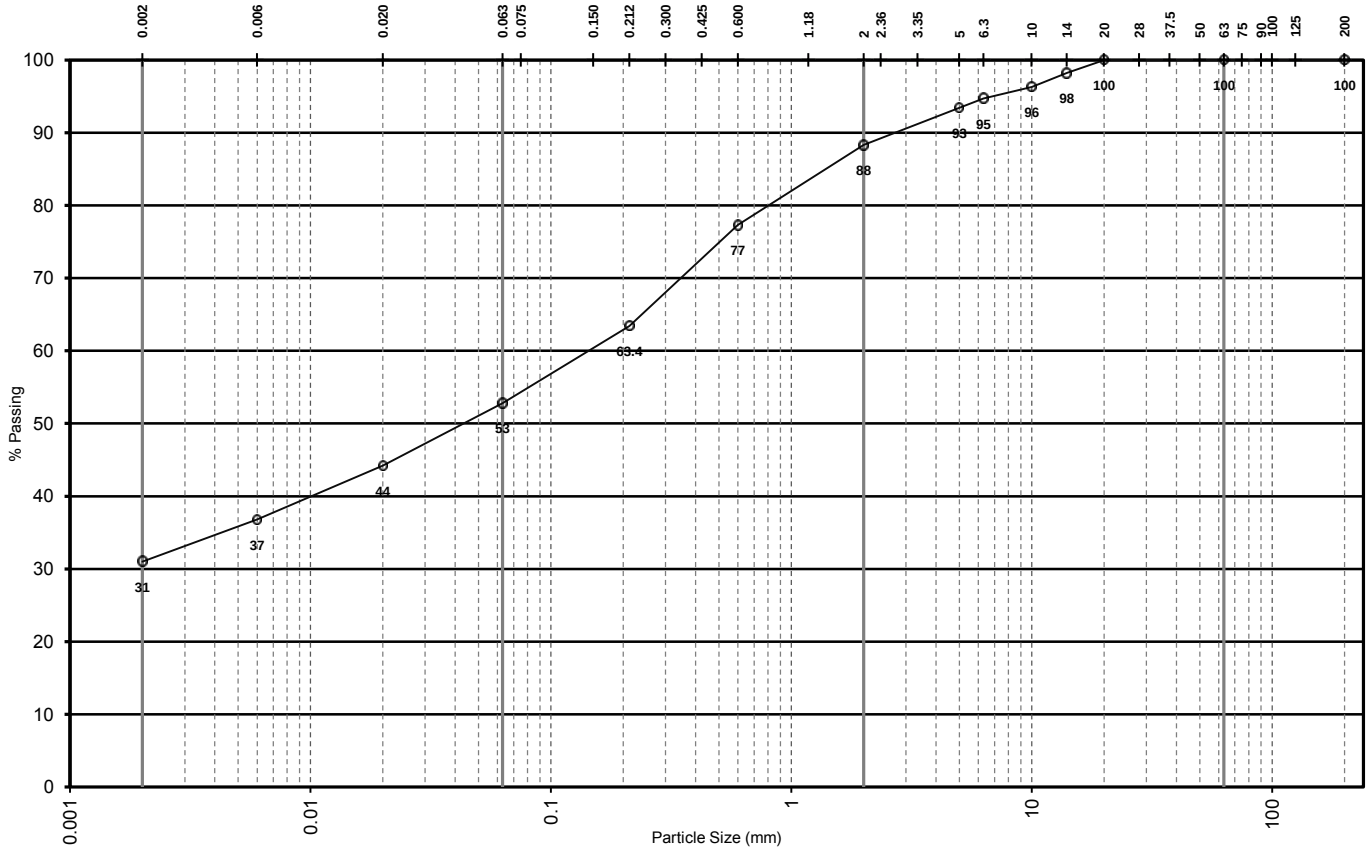
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	88.3
90		1.18	
75		0.600	77.3
63	100.0	0.425	
50		0.300	
37.5		0.212	63.4
28		0.150	
20	100.0	0.075	
14	98.2	0.063	52.8
10	96.3	0.020	44.2
6.3	94.7	0.006	36.8
5.0	93.4	0.002	31.0

Cobbles	0.0
Gravel	11.7
Sand	35.5
Silt	21.8
Clay	31.0



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415861

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52903 / 242626**
Client Ref. No:	**HAF/CAP/CLA/B/14**
Date and Time of Sampling:	**27/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**02/06/2015**
Sampling Location:	**D1 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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

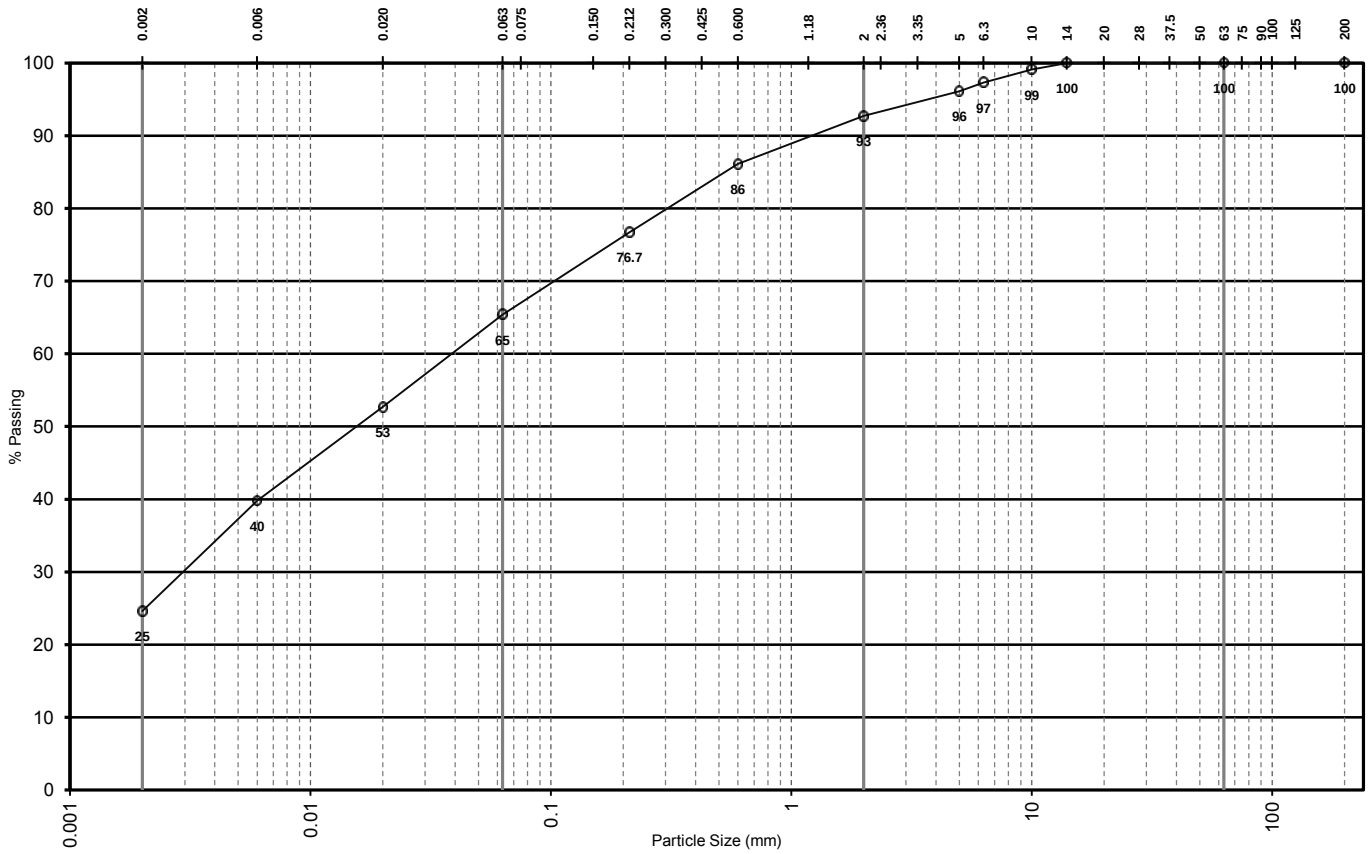
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	92.7
90		1.18	
75		0.600	86.1
63	100.0	0.425	
50		0.300	
37.5		0.212	76.7
28		0.150	
20		0.075	
14	100.0	0.063	65.4
10	99.1	0.020	52.7
6.3	97.3	0.006	39.8
5.0	96.1	0.002	24.6

Cobbles	0.0
Gravel	7.3
Sand	27.3
Silt	40.8
Clay	24.6



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 416317

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S52966 / 242628**
Client Ref. No:	**HAF/CAP/CLA/B/15**
Date and Time of Sampling:	**28/05/2015**
Date of Receipt at Lab:	**02/06/2015**
Date of Start of Test:	**03/06/2015**
Sampling Location:	**B1 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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

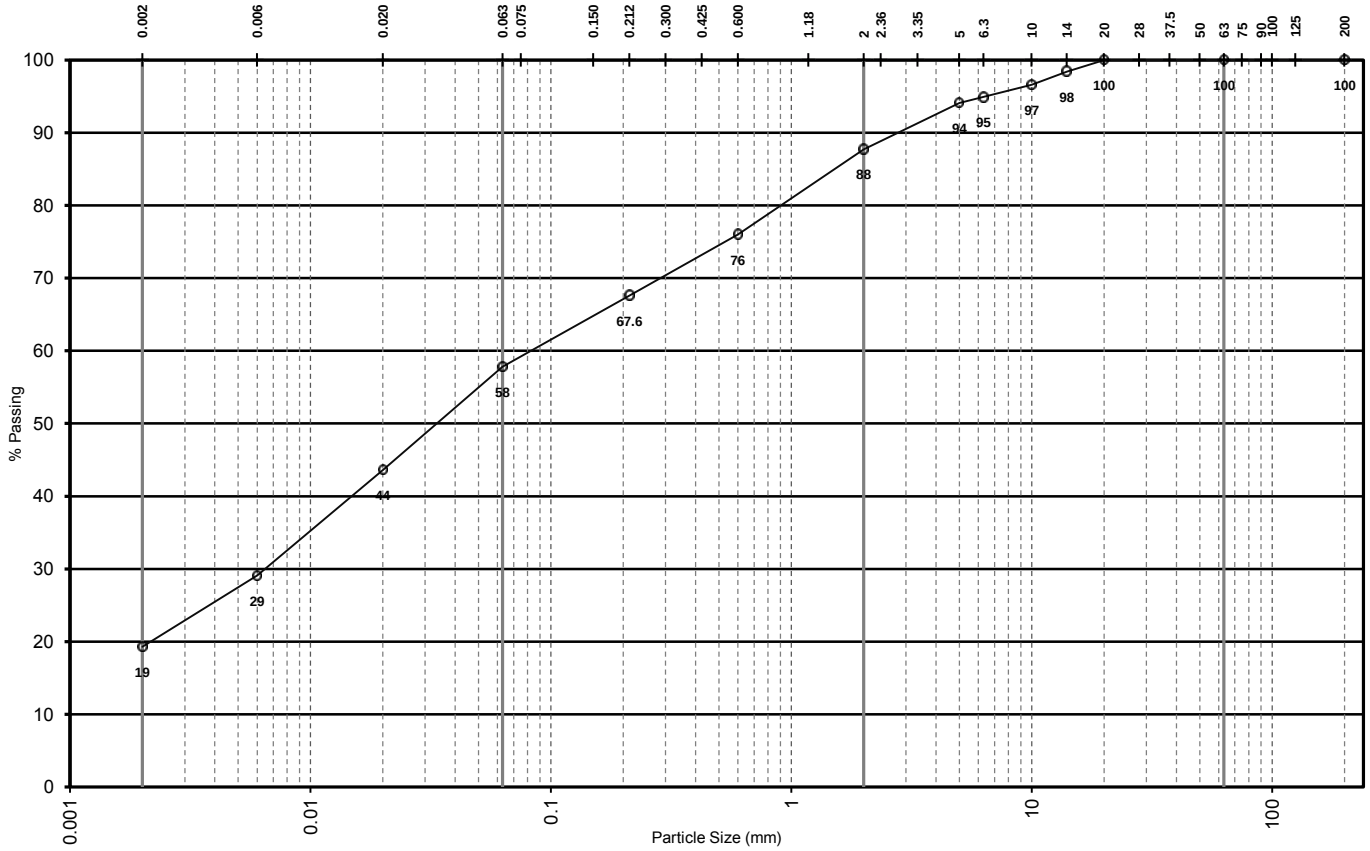
MATERIAL DESCRIPTION

Red/brown gravelly sandy very silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	87.7
90		1.18	
75		0.600	76.0
63	100.0	0.425	
50		0.300	
37.5		0.212	67.6
28		0.150	
20	100.0	0.075	
14	98.4	0.063	57.8
10	96.6	0.020	43.6
6.3	94.9	0.006	29.1
5.0	94.1	0.002	19.3

Cobbles	0.0
Gravel	12.3
Sand	29.9
Silt	38.5
Clay	19.3



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411029

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52321 / 242602**
Client Ref. No:	**HAF/CAP/CLA/B/1**
Date and Time of Sampling:	**16/04/2015**
Date of Receipt at Lab:	**20/04/2015**
Date of Start of Test:	**24/04/2015**
Sampling Location:	**Trial Pad - C3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.72 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411316

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242605**
Client Ref. No:	**HAF/CAP/CLA/B2**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**28/04/2015**
Sampling Location:	**B3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.70 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411320

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242607**
Client Ref. No:	**HAF/CAP/CLA/B3**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**28/04/2015**
Sampling Location:	**B2 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.71 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411323

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242608**
Client Ref. No:	**HAF/CAP/CLA/B4**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**28/04/2015**
Sampling Location:	**B3 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.71 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411326

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242609**
Client Ref. No:	**HAF/CAP/CLA/B5**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**28/04/2015**
Sampling Location:	**B4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.72 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411330

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242611**
Client Ref. No:	**HAF/CAP/CLA/B6**
Date and Time of Sampling:	**21/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**28/04/2015**
Sampling Location:	**A5 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.71 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411333

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52359 / 242612**
Client Ref. No:	**HAF/CAP/CLA/B7**
Date and Time of Sampling:	**21/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**28/04/2015**
Sampling Location:	**C4 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.70 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

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33 Rodney Road

Cheltenham
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GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411670

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52409 / 242616**
Client Ref. No:	**HAF/CAP/CLA/B/8**
Date and Time of Sampling:	**22/04/2015**
Date of Receipt at Lab:	**24/04/2015**
Date of Start of Test:	**01/05/2015**
Sampling Location:	**A5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.71 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

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Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411673

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52409 / 242617**
Client Ref. No:	**HAF/CAP/CLA/B/9**
Date and Time of Sampling:	**22/04/2015**
Date of Receipt at Lab:	**24/04/2015**
Date of Start of Test:	**01/05/2015**
Sampling Location:	**B4 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.73 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

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GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411676

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52409 / 242618**
Client Ref. No:	**HAF/CAP/CLA/B/10**
Date and Time of Sampling:	**22/04/2015**
Date of Receipt at Lab:	**24/04/2015**
Date of Start of Test:	**01/05/2015**
Sampling Location:	**D4 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.74 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

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The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415842

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52903 / 242620**
Client Ref. No:	**HAF/CAP/CLA/B/11**
Date and Time of Sampling:	**26/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**03/06/2015**
Sampling Location:	**B9 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.72 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

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ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415847

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52903 / 242622**
Client Ref. No:	**HAF/CAP/CLA/B/12**
Date and Time of Sampling:	**26/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**03/06/2015**
Sampling Location:	**C10 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.73 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

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ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415857

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52903 / 242625**
Client Ref. No:	**HAF/CAP/CLA/B/13**
Date and Time of Sampling:	**27/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**03/06/2015**
Sampling Location:	**D9 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.70 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

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ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415860

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52903 / 242626**
Client Ref. No:	**HAF/CAP/CLA/B/14**
Date and Time of Sampling:	**27/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**03/06/2015**
Sampling Location:	**D1 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.71 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

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ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 416316

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S52966 / 242628**
Client Ref. No:	**HAF/CAP/CLA/B/15**
Date and Time of Sampling:	**28/05/2015**
Date of Receipt at Lab:	**02/06/2015**
Date of Start of Test:	**05/06/2015**
Sampling Location:	**B1 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.70 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

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ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 469633

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58991 / 212517**
Client Ref. :	**HAF/CAP/CLA/B27**
Date and Time of Sampling:	**16/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**27/06/2016**
Sampling Location:	**C3 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**54**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**33**
Plasticity Index	**=**	**17**

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
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Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470484

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212520**
Client Ref. :	**HAF/CAP/CLA/B28**
Date and Time of Sampling:	**20/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**B3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**76**
Plastic Limit	**=**	**14**
Liquid Limit	**=**	**29**
Plasticity Index	**=**	**15**

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

CQA International Ltd.
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ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470488

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212522**
Client Ref. :	**HAF/CAP/CLA/B29**
Date and Time of Sampling:	**20/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**B4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**81**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**35**
Plasticity Index	**=**	**19**

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

CQA International Ltd.
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Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470491

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212523**
Client Ref. :	**HAF/CAP/CLA/B30**
Date and Time of Sampling:	**21/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**D5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**76**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**32**
Plasticity Index	**=**	**16**

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

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Three Mile Lane
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Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470495

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212525**
Client Ref. :	**HAF/CAP/CLA/B31**
Date and Time of Sampling:	**22/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**E5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**81**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**35**
Plasticity Index	**=**	**19**

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470498

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212526**
Client Ref. :	**HAF/CAP/CLA/B32**
Date and Time of Sampling:	**22/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**F5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**84**
Plastic Limit	**=**	**17**
Liquid Limit	**=**	**38**
Plasticity Index	**=**	**21**

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

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ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470501

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212527**
Client Ref. :	**HAF/CAP/CLA/B33**
Date and Time of Sampling:	**23/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**B4 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**81**
Plastic Limit	**=**	**15**
Liquid Limit	**=**	**30**
Plasticity Index	**=**	**15**

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

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The Keele Centre
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Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470504

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212528**
Client Ref. :	**HAF/CAP/CLA/B34**
Date and Time of Sampling:	**24/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**C4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**83**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**32**
Plasticity Index	**=**	**16**

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

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Three Mile Lane
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Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471519

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212530**
Client Ref. :	**HAF/CAP/CLA/B35**
Date and Time of Sampling:	**27/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**11/07/2016**
Sampling Location:	**A3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**81**
Plastic Limit	**=**	**15**
Liquid Limit	**=**	**32**
Plasticity Index	**=**	**17**

Comments

None

Certificate Prepared by:-

Meical Owen
Assistant Laboratory Manager

Approved by:

Eric Goulden
Technical Manager

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The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471523

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212532**
Client Ref. :	**HAF/CAP/CLA/B36**
Date and Time of Sampling:	**28/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**11/07/2016**
Sampling Location:	**B4 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**86**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**32**
Plasticity Index	**=**	**16**

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

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Date: 03 August 2016
Test Report Ref: STR 471526

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212533**
Client Ref. :	**HAF/CAP/CLA/B37**
Date and Time of Sampling:	**28/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**11/07/2016**
Sampling Location:	**C5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**83**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**33**
Plasticity Index	**=**	**17**

Comments
None

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Approved by:
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Date: 03 August 2016
Test Report Ref: STR 471530

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212535**
Client Ref. :	**HAF/CAP/CLA/B38**
Date and Time of Sampling:	**30/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**11/07/2016**
Sampling Location:	**A1 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**85**
Plastic Limit	**=**	**15**
Liquid Limit	**=**	**31**
Plasticity Index	**=**	**16**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 471535

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212537**
Client Ref. :	**HAF/CAP/CLA/B39**
Date and Time of Sampling:	**01/07/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**11/07/2016**
Sampling Location:	**A2 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**83**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**33**
Plasticity Index	**=**	**17**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 471540

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212539**
Client Ref. :	**HAF/CAP/CLA/B40**
Date and Time of Sampling:	**01/07/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**11/07/2016**
Sampling Location:	**A3 Layer 6**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**83**
Plastic Limit	**=**	**15**
Liquid Limit	**=**	**28**
Plasticity Index	**=**	**13**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 471559

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59205 / 212540**
Client Ref. :	**HAF/CAP/CLA/B41**
Date and Time of Sampling:	**04/07/2016**
Date of Receipt at Lab:	**05/07/2016**
Date of Start of Test:	**11/07/2016**
Sampling Location:	**B2 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**69**
Plastic Limit	**=**	**15**
Liquid Limit	**=**	**30**
Plasticity Index	**=**	**15**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 471562

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59205 / 212541**
Client Ref. :	**HAF/CAP/CLA/B42**
Date and Time of Sampling:	**04/07/2016**
Date of Receipt at Lab:	**05/07/2016**
Date of Start of Test:	**11/07/2016**
Sampling Location:	**B3 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**71**
Plastic Limit	**=**	**15**
Liquid Limit	**=**	**30**
Plasticity Index	**=**	**15**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 467793

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S58728 / 212503**
Client Ref. :	**Bulk 16**
Date and Time of Sampling:	**02/06/2016**
Date of Receipt at Lab:	**06/06/2016**
Date of Start of Test:	**14/06/2016**
Sampling Location:	**Trial Pad**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**62**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**33**
Plasticity Index	**=**	**17**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 467796

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S58728 / 212504**
Client Ref. :	**Bulk 17**
Date and Time of Sampling:	**02/06/2016**
Date of Receipt at Lab:	**06/06/2016**
Date of Start of Test:	**14/06/2016**
Sampling Location:	**Stockpile A**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**73**
Plastic Limit	**=**	**16**
Liquid Limit	**=**	**32**
Plasticity Index	**=**	**16**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 467800

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S58728 / 212505**
Client Ref. :	**Bulk 18**
Date and Time of Sampling:	**02/06/2016**
Date of Receipt at Lab:	**06/06/2016**
Date of Start of Test:	**14/06/2016**
Sampling Location:	**Stockpile B**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**80**
Plastic Limit	**=**	**17**
Liquid Limit	**=**	**35**
Plasticity Index	**=**	**18**

Comments

None

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Date: 03 August 2016
Test Report Ref: STR 468774

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212506**
Client Ref. :	**HAF/CAP/CLA/B19**
Date and Time of Sampling:	**07/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**20/06/2016**
Sampling Location:	**E5 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**67**
Plastic Limit	**=**	**17**
Liquid Limit	**=**	**35**
Plasticity Index	**=**	**18**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 468778

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212508**
Client Ref. :	**HAF/CAP/CLA/B20**
Date and Time of Sampling:	**08/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**20/06/2016**
Sampling Location:	**F5 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**61**
Plastic Limit	**=**	**17**
Liquid Limit	**=**	**35**
Plasticity Index	**=**	**18**

Comments
None

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ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 468781

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212509**
Client Ref. :	**HAF/CAP/CLA/B21**
Date and Time of Sampling:	**08/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**20/06/2016**
Sampling Location:	**E4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**67**
Plastic Limit	**=**	**17**
Liquid Limit	**=**	**32**
Plasticity Index	**=**	**15**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 468786

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212511**
Client Ref. :	**HAF/CAP/CLA/B22**
Date and Time of Sampling:	**09/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**20/06/2016**
Sampling Location:	**F4 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**66**
Plastic Limit	**=**	**18**
Liquid Limit	**=**	**35**
Plasticity Index	**=**	**17**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 468790

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212512**
Client Ref. :	**HAF/CAP/CLA/B23**
Date and Time of Sampling:	**09/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**20/06/2016**
Sampling Location:	**F6 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**66**
Plastic Limit	**=**	**17**
Liquid Limit	**=**	**34**
Plasticity Index	**=**	**17**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 469623

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58991 / 212513**
Client Ref. :	**HAF/CAP/CLA/B24**
Date and Time of Sampling:	**13/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**27/06/2016**
Sampling Location:	**D3 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**65**
Plastic Limit	**=**	**14**
Liquid Limit	**=**	**28**
Plasticity Index	**=**	**14**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 469626

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58991 / 212514**
Client Ref. :	**HAF/CAP/CLA/B25**
Date and Time of Sampling:	**13/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**27/06/2016**
Sampling Location:	**D3 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**62**
Plastic Limit	**=**	**14**
Liquid Limit	**=**	**29**
Plasticity Index	**=**	**15**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 469630

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with **BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58991 / 212516**
Client Ref. :	**HAF/CAP/CLA/B26**
Date and Time of Sampling:	**15/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**27/06/2016**
Sampling Location:	**C4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Soil Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

History of sample:	**:**	**After wet sieving**
% Materials passing 425µm	**=**	**72**
Plastic Limit	**=**	**17**
Liquid Limit	**=**	**35**
Plasticity Index	**=**	**18**

Comments
None

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Date: 03 August 2016
Test Report Ref: STR 470497

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212525**
Client Ref. No:	**HAF/CAP/CLA/B31**
Date and Time of Sampling:	**22/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**E5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

SEE ATTACHED

Comments
None

Certificate Prepared by:-
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Approved by: -
Eric Goulden
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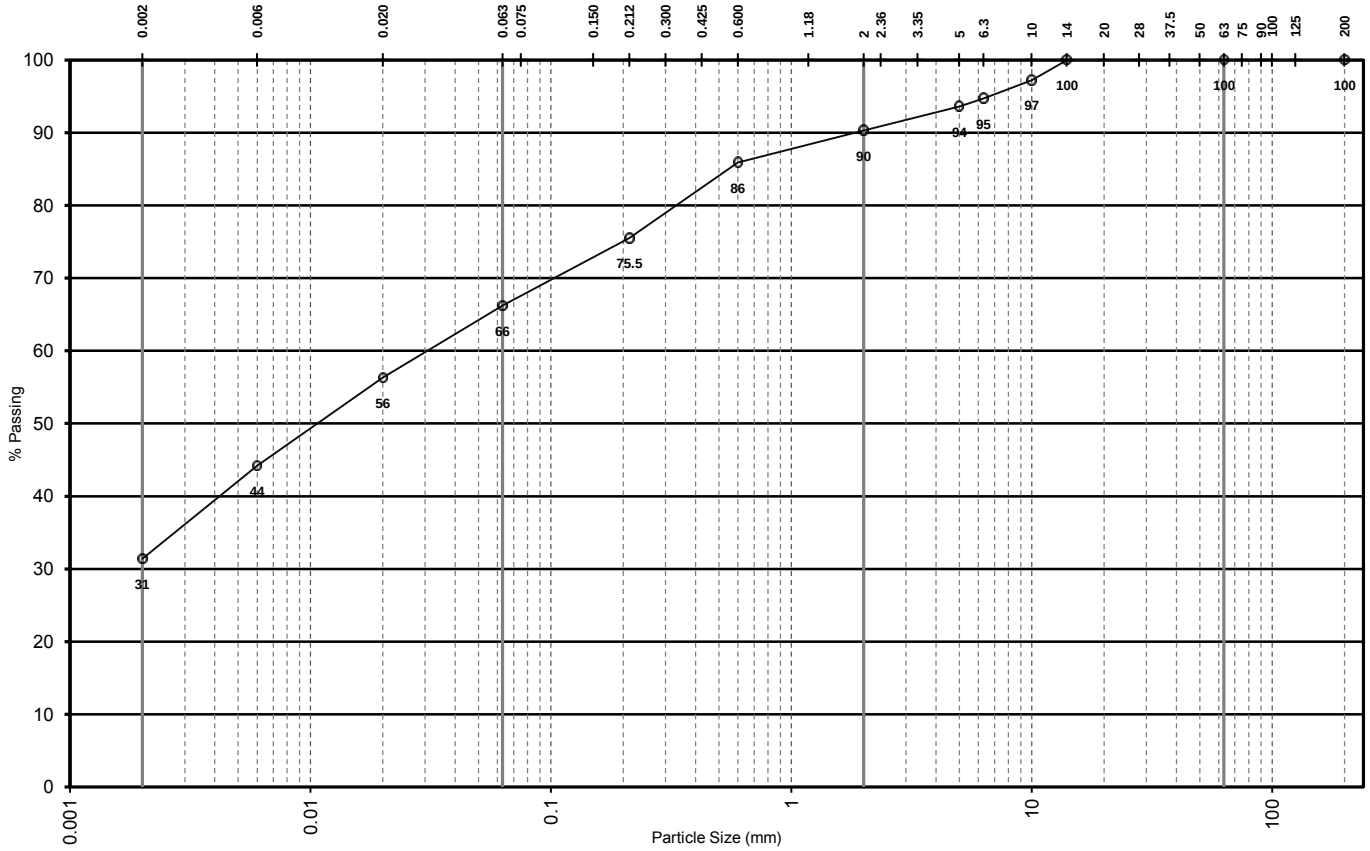
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	90.3
90		1.18	
75		0.600	85.9
63	100.0	0.425	
50		0.300	
37.5		0.212	75.5
28		0.150	
20		0.075	
14	100.0	0.063	66.2
10	97.2	0.020	56.3
6.3	94.7	0.006	44.2
5.0	93.6	0.002	31.4

Cobbles	0.0
Gravel	9.7
Sand	24.1
Silt	34.8
Clay	31.4



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

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Date: 03 August 2016
Test Report Ref: STR 470500

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212526**
Client Ref. No:	**HAF/CAP/CLA/B32**
Date and Time of Sampling:	**22/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**F5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

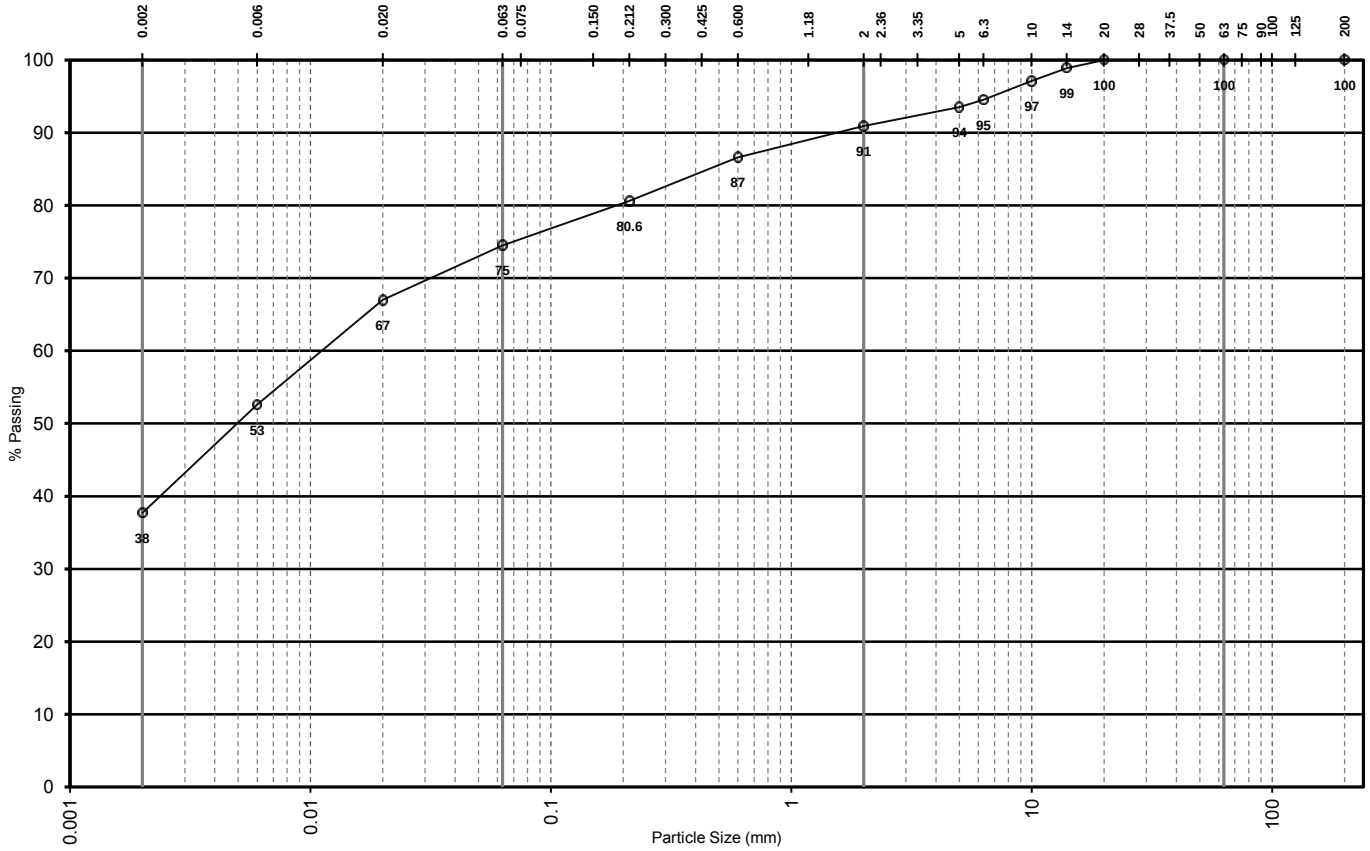
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	90.9
90		1.18	
75		0.600	86.6
63	100.0	0.425	
50		0.300	
37.5		0.212	80.6
28		0.150	
20	100.0	0.075	
14	98.9	0.063	74.5
10	97.1	0.020	67.0
6.3	94.5	0.006	52.6
5.0	93.5	0.002	37.7

Cobbles	0.0
Gravel	9.1
Sand	16.4
Silt	36.8
Clay	37.7



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

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Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470503

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212527**
Client Ref. No:	**HAF/CAP/CLA/B33**
Date and Time of Sampling:	**23/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**B4 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

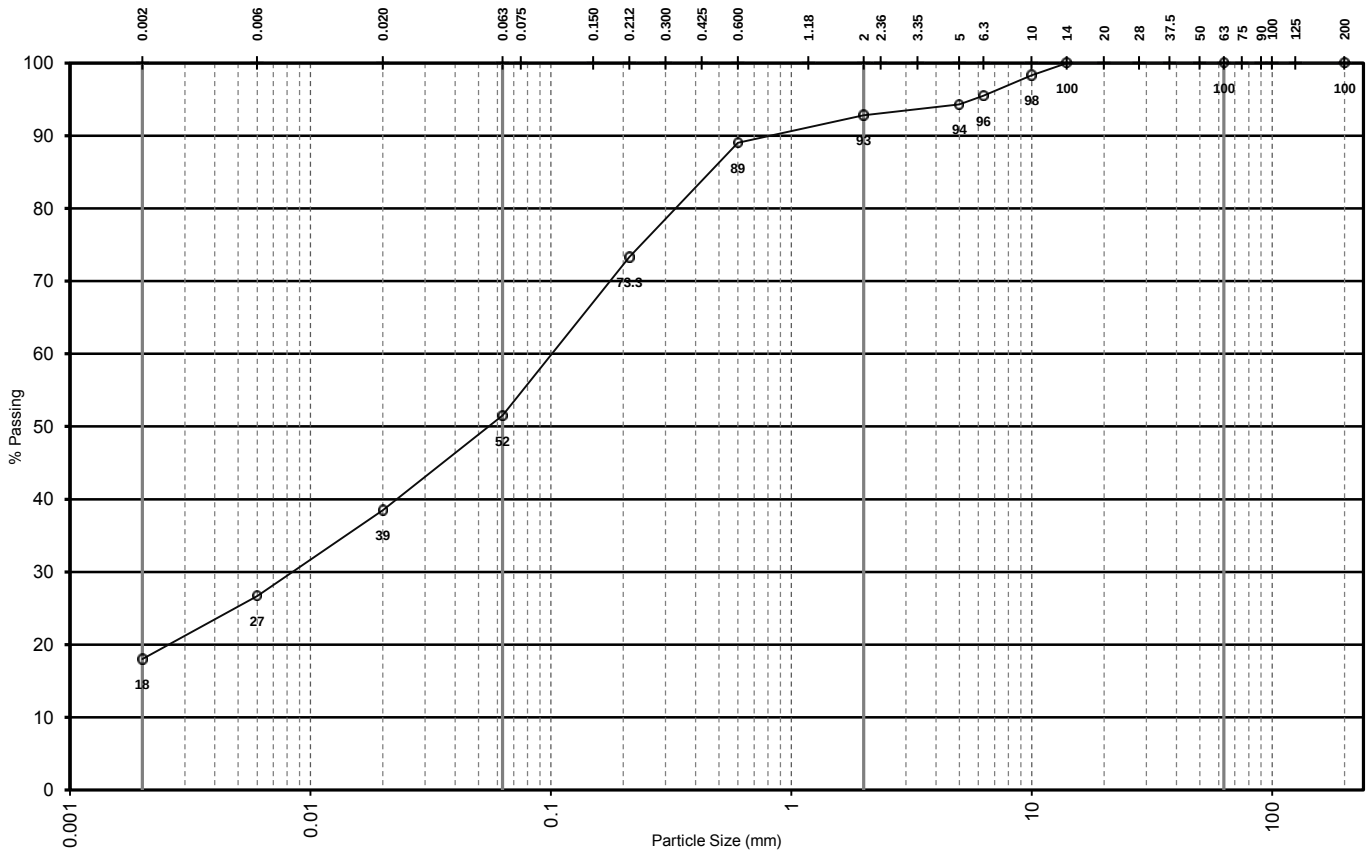
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	92.8
90		1.18	
75		0.600	89.0
63	100.0	0.425	
50		0.300	
37.5		0.212	73.3
28		0.150	
20		0.075	
14	100.0	0.063	51.5
10	98.3	0.020	38.5
6.3	95.5	0.006	26.7
5.0	94.3	0.002	18.0

Cobbles	0.0
Gravel	7.2
Sand	41.3
Silt	33.5
Clay	18.0



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470506

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212528**
Client Ref. No:	**HAF/CAP/CLA/B34**
Date and Time of Sampling:	**24/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**C4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

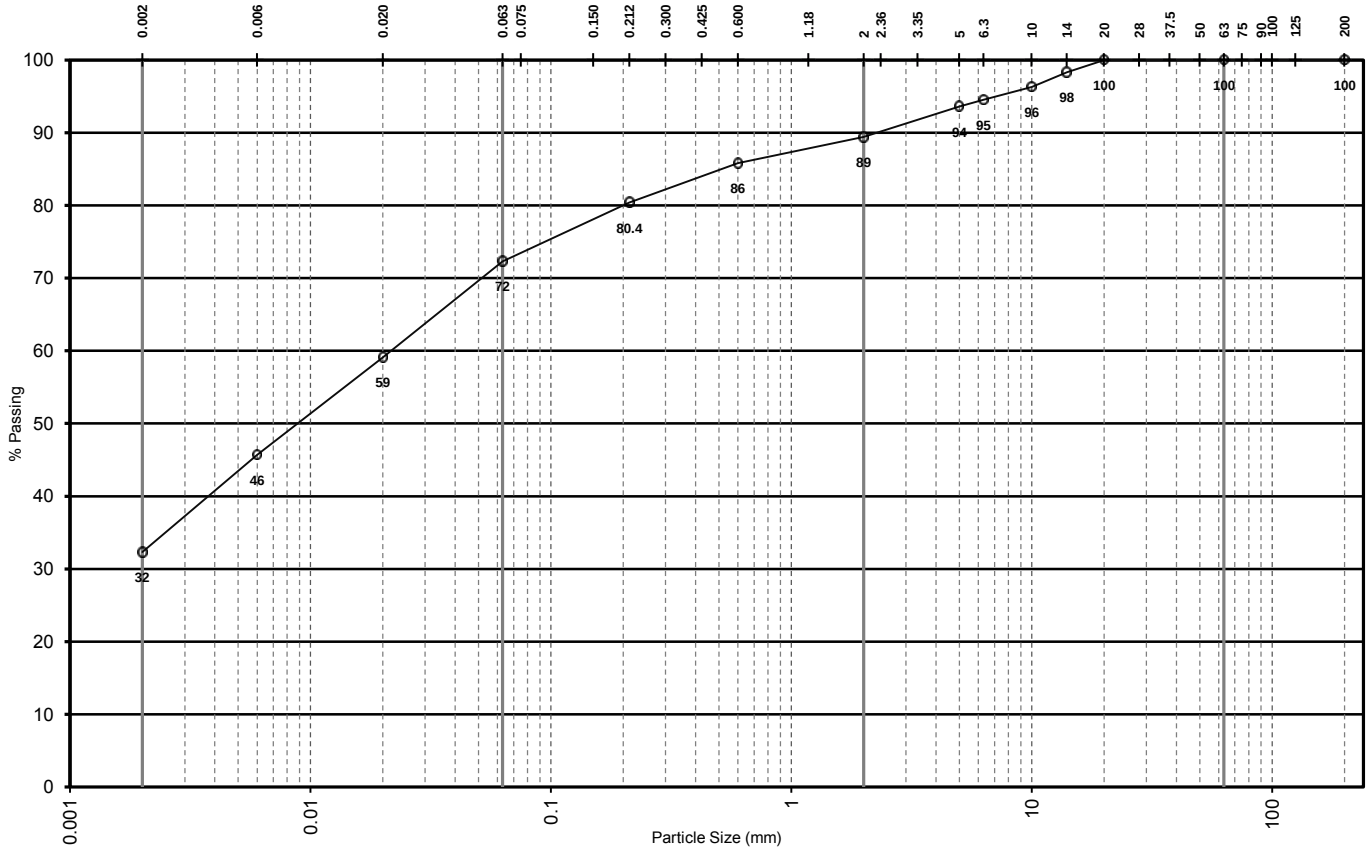
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	89.4
90		1.18	
75		0.600	85.8
63	100.0	0.425	
50		0.300	
37.5		0.212	80.4
28		0.150	
20	100.0	0.075	
14	98.3	0.063	72.3
10	96.3	0.020	59.1
6.3	94.5	0.006	45.7
5.0	93.6	0.002	32.3

Cobbles	0.0
Gravel	10.6
Sand	17.1
Silt	40.0
Clay	32.3



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471521

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212530**
Client Ref. No:	**HAF/CAP/CLA/B35**
Date and Time of Sampling:	**27/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**19/07/2016**
Sampling Location:	**A3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

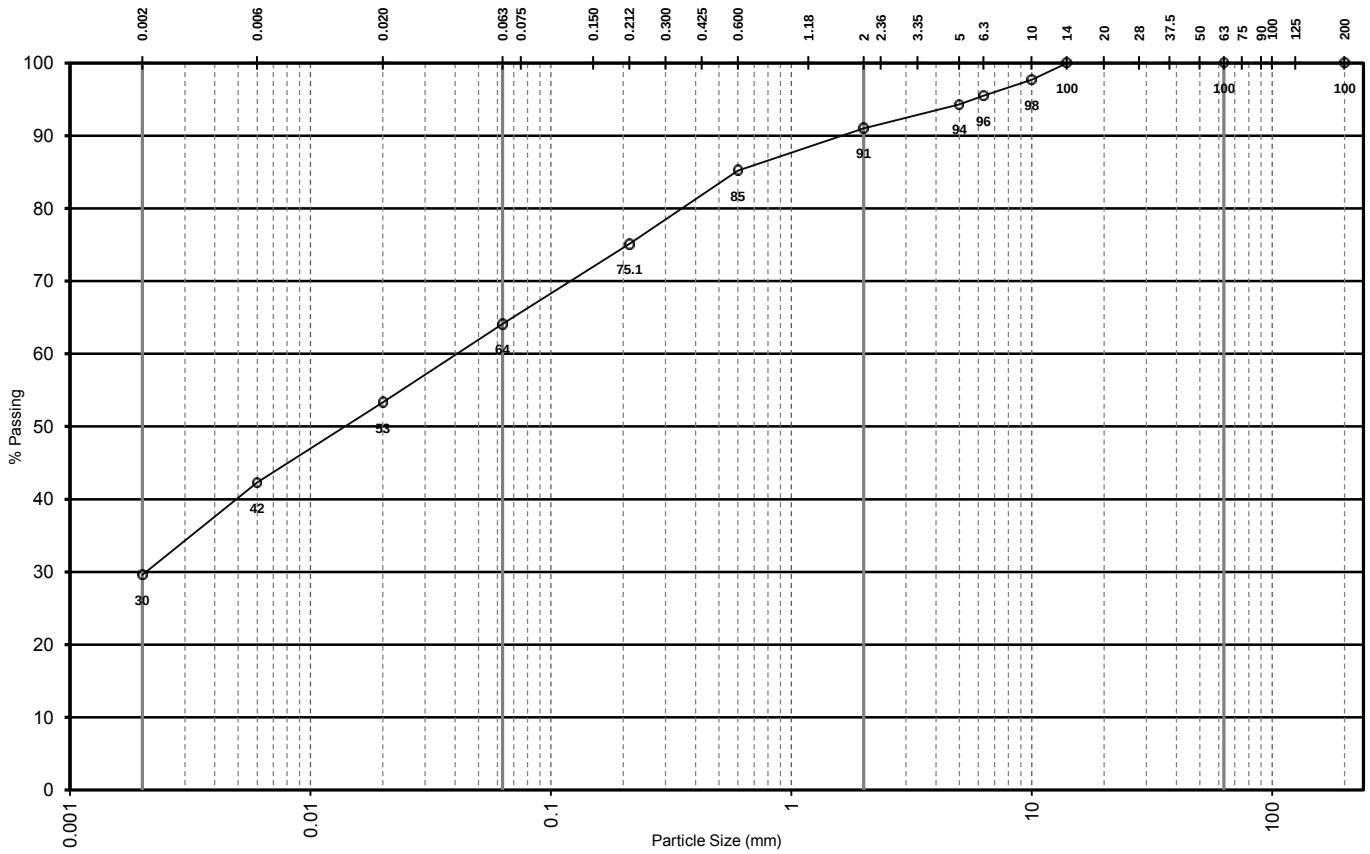
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	91.0
90		1.18	
75		0.600	85.2
63	100.0	0.425	
50		0.300	
37.5		0.212	75.1
28		0.150	
20		0.075	
14	100.0	0.063	64.1
10	97.7	0.020	53.3
6.3	95.5	0.006	42.3
5.0	94.3	0.002	29.6

Cobbles	0.0
Gravel	9.0
Sand	26.9
Silt	34.5
Clay	29.6



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0 6.3		20	63 200
	SILT			0.2 SAND			GRAVEL			

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Three Mile Lane
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Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471528

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212533**
Client Ref. No:	**HAF/CAP/CLA/B37**
Date and Time of Sampling:	**28/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**19/07/2016**
Sampling Location:	**C5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

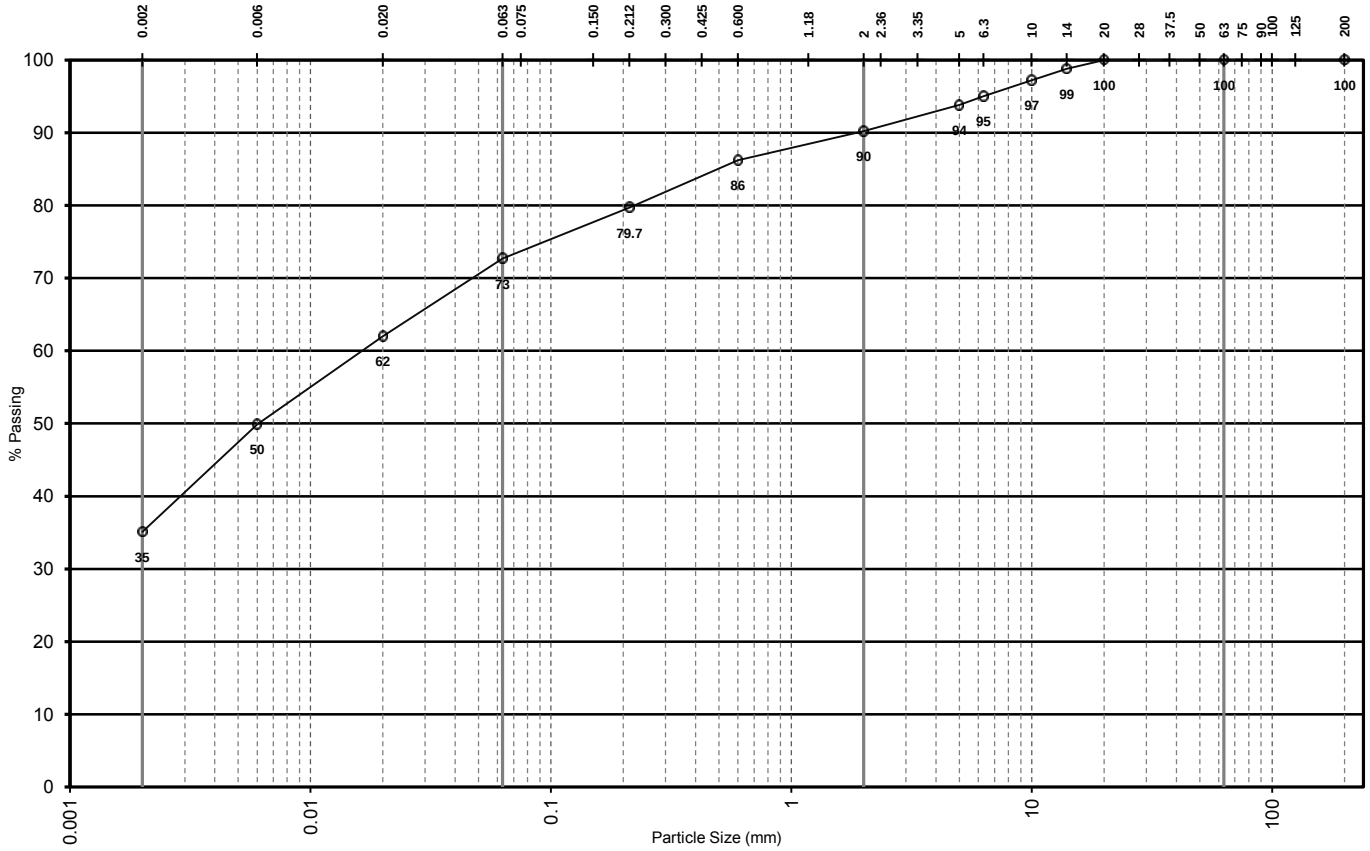
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	90.2
90		1.18	
75		0.600	86.2
63	100.0	0.425	
50		0.300	
37.5		0.212	79.7
28		0.150	
20	100.0	0.075	
14	98.8	0.063	72.7
10	97.2	0.020	62.0
6.3	95.0	0.006	49.9
5.0	93.8	0.002	35.1

Cobbles	0.0
Gravel	9.8
Sand	17.5
Silt	37.6
Clay	35.1



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

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Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471533

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212535**
Client Ref. No:	**HAF/CAP/CLA/B38**
Date and Time of Sampling:	**30/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**19/07/2016**
Sampling Location:	**A1 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

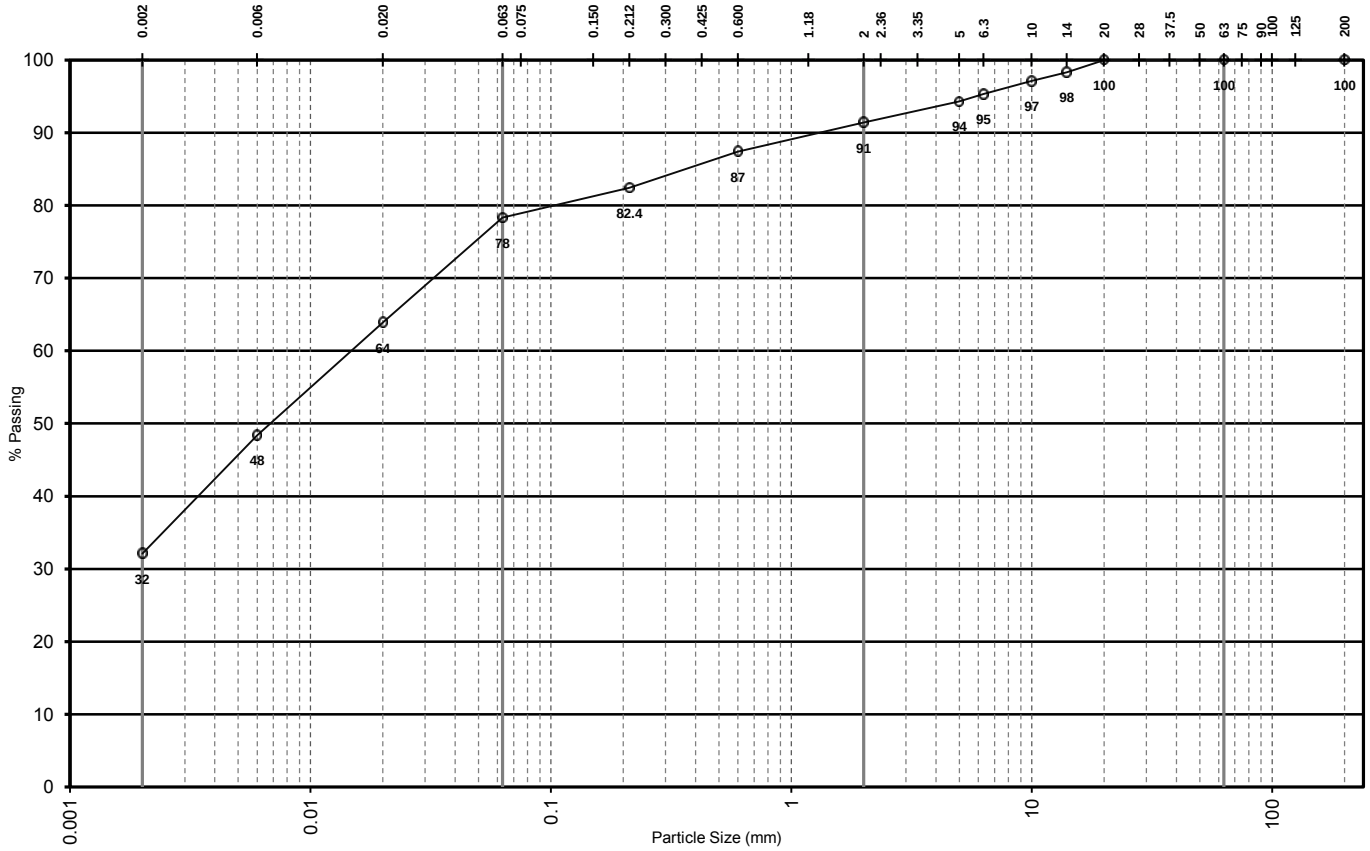
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	91.4
90		1.18	
75		0.600	87.4
63	100.0	0.425	
50		0.300	
37.5		0.212	82.4
28		0.150	
20	100.0	0.075	
14	98.3	0.063	78.3
10	97.1	0.020	63.9
6.3	95.3	0.006	48.4
5.0	94.3	0.002	32.1

Cobbles	0.0
Gravel	8.6
Sand	13.1
Silt	46.2
Clay	32.1



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471537

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212537**
Client Ref. No:	**HAF/CAP/CLA/B39**
Date and Time of Sampling:	**01/07/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**19/07/2016**
Sampling Location:	**A2 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

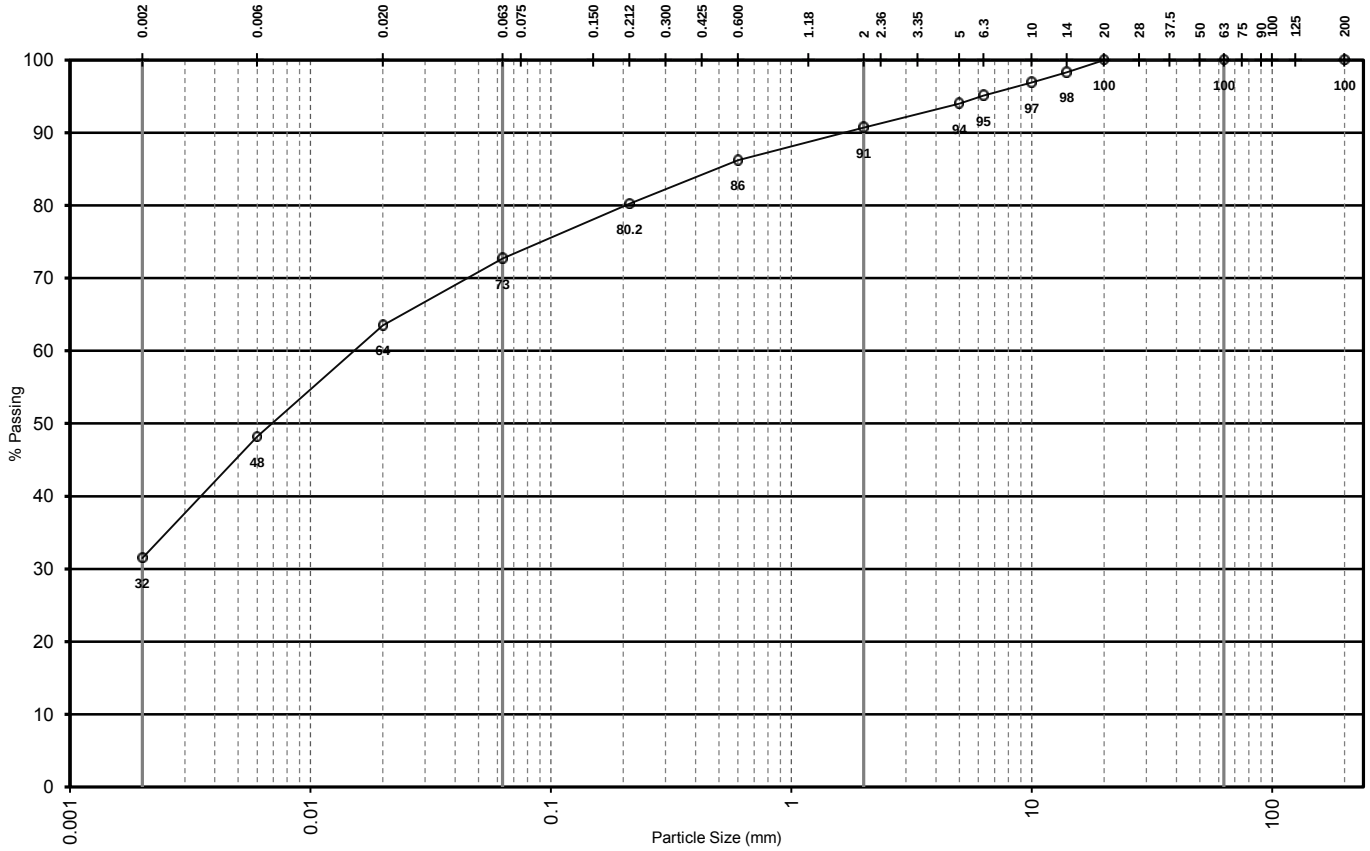
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	90.7
90		1.18	
75		0.600	86.2
63	100.0	0.425	
50		0.300	
37.5		0.212	80.2
28		0.150	
20	100.0	0.075	
14	98.3	0.063	72.7
10	96.9	0.020	63.5
6.3	95.1	0.006	48.2
5.0	94.0	0.002	31.5

Cobbles	0.0
Gravel	9.3
Sand	18.0
Silt	41.2
Clay	31.5



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471542

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212539**
Client Ref. No:	**HAF/CAP/CLA/B40**
Date and Time of Sampling:	**01/07/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**19/07/2016**
Sampling Location:	**A3 Layer 6**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

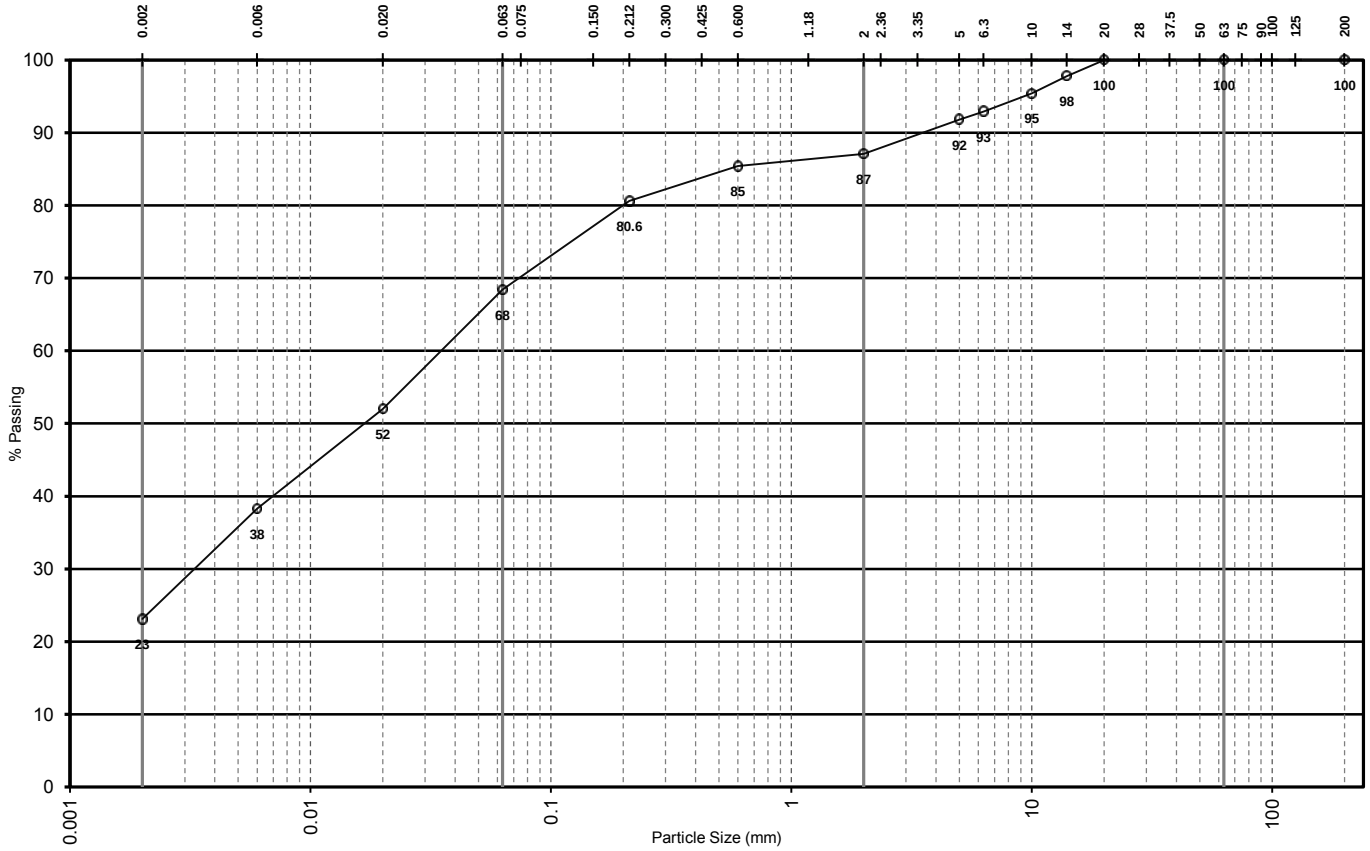
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	87.1
90		1.18	
75		0.600	85.4
63	100.0	0.425	
50		0.300	
37.5		0.212	80.6
28		0.150	
20	100.0	0.075	
14	97.8	0.063	68.4
10	95.4	0.020	52.0
6.3	92.9	0.006	38.3
5.0	91.8	0.002	23.1

Cobbles	0.0
Gravel	12.9
Sand	18.7
Silt	45.3
Clay	23.1



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471561

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59205 / 212540**
Client Ref. No:	**HAF/CAP/CLA/B41**
Date and Time of Sampling:	**04/07/2016**
Date of Receipt at Lab:	**05/07/2016**
Date of Start of Test:	**15/07/2016**
Sampling Location:	**B2 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

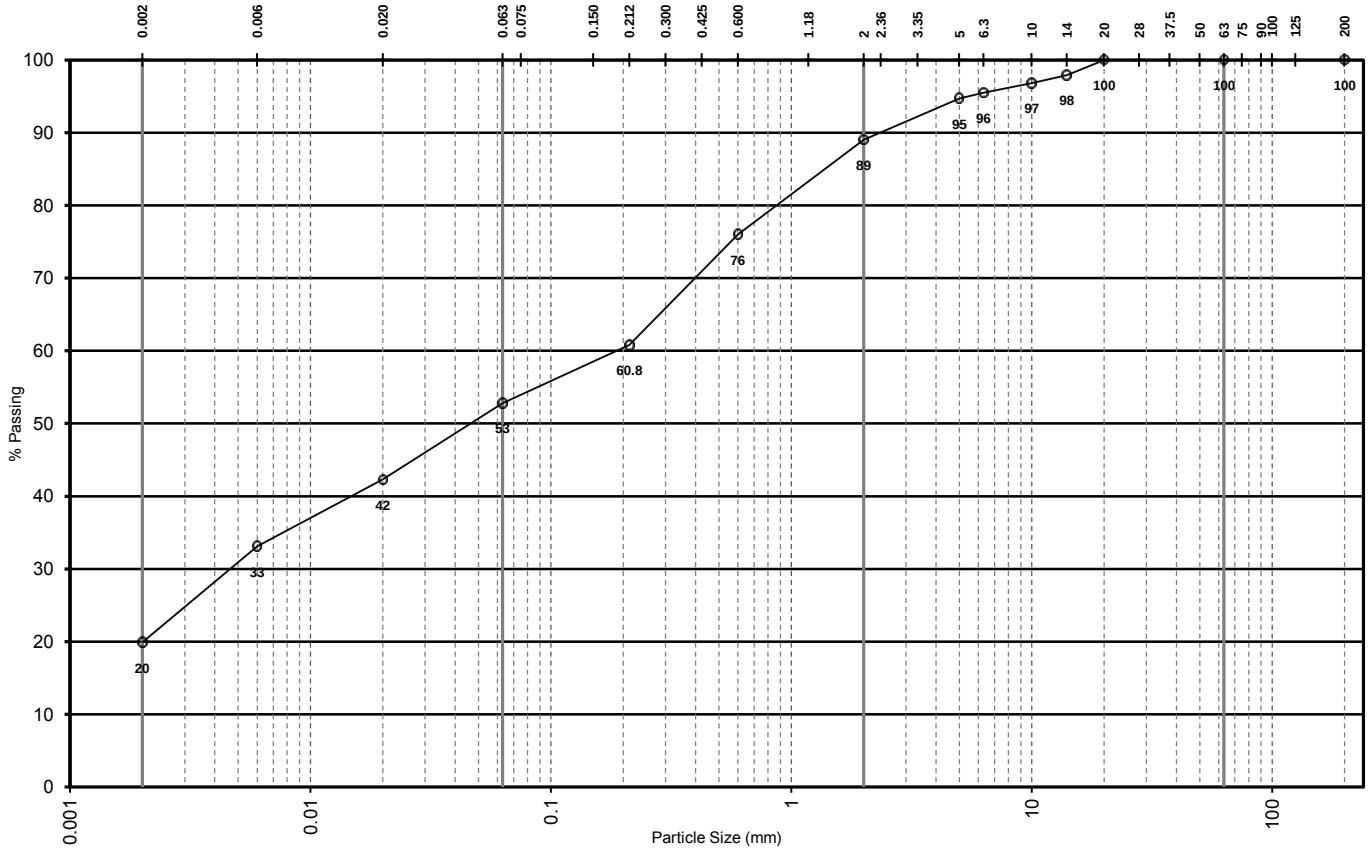
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	89.0
90		1.18	
75		0.600	76.0
63	100.0	0.425	
50		0.300	
37.5		0.212	60.8
28		0.150	
20	100.0	0.075	
14	97.9	0.063	52.8
10	96.8	0.020	42.3
6.3	95.5	0.006	33.1
5.0	94.7	0.002	19.9

Cobbles	0.0
Gravel	11.0
Sand	36.2
Silt	32.9
Clay	19.9



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471564

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59205 / 212541**
Client Ref. No:	**HAF/CAP/CLA/B42**
Date and Time of Sampling:	**04/07/2016**
Date of Receipt at Lab:	**05/07/2016**
Date of Start of Test:	**15/07/2016**
Sampling Location:	**B3 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

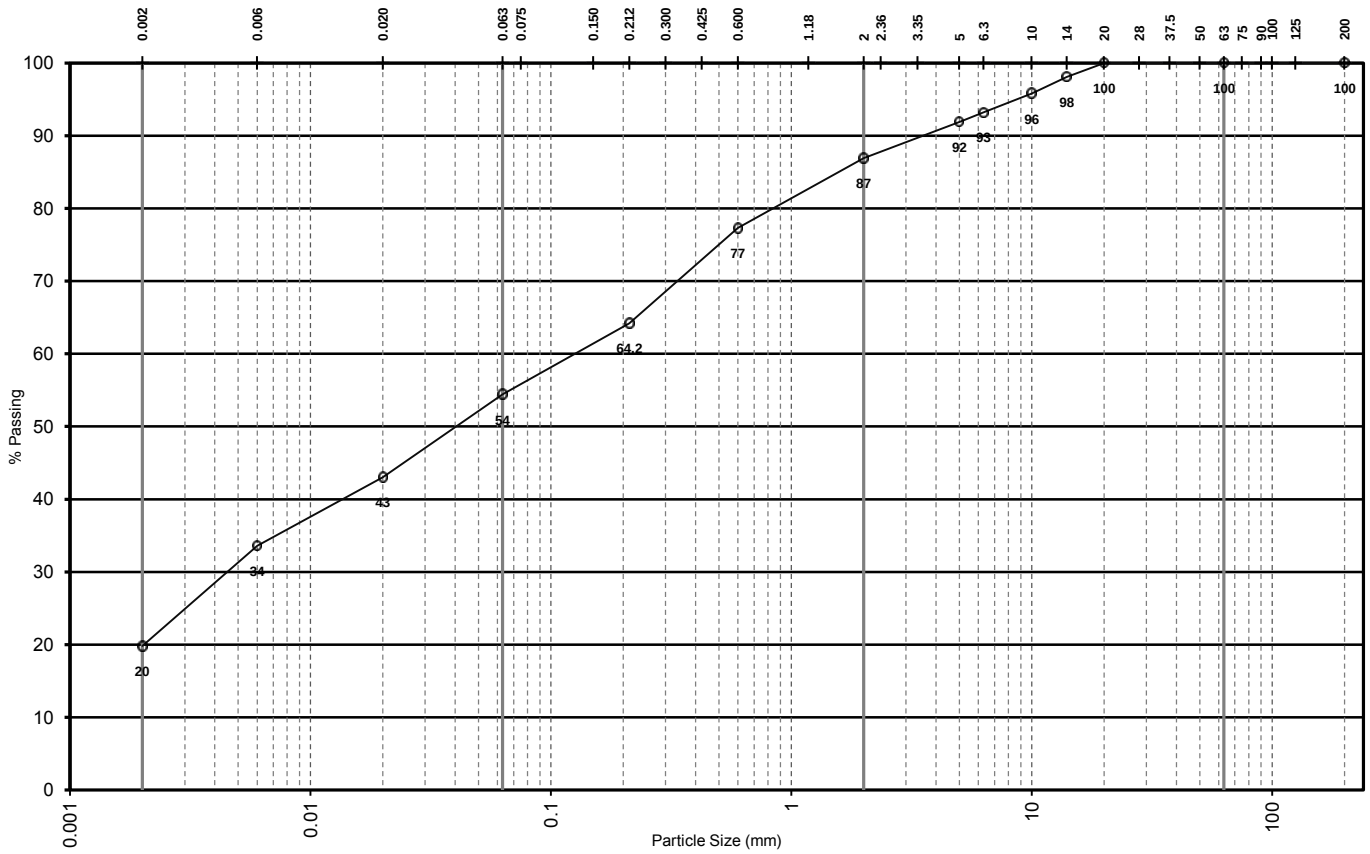
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	86.9
90		1.18	
75		0.600	77.3
63	100.0	0.425	
50		0.300	
37.5		0.212	64.2
28		0.150	
20	100.0	0.075	
14	98.1	0.063	54.4
10	95.8	0.020	43.0
6.3	93.2	0.006	33.6
5.0	91.9	0.002	19.8

Cobbles	0.0
Gravel	13.1
Sand	32.5
Silt	34.6
Clay	19.8



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
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Three Mile Lane
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Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 467795

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S58728 / 212503**
Client Ref. No:	**Bulk 16**
Date and Time of Sampling:	**02/06/2016**
Date of Receipt at Lab:	**06/06/2016**
Date of Start of Test:	**15/06/2016**
Sampling Location:	**Trial Pad**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

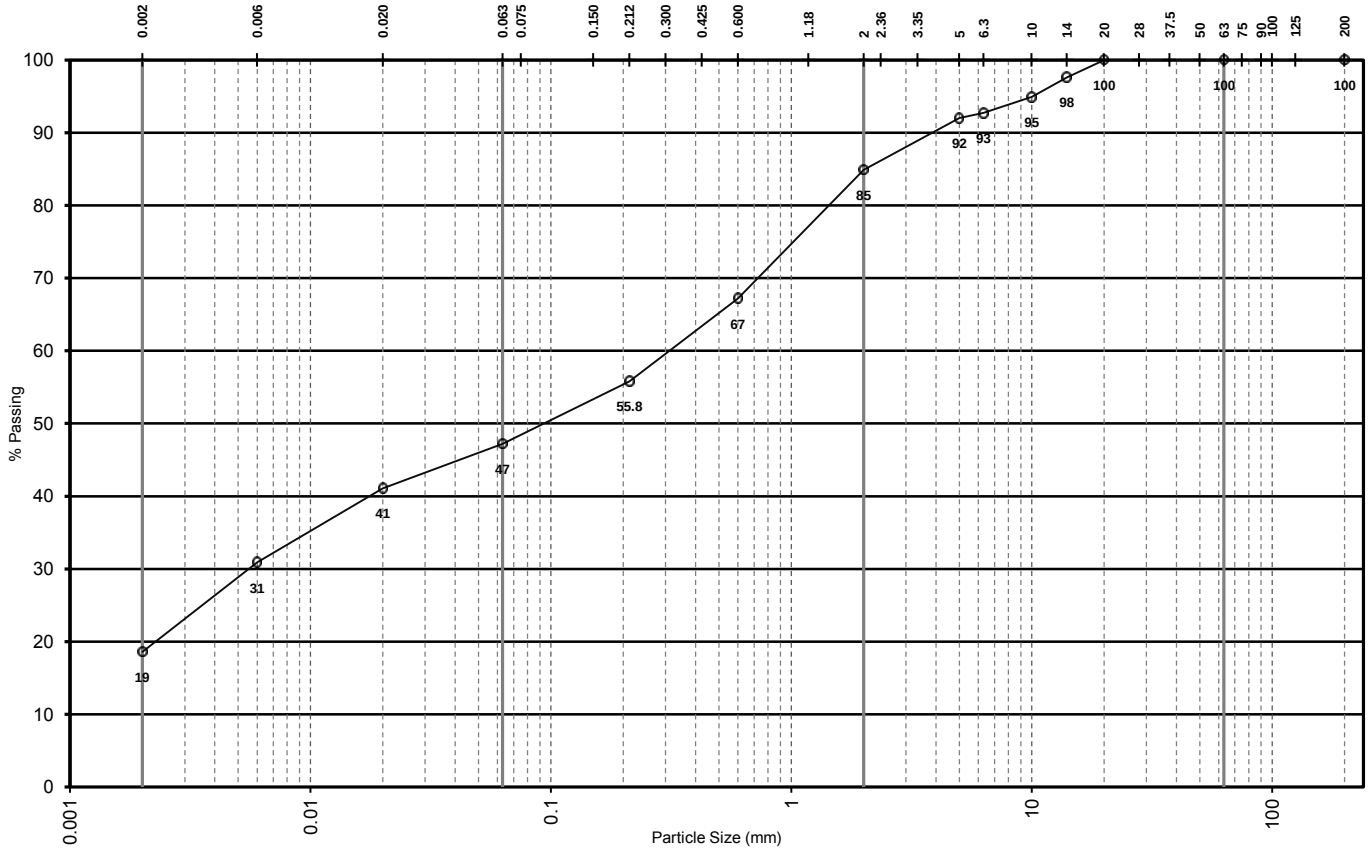
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	84.9
90		1.18	
75		0.600	67.2
63	100.0	0.425	
50		0.300	
37.5		0.212	55.8
28		0.150	
20	100.0	0.075	
14	97.6	0.063	47.2
10	94.9	0.020	41.1
6.3	92.7	0.006	30.9
5.0	92.0	0.002	18.6

Cobbles	0.0
Gravel	15.1
Sand	37.7
Silt	28.6
Clay	18.6



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
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Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 467798

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S58728 / 212504**
Client Ref. No:	**Bulk 17**
Date and Time of Sampling:	**02/06/2016**
Date of Receipt at Lab:	**06/06/2016**
Date of Start of Test:	**15/06/2016**
Sampling Location:	**Stockpile A**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

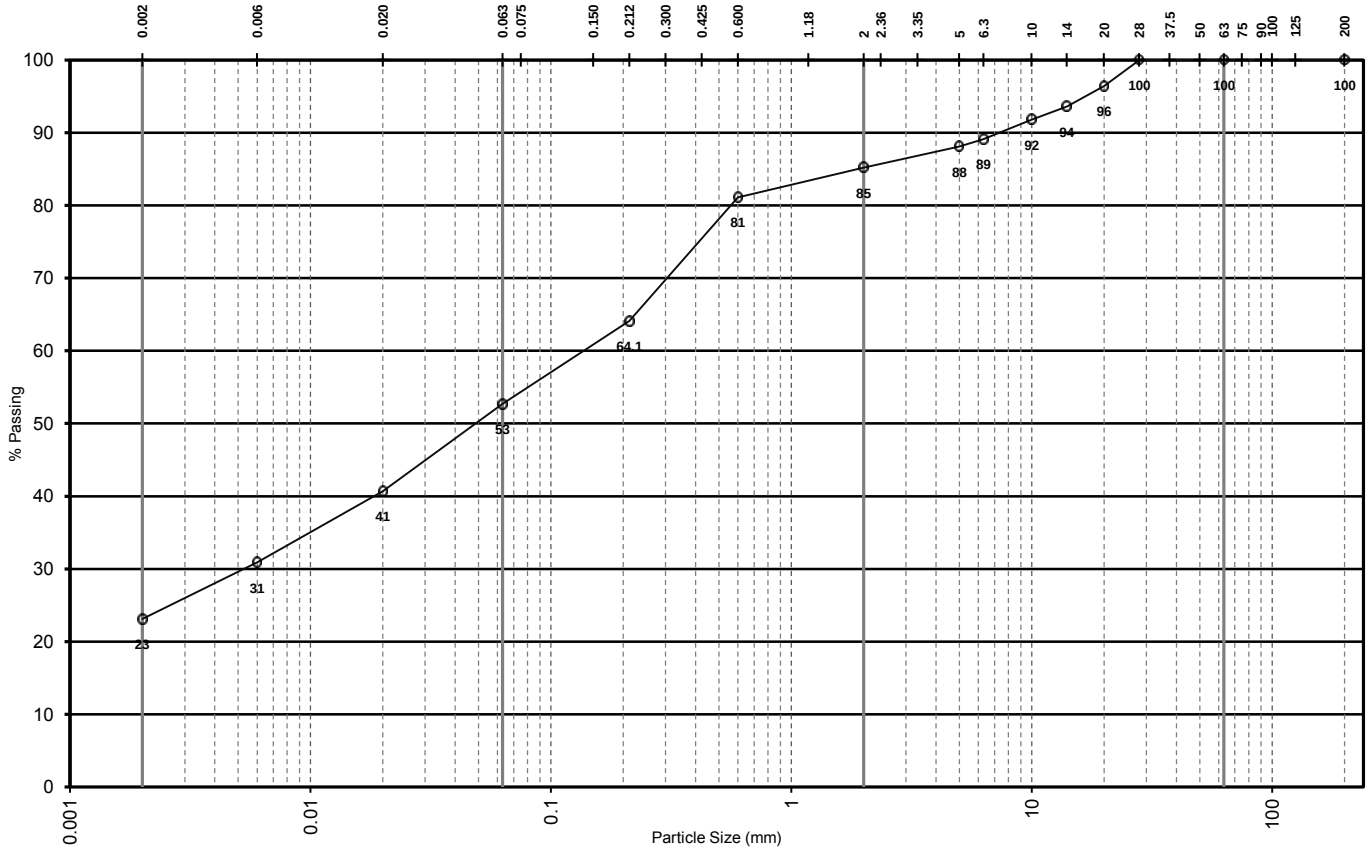
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	85.2
90		1.18	
75		0.600	81.1
63	100.0	0.425	
50		0.300	
37.5		0.212	64.1
28	100.0	0.150	
20	96.4	0.075	
14	93.6	0.063	52.7
10	91.8	0.020	40.7
6.3	89.1	0.006	30.9
5.0	88.1	0.002	23.1

Cobbles	0.0
Gravel	14.8
Sand	32.5
Silt	29.6
Clay	23.1



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 467802

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S58728 / 212505**
Client Ref. No:	**Bulk 18**
Date and Time of Sampling:	**02/06/2016**
Date of Receipt at Lab:	**06/06/2016**
Date of Start of Test:	**15/06/2016**
Sampling Location:	**Stockpile B**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

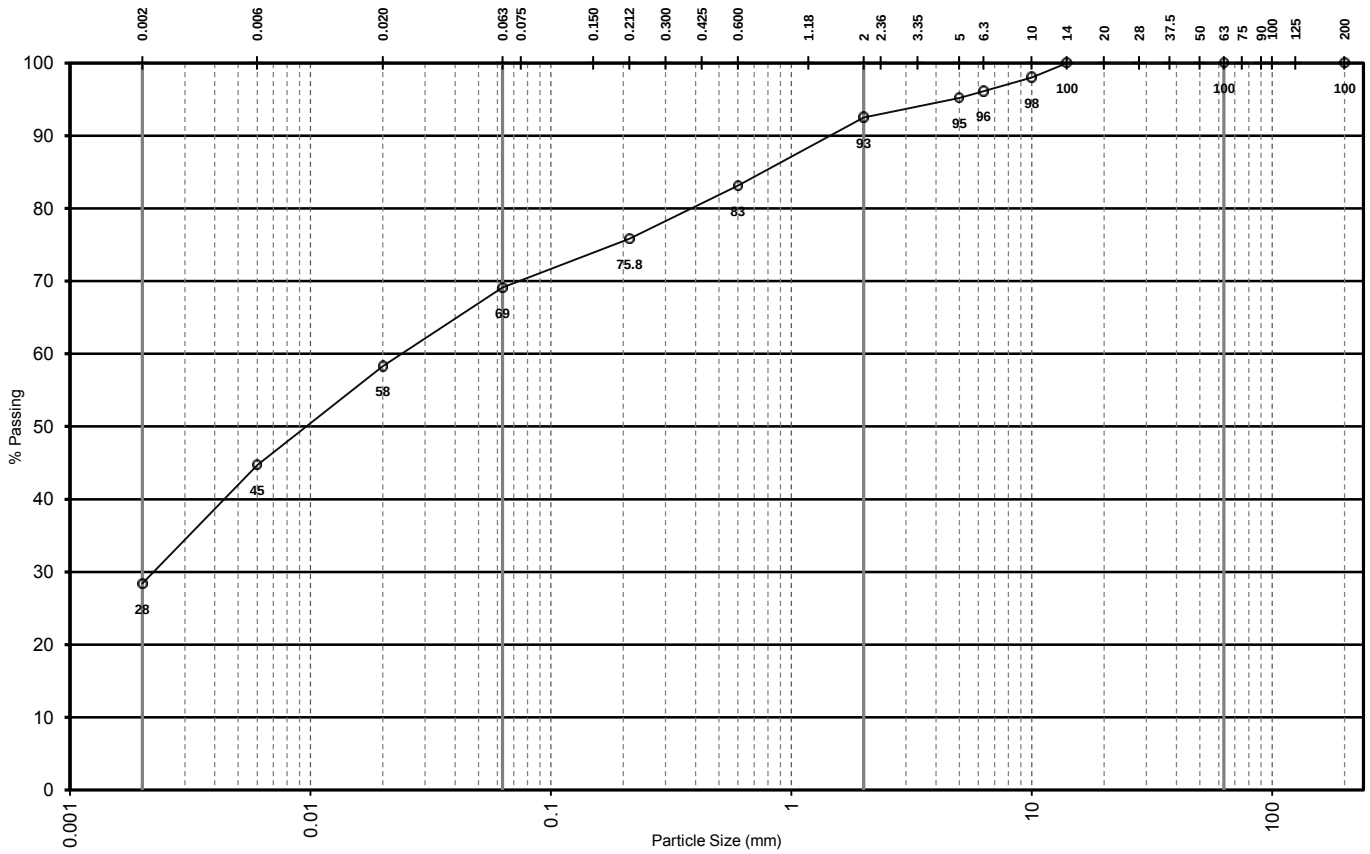
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	92.5
90		1.18	
75		0.600	83.1
63	100.0	0.425	
50		0.300	
37.5		0.212	75.8
28		0.150	
20		0.075	
14	100.0	0.063	69.1
10	98.0	0.020	58.3
6.3	96.1	0.006	44.7
5.0	95.2	0.002	28.4

Cobbles	0.0
Gravel	7.5
Sand	23.4
Silt	40.7
Clay	28.4



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
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Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 468776

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212506**
Client Ref. No:	**HAF/CAP/CLA/B19**
Date and Time of Sampling:	**07/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**22/06/2016**
Sampling Location:	**E5 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

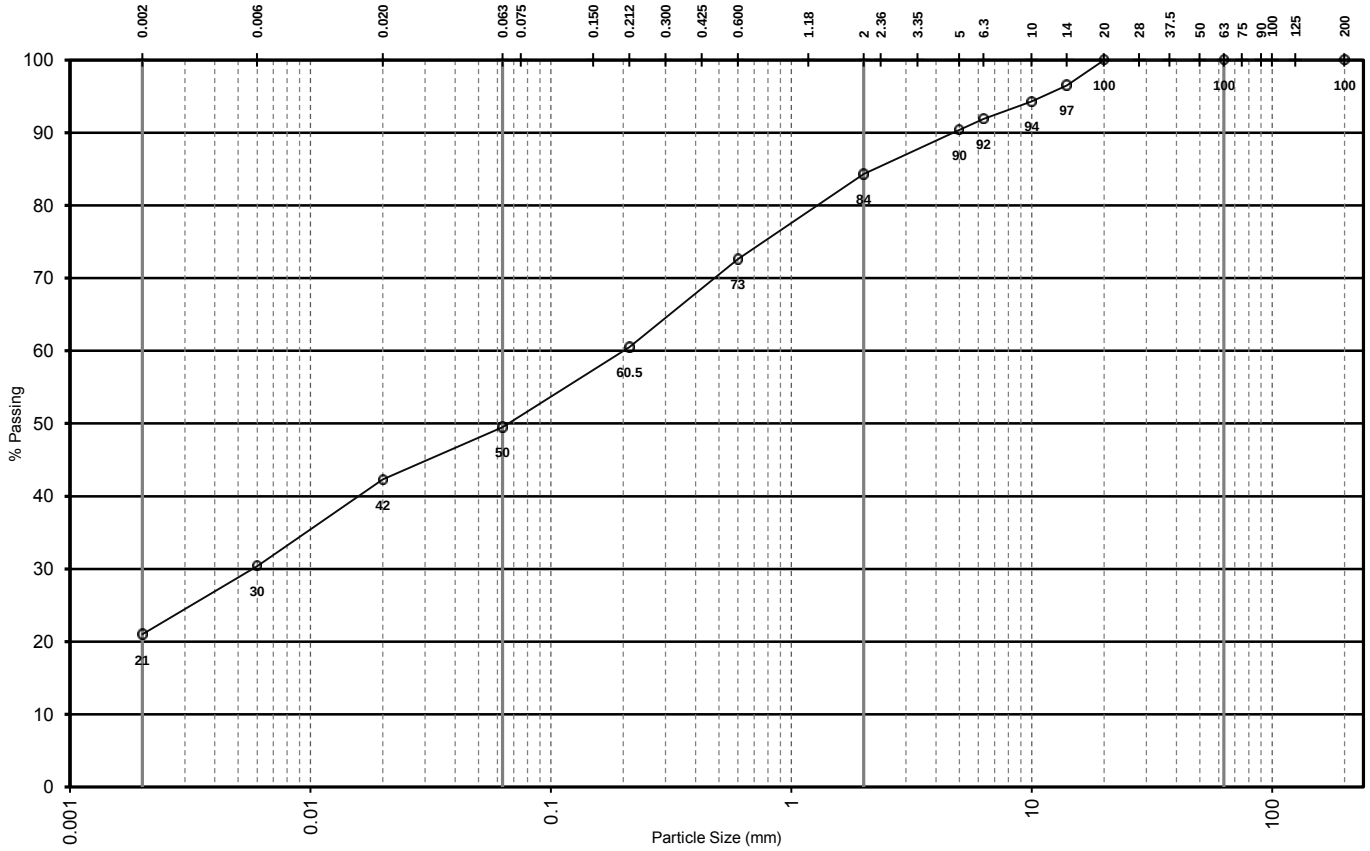
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	84.3
90		1.18	
75		0.600	72.6
63	100.0	0.425	
50		0.300	
37.5		0.212	60.5
28		0.150	
20	100.0	0.075	
14	96.5	0.063	49.5
10	94.3	0.020	42.3
6.3	91.9	0.006	30.4
5.0	90.4	0.002	21.0

Cobbles	0.0
Gravel	15.7
Sand	34.8
Silt	28.5
Clay	21.0



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
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Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 468780

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212508**
Client Ref. No:	**HAF/CAP/CLA/B20**
Date and Time of Sampling:	**08/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**22/06/2016**
Sampling Location:	**F5 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

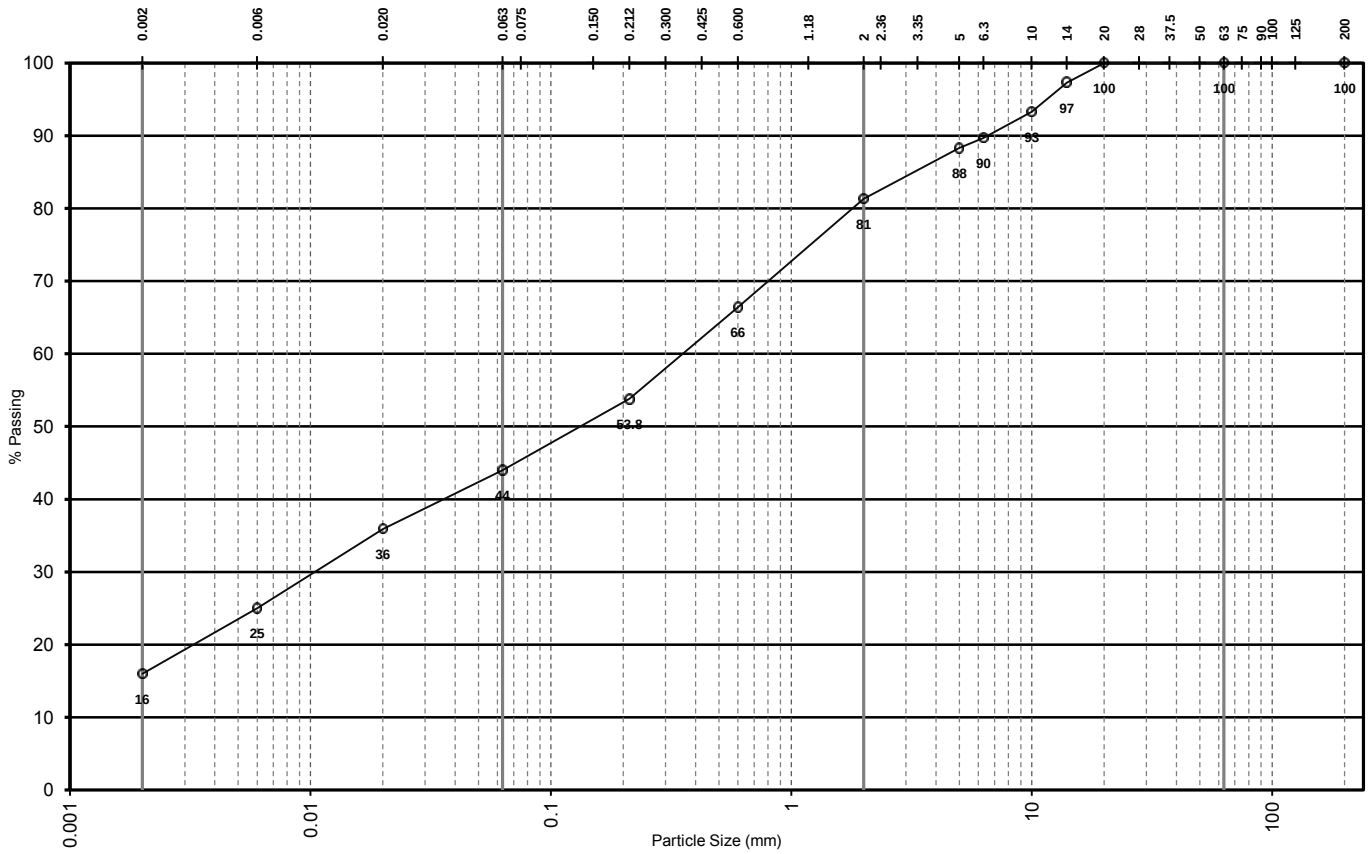
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	81.3
90		1.18	
75		0.600	66.4
63	100.0	0.425	
50		0.300	
37.5		0.212	53.8
28		0.150	
20	100.0	0.075	
14	97.3	0.063	44.0
10	93.3	0.020	35.9
6.3	89.7	0.006	25.0
5.0	88.3	0.002	16.0

Cobbles	0.0
Gravel	18.7
Sand	37.3
Silt	28.0
Clay	16.0



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
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Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 468783

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212509**
Client Ref. No:	**HAF/CAP/CLA/B21**
Date and Time of Sampling:	**08/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**22/06/2016**
Sampling Location:	**E4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

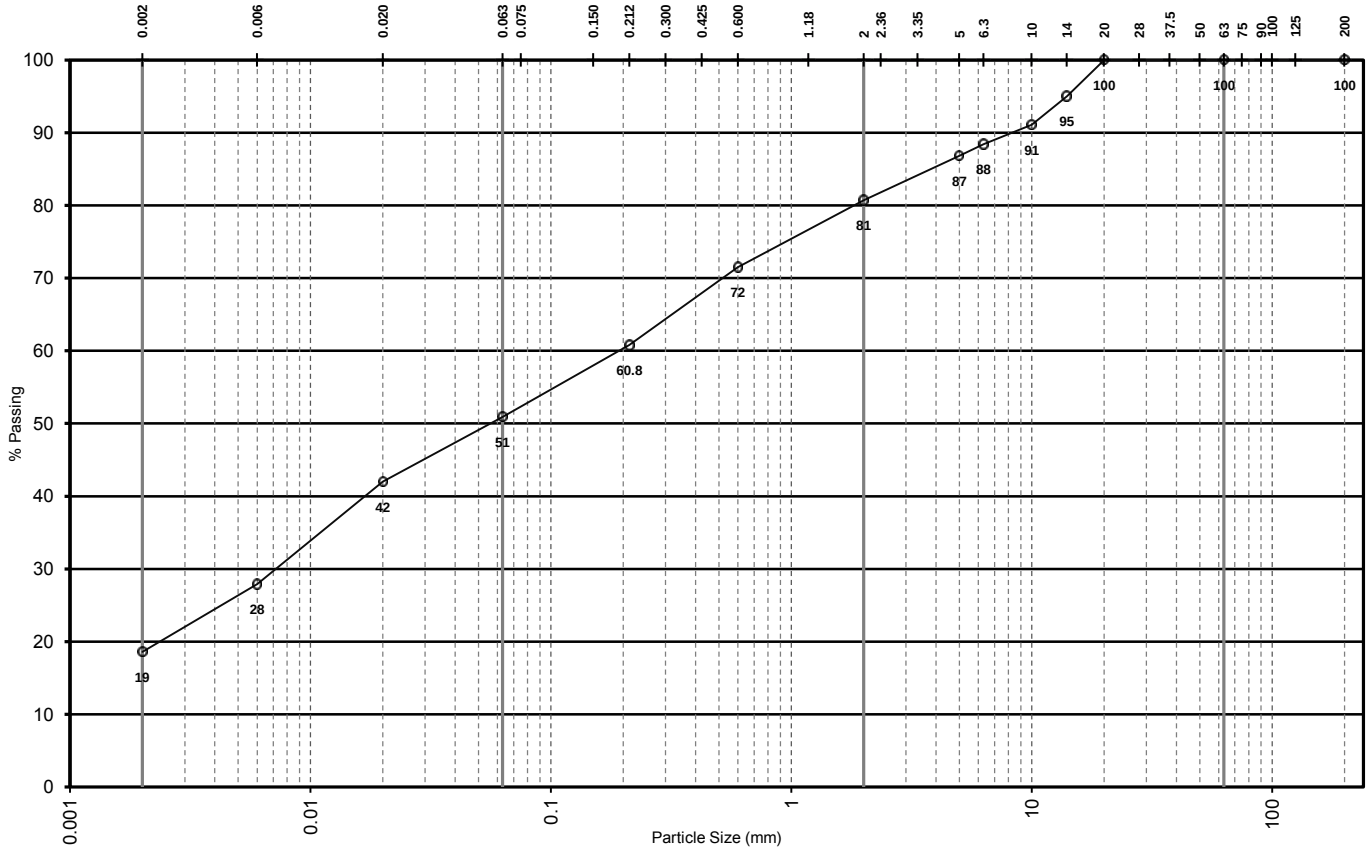
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	80.7
90		1.18	
75		0.600	71.5
63	100.0	0.425	
50		0.300	
37.5		0.212	60.8
28		0.150	
20	100.0	0.075	
14	95.0	0.063	50.9
10	91.1	0.020	42.0
6.3	88.4	0.006	27.9
5.0	86.8	0.002	18.6

Cobbles	0.0
Gravel	19.3
Sand	29.8
Silt	32.3
Clay	18.6



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0 6.3		20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 468789

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212511**
Client Ref. No:	**HAF/CAP/CLA/B22**
Date and Time of Sampling:	**09/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**22/06/2016**
Sampling Location:	**F4 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

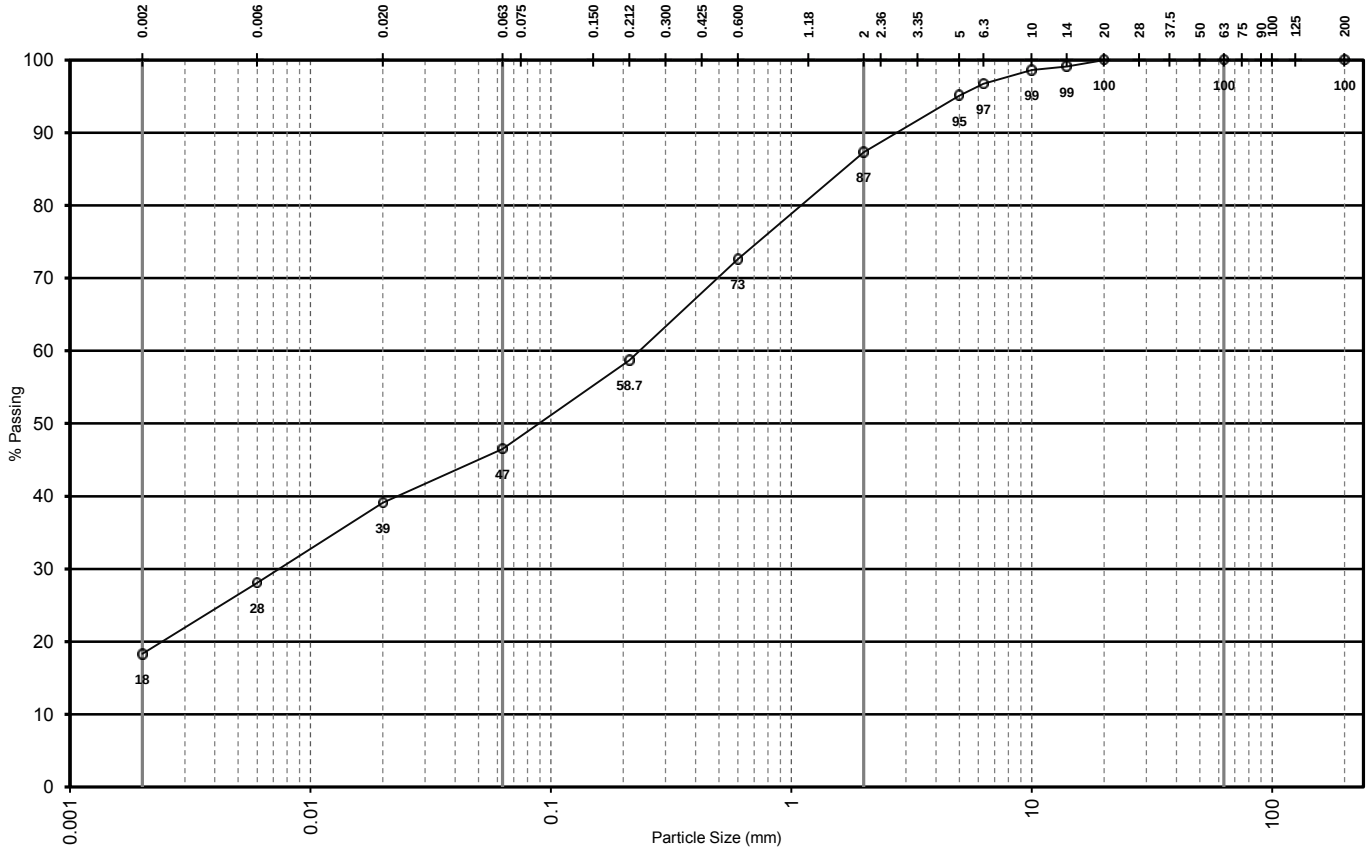
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	87.3
90		1.18	
75		0.600	72.6
63	100.0	0.425	
50		0.300	
37.5		0.212	58.7
28		0.150	
20	100.0	0.075	
14	99.1	0.063	46.5
10	98.6	0.020	39.1
6.3	96.7	0.006	28.1
5.0	95.1	0.002	18.3

Cobbles	0.0
Gravel	12.7
Sand	40.8
Silt	28.2
Clay	18.3



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 468792

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212512**
Client Ref. No:	**HAF/CAP/CLA/B23**
Date and Time of Sampling:	**09/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**22/06/2016**
Sampling Location:	**F6 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

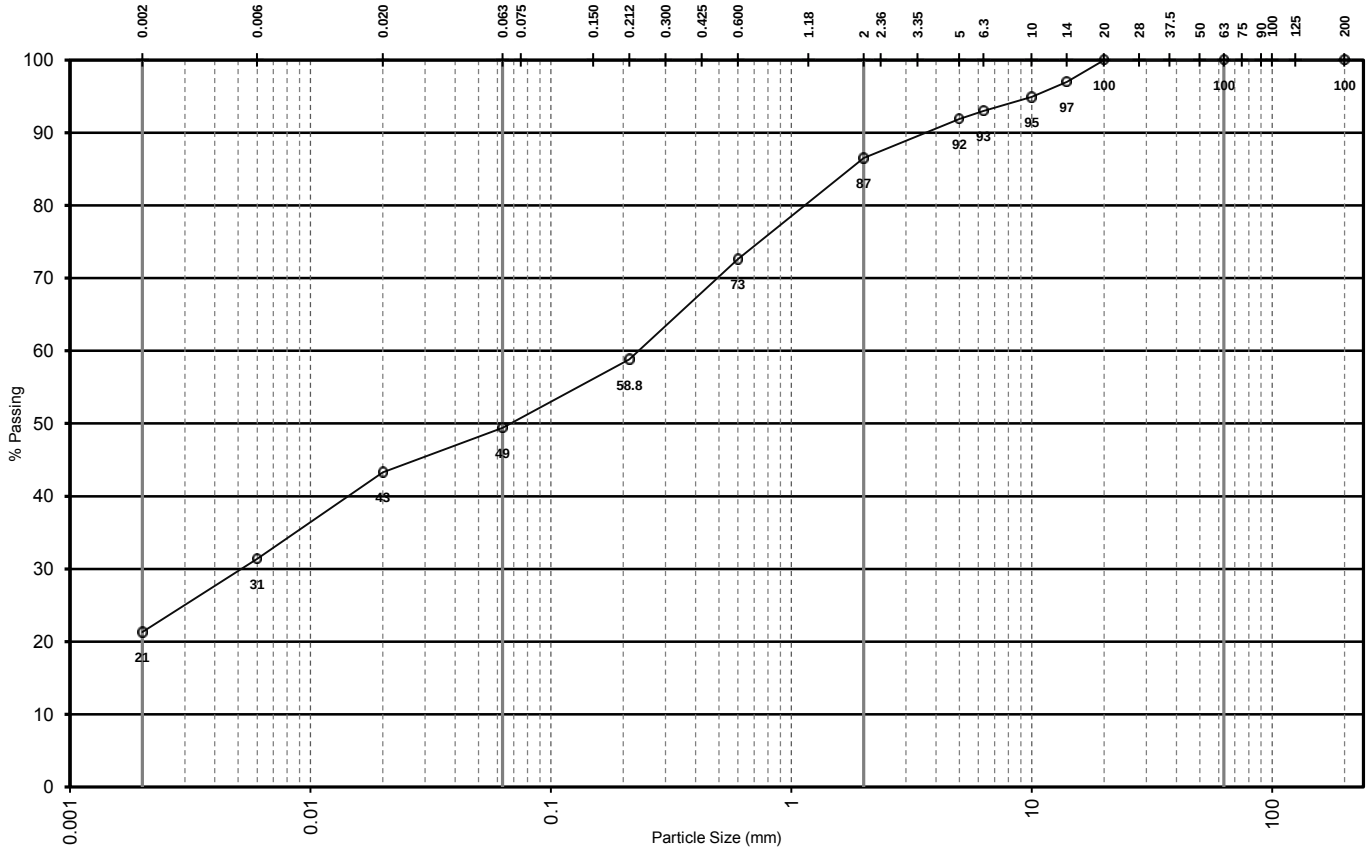
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	86.5
90		1.18	
75		0.600	72.6
63	100.0	0.425	
50		0.300	
37.5		0.212	58.8
28		0.150	
20	100.0	0.075	
14	97.0	0.063	49.4
10	94.9	0.020	43.3
6.3	93.0	0.006	31.4
5.0	91.9	0.002	21.3

Cobbles	0.0
Gravel	13.5
Sand	37.1
Silt	28.1
Clay	21.3



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 469625

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58991 / 212513**
Client Ref. No:	**HAF/CAP/CLA/B24**
Date and Time of Sampling:	**13/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**28/06/2016**
Sampling Location:	**D3 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

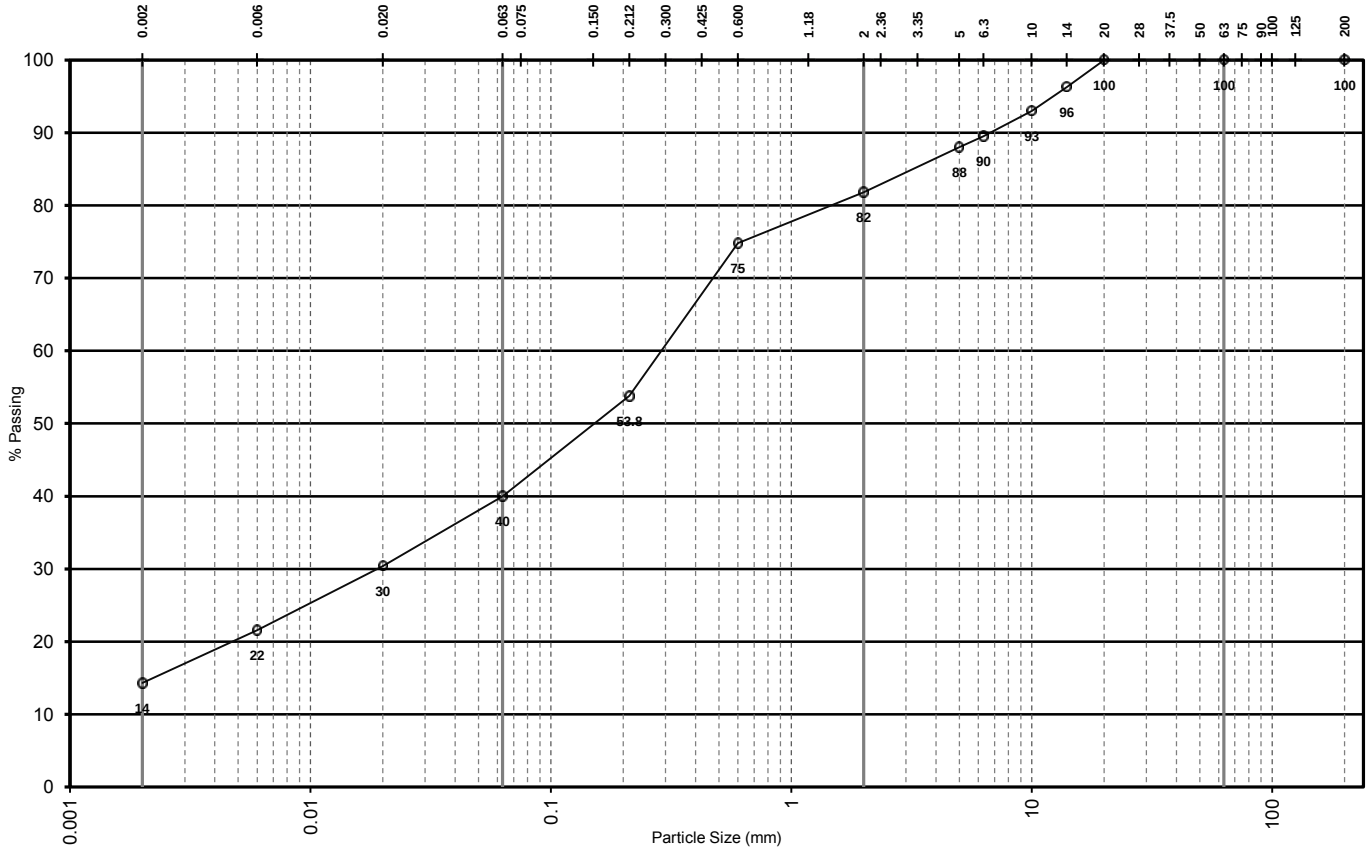
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	81.8
90		1.18	
75		0.600	74.8
63	100.0	0.425	
50		0.300	
37.5		0.212	53.8
28		0.150	
20	100.0	0.075	
14	96.3	0.063	40.0
10	93.0	0.020	30.4
6.3	89.5	0.006	21.6
5.0	88.0	0.002	14.3

Cobbles	0.0
Gravel	18.2
Sand	41.8
Silt	25.7
Clay	14.3



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 469628

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58991 / 212514**
Client Ref. No:	**HAF/CAP/CLA/B25**
Date and Time of Sampling:	**13/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**28/06/2016**
Sampling Location:	**D3 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

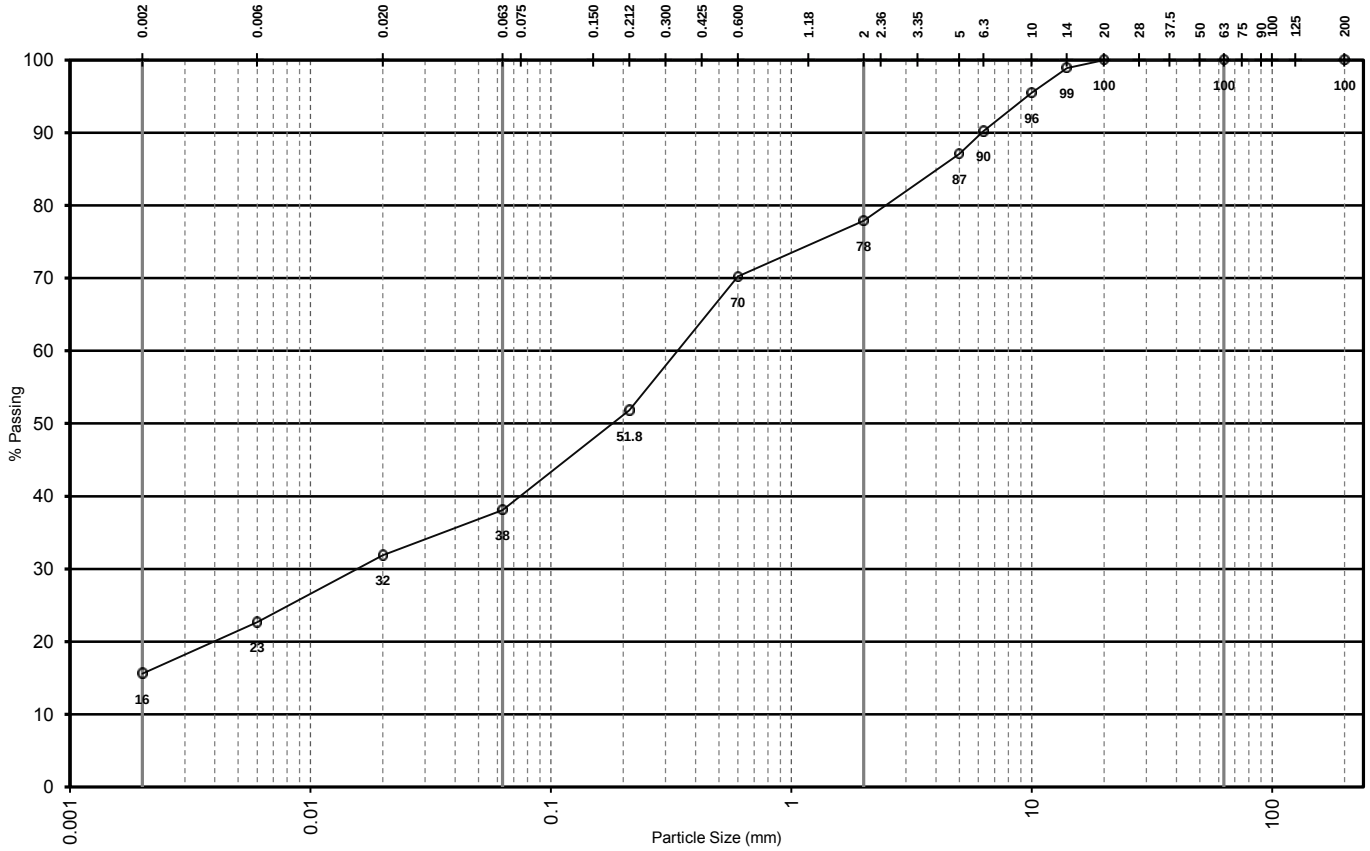
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	77.9
90		1.18	
75		0.600	70.2
63	100.0	0.425	
50		0.300	
37.5		0.212	51.8
28		0.150	
20	100.0	0.075	
14	98.9	0.063	38.1
10	95.5	0.020	31.9
6.3	90.2	0.006	22.7
5.0	87.1	0.002	15.6

Cobbles	0.0
Gravel	22.1
Sand	39.8
Silt	22.5
Clay	15.6



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

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ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 469632

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58991 / 212516**
Client Ref. No:	**HAF/CAP/CLA/B26**
Date and Time of Sampling:	**15/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**28/06/2016**
Sampling Location:	**C4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

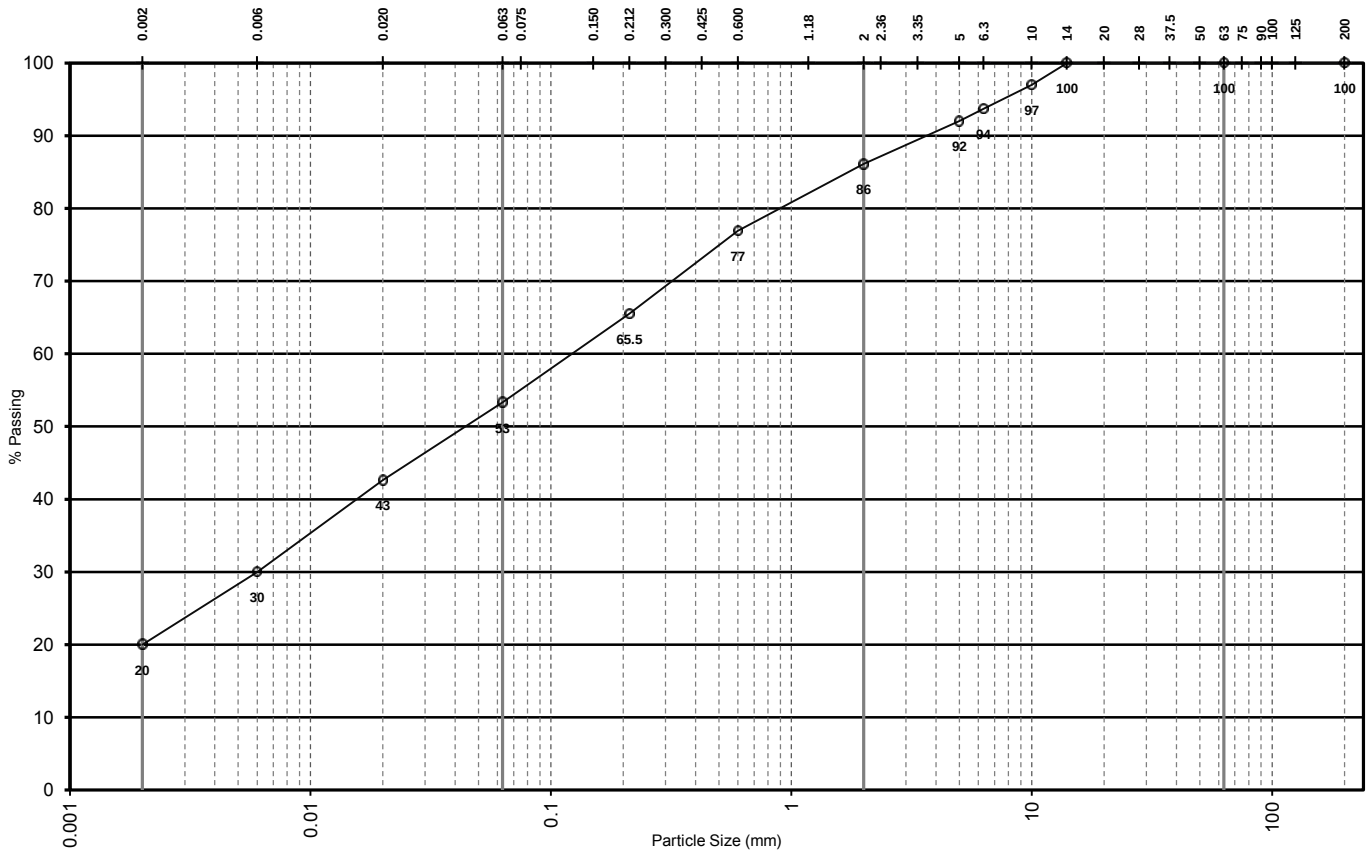
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	86.1
90		1.18	
75		0.600	76.9
63	100.0	0.425	
50		0.300	
37.5		0.212	65.5
28		0.150	
20		0.075	
14	100.0	0.063	53.3
10	97.0	0.020	42.6
6.3	93.7	0.006	30.0
5.0	92.0	0.002	20.0

Cobbles	0.0
Gravel	13.9
Sand	32.8
Silt	33.3
Clay	20.0



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

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Keele
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ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 469635

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58991 / 212517**
Client Ref. No:	**HAF/CAP/CLA/B27**
Date and Time of Sampling:	**16/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**28/06/2016**
Sampling Location:	**C3 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

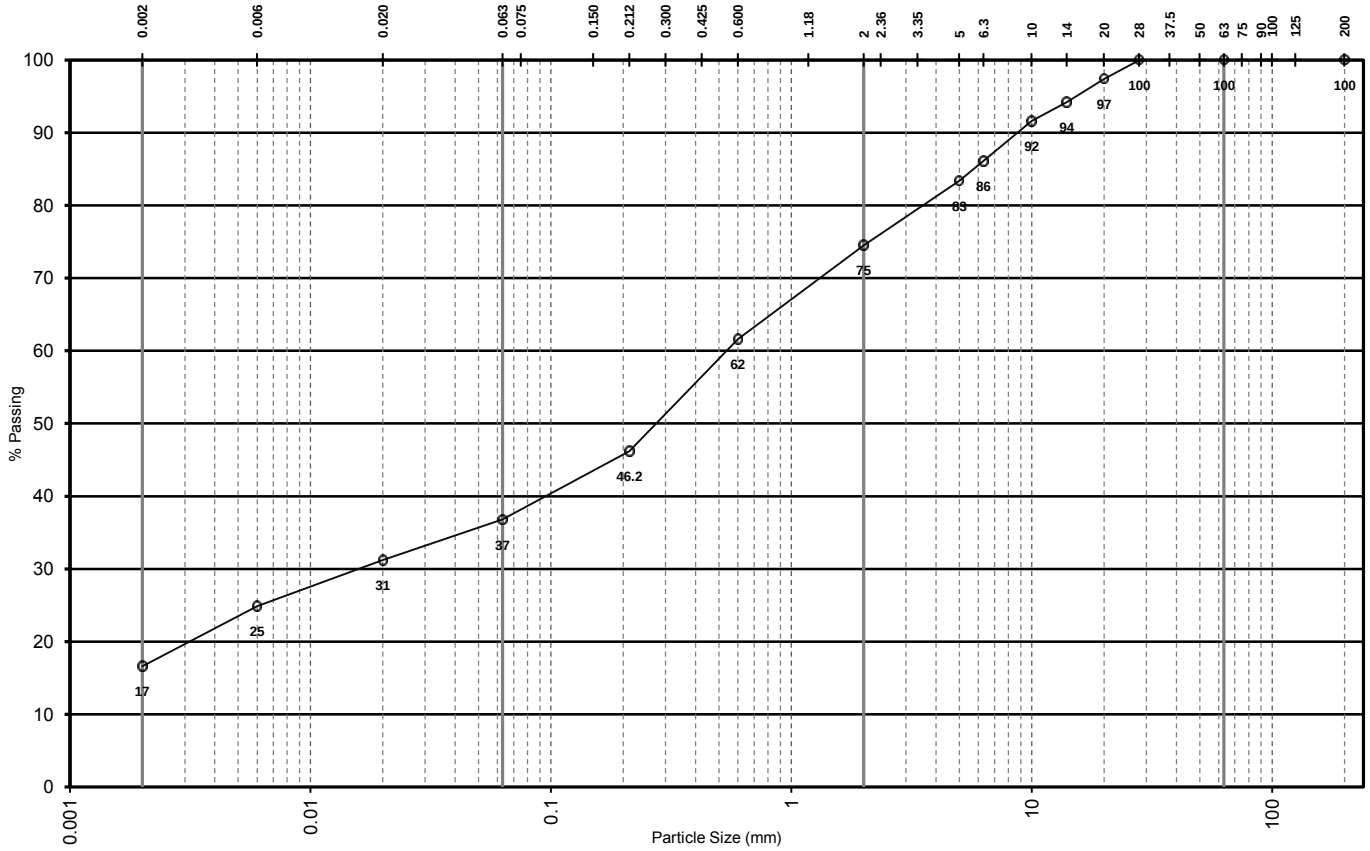
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	74.5
90		1.18	
75		0.600	61.6
63	100.0	0.425	
50		0.300	
37.5		0.212	46.2
28	100.0	0.150	
20	97.4	0.075	
14	94.2	0.063	36.8
10	91.6	0.020	31.2
6.3	86.1	0.006	24.9
5.0	83.4	0.002	16.6

Cobbles	0.0
Gravel	25.5
Sand	37.7
Silt	20.2
Clay	16.6



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

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ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470486

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212520**
Client Ref. No:	**HAF/CAP/CLA/B28**
Date and Time of Sampling:	**20/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**B3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

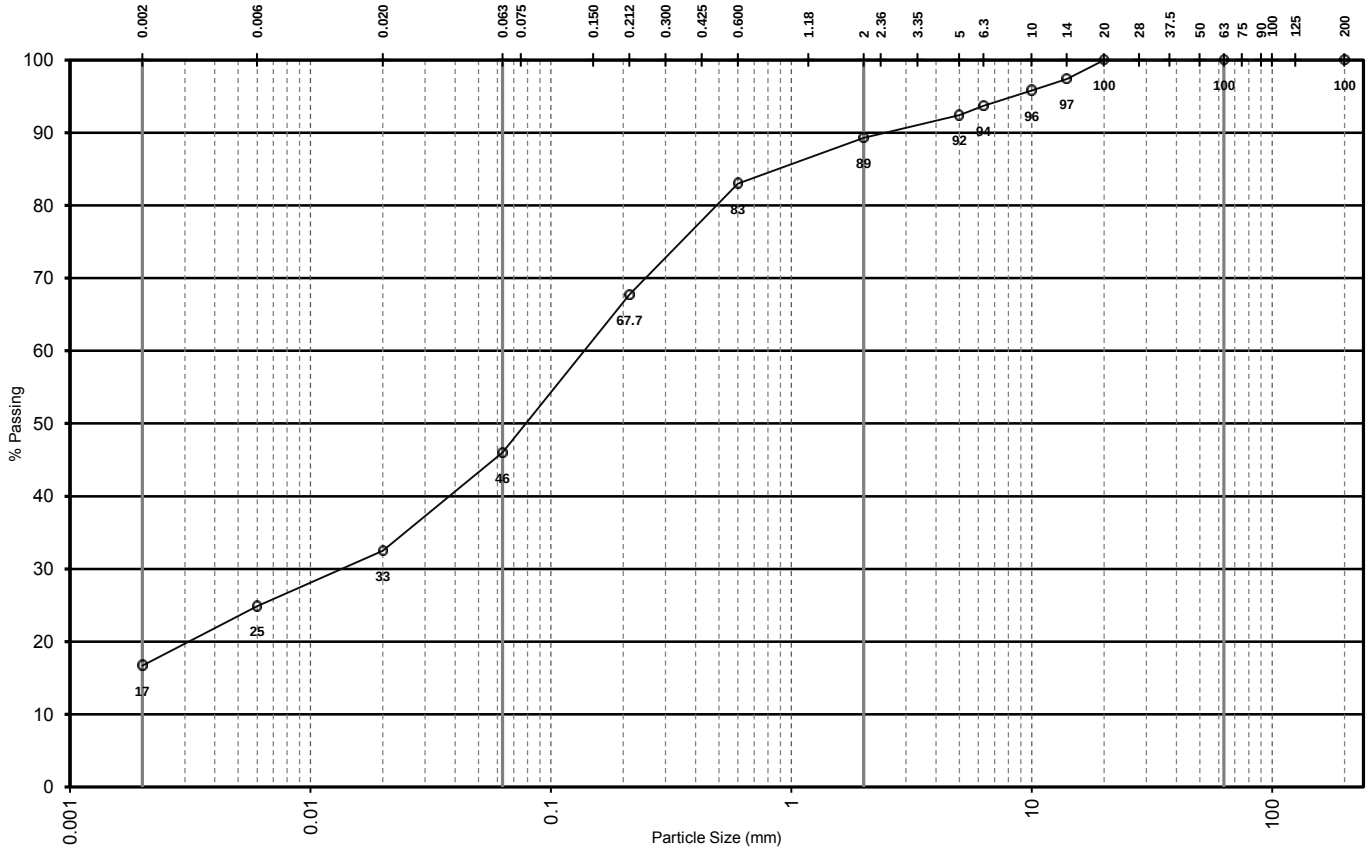
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	89.3
90		1.18	
75		0.600	83.0
63	100.0	0.425	
50		0.300	
37.5		0.212	67.7
28		0.150	
20	100.0	0.075	
14	97.4	0.063	46.0
10	95.8	0.020	32.5
6.3	93.7	0.006	24.9
5.0	92.4	0.002	16.7

Cobbles	0.0
Gravel	10.7
Sand	43.3
Silt	29.3
Clay	16.7



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002 0.006		0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

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Date: 03 August 2016
Test Report Ref: STR 470490

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212522**
Client Ref. No:	**HAF/CAP/CLA/B29**
Date and Time of Sampling:	**20/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**B4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

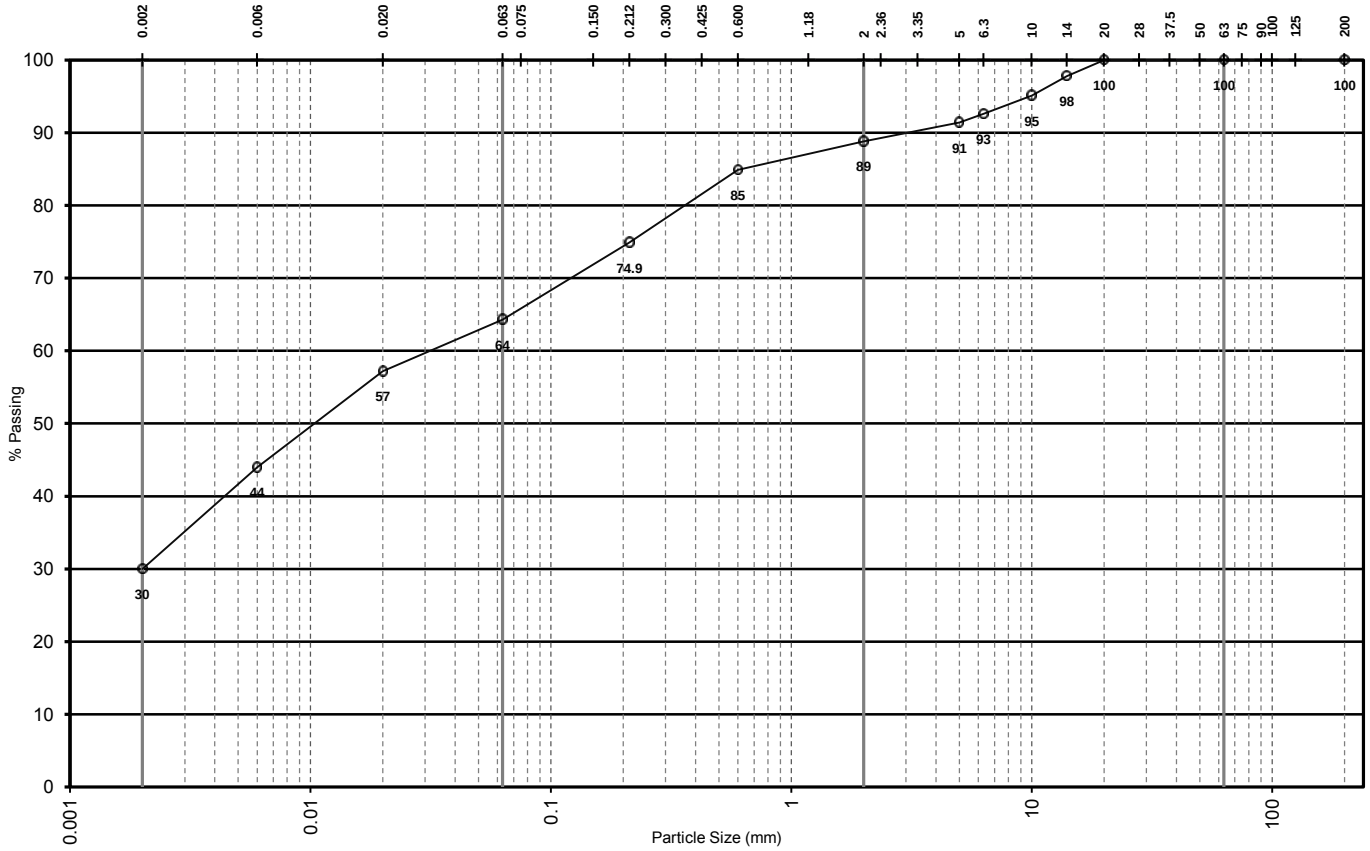
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	88.8
90		1.18	
75		0.600	84.9
63	100.0	0.425	
50		0.300	
37.5		0.212	74.9
28		0.150	
20	100.0	0.075	
14	97.8	0.063	64.3
10	95.1	0.020	57.2
6.3	92.6	0.006	44.0
5.0	91.4	0.002	30.0

Cobbles	0.0
Gravel	11.2
Sand	24.5
Silt	34.3
Clay	30.0



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

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ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470493

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS1377-Part2-1990 Clause 9.2** Sedimentation by pipette method to **BS 1377: Part 2: 1990: clause 9.4.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212523**
Client Ref. No:	**HAF/CAP/CLA/B30**
Date and Time of Sampling:	**21/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**05/07/2016**
Sampling Location:	**D5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown 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

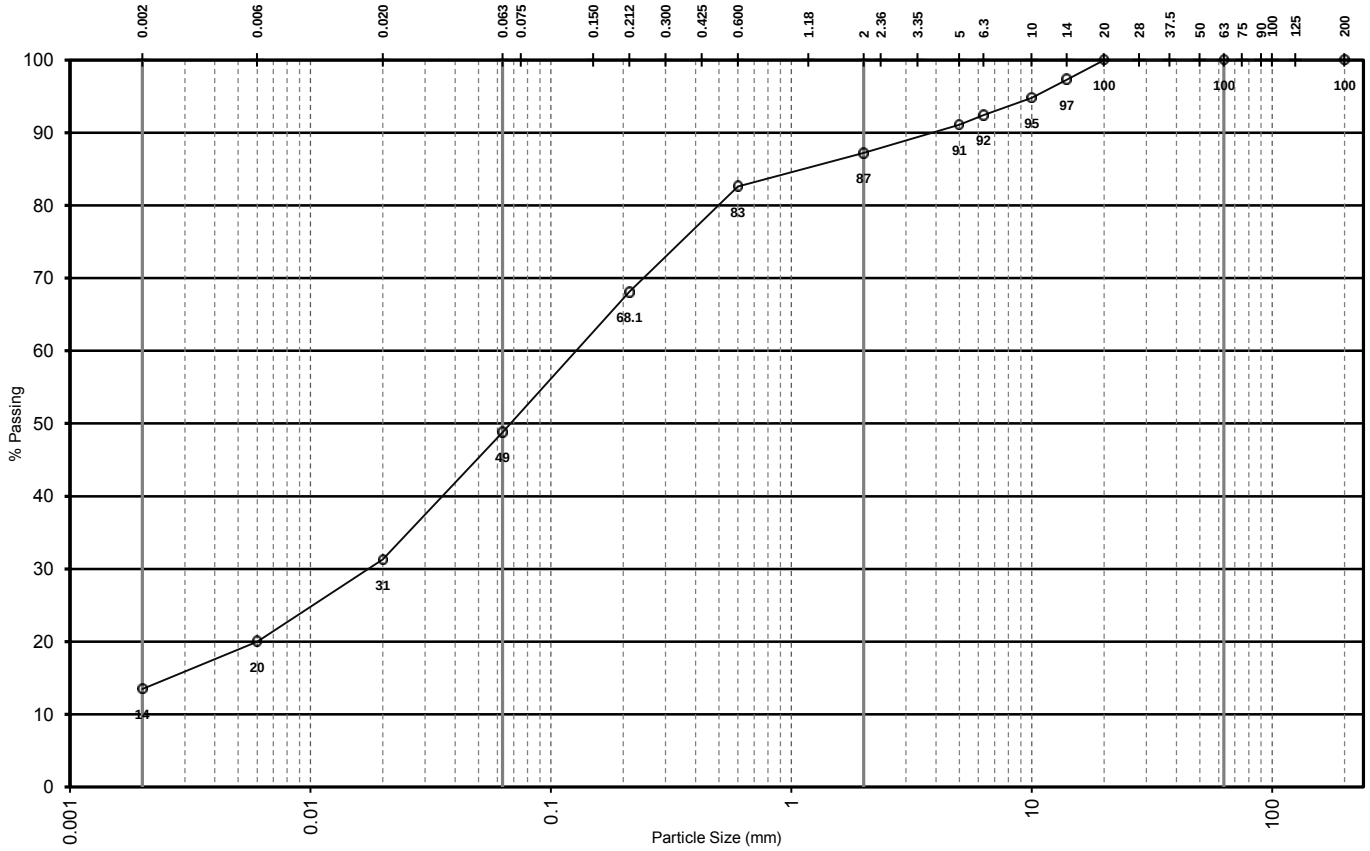
MATERIAL DESCRIPTION

Red/brown gravelly very sandy silty CLAY

Method of pre-treatment: N/A

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100.0	3.35	
125		2.36	
100		2.0	87.2
90		1.18	
75		0.600	82.6
63	100.0	0.425	
50		0.300	
37.5		0.212	68.1
28		0.150	
20	100.0	0.075	
14	97.3	0.063	48.8
10	94.8	0.020	31.3
6.3	92.4	0.006	20.0
5.0	91.1	0.002	13.5

Cobbles	0.0
Gravel	12.8
Sand	38.4
Silt	35.3
Clay	13.5



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	0.002	0.006	0.02	0.063		0.63	2.0	6.3	20	63 200
	SILT			0.2 SAND			GRAVEL			

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Date: 03 August 2016
Test Report Ref: STR 470485

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212520**
Client Ref. No:	**HAF/CAP/CLA/B28**
Date and Time of Sampling:	**20/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**30/06/2016**
Sampling Location:	**B3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.71 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470489

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212522**
Client Ref. No:	**HAF/CAP/CLA/B29**
Date and Time of Sampling:	**20/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**30/06/2016**
Sampling Location:	**B4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.70 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
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ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470492

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212523**
Client Ref. No:	**HAF/CAP/CLA/B30**
Date and Time of Sampling:	**21/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**30/06/2016**
Sampling Location:	**D5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.70 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470496

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212525**
Client Ref. No:	**HAF/CAP/CLA/B31**
Date and Time of Sampling:	**22/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**30/06/2016**
Sampling Location:	**E5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.71 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

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The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470499

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212526**
Client Ref. No:	**HAF/CAP/CLA/B32**
Date and Time of Sampling:	**22/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**30/06/2016**
Sampling Location:	**F5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.72 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470502

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212527**
Client Ref. No:	**HAF/CAP/CLA/B33**
Date and Time of Sampling:	**23/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**30/06/2016**
Sampling Location:	**B4 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.72 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 470505

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212528**
Client Ref. No:	**HAF/CAP/CLA/B34**
Date and Time of Sampling:	**24/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**30/06/2016**
Sampling Location:	**C4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.72 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471520

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212530**
Client Ref. No:	**HAF/CAP/CLA/B35**
Date and Time of Sampling:	**27/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**08/07/2016**
Sampling Location:	**A3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.71 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

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The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471524

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212532**
Client Ref. No:	**HAF/CAP/CLA/B36**
Date and Time of Sampling:	**28/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**08/07/2016**
Sampling Location:	**B4 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.72 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471527

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212533**
Client Ref. No:	**HAF/CAP/CLA/B37**
Date and Time of Sampling:	**28/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**08/07/2016**
Sampling Location:	**C5 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.72 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

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The Keele Centre
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Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471532

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212535**
Client Ref. No:	**HAF/CAP/CLA/B38**
Date and Time of Sampling:	**30/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**08/07/2016**
Sampling Location:	**A1 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.73 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

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ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471536

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212537**
Client Ref. No:	**HAF/CAP/CLA/B39**
Date and Time of Sampling:	**01/07/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**08/07/2016**
Sampling Location:	**A2 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.73 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

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Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471541

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212539**
Client Ref. No:	**HAF/CAP/CLA/B40**
Date and Time of Sampling:	**01/07/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**08/07/2016**
Sampling Location:	**A3 Layer 6**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.70 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

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ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471560

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59205 / 212540**
Client Ref. No:	**HAF/CAP/CLA/B41**
Date and Time of Sampling:	**04/07/2016**
Date of Receipt at Lab:	**05/07/2016**
Date of Start of Test:	**11/07/2016**
Sampling Location:	**B2 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.70 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 471563

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59205 / 212541**
Client Ref. No:	**HAF/CAP/CLA/B42**
Date and Time of Sampling:	**04/07/2016**
Date of Receipt at Lab:	**05/07/2016**
Date of Start of Test:	**11/07/2016**
Sampling Location:	**B3 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.69 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 467794

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S58728 / 212503**
Client Ref. No:	**Bulk 16**
Date and Time of Sampling:	**02/06/2016**
Date of Receipt at Lab:	**06/06/2016**
Date of Start of Test:	**10/06/2016**
Sampling Location:	**Trial Pad**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.74 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 467797

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S58728 / 212504**
Client Ref. No:	**Bulk 17**
Date and Time of Sampling:	**02/06/2016**
Date of Receipt at Lab:	**06/06/2016**
Date of Start of Test:	**10/06/2016**
Sampling Location:	**Stockpile A**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.73 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 467801

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S58728 / 212505**
Client Ref. No:	**Bulk 18**
Date and Time of Sampling:	**02/06/2016**
Date of Receipt at Lab:	**06/06/2016**
Date of Start of Test:	**10/06/2016**
Sampling Location:	**Stockpile B**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.73 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 468775

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212506**
Client Ref. No:	**HAF/CAP/CLA/B19**
Date and Time of Sampling:	**07/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**20/06/2016**
Sampling Location:	**E5 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.72 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 468779

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212508**
Client Ref. No:	**HAF/CAP/CLA/B20**
Date and Time of Sampling:	**08/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**20/06/2016**
Sampling Location:	**F5 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.71 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 468782

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212509**
Client Ref. No:	**HAF/CAP/CLA/B21**
Date and Time of Sampling:	**08/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**20/06/2016**
Sampling Location:	**E4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.71 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 468787

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212511**
Client Ref. No:	**HAF/CAP/CLA/B22**
Date and Time of Sampling:	**09/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**20/06/2016**
Sampling Location:	**F4 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.73 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 468791

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58866 / 212512**
Client Ref. No:	**HAF/CAP/CLA/B23**
Date and Time of Sampling:	**09/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**20/06/2016**
Sampling Location:	**F6 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.72 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 469624

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58991 / 212513**
Client Ref. No:	**HAF/CAP/CLA/B24**
Date and Time of Sampling:	**13/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**24/06/2016**
Sampling Location:	**D3 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.72 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 469627

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58991 / 212514**
Client Ref. No:	**HAF/CAP/CLA/B25**
Date and Time of Sampling:	**13/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**24/06/2016**
Sampling Location:	**D3 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.73 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 469631

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58991 / 212516**
Client Ref. No:	**HAF/CAP/CLA/B26**
Date and Time of Sampling:	**15/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**24/06/2016**
Sampling Location:	**C4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.70 Mg/m^3

Comments
None

Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 03 August 2016
Test Report Ref: STR 469634

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Density of Soil – Gas Jar method, in accordance with **BS 1377 : Part 2 : 1990 : Clause 8.2.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S58991 / 212517**
Client Ref. No:	**HAF/CAP/CLA/B27**
Date and Time of Sampling:	**16/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**24/06/2016**
Sampling Location:	**C3 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Disturbed Bulk Sample**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification	**N/A**

RESULTS:

Particle Density = 2.71 Mg/m^3

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

Appendix F Compaction Test Results

celtest
INDEPENDENT MATERIALS TESTING I DIAMOND DRILLING & SAWING

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411667

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Dry Density and Moisture Content Relationship of soil passing 20mm sieve 2.5kg Rammer Method in accordance with BS 1377: 4: 1990 Clause 3.3

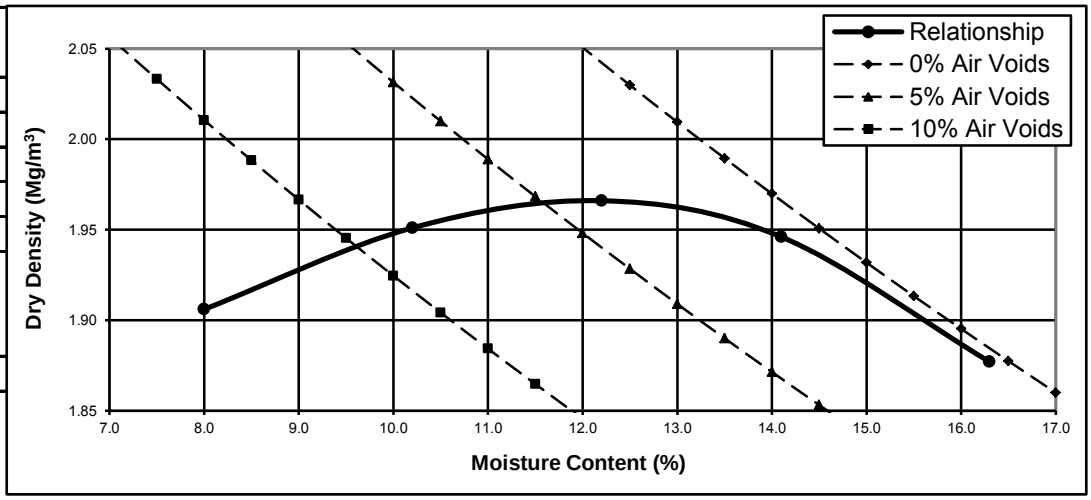
SAMPLE DETAILS:

Certificate of sampling received:	**Yes**	Name of Source:	**Site Won**
Laboratory Ref. No:	**S52409 / 242614**	Method of Sampling:	**Disturbed Bulk Sample**
Client Ref. :	**HAF/CAP/CLA/CP/1**	Sampled By:	**Client**
Date and Time of Sampling:	**22/04/2015**		
Date of Receipt at Lab:	**24/04/2015**		
Date of Start of Test:	**28/04/2015**		
Sampling Location:	**A1 Layer 2**		
Soil Description:	**Red/brown gravelly sandy very silty CLAY**		

RESULTS:

Were any unrepresentative lumps present?	**No**
Sample Preparation Procedure:	**3.2.4.1**
Sample Preparation Method:	**Single**
Particle Density:	**2.72Mg/m3 (Found using Gas Jar Method)**
Amount of sample retained on 37.5mm test sieve:	**0 %**
Amount of sample retained on 20mm test sieve:	**0 %**

Moisture Content (%)	Dry Density Mg/m^3
8.0	1.91
10.2	1.95
12.2	1.97
14.1	1.95
16.3	1.88
Optimum Moisture Content (%)	**Maximum Dry Density Mg/m^3**
12	1.97



Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415852

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Dry Density and Moisture Content Relationship of soil passing 20mm sieve 2.5kg Rammer Method in accordance with BS 1377: 4: 1990 Clause 3.3

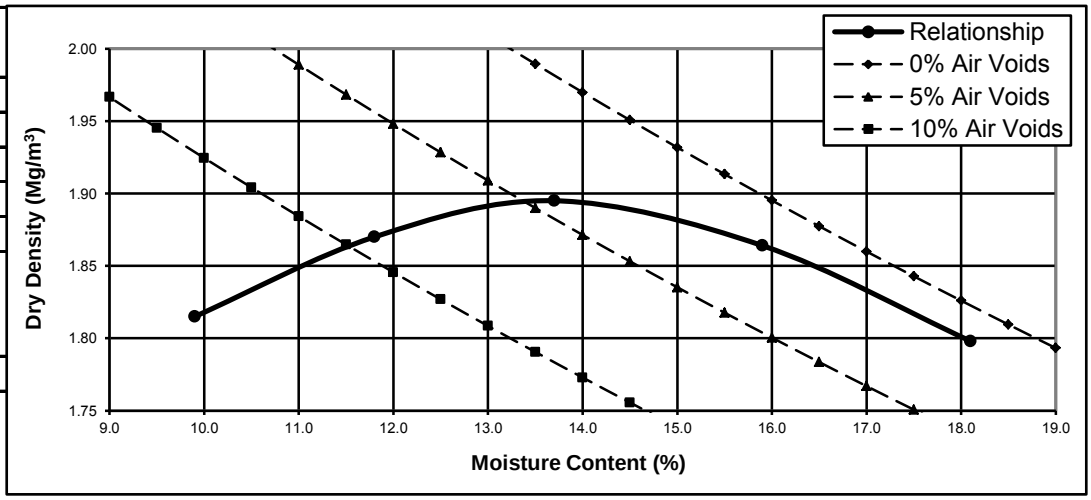
SAMPLE DETAILS:

Certificate of sampling received:	**Yes**	Name of Source:	**Site Won**
Laboratory Ref. No:	**S52903 / 242623**	Method of Sampling:	**Disturbed Bulk Sample**
Client Ref. :	**HAF/CAP/CLA/CP/2**	Sampled By:	**Client**
Date and Time of Sampling:	**26/05/2015**		
Date of Receipt at Lab:	**28/05/2015**		
Date of Start of Test:	**08/06/2015**		
Sampling Location:	**C1 Layer 2**		
Soil Description:	**Red/brown gravelly sandy very silty CLAY**		

RESULTS:

Were any unrepresentative lumps present?	**No**
Sample Preparation Procedure:	**3.2.4.1**
Sample Preparation Method:	**Single**
Particle Density:	**2.72Mg/m3 (Found using Gas Jar Method)**
Amount of sample retained on 37.5mm test sieve:	**0 %**
Amount of sample retained on 20mm test sieve:	**0 %**

Moisture Content (%)	Dry Density Mg/m^3
9.9	1.82
11.8	1.87
13.7	1.90
15.9	1.86
18.1	1.80
Optimum Moisture Content (%)	**Maximum Dry Density Mg/m^3**
14	1.90



Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 467803

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Dry Density and Moisture Content Relationship of soil passing 20mm sieve 2.5kg Rammer Method in accordance with BS 1377: 4: 1990 Clause 3.3

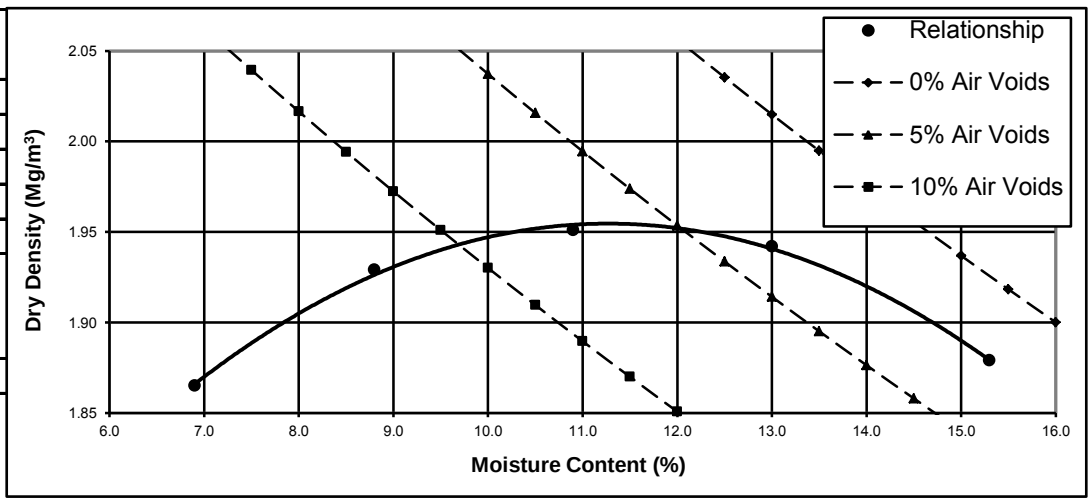
SAMPLE DETAILS:

Certificate of sampling received:	**No**	Name of Source:	**Site Won**
Laboratory Ref. No:	**S58728 / 212505**	Method of Sampling:	**Disturbed Bulk Sample**
Client Ref. :	**Bulk 18**	Sampled By:	**Client**
Date and Time of Sampling:	**02/06/2016**		
Date of Receipt at Lab:	**06/06/2016**		
Date of Start of Test:	**15/06/2016**		
Sampling Location:	**Stockpile B**		
Soil Description:	**Red/brown gravelly very sandy silty CLAY**		

RESULTS:

Were any unrepresentative lumps present?	**No**
Sample Preparation Procedure:	**3.2.4.1**
Sample Preparation Method:	**Single**
Particle Density:	**2.73Mg/m3 (Found using Gas Jar Method)**
Amount of sample retained on 37.5mm test sieve:	**0 %**
Amount of sample retained on 20mm test sieve:	**0 %**

Moisture Content (%)	Dry Density Mg/m^3
6.9	1.87
8.8	1.93
10.9	1.95
13.0	1.94
15.3	1.88
Optimum Moisture Content (%)	**Maximum Dry Density Mg/m^3**
11	1.95



Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 476453

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Dry Density and Moisture Content Relationship of soil passing 20mm sieve 2.5kg Rammer Method in accordance with BS 1377: 4: 1990 Clause 3.3

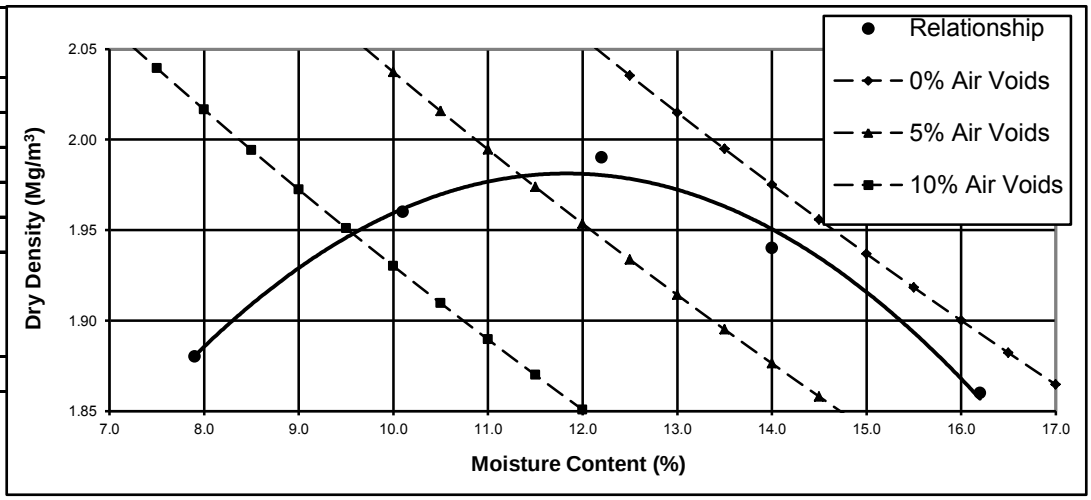
SAMPLE DETAILS:

Certificate of sampling received:	**No**	Name of Source:	**Site Won**
Laboratory Ref. No:	**S59182 / 212535**	Method of Sampling:	**Disturbed Bulk Sample**
Client Ref. :	**HAF/CAP/CLA/B38**	Sampled By:	**Client**
Date and Time of Sampling:	**30/06/2016**		
Date of Receipt at Lab:	**04/07/2016**		
Date of Start of Test:	**18/07/2016**		
Sampling Location:	**A1 Layer 2**		
Soil Description:	**Red/brown gravelly very sandy silty CLAY**		

RESULTS:

Were any unrepresentative lumps present?	**No**
Sample Preparation Procedure:	**3.2.4.1**
Sample Preparation Method:	**Single**
Particle Density:	**2.73Mg/m3 (Found using Gas Jar Method)**
Amount of sample retained on 37.5mm test sieve:	**0 %**
Amount of sample retained on 20mm test sieve:	**0 %**

Moisture Content (%)	Dry Density Mg/m^3
7.9	1.88
10.1	1.96
12.2	1.99
14.0	1.94
16.2	1.86
Optimum Moisture Content (%)	**Maximum Dry Density Mg/m^3**
12	1.98



Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 467799

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Dry Density and Moisture Content Relationship of soil passing 20mm sieve 2.5kg Rammer Method in accordance with BS 1377: 4: 1990 Clause 3.3

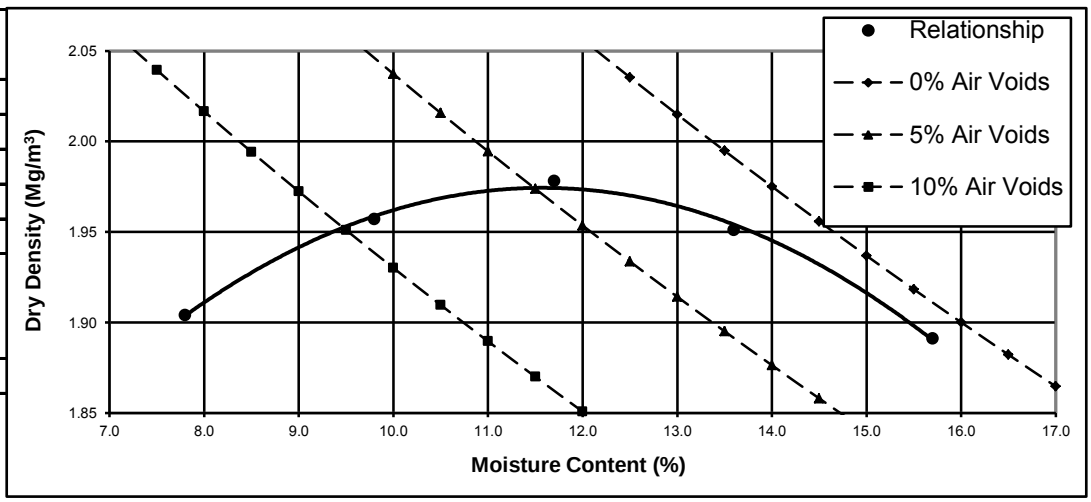
SAMPLE DETAILS:

Certificate of sampling received:	**No**	Name of Source:	**Site Won**
Laboratory Ref. No:	**S58728 / 212504**	Method of Sampling:	**Disturbed Bulk Sample**
Client Ref. :	**Bulk 17**	Sampled By:	**Client**
Date and Time of Sampling:	**02/06/2016**		
Date of Receipt at Lab:	**06/06/2016**		
Date of Start of Test:	**15/06/2016**		
Sampling Location:	**Stockpile A**		
Soil Description:	**Red/brown gravelly very sandy silty CLAY**		

RESULTS:

Were any unrepresentative lumps present?	**No**
Sample Preparation Procedure:	**3.2.4.1**
Sample Preparation Method:	**Single**
Particle Density:	**2.73Mg/m3 (Found using Gas Jar Method)**
Amount of sample retained on 37.5mm test sieve:	**0 %**
Amount of sample retained on 20mm test sieve:	**0 %**

Moisture Content (%)	Dry Density Mg/m^3
7.8	1.90
9.8	1.96
11.7	1.98
13.6	1.95
15.7	1.89
Optimum Moisture Content (%)	**Maximum Dry Density Mg/m^3**
12	1.98



Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by:
Eric Goulden
Technical Manager

Appendix G Core Density Results

In-situ core density test results

Results of in-situ core density tests performed by the CQA Engineer during the installation of the capping clay layers.

Phase 2A – Trial pad cores

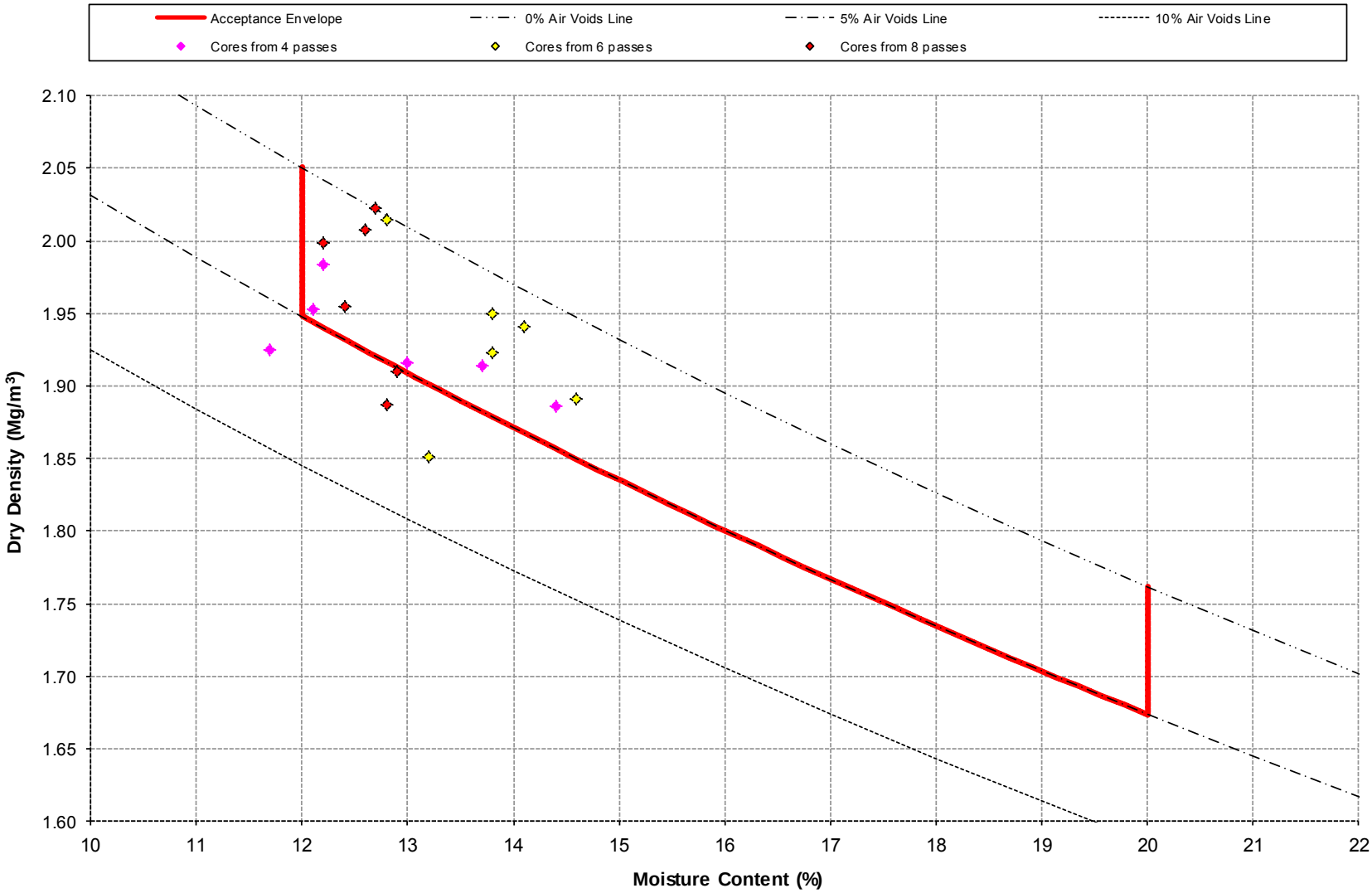
Sample	Grid	Layer	Compactor passes	Moisture Content, %	Dry Density, Mg/m^3	Air Voids, %
T1	2C	1	4	12.1	1.953	4.6
T2	3C	1	4	12.2	1.984	2.8
T3	4C	1	4	11.7	1.925	6.7
T4	2C	1	6	14.6	1.891	2.9
T5	3C	1	6	14.1	1.941	1.2
T6	4C	1	6	13.2	1.851	7.6
T7	2C	1	8	12.2	1.999	2.1
T8	3C	1	8	12.8	1.887	6.5
T9	4C	1	8	12.6	2.008	0.9
T10	4C	2	4	13	1.916	4.6
T11	4C	2	4	13.7	1.914	3.4
T12	3C	2	4	14.4	1.886	3.6
T13	4C	2	6	13.8	1.923	2.7
T14	3C	2	6	13.8	1.95	1.3
T15	4C	2	6	12.8	2.015	0.2
T16	4C	2	8	12.7	2.022	-0.1
T17	3C	2	8	12.9	1.91	5.1
T18	4C	2	8	12.4	1.955	3.9

Hafod Landfill Site
Capping works Phase 2A

In-situ core density test results

CQA

CORE PLOTS & ACCEPTANCE ENVELOPE HAFOD QUARRY LANDFILL CAPPING - TRIAL PAD



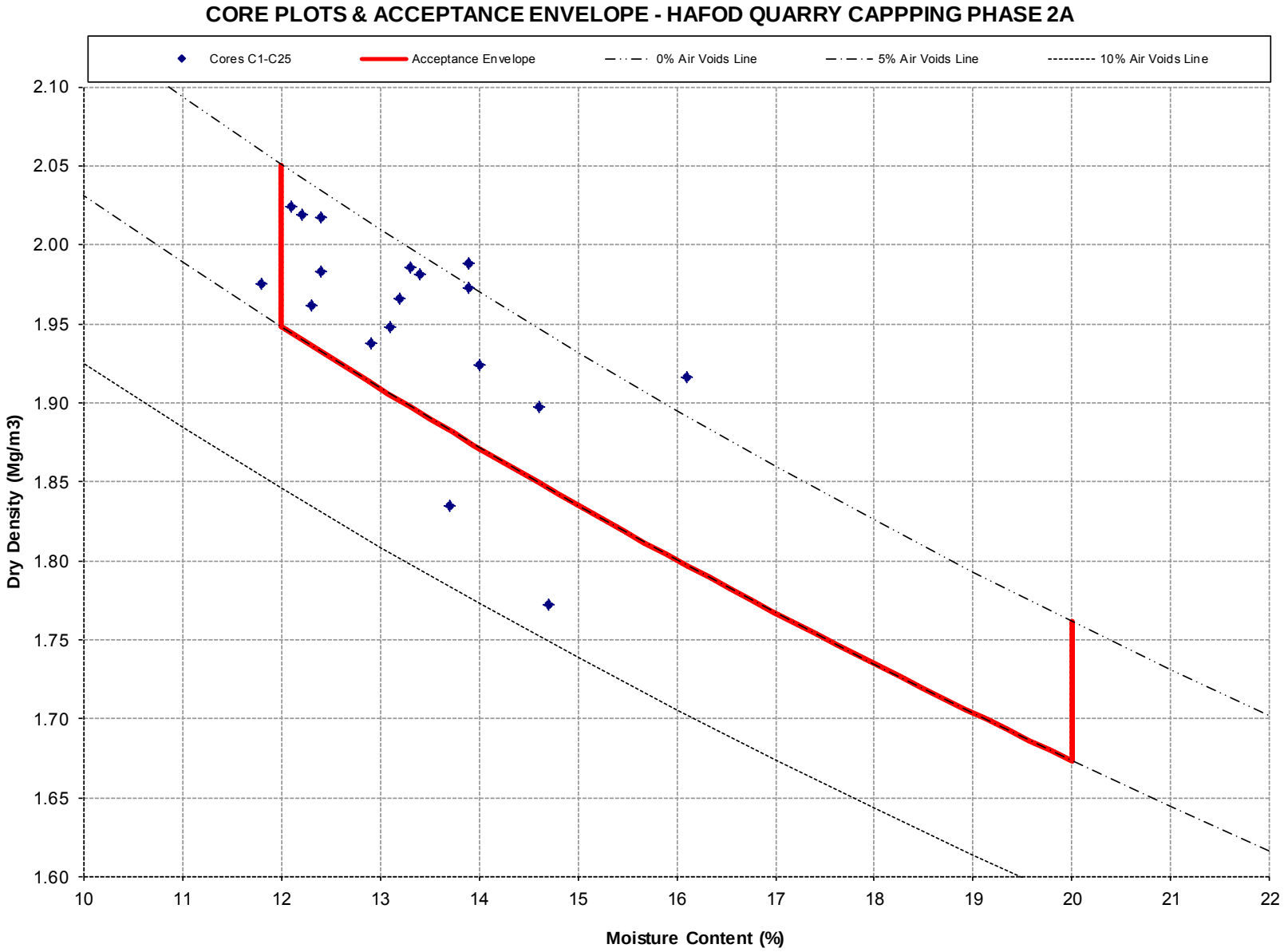
In-situ core density test results

Phase 2A – Cores taken during installation

Date	Test #	Grid	Layer	Moisture content, %	Dry density, mg/m3	Air voids, %
20/04/2015	C1	C3	2	12.1	2.024	1.1
21/04/2015	C2	B2	3	13.9	1.988	-0.7
21/04/2015	C3	B4	3	13.1	1.948	2.9
21/04/2015	C4	D4	3	14.0	1.924	2.3
21/04/2015	C5	C4	3	14.7	1.772	8.8
22/04/2015	C6	A1	4	13.9	1.973	0.1
22/04/2015	C7	A2	4	13.7	1.835	7.4
22/04/2015	C8	C6	4	14.6	1.897	2.6
22/04/2015	C9	D6	4	12.4	2.017	0.9
22/04/2015	C10	D5	4	13.3	1.986	0.6
26/05/2015	C11	D9	1	11.8	1.975	4.1
26/05/2015	C12	C10	1	12.4	1.983	2.5
26/05/2015	C13	B9	2	12.9	1.938	3.7
26/05/2015	C14	B10	2	16.1	1.916	-1.2
26/05/2015	C15	D1	2	13.9	1.988	-0.7
27/05/2015	C16	C1	3	12.2	2.019	1.1
27/05/2015	C17	B9	3	12.3	1.962	3.8
27/05/2015	C18	D10	3	13.2	1.966	1.7
28/05/2015	C19	B1	4	13.4	1.981	0.6
28/05/2015	C20	C2	4	12.2	1.973	3.4

Hafod Landfill Site
Capping works Phase 2A

In-situ core density test results



In-situ core density test results

Phase 2B Trial Pad 1

Sample	Layer	Compactor passes	Moisture Content, %	Dry Density, Mg/m^3	Air Voids, %
T19	1	4	17.1	1.874	-1.0
T20	1	4	15.7	1.984	-4.1
T21	1	4	17.0	1.889	-1.6
T22	1	6	15.4	1.983	-3.5
T23	1	6	16.2	1.936	-2.7
T24	1	6	15.6	1.967	-3.1
T25	1	8	16.5	2.002	-6.7
T26	1	8	17.0	1.898	-2.2
T27	1	8	16.1	1.951	-3.4
T28	2	4	16.7	1.822	2.5
T29	2	4	17.0	1.883	-1.3
T30	2	4	17.9	1.888	-3.3
T31	2	6	17.2	1.748	5.5
T32	2	6	17.0	1.865	-0.4
T33	2	6	16.5	1.842	1.8
T34	2	8	16.3	1.918	-1.9
T35	2	8	17.0	1.892	-1.9
T36	2	8	17.4	1.865	-1.2

In-situ core density test results

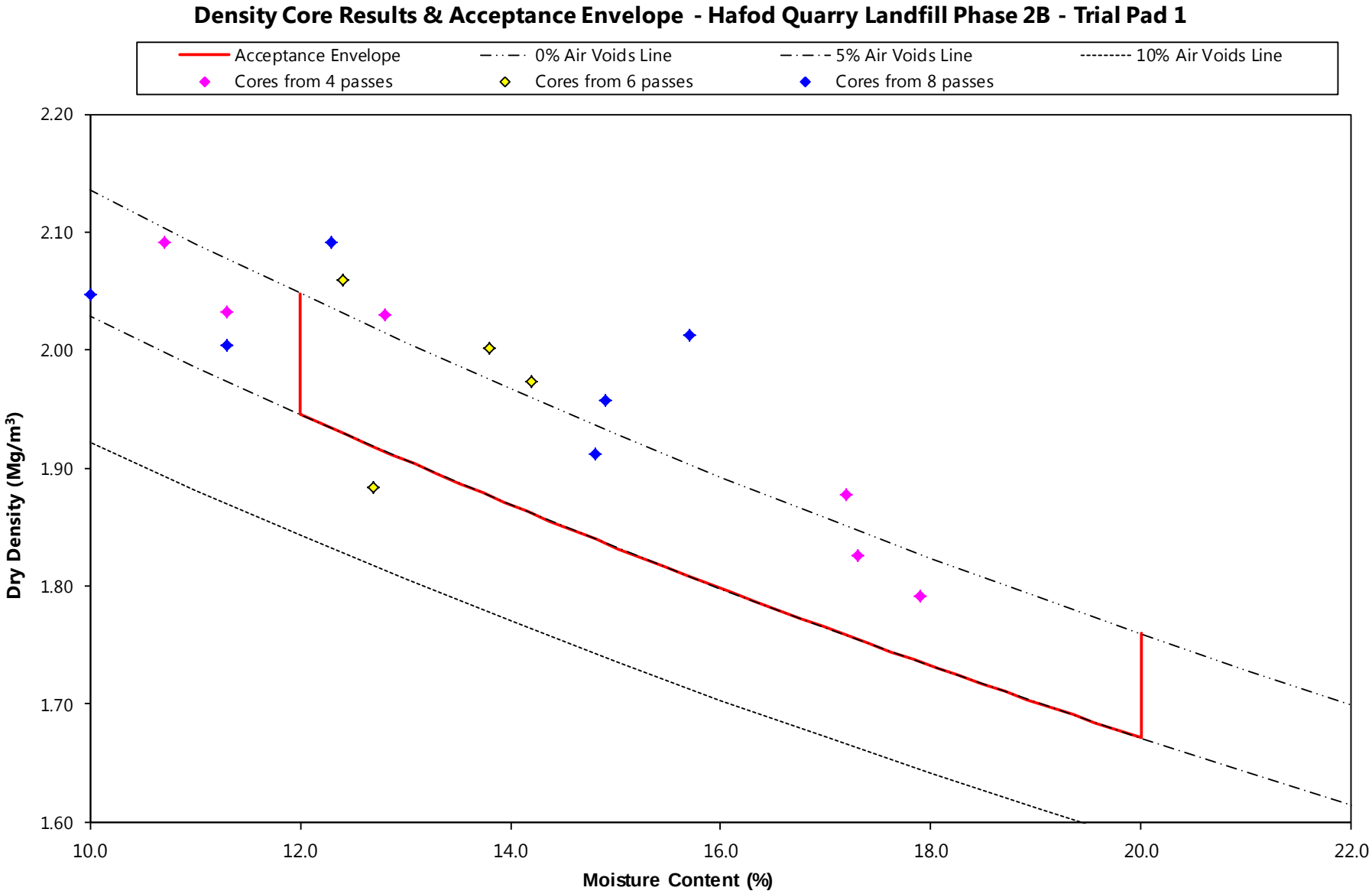
Phase 2B Trial Pad 2

Sample	Layer	Compactor passes	Moisture Content, %	Dry Density, Mg/m^3	Air Voids, %
T37	1	4	17.3	1.826	1.2
T38	1	4	17.2	1.877	-1.4
T39	1	4	17.9	1.791	1.9
T40	1	6	14.2	1.973	-0.6
T41	1	6	12.7	1.883	6.8
T42	1	6	13.8	2.002	-1.4
T43	1	8	14.9	1.957	-1.3
T44	1	8	14.8	1.912	1.3
T45	1	8	15.7	2.013	-5.8
T46	2	4	10.7	2.091	0.7
T47	2	4	11.3	2.032	2.1
T48	2	4	12.8	2.030	-0.7
T49	2	6	6.3	2.227	3.9
T50	2	6	12.4	2.059	-1.3
T51	2	6	9.5	2.181	-1.1
T52	2	8	12.3	2.091	-2.8
T53	2	8	10.0	2.047	4.2
T54	2	8	11.3	2.004	3.5

Hafod Landfill Site
Capping works Phase 2B

In-situ core density test results

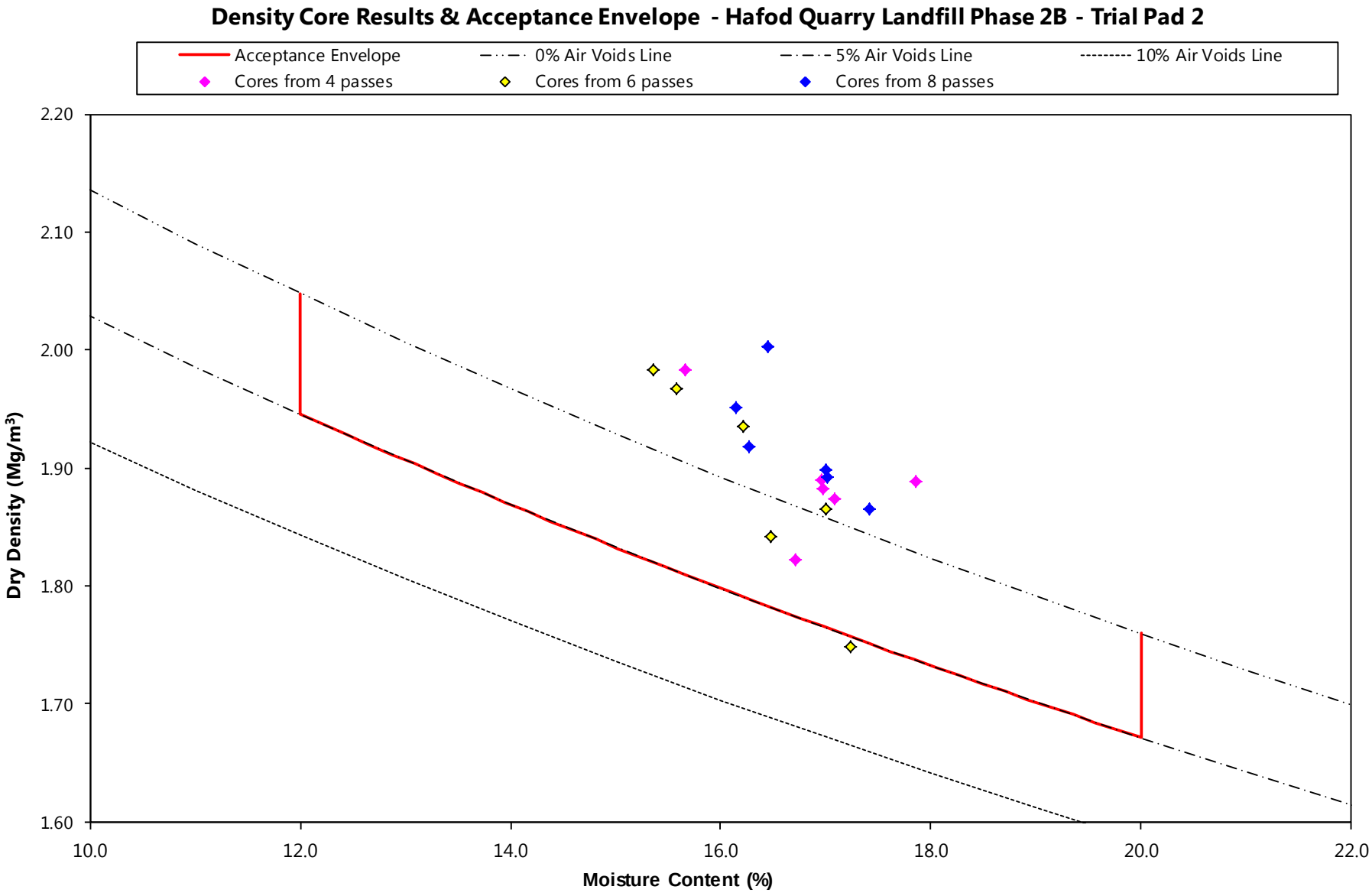
CQA



Hafod Landfill Site
Capping works Phase 2B

In-situ core density test results

CQA



In-situ core density test results

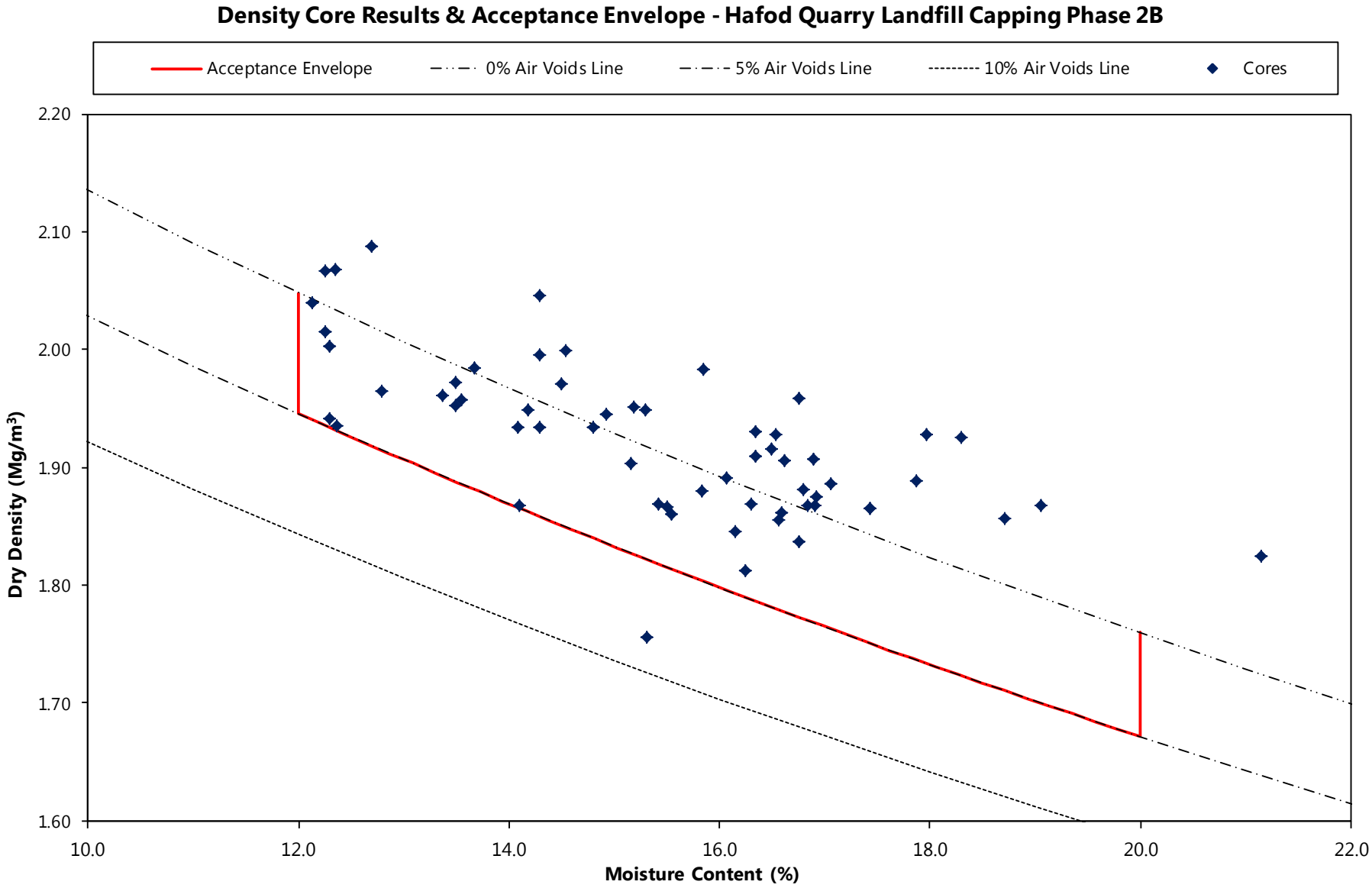
Phase 2B – Cores taken during installation

Date	Test #	Grid	Layer	Moisture content, %	Dry density, mg/m3	Air voids, %
07/06/2016	C21	F5	1	17.4	1.865	-1.2
07/06/2016	C22	F6	1	16.6	1.856	0.9
07/06/2016	C23	F4	1	19.1	1.868	-4.4
07/06/2016	C24	E5	1	18.0	1.928	-5.7
08/06/2016	C25	F5	2	16.2	1.845	2.2
08/06/2016	C26	F6	2	16.3	1.812	3.8
08/06/2016	C27	E4	2	16.8	1.881	-0.9
08/06/2016	C28	D5	2	16.6	1.861	0.6
09/06/2016	C29	F6	3	16.9	1.875	-0.8
09/06/2016	C30	F4	3	18.3	1.926	-6.2
09/06/2016	C31	D4	3	17.9	1.888	-3.3
10/06/2016	C32	D3	1	16.8	1.867	-0.2
13/06/2016	C33	D3	2	12.3	2.003	1.6
13/06/2016	C34	D3	3	12.3	1.941	4.6
13/06/2016	C35	D3	4	12.4	2.067	-1.7
14/06/2016	C36	C3	1	12.1	2.040	0.1
15/06/2016	C37	C4	2	17.4	1.866	-1.2
16/06/2016	C38	B4	3	15.9	1.984	-4.5
16/06/2016	C39	C3	4	14.3	2.045	-4.6
20/06/2016	C40	B2	1	14.5	1.971	-1.2
20/06/2016	C41	B3	1	12.2	2.067	-1.4
20/06/2016	C42	B1	2	12.7	2.087	-3.4

20/06/2016	C43	B4	2	13.5	1.952	1.8
21/06/2016	C44	D5	3	15.8	1.880	1.0
21/06/2016	C45	D5	4	18.7	1.856	-3.1
21/06/2016	C46	D4	4	16.6	1.906	-1.9
22/06/2016	C47	E5	4	21.1	1.825	-5.8
22/06/2016	C48	F5	4	16.8	1.837	1.5
23/06/2016	C49	B4	1	17.1	1.885	-1.6
23/06/2016	C50	C5	1	16.5	1.928	-2.9
24/06/2016	C51	C4	2	15.3	1.949	-1.6
24/06/2016	C52	C5	2	15.3	1.756	8.4
27/06/2016	C53	A2	1	14.3	1.934	1.1
27/06/2016	C54	A4	1	14.3	1.996	-2.0
28/06/2016	C55	B4	3	16.9	1.868	-0.4
28/06/2016	C56	C4	3	16.8	1.958	-4.9
28/06/2016	C57	C5	4	14.5	1.999	-2.7
28/06/2016	C58	C4	4	16.3	1.930	-2.6
30/06/2016	C59	A1	2	16.9	1.907	-2.4
30/06/2016	C60	A3	2	15.5	1.866	2.3
01/07/2016	C61	A2	3	15.2	1.951	-1.5
01/07/2016	C62	A1	3	16.1	1.891	0.0
01/07/2016	C63	A3	4	16.3	1.909	-1.5
01/07/2016	C64	A1	4	14.1	1.867	4.9
04/07/2016	C65	A4	3	14.1	1.934	1.5
04/07/2016	C66	A4	3	13.7	1.984	-0.2
04/07/2016	C67	A4	4	15.2	1.903	1.0
04/07/2016	C68	A4	4	16.3	1.869	0.7

05/09/2016	C69	A4	1	16.5	1.915	-2.1
05/09/2016	C70	C5	1	12.8	1.964	2.5
05/09/2016	C71	B6	1	15.4	1.869	2.3
05/09/2016	C72	B5	2	13.4	1.961	1.6
05/09/2016	C73	A5	2	13.6	1.957	1.4
05/09/2016	C74	D5	2	14.9	1.946	-0.7
06/09/2016	C75	B6	3	14.8	1.933	0.2
06/09/2016	C76	C4	3	12.4	1.936	4.8
06/09/2016	C77	A4	3	14.2	1.948	0.6
06/09/2016	C78	A5	4	15.5	1.860	2.6
06/09/2016	C79	B5	4	13.5	1.972	0.8
06/09/2016	C80	C5	4	12.3	2.015	1.1

In-situ core density test results



Appendix H Laboratory Permeability Tests Results

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411032

Contract: Hafod Landfill - Capping Phase 1

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:	**S52321 / 242604**
Client Ref. No:	**HAF/CAP/CLA/P1**
Date and Time of Sampling:	**16/04/2015**
Date of Receipt at Lab:	**20/04/2015**
Date of Start of Test:	**21/04/2015**
Sampling Location:	**Trial Pad - B2 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy very 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:	99 mm	N/A
Moisture Content:	12.3 %	13.7 %
Bulk density:	2.232 Mg/m^3	2.327 Mg/m^3
Dry density:	1.988 Mg/m^3	2.047 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:	1.00
Duration of stage:	8 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	4 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 = 8.6×10^{-11} m/s

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411318

Contract: Hafod Landfill - Capping Phase 1

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:	**S52359 / 242606**
Client Ref. No:	**HAF/CAP/CLA/P2**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**24/04/2015**
Sampling Location:	**C3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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:	100 mm	N/A
Moisture Content:	12.7 %	12.7 %
Bulk density:	2.259 Mg/m^3	2.305 Mg/m^3
Dry density:	2.004 Mg/m^3	2.004 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:	0.34
Final pore pressure coefficient,B:	1.00
Duration of stage:	4 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	2 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 = 1.3×10^{-10} m/s

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411328

Contract: Hafod Landfill - Capping Phase 1

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:	**S52359 / 242610**
Client Ref. No:	**HAF/CAP/CLA/P3**
Date and Time of Sampling:	**20/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**24/04/2015**
Sampling Location:	**C5 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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:	100 mm	N/A
Moisture Content:	13.7 %	13.4 %
Bulk density:	2.208 Mg/m^3	2.290 Mg/m^3
Dry density:	1.942 Mg/m^3	2.019 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: **0.54**

Final pore pressure coefficient,B: **1.00**

Duration of stage: **4 days**

Consolidation stage:

Effective pressure: **100 kPa**

Duration of stage: **2 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 = 2.3×10^{-10} m/s

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411335

Contract: Hafod Landfill - Capping Phase 1

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:	**S52359 / 242613**
Client Ref. No:	**HAF/CAP/CLA/P4**
Date and Time of Sampling:	**21/04/2015**
Date of Receipt at Lab:	**22/04/2015**
Date of Start of Test:	**24/04/2015**
Sampling Location:	**D5 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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:	98 mm	N/A
Moisture Content:	12.9 %	13.5 %
Bulk density:	2.218 Mg/m^3	2.290 Mg/m^3
Dry density:	1.965 Mg/m^3	2.018 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:	0.20
Final pore pressure coefficient,B:	0.96
Duration of stage:	4 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	2 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 = 7.4×10^{-11} m/s

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411678

Contract: Hafod Landfill - Capping Phase 1

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:	**S52409 / 242619**
Client Ref. No:	**HAF/CAP/CLA/P/5**
Date and Time of Sampling:	**22/04/2015**
Date of Receipt at Lab:	**24/04/2015**
Date of Start of Test:	**27/04/2015**
Sampling Location:	**D4 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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:	100 mm	N/A
Moisture Content:	13.0 %	13.4 %
Bulk density:	2.214 Mg/m^3	2.267 Mg/m^3
Dry density:	1.959 Mg/m^3	1.999 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: **0.14**

Final pore pressure coefficient,B: **0.96**

Duration of stage: **2 days**

Consolidation stage:

Effective pressure: **100 kPa**

Duration of stage: **4 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

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415844

Contract: Hafod Landfill - Capping Phase 2

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:	**S52903 / 242621**
Client Ref. No:	**HAF/CAP/CLA/P/6**
Date and Time of Sampling:	**26/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**29/05/2015**
Sampling Location:	**B9 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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:	100 mm	N/A
Moisture Content:	12.8 %	13.5 %
Bulk density:	2.226 Mg/m^3	2.284 Mg/m^3
Dry density:	1.973 Mg/m^3	2.012 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:	0.96
Duration of stage:	4 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	2 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 = 1.3×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415862

Contract: Hafod Landfill - Capping Phase 2

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:	**S52903 / 242627**
Client Ref. No:	**HAF/CAP/CLA/P/7**
Date and Time of Sampling:	**27/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**29/05/2015**
Sampling Location:	**D10 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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:	101 mm	N/A
Moisture Content:	11.4 %	12.5 %
Bulk density:	2.222 Mg/m^3	2.295 Mg/m^3
Dry density:	1.995 Mg/m^3	2.040 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: **0.08**

Final pore pressure coefficient,B: **0.96**

Duration of stage: **4 days**

Consolidation stage:

Effective pressure: **100 kPa**

Duration of stage: **2 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 = 3.5×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 416318

Contract: Hafod Landfill - Capping Phase 2

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:	**No**
Laboratory Ref. No:	**S52966 / 242629**
Client Ref. No:	**HAF/CAP/CLA/P/8**
Date and Time of Sampling:	**28/05/2015**
Date of Receipt at Lab:	**02/06/2015**
Date of Start of Test:	**02/06/2015**
Sampling Location:	**C2 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very 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:	99 mm	N/A
Moisture Content:	11.8 %	13.7 %
Bulk density:	2.193 Mg/m^3	2.272 Mg/m^3
Dry density:	1.962 Mg/m^3	1.998 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:	0.18
Final pore pressure coefficient,B:	1.00
Duration of stage:	7 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	2 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 = 2.9×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 467792

Contract: Hafod Landfill - Capping Phase 2

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:	**No**
Laboratory Ref. No:	**S58728 / 212502**
Client Ref. No:	**Perm 9**
Date and Time of Sampling:	**02/06/2016**
Date of Receipt at Lab:	**06/06/2016**
Date of Start of Test:	**13/06/2016**
Sampling Location:	**Trial Pad**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown 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:	98.9 mm	N/A
Height:	105.1 mm	N/A
Moisture Content:	13.6 %	13.9 %
Bulk density:	2.199 Mg/m^3	2.281 Mg/m^3
Dry density:	1.936 Mg/m^3	2.003 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:	0.14
Final pore pressure coefficient,B:	0.96
Duration of stage:	8 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	2 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 = 7.5×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 468777

Contract: Hafod Landfill - Capping Phase 2

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:	**S58866 / 212507**
Client Ref. No:	**HAF/CAP/CLA/P10**
Date and Time of Sampling:	**08/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**22/06/2016**
Sampling Location:	**D5 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown 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:	101.1 mm	N/A
Height:	101.5 mm	N/A
Moisture Content:	15.1 %	15.0 %
Bulk density:	2.131 Mg/m^3	2.160 Mg/m^3
Dry density:	1.851 Mg/m^3	1.878 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:	0.78
Final pore pressure coefficient,B:	0.96
Duration of stage:	6 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	2 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 = 2.5×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 468784

Contract: Hafod Landfill - Capping Phase 2

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:	**S58866 / 212510**
Client Ref. No:	**HAF/CAP/CLA/P11**
Date and Time of Sampling:	**09/06/2016**
Date of Receipt at Lab:	**14/06/2016**
Date of Start of Test:	**22/06/2016**
Sampling Location:	**D4 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown 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:	101.3 mm	N/A
Height:	100.1 mm	N/A
Moisture Content:	14.5 %	13.9 %
Bulk density:	2.227 Mg/m^3	2.281 Mg/m^3
Dry density:	1.945 Mg/m^3	2.003 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:	0.78
Final pore pressure coefficient,B:	0.98
Duration of stage:	6 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	2 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 = 2.3×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 469629

Contract: Hafod Landfill - Capping Phase 2

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:	**S58991 / 212515**
Client Ref. No:	**HAF/CAP/CLA/P12**
Date and Time of Sampling:	**13/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**04/07/2016**
Sampling Location:	**D3 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown 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:	98.9 mm	N/A
Height:	103.7 mm	N/A
Moisture Content:	11.4 %	11.4 %
Bulk density:	2.224 Mg/m^3	2.276 Mg/m^3
Dry density:	1.996 Mg/m^3	2.043 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:	0.74
Final pore pressure coefficient,B:	1.00
Duration of stage:	4 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	4 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 = 2.3×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 469636

Contract: Hafod Landfill - Capping Phase 2

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:	**S58991 / 212518**
Client Ref. No:	**HAF/CAP/CLA/P13**
Date and Time of Sampling:	**16/06/2016**
Date of Receipt at Lab:	**20/06/2016**
Date of Start of Test:	**04/07/2016**
Sampling Location:	**B4 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown 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:	99.1 mm	N/A
Height:	106.5 mm	N/A
Moisture Content:	13.0 %	13.3 %
Bulk density:	2.160 Mg/m^3	2.213 Mg/m^3
Dry density:	1.912 Mg/m^3	1.953 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:	0.52
Final pore pressure coefficient,B:	0.96
Duration of stage:	7 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	2 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 = 2.4×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 470487

Contract: Hafod Landfill - Capping Phase 2

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:	**S59080 / 212521**
Client Ref. No:	**HAF/CAP/CLA/P14**
Date and Time of Sampling:	**20/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**04/07/2016**
Sampling Location:	**B1 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown 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:	100.8 mm	N/A
Height:	101.2 mm	N/A
Moisture Content:	10.2 %	10.4 %
Bulk density:	2.293 Mg/m^3	2.342 Mg/m^3
Dry density:	2.081 Mg/m^3	2.121 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:	0.62
Final pore pressure coefficient,B:	0.98
Duration of stage:	5 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	4 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 = 2.8×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 470494

Contract: Hafod Landfill - Capping Phase 2

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:	**S59080 / 212524**
Client Ref. No:	**HAF/CAP/CLA/P15**
Date and Time of Sampling:	**21/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**04/07/2016**
Sampling Location:	**D4 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown 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:	99.5 mm	N/A
Height:	102.2 mm	N/A
Moisture Content:	15.2 %	14.9 %
Bulk density:	2.161 Mg/m^3	2.213 Mg/m^3
Dry density:	1.876 Mg/m^3	1.926 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:	1.00
Duration of stage:	3 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	4 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 = 3.4×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 470507

Contract: Hafod Landfill - Capping Phase 2

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:	**S59080 / 212529**
Client Ref. No:	**HAF/CAP/CLA/P16**
Date and Time of Sampling:	**24/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**04/07/2016**
Sampling Location:	**C4 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown 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:	100.8 mm	N/A
Height:	100.4 mm	N/A
Moisture Content:	10.6 %	11.1 %
Bulk density:	2.247 Mg/m^3	2.302 Mg/m^3
Dry density:	2.032 Mg/m^3	2.072 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:	0.40
Final pore pressure coefficient,B:	0.96
Duration of stage:	5 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	4 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 = 2.0×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 471522

Contract: Hafod Landfill - Capping Phase 2

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:	**No**
Laboratory Ref. No:	**S59182 / 212531**
Client Ref. No:	**HAF/CAP/CLA/P17**
Date and Time of Sampling:	**27/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**13/07/2016**
Sampling Location:	**A3 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown 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:	100.9 mm	N/A
Height:	94.8 mm	N/A
Moisture Content:	12.9 %	13.2 %
Bulk density:	2.199 Mg/m^3	2.265 Mg/m^3
Dry density:	1.948 Mg/m^3	2.001 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:	0.70
Final pore pressure coefficient,B:	1.00
Duration of stage:	8 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	4 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 = 2.3×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 471529

Contract: Hafod Landfill - Capping Phase 2

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:	**No**
Laboratory Ref. No:	**S59182 / 212534**
Client Ref. No:	**HAF/CAP/CLA/P18**
Date and Time of Sampling:	**28/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**13/07/2016**
Sampling Location:	**C4 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown 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:	101.0 mm	N/A
Height:	88.7 mm	N/A
Moisture Content:	13.8 %	14.6 %
Bulk density:	2.187 Mg/m^3	2.273 Mg/m^3
Dry density:	1.922 Mg/m^3	1.983 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:	0.50
Final pore pressure coefficient,B:	1.00
Duration of stage:	8 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	4 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 = 2.0×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 471538

Contract: Hafod Landfill - Capping Phase 2

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:	**No**
Laboratory Ref. No:	**S59182 / 212538**
Client Ref. No:	**HAF/CAP/CLA/P19**
Date and Time of Sampling:	**01/07/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**13/07/2016**
Sampling Location:	**A1 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown 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:	100.9 mm	N/A
Height:	95.8 mm	N/A
Moisture Content:	13.5 %	13.7 %
Bulk density:	2.236 Mg/m^3	2.339 Mg/m^3
Dry density:	1.970 Mg/m^3	2.057 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: **0.80**

Final pore pressure coefficient,B: **1.00**

Duration of stage: **6 days**

Consolidation stage:

Effective pressure: **100 kPa**

Duration of stage: **4 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 = 1.5×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 471565

Contract: Hafod Landfill - Capping Phase 2

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:	**S59205 / 212542**
Client Ref. No:	**HAF/CAP/CLA/P20**
Date and Time of Sampling:	**04/07/2016**
Date of Receipt at Lab:	**05/07/2016**
Date of Start of Test:	**13/07/2016**
Sampling Location:	**B2 Layer 4**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown 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:	101.2 mm	N/A
Height:	104.3 mm	N/A
Moisture Content:	12.2 %	13.1 %
Bulk density:	2.213 Mg/m^3	2.295 Mg/m^3
Dry density:	1.972 Mg/m^3	2.029 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:	0.34
Final pore pressure coefficient,B:	0.98
Duration of stage:	8 days

Consolidation stage:

Effective pressure:	100 kPa
Duration of stage:	4 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 = 2.3×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 October 2016
Test Report Ref: STR 481065

Contract: Hafod Landfill - Capping Phase 2

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:	**S60205 / 212544**
Client Ref. No:	**HAF/CAP/CLA/P21**
Date and Time of Sampling:	**05/09/2016**
Date of Receipt at Lab:	**07/09/2016**
Date of Start of Test:	**28/09/2016**
Sampling Location:	**Area 7 - A4 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown sandy very 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:	99.1 mm	N/A
Height:	118.1 mm	N/A
Moisture Content:	15.7 %	14.4 %
Bulk density:	2.134 Mg/m^3	2.157 Mg/m^3
Dry density:	1.844 Mg/m^3	1.885 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:	0.86
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 = 2.1×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 October 2016
Test Report Ref: STR 481072

Contract: Hafod Landfill - Capping Phase 2

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:	**S60205 / 212547**
Client Ref. No:	**HAF/CAP/CLA/P22**
Date and Time of Sampling:	**05/09/2016**
Date of Receipt at Lab:	**07/09/2016**
Date of Start of Test:	**28/09/2016**
Sampling Location:	**Area 7 - A5 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown sandy very 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:	101.2 mm	N/A
Height:	100.1 mm	N/A
Moisture Content:	12.4 %	13.0 %
Bulk density:	2.184 Mg/m^3	2.261 Mg/m^3
Dry density:	1.943 Mg/m^3	2.001 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:	0.44
Final pore pressure coefficient,B:	0.96
Duration of stage:	6 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 = 2.8×10^{-10} m/s

CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 October 2016
Test Report Ref: STR 481079

Contract: Hafod Landfill - Capping Phase 2

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:	**S60205 / 212550**
Client Ref. No:	**HAF/CAP/CLA/P23**
Date and Time of Sampling:	**06/09/2016**
Date of Receipt at Lab:	**07/09/2016**
Date of Start of Test:	**28/09/2016**
Sampling Location:	**Area 7 - A4 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**Core Cutter**
Sampled By:	**Client**
Material Description:	**Red/brown sandy very 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:	101.2 mm	N/A
Height:	101.9 mm	N/A
Moisture Content:	11.9 %	12.6 %
Bulk density:	2.201 Mg/m^3	2.268 Mg/m^3
Dry density:	1.967 Mg/m^3	2.014 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:	0.96
Duration of stage:	6 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 = 2.6×10^{-10} m/s

Appendix I Laboratory Shear Test Results

CQA Ltd.
33 Rodney Road

Cheltenham
Gloucestershire
GL50 1HX

Date: 20 May 2015
Test Report Ref: STR 411668

Contract: Hafod Landfill - Capping Phase 1

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure in accordance with **BS 1377-7: 1990 Clause 8**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52409 / 242615**
Client Ref. No:	**HAF/CAP/CLA/SS/1**
Date and Time of Sampling:	**22/04/2015**
Date of Receipt at Lab:	**24/04/2015**
Date of Start of Test:	**27/04/2015**
Sampling Location:	**A4 Layer 3**
Name of Source:	**Site Won**
Method of Sampling:	**U38 Tube**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

See attached

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

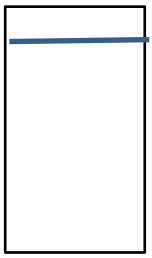
Approved by: -
Eric Goulden
Technical Manager

Sample Condition: UNDISTURBED/~~REMOULDED~~*

If remoulded state method of compaction: ~~2.5kg rammer/4.5kg rammer~~*

* Delete as appropriate.

ORIENTATION AND POSITION OF UNDISTURBED SAMPLE WITHIN SAMPLING CONTAINER



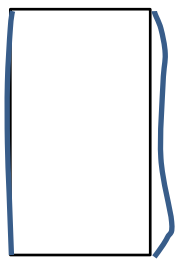
Initial Specimen Length	75 mm
Initial Specimen Diameter	38 mm
Initial Moisture Content	11.9 %
Bulk Density	2.152 Mg/m³
Dry Density	1.923 Mg/m³
Rate of Strain	1.5 %/min
Latex Membrane Thickness	0.2 mm
Membrane Correction	2.0 kPa
Cell Pressure	200 kPa
Corrected Maximum Deviator Stress at failure	308 kPa
Strain at Failure	20.0 %
Shear Strength C_u	**154 kPa**

Mode of Failure: Plastic Failure (Barrelling) *

~~Brittle Failure (Shear Plane)~~ *

~~Intermediate Type~~ *

* Delete as appropriate.



CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 18 June 2015
Test Report Ref: STR 415855

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure in accordance with **BS 1377-7: 1990 Clause 8**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S52903 / 242624**
Client Ref. No:	**HAF/CAP/CLA/SS/2**
Date and Time of Sampling:	**26/05/2015**
Date of Receipt at Lab:	**28/05/2015**
Date of Start of Test:	**11/06/2015**
Sampling Location:	**B10 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**U38 Tube**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly sandy very silty CLAY**
Target Specification:	**N/A**

RESULTS:

See attached

Comments
None

Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

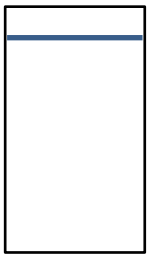
Approved by: -
Eric Goulden
Technical Manager

Sample Condition: UNDISTURBED/~~REMOULDED~~*

If remoulded state method of compaction: ~~2.5kg rammer/4.5kg rammer~~*

* Delete as appropriate.

ORIENTATION AND POSITION OF UNDISTURBED SAMPLE WITHIN SAMPLING CONTAINER



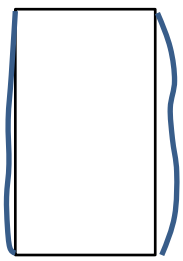
Initial Specimen Length	76 mm
Initial Specimen Diameter	38 mm
Initial Moisture Content	14.3 %
Bulk Density	2.190 Mg/m³
Dry Density	1.916 Mg/m³
Rate of Strain	1.5 %/min
Latex Membrane Thickness	0.2 mm
Membrane Correction	2.0 kPa
Cell Pressure	200 kPa
Corrected Maximum Deviator Stress at failure	283 kPa
Strain at Failure	20.0 %
Shear Strength C_u	**142 kPa**

Mode of Failure: Plastic Failure (Barrelling) *

~~Brittle Failure (Shear Plane)~~ *

~~Intermediate Type~~ *

* Delete as appropriate.



CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 471534

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure in accordance with **BS 1377-7: 1990 Clause 8**

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S59182 / 212536**
Client Ref. No:	**HAF/CAP/CLA/SS4**
Date and Time of Sampling:	**30/06/2016**
Date of Receipt at Lab:	**04/07/2016**
Date of Start of Test:	**19/07/2016**
Sampling Location:	**A3 Layer 2**
Name of Source:	**Site Won**
Method of Sampling:	**U38 Tube**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

See attached

Comments
None

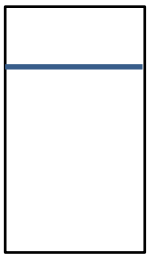
Certificate Prepared by:- Meical Owen
Assistant Laboratory Manager

Approved by: - Eric Goulden
Technical Manager

Sample Condition: UNDISTURBED

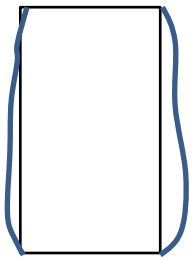
If remoulded state method of compaction:

ORIENTATION AND POSITION OF UNDISTURBED SAMPLE WITHIN SAMPLING CONTAINER



Initial Specimen Length	77 mm
Initial Specimen Diameter	38 mm
Initial Moisture Content	14.6 %
Bulk Density	2.160 Mg/m³
Dry Density	1.885 Mg/m³
Rate of Strain	1.5 %/min
Latex Membrane Thickness	0.6 mm
Membrane Correction	2.2 kPa
Cell Pressure	200 kPa
Corrected Maximum Deviator Stress at failure	154 kPa
Strain at Failure	20.0 %
Shear Strength C_u	**77 kPa**

Mode of Failure: Plastic Failure (Barrelling) *
~~Brittle Failure (Shear Plane)~~ *
~~Intermediate Type~~ *
* Delete as appropriate.



CQA International Ltd.
The Keele Centre
Three Mile Lane
Keele
Staffordshire
ST5 5HH

Date: 04 August 2016
Test Report Ref: STR 470483

Contract: Hafod Landfill - Capping Phase 2

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Undrained Shear Strength in Triaxial Compression Without Measurement of Pore Pressure in accordance with **BS 1377-7: 1990 Clause 8**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59080 / 212519**
Client Ref. No:	**HAF/CAP/CLA/SS3**
Date and Time of Sampling:	**20/06/2016**
Date of Receipt at Lab:	**27/06/2016**
Date of Start of Test:	**01/07/2016**
Sampling Location:	**B2 Layer 1**
Name of Source:	**Site Won**
Method of Sampling:	**U38 Tube**
Sampled By:	**Client**
Material Description:	**Red/brown gravelly very sandy silty CLAY**
Target Specification:	**N/A**

RESULTS:

See attached

Comments
None

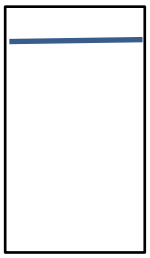
Certificate Prepared by:-
Meical Owen
Assistant Laboratory Manager

Approved by: -
Eric Goulden
Technical Manager

Sample Condition: UNDISTURBED

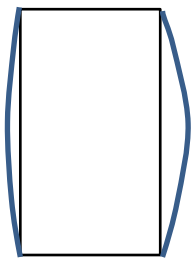
If remoulded state method of compaction:

ORIENTATION AND POSITION OF UNDISTURBED SAMPLE WITHIN SAMPLING CONTAINER



Initial Specimen Length	76 mm
Initial Specimen Diameter	38 mm
Initial Moisture Content	10.7 %
Bulk Density	2.238 Mg/m³
Dry Density	2.022 Mg/m³
Rate of Strain	1.0 %/min
Latex Membrane Thickness	0.6 mm
Membrane Correction	1.9 kPa
Cell Pressure	200 kPa
Corrected Maximum Deviator Stress at failure	404 kPa
Strain at Failure	17.0 %
Shear Strength C_u	**202 kPa**

Mode of Failure: Plastic Failure (Barrelling) *
~~Brittle Failure (Shear Plane)~~ *
~~Intermediate Type~~ *
* Delete as appropriate.



Appendix J Shear Vane Results

Hand Shear Vane Results, Haford Quarry Landfill Site Capping Phase 2A

Core Sample No.	Test Date	Test Location		Shear Strength, kPa				Moisture Content, %
		Grid	Layer	1	2	3	Mean	
C1	20-Apr	C3	2	183	183	201	189	12.1
C2	21-Apr	B2	3	145	217	190	184	13.9
C3	21-Apr	B4	3	177	171	145	164	13.1
C4	21-Apr	D4	3	148	177	203	176	14.0
C5	21-Apr	C4	3	145	209	161	172	14.7
C6	22-Apr	A1	4	193	225	190	>203	13.9
C7	22-Apr	A2	4	225	209	225	>220	11.1
C8	22-Apr	C6	4	225	225	209	>220	14.6
C9	22-Apr	D6	4	225	225	203	>218	12.4
C10	22-Apr	D5	4	138	193	222	184	13.3
C11	26-May	D9	1	126	138	145	136	10.6
C12	26-May	C10	1	145	138	193	159	10.2
C13	26-May	B9	2	177	219	193	196	12.9
C14	26-May	B10	2	145	145	138	143	16.1
C15	26-May	D1	2	193	193	219	202	13.9
C16	27-May	C1	3	177	161	209	182	12.2
C17	27-May	B9	3	129	161	177	156	12.3
C18	27-May	D10	3	190	190	225	>202	13.2
C19	28-May	B1	4	145	161	177	161	13.4
C20	28-May	C2	4	177	145	161	161	12.2

Hand Shear Vane Results, Haford Quarry Landfill Site Capping Phase 2B

Core Sample No.	Test Date	Test Location		Shear Strength, kPa				Moisture Content, %
		Grid	Layer	1	2	3	Mean	
C21	07/06/2016	F5	1	208	203	208	>206	17.4
C22	07/06/2016	F6	1	208	208	203	>206	16.6
C23	07/06/2016	F4	1	89	134	104	109	19.1
C24	07/06/2016	E5	1	194	200	188	194	18.0
C25	08/06/2016	F5	2	77	68	63	69	16.2
C26	08/06/2016	F6	2	95	98	134	109	16.3
C27	08/06/2016	E4	2	89	89	134	104	16.8
C28	08/06/2016	D5	2	60	66	104	76	16.6
C29	09/06/2016	F6	3	60	74	128	87	16.9
C30	09/06/2016	F4	3	60	66	104	76	18.3
C31	09/06/2016	D4	3	60	74	104	79	17.9
C32	10/06/2016	D3	1	68	74	95	79	16.8
C33	13/06/2016	D3	2	74	83	104	87	12.3
C34	13/06/2016	D3	3	77	104	137	106	12.3
C35	13/06/2016	D3	4	68	89	119	92	12.4
C36	14/06/2016	C3	1	89	83	134	102	12.1
C37	15/06/2016	C4	2	66	86	134	95	17.4
C38	16/06/2016	B4	3	98	104	95	99	15.9
C39	16/06/2016	C3	4	63	63	104	76	14.3
C40	20/06/2016	B2	1	119	149	185	151	14.5
C41	20/06/2016	B3	1	119	179	134	144	12.2
C42	20/06/2016	B1	2	98	104	110	104	12.7
C43	20/06/2016	B4	2	89	86	104	93	13.5
C44	21/06/2016	D5	3	89	119	134	114	15.8
C45	21/06/2016	D5	4	104	107	86	99	18.7
C46	21/06/2016	D4	4	104	107	98	103	16.6
C47	22/06/2016	E5	4	89	92	68	83	21.1
C48	22/06/2016	F5	4	89	104	98	97	16.8

In-situ Vane Shear Test results

C49	23/06/2016	B4	1	104	83	104	97	17.1
C50	23/06/2016	C5	1	104	83	104	97	16.5
C51	24/06/2016	C4	2	104	107	101	104	15.3
C52	24/06/2016	C5	2	104	110	119	111	15.3
C53	27/06/2016	A2	1	122	118	143	128	14.3
C54	27/06/2016	A4	1	143	131	155	143	14.3
C55	28/06/2016	B4	3	74	104	83	87	16.9
C56	28/06/2016	C4	3	98	134	98	110	16.8
C57	28/06/2016	C5	4	119	134	146	133	14.5
C58	28/06/2016	C4	4	119	116	113	116	16.3
C59	30/06/2016	A1	2	86	113	119	106	16.9
C60	30/06/2016	A3	2	89	134	119	114	15.5
C61	01/07/2016	A2	3	80	104	110	98	15.2
C62	01/07/2016	A1	3	83	95	104	94	16.1
C63	01/07/2016	A3	4	68	77	83	76	16.3
C64	01/07/2016	A1	4	86	119	113	106	14.1
C65	04/07/2016	A4	3	137	208	179	>175	14.1
C66	04/07/2016	A4	3	143	146	208	>166	13.7
C67	04/07/2016	A4	4	128	208	137	>158	15.2
C68	04/07/2016	A4	4	122	143	164	143	16.3
C69	05/09/2016	A4	1	119	113	86	106	16.5
C70	05/09/2016	C5	1	95	104	113	104	12.8
C71	05/09/2016	B6	1	137	179	164	160	15.4
C72	05/09/2016	B5	2	83	77	68	76	13.4
C73	05/09/2016	A5	2	146	208	143	>166	13.6
C74	05/09/2016	D5	2	137	143	164	148	14.9
C75	06/09/2016	B6	3	122	119	116	119	14.8
C76	06/09/2016	C4	3	146	143	208	>166	12.4
C77	06/09/2016	A4	3	134	113	119	122	14.2
C78	06/09/2016	A5	4	89	86	119	98	15.5
C79	06/09/2016	B5	4	80	104	95	93	13.5
C80	06/09/2016	C5	4	122	110	104	112	12.3