Docksway Disposal Site, Newport

Area 2, Cell 3a Clay Lining – CQA Validation Report

On behalf of **Newport City Council**

Project Ref: 14739/3514 | Rev: 01 | Date: July 2016

Office Address: Caversham Bridge House, Waterman Place, Reading, Berkshire RG1 8DN
T: +44 (0)118 950 0761 F: +44 (0)118 959 7498 E: reading@peterbrett.com

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Project Ref: **14739/3514**

Report Title: **Area 2, Cell 3a Clay Lining – CQA Validation Report**

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	Name	Position	Signature	Date
Prepared by:	Kate Riley	Principal Engineer		28/7/16
Approved by:	Richard Thomas	Senior Consultant		28/7/16
For and on behalf of Peter Brett Associates LLP				

Revision	Date	Description	Prepared	Reviewed	Approved
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1 Introduction

1.1 Background

1.1.1 Docksway Disposal Site is an active licensed waste disposal site located approximately 3km south of Newport City Centre, Gwent, and is centred on National Grid Reference ST 305 853. The site is operated by Newport City Council, referred to hereafter as NCC. The location of the site is shown on Figure 1.

1.1.2 The site is approximately split into a northern half (Area 1) and a southern half (Area 2). Area 1 is an unlined ('dilute and disperse') landfill that was operated under waste management licence (WML) number EAWML30058 and is now closed and in the aftercare phase, whilst Area 2 is an engineered containment landfill that is active and operated under Pollution Prevention Control (PPC) Permit No. DP3733BK.

1.1.3 Area 2 comprises five engineered landfill cells (Cells 1-5), as shown on Figure 2. Cells 1 and 2 have previously been constructed and are receiving waste, whilst Cells 3-4 are currently under construction and construction of Cell 5 has not currently started.

1.1.4 The Area 2 Engineering Design Philosophy[1] for the site describes the Area 2 design concept and this includes the construction of an Engineered Barrier System (EBS) above a natural geological barrier. Part of the EBS is a 1.2m thick engineered clay barrier with a hydraulic conductivity of no greater than $1x10^{-9}$ m/s, and this is created from imported clay material that is engineered in situ. This maximum permeability is based on the conservative value of vertical hydraulic conductivity used for LandSim modelling work, as described in the Conceptual Model and Hydrogeological Risk Assessment for Area 2 – Landfill Extension, PBA 2005[2].

1.1.5 This CQA Validation report describes the works in Cell 3a carried out to construct and validate the engineered clay barrier part of the EBS as described above, and in general accordance with Environment Agency (EA) guidance document LFE 4 – 'Earthworks in landfill engineering' (LFE4). The work was carried out in accordance with the CQA Plan that was submitted to Natural Resources Wales (NRW) prior to commencement of the clay lining works. A copy of the CQA Plan is presented in Annex B of Appendix 1 (CQA Engineer's Report).

1.1.6 Cell 3 has been split into two halves (Cell 3a and Cell 3b) to enable different material types to be deposited in each half, separated by a physical separation barrier. The clay lining works for Cell 3b were suspended over the winter period and are currently ongoing. A separate CQA Validation report will be produced for Cell 3b in due course.

1.2 Parties

1.2.1 The following parties were involved in the undertaking of this project as described below, and with duties as defined in the CQA Plan for the works, presented in Annex B of Appendix 1.

1.2.2 **Client/Employer**: Newport City Council - responsible for preparing contract documents, drawings and specifications, reviewing Contractors (and Sub-Contractors) information, reviewing and agreeing amendments to contract documents, drawings and specifications, overseeing budgetary and contractual matters, provide day to day management of the works, surveying services, liaise with all parties.

1.2.3 **Contractor**: Jim Davis Civil Engineering Ltd (Contractor) – responsible for the preparation and construction of the works in accordance with the contract documents, drawings and specifications and to meet the requirements of the Employer and CQA Consultant.

1.2.4 **CQA Site Engineer:** Meirion Humphreys – Newport City Council – responsible for preparing the CQA Plan, for the day to day management of the works in accordance with the CQA Plan and the contract documents, drawings and specifications, under the direction of the CQA Consultant.

1.2.5 **CQA Consultant:** Peter Brett Associates LLP – responsible for reviewing the CQA Field Engineer's site diary, technical queries during the works and preparation of the CQA Validation Report.

1.3 Scope of Works

1.3.1 The clay lining phase of work for Cell 3a follows on from base stabilisation works of the alluvial clays in the former river channels within the wider Cells 3 and 4 areas. The stabilisation works have been the subject of separate CQA validation and a separate CQA Validation Report (PBA, March 2016) previously submitted to and approved by Natural Resources Wales (NRW).

1.3.2 The area of Cell 3 covers approximately 20,175m^2 and is to be split into two halves, with Cell 3a permitted for the disposal of Stable Non Reactive Hazardous Waste (SNRHW) and Cell 3b permitted for non-hazardous waste.

1.3.3 The cells are formed into shallow bowl shapes following and enhancing the natural topography of the site area.

1.3.4 Cell 3a covers an area of approximately 10,150m^2 and is designed with a gradient (for drainage) of 1(vertical):50 (horizontal) across the basal area towards a sump location at the lowest point within the cell area. The minimum thickness of engineered clay liner will be 1.2m across the base and up the sides of the bowl shaped cell to the level of the surrounding ground level (where the cell edges are against side slopes). However where the cell edges lie within the wider Area 2 and are not against existing side slopes, new engineered bunds will be created to a height of approximately 2m above the surface of the liner. A new internal engineered bund will be constructed on the western edge of Cell 3a, separating Cell 3a from Cell 4a (western cell division bund on Drawing Number 14739/155/001 in Appendix 2), and on the southern edge of Cell 3a, separating Cell 3a from Cell 3b (cell division bund on Drawing Number 14739/155/001 in Appendix 2). A new engineered external bund has been constructed on the northern edge of Cell 3a (northern bund on Drawing Number 14739/155/001 in Appendix 2).

1.4 Clay Source and Suitability Testing

1.4.1 The clay used for the lining works described herein was imported from Wingmoor Farm, located at Bishops Cleeve in Gloucestershire. The source material has previously been used in the clay lining works for Cell 2 at the site and has therefore been approved previously. The imported clay is excavated from within the source site and comprises material from the Blue Lias Clay Formation. The clay used in this contract was from the same source as the clay used in Area 2 Cell 2 construction and therefore its suitability has been fully demonstrated (Report on Lias Clay Compaction Trial, Stage 2, Cell 2 – October 2008)[3].

1.4.2 Notwithstanding the previous suitability testing, additional material suitability testing was undertaken on samples of the source clay in accordance with the CQA Plan, and the results are presented in Annex E of Appendix 1. The source testing identified that the Optimum Moisture Content (OMC) of the imported clay material was 15%, that the plastic limit varied between 23% and 27% and that the liquid limit varied between 46% and 55%.

1.4.3 The source testing results were used to define the ranges of acceptable limits for the imported clay. Although the source testing indicated an optimum moisture content of 15%, this was considered to be too far from the plastic limit to enable the imported clay material to be worked

and remoulded effectively. On the basis of the lowest plastic limit obtained during the source testing, the lower acceptable moisture content was set at the lowest plastic limit (23%) minus 5%, giving 18%. The upper acceptable moisture content was set at the average plastic limit from the source testing, of 25%. Previous use of the source material on this site indicated that the material could achieve permeability values well below the maximum allowable value (1 x 10^{-9} m/s) if the material was sufficiently compacted in accordance with the requirements given in LFE4 (i.e. <5% air voids). In addition to this, permeability test results provided by the Contractor for the source material also indicated that recompacted samples of the material had achieved permeability values lower than the prescribed maximum. The source material test results are presented in Annex E of Appendix 1.

1.5 Methodology and Plant

1.5.1 The works were carried out in general accordance with the methodology and using the plant described in the CQA Engineer's CQA Report, presented in Appendix 1, and summarised below. This methodology was developed following a field compaction trial, as described in Section 2.2.

1.5.2 The imported clay was stockpiled in advance of the works commencing, to facilitate progress once the works started. Visual inspection of the material indicated that it contained clods of material and that it was too dry to be efficiently worked and remoulded. Therefore the adopted methodology required the material to be conditioned by the addition of water to the material in the stockpile and working the material within the stockpile area to break the clods down before the material was transported to the cell area being lined. The conditioned material was then placed in layers at 300mm thickness and further worked during spreading by the 4 tonne bulldozer. Samples of material were taken for acceptability testing and then the material was compacted according to the adopted specification following the site compaction trial (see Section 2.2). Following compaction, samples of the compacted material were obtained using the core cutter method (BS 1377-9:1990) and transported to the UKAS accredited laboratory for compliance testing (see Sections 2.3 and 2.4).

1.5.3 The methodology that was developed for dealing with compliance failures was generally as described here and is specific to the reason for failure.

- Any cells with sample test results outside of the specified moisture content range were ripped through and re-conditioned before being recompacted.

- Cells with in situ density test results indicating greater than 5% air voids were re-sampled at two locations within the cell and both of these samples were submitted to the laboratory for testing. If both of the subsequent in situ density tests indicated air voids less than 5%, the cell was accepted without the requirement for remediation and the failed test result was accepted as being within the total allowance for failures. If both of the re-samples also indicated greater than 5% air voids, then the cell was ripped through, reconditioned as appropriate and recompacted.

- Cells with in situ density results indicating less than 0% air voids were re-sampled at two locations within the cell and these samples were submitted to the laboratory for testing. If the re-samples indicated compliant air voids, then the initial test result was accepted as compliant.

2 CQA Requirements

2.1 CQA Plan

2.1.1 A Construction Quality Assurance (CQA) Plan, describing the works to be carried out, defining the roles and responsibilities of the parties involved and the quality procedures to be adopted during the construction works was produced by the CQA Engineer and submitted to NRW for approval prior to commencement of the works. A copy of the CQA Plan is presented as Annex B of Appendix 1.

2.2 Compaction Trial

2.2.1 A compaction trial was carried out prior to commencement of the clay lining works, in accordance with the CQA Plan, and as described in Annex A of Appendix 1. The objective of the compaction trial was to determine the optimum working methods and material acceptability requirements to achieve the minimum requirements of the engineered clay barrier part of the EBS, described in Section 1.1.4.

2.2.2 The results of the compaction trial informed the proposed methodology that was adopted by the Contractor. The adopted methodology required the imported clay to be placed in 300mm thick (pre compaction) layers and to receive 12 passes of a Bomag BW 213 PDH-4 padfoot roller to achieve the maximum allowable permeability and to provide satisfactory remoulding of any clods within the imported clay (individual clod sizes to be <2/3 layer thickness).

2.3 Acceptability and Compliance

2.3.1 The engineered clay barrier must achieve permeability no greater than $1x10^{-9}$ m/s and this has been determined through laboratory testing of samples of the compacted clay material, taken systematically during the lining works at a minimum frequency of $1/2000m^3$, in accordance with the CQA Plan.

2.3.2 To provide further evidence that the engineered clay barrier has achieved the maximum permeability requirements, the Contractor is also required to demonstrate that the compacted clay contains less than 5% air voids, determined through laboratory testing of the compacted clay material, taken systematically during the lining works at a frequency of 1 per 25m x 25m grid cell (the works were set out using a 25m by 25m grid cell system, as described in the CQA Engineer's CQA Report, presented in Appendix 1.

2.3.3 The minimum thickness of the engineered clay barrier is 1.2m, and this is demonstrated through on site checks as work progresses, and through pre commencement and post construction surveys.

2.3.4 Operational controls during the clay lining works provided the Contractor with a framework to enable the consistency of the condition of the imported clay material to be controlled. The operational controls included placement of the clay within a moisture content range (18% to 25%), determined from the source testing and the compaction trial, and to optimise the workability of the material to ensure the objectives and compliance requirements were met.

2.4 Laboratory Accreditation

The samples for initial suitability, initial acceptability and subsequent permeability testing were submitted to UKAS accredited laboratory, GEO Site and Testing Services Ltd (GSTL), for testing in accordance with BS1377 Part 6 : 1990 Clause 6 – Determination of Permeability in a triaxial cell. The GSTL UKAS accreditation number is 2788.

The samples for the majority of the acceptability and compliance testing (excluding permeability) were submitted to UKAS accredited laboratory Apex Testing Solutions in Bridgend. The Apex UKAS accreditation number is 7771.

2.5 CQA Records

The CQA records of relevance to this CQA Validation Report are the laboratory certificates for the permeability testing and the insitu density testing, together with the associated compaction charts, the drawings showing the cell locations, and the CQA Field Engineer's weekly progress records. These CQA records are all presented in the CQA Engineer's Final Report presented in Appendix 1.

3 Works Progress

3.1 General

3.1.1 CQA Engineer's Weekly Reports

The Contractor commenced the clay lining works in Cell 3a on 29th June 2015 and completed the clay lining works in Cell 3a on 22nd October 2015.

The CQA Engineer has recorded progress over the 17 week period in weekly reports that are presented in Annex C of Appendix 1. The CQA Engineer was present on site during the works and recorded the weather, progress, technical issues, sampling and testing for each week and relevant photographs within the weekly reports.

3.1.2 Progress

As described in the CQA Engineer's Final Report, approximately 23,000m^3 of imported clay material was placed under the direction of the CQA Engineer, and in accordance with the CQA Plan, across Cell 3a during the 17 week period. This included the basal liner and also the engineered bunds. As shown on Drawing Number 2506_AB_02 in Annex D of Appendix 1 there are a total of 28 full and partial grid cells that cover the plan area of Cell 3a, and with a pre compacted layer thickness of 300mm, a total of 5 layers of material have been placed under CQA to achieve the minimum 1.2m thickness for the engineered clay barrier part of the EBS. In areas of engineered bunds, additional layers were placed under CQA to achieve the design levels. As the bund construction progressed, and levels increased, the plan areas of the bunds decreased and therefore CQA sampling and testing decreased on a pro rata basis whilst maintaining the minimum testing requirements.

Weekly and daily progress involving earthworks of this nature are entirely dependent on favourable weather conditions and the speed of compliance testing, and therefore the weekly reports show variations in progress on a week by week basis.

3.1.3 Problems Encountered

The main problem encountered during the works was the consistency with which the Contractor conditioned the clay and therefore compliance testing failures resulting in cells being resampled or ripped, reconditioned and recompacted, as described in Section 1.5.3.

4 Acceptability Testing

4.1 Moisture Content and Atterberg Limits

4.1.1 In general accordance with the CQA Plan, bulk samples of the conditioned material were taken from within the grid cells following placement and spreading but prior to compaction. The bulk samples were submitted to the laboratory for moisture content and atterberg limit testing.

4.1.2 The CQA Engineer indicates that there are a total of 122 laboratory test certificates for moisture content and atterberg limits and the CQA Engineer has determined the average and ranges for the results as follows. The results are in accordance with typical clay liner properties provided in LFE4, and predominantly in accordance with the specified acceptability limits (except for four exceptions, see Section 6).

- Moisture content range = 18-26%
- Moisture content average = 22%
- Liquid limit range = 33-58%
- Liquid limit average = 48%
- Plasticity Index range = 13-43%

4.1.3 The number of test results provides a test frequency of 1/189m^3, and this is significantly greater than the minimum requirements of 1/250m^3 (LFE4).

5 Compliance Testing

5.1 Moisture Content

The CQA Engineer indicates that there are a total of 160 laboratory test certificates for moisture content testing of core cutter samples following completion of compaction in the grid cells across Cell 3a. The results indicate a range of results predominantly within the specification requirements (except for two exceptions, see Section 6) and an average moisture content of 21%.

5.2 Field Dry Density

The CQA Engineer indicates that there are a total of 206 diamond black, diamond grey and diamond white results (in accordance with LFE4) for Cell 3a, of which 21 are diamond white. Diamond black results are samples with moisture contents within specification range and with less than or equal to 5% air voids, diamond grey results are samples with moisture contents within specification range and which plot above the 0% air voids line, and diamond white results are samples with moisture contents within specification range and with greater than 5% air voids.

Therefore, 90% of the total results are diamond black or diamond grey, and the results are compliant with LFE4 and can be considered to be acceptable.

Excluding retests and duplicates, the total number of standalone laboratory certificates for field dry density is 160, and this indicates a test frequency of 1/144m^3 which is significantly greater than the guidance frequency of 1/250m^3 provided in LFE4.

5.3 Permeability

There are a total of 12 laboratory test certificates for permeability testing of core samples obtained following completion of compaction across Cell 3a. The samples were obtained at a frequency of 1/2000m^3 in accordance with the CQA Plan. The results indicate compliant permeability values below the maximum allowable value of 1 x 10^{-9} m/s, as shown in the table below.

Cell 3a Permeability Results		
Cell Reference	Permeability Value (m/s)	Lab Certificate Reference (GSTL)
A4_C5	7.68 x 10^{-11}	27912
A56_C11	1.73 x 10^{-10}	28603
B6_C5	5.42 x 10^{-11}	27912
C5_C1	2.53 x 10^{-10}	27718
C5_P6	1.38 x 10^{-10}	28019
C7_C1	4.52 x 10^{-10}	27495
D5_C1	2.79 x 10^{-10}	27718

D6_C3	8.78×10^{-11}	27871
D7_C2	3.50×10^{-10}	27668
E4_C1	3.16×10^{-10}	27495
E5_2.2	5.83×10^{-10}	28390
E7_P3	3.27×10^{-10}	28019

5.4 Undrained Shear Strength

A total of 129 readings of undrained shear strength readings were taken using a Hand Shear Vane during the clay lining works in Cell 3a. These indicate shear strengths between 89kPa and 128kPa which are greater than the minimum 40kPa considered to be trafficable by typical landfill construction plants across clay liners.

5.5 Survey

The CQA Engineer has undertaken pre and post clay lining surveys to demonstrate liner thickness across Cell 3a. The as built drawings and cross sections contained in Annex D of Appendix 1 indicate that the minimum thickness of clay liner that has been constructed is greater than 1.2m.

6 Non-Conformities

6.1 General

6.1.1 Non conformities in terms of acceptability and compliance failures have generally been dealt with during progress of the work, as described in the CQA Engineer's weekly progress reports. That is to say that where there have been failures due to moisture content or percentage air voids, the grid cells where these failures were located have generally been rejected and reworked. That is to say they were ripped open, reconditioned, recompacted and retested. Where this has been completed and the subsequently recompacted and retested material has passed and been accepted, the original failures are no longer considered to be non-conformities.

6.1.2 There are four moisture content results from the bulk samples that were part of the acceptability testing and that were indicated to be outside of the specification range. These grid cell locations are B5_B2, B7_B6, D6_B5 and F4_B2. The recorded moisture content for each of these grid cells was 26%, just over the upper specification limit of 25%. It is considered that these results have not adversely affected the ability of the material to be compacted and to achieve the density and permeability requirements. Previous clay lining works at this site using this same source material have allowed for acceptable moisture contents up to 27%, and in consideration that these are only four results – it is not considered that any remedial action is required or appropriate.

6.1.3 There are two moisture content results from the core cutter samples that were part of the compliance testing and that were indicated to be outside of the specification range. These grid cell locations are B5_C1 and D7_C7. The recorded moisture contents were 17% and 26% respectively, both just outside the outer specification limits. It is considered that these results have not adversely affected the overall permeability of the liner, and both source test results and previous compaction results indicate that permeability values lower than the maximum allowable value can be achieved with material compacted at moisture contents within this range. In consideration of this, and that these are only two results in the Cell 3a area - it is not considered that any remedial action is required or appropriate.

7 Conclusions

7.1 General

7.1.1 The CQA Engineer's report and the results of the laboratory testing indicate that the Cell 3a clay lining works have been completed successfully and in accordance with the CQA Plan and LFE4.

7.1.2 As built drawings and cross sections supplied by NCC indicate that the minimum thickness of the engineered clay liner is at, or exceeds, 1.2m which is the minimum thickness required, and that the minimum design gradients have been achieved.

7.1.3 The in situ density results indicate that the minimum requirements of 90% of the total samples comprising diamond black and diamond grey results, as set out in guidance document LFE4 have been achieved.

7.1.4 The permeability results indicate that permeability values significantly below the maximum allowable value (1×10^{-9}) have been achieved for each of the samples.

7.1.5 It is considered that the clay lining works have been completed in general accordance with the CQA Plan, LFE4 and the engineering design philosophy.

REFERENCES

[1] Docksway Landfill Site, Area 2 Engineering Design Philosophy (Rev A) – Peter Brett Associates, 2005.

[2] Docksway Disposal Site, Newport. Conceptual Model and Hydrogeological Risk Assessment for Area 2 – Landfill Extension. Peter Brett Associates, April 2005.

[3] Docksway Landfill, Newport City Council. Report on Lias Clay Compaction Trial Stage 2, Cell 2. Peter Brett Associates, October 2008.

FIGURES

Site Grid Reference: ST 309 852

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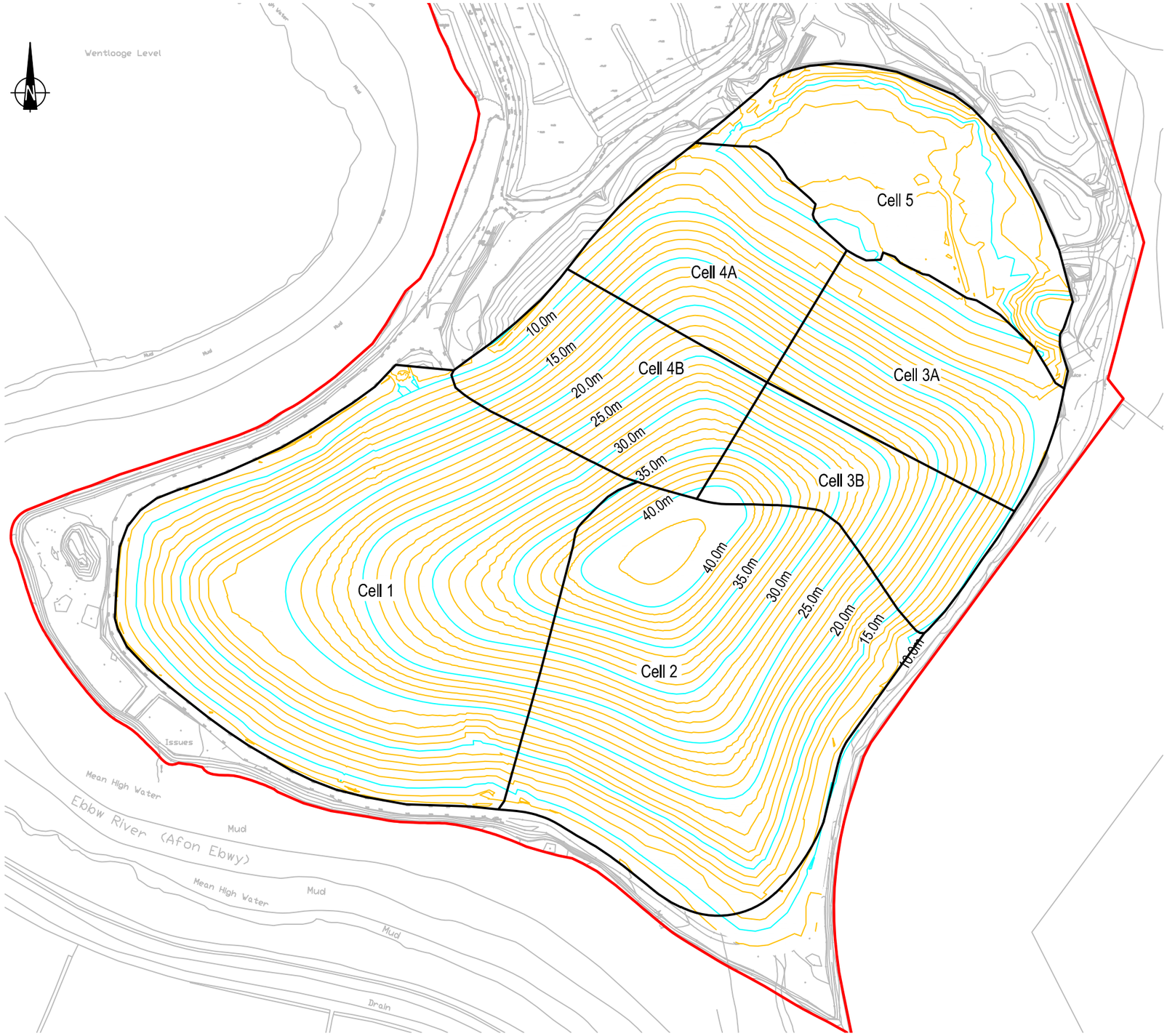
Client
NEWPORT CITY COUNCIL

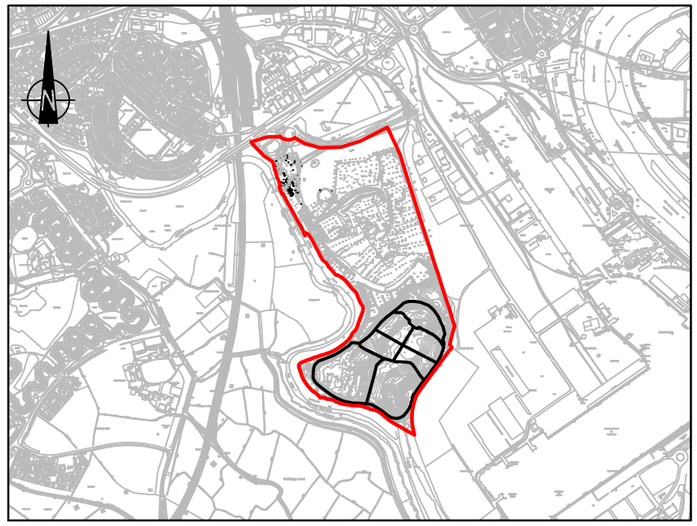
DOCKSWAY DISPOSAL SITE NEWPORT

SITE LOCATION PLAN

Date	01.04.2015
A4 Scale	1:50 000
Drawn by	davco
Checked by	VKR
Revision	0

FIGURE 1





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Client
NEWPORT CITY COUNCIL

DOCKSWAY DISPOSAL SITE
AREA 2

PRE SETTLEMENT RESTORATION CONTOURS

Date	30.03.2015
A3 Scale	1:5000
Drawn by	davco
Checked by	VKR
Figure Number	2

user name: david cotton

File Location: j:\14739\155 - permit revision 2015\03_ figures & drawings\cad\dwgs\figure 2.dwg

Appendix 1

Streetscene
Y-Strydynun

Civic Centre/Canolfan Ddinesig
Newport/Casnewydd
South Wales/De Cymru
NP20 4UR

Newport CITY COUNCIL
CYNGOR DINAS Casnewydd

Environmental Services

Title: Docksway Waste Disposal Site Cell 3 Containment

Construction Quality Assurance Final Report – Sub-Cell A

Streetscene
Y-Strydynun

Civic Centre/Canolfan Ddinesig
Newport/Casnewydd
South Wales/De Cymru
NP20 4UR

Newport CITY COUNCIL CYNGOR DINAS Casnewydd

Project Ref: 2506
Date: 10-06-16

Document Control Sheet

Project Name: WDS Stage 2 Cell 3 Containment
Project Ref: 2506
Report Title: Construction Quality Assurance Final Report (Sub-Cell A)

	Name	Position	Signature	Date
Prepared by:	Meirion Humphreys	CQA Engineer		~~June 2015~~ July 2016
Reviewed by:				V Kate Riley
Approved by:				
Environmental Services				

Revision	Date	Description	Prepared	Reviewed	Approved

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Summary Report

Prepared by Meirion Humphreys (CQA Engineer)

Contents

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Summary Report

Prepared by Meirion Humphreys (CQA Engineer)

1 Overview

1.1 This report describes the partial construction of the basal liner of Cell 3 at Docksway Waste Disposal Site, Newport during the summer of 2015. The works commenced on 29th June and continued for 17 weeks until the final layers of clay were laid on 22nd October 2015.

1.2 The liner was constructed by Jim Davies Civil Engineering Ltd, using imported clay engineered to knit into the naturally occurring sub-grade of river silts occurring at a historically reclaimed river channel and its adjacent banks. In all approximately 23,000 m3 of clay was laid under the auspice of this CQA programme (with approx 27,000 m3 being laid in total).

1.3 To enable the works to proceed, the remnant river channel, with its low natural shear strength, had been subject to an in-situ stabilisation programme carried out earlier in the year, detailed in a dedicated CQA report, doc ref 14739-3511-REV01.

1.4 Cell 3 consists of two side by side sub-cells; sub-cell A and sub-cell B (refer to drawing Annex A, dwg nos. 2506_AB_02 and 2506_AB_03 for site context). This phase of construction was focused only on the sub-cell A cell, in line with the client's priorities; however it must be noted that the adjacent cell was progressed to a small degree when no other areas were available to work (mainly due to the lack of available working areas whilst awaiting lab results). The lab results relating to sub-cell B have not been included in either the summary data tables or the quantitative assessment of the laid material; rather they will be retained for inclusion in the CQA submission for sub-cell B upon its completion.

2 Materials & Working Method

2.1 The clay, and a range of potential methods for laying and compaction, were trialled for suitability prior to commencement, the details and results of which are included at Annex A. Given appropriate conditioning the clay was found to be suitable to achieve the requisite density and permeability parameters (see Annex A – Clay Compaction trial Report) and the most suitable construction method was agreed upon and communicated to the contractor; briefly, the clay would be laid in 300mm thick (un-compacted) layers and compacted using a Bomag BW213 PDH pad-footed vibro-roller at a minimum of 12 passes.

2.2 The clay was conditioned using 360° excavators and transported for the most part using standard 9 tonne dumpers (extra transport was provided when production momentum was high and when running surfaces were favourable). Water was provided via a 10,000 litre tractor-towed bowser and sourced from an on site borrow pit that had filled with rainwater (a legacy from previous unrelated operations). This source was sufficient to provide water for almost the entirety of the works, so disturbance of the local ox-bow lake was virtually non-existent. The weather conditions for the most part necessitated pre-wetting of the sub-grade and regular dampening of the finished surfaces. The bowser was employed full time to achieve this.

2.3 The clay was levelled using a 4 tonne bulldozer, with the site foreman and CQA Engineer supervising to ensure control of layer thickness and clay quality.

2.4 As per the CQA Plan, the clay was tested in its bulk state and its compacted state at the given frequencies (see Annex B, table 2) in order to confirm material suitability and the efficacy of the contractor's working methods. The majority of clay sampling was carried out by site personnel; mainly myself as CQA Engineer, and by the site foreman in my absence.

2.5 Further information relating to surveying, setting out and location control are provided in Week 1 Progress Report at Annex C.

3 Notable Issues

3.1 **Clay Conditioning** To minimise haulage costs the contractor chose to pre-import and stockpile approximately 10,000 m3 of clay, which initially required a fairly intensive effort to re-condition. The warm and dry weather also created a high demand on added water. These issues are described in the early weekly site reports, which can be read at Annex B. The conditioning effort impacted on early progress to some degree, although momentum was gained once an efficient method of water provision was provided during week 2.

3.2 **Labs** Two labs were employed, consecutively, to carry out testing. Firstly GEO Site & Testing Services Ltd (GSTL) of Llanelli, and secondly Apex Testing Services (APEX) of Bridgend. Apex were employed in favour of GSTL due to their commitment to a quick turnaround of results, thereby offering reduced risk and an improvement in production efficiency.

3.3 **Failures** During the early stages of the job the approach to failures followed the guidance of Environment Agency document LFE4 (Earthworks for Landfill Engineering), in that near passes were accepted assuming that the overall percentage of Diamond Black and Diamond Grey results (within the acceptable MC) remained above 90%. However, after receiving a number of Diamond White failures at the outset, it was decided to re-test all failures twice and then remediate any cells indicating further failures.

The nature of remediation would be dependent on the nature and severity of the failure. In some cases it was observed that a cell showing slightly low densities and a moisture content toward the higher end could be allowed to dry and then re-rolled to achieve a higher density if the weather conditions were favourable. In the case of dry material the only remediation was to recondition the clay.

4 Outstanding Issues

4.1 There was no design detail provided for completion of clay at the top of the eastern slope (adjacent to the haul road). The clay thins out at to less than 1.2m at this juncture and will require additional attention at a later date. This area lies outside the footprint of the drainage stone and is accessible for completion during the next phase of the works. The client and design consultant are aware of this.

4.2 The clay laid within the footprint of the neighbouring waste cell has not been considered in the scope of this report. Information regarding this portion of the works will be passed to the CQA Engineer employed to oversee the remainder of the lining works.

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Summary Report

Prepared by Meirion Humphreys (CQA Engineer)

5 Test Results

5.1 A full breakdown of the lab results is presented at Annex E, and weekly summaries of pass / fail results are contained within the weekly progress reports. Referring to the tabulated summaries of results it will be noted that the list contains reference to rejected tests. These results do not figure in the quantitative summary presented in para. 5.2 below since they refer to cells that have been remediated in some way, but they remain on the record for the sake of completeness and to avoid confusion when referring to the lab reports. They are identifiable as being struck-through in the relevant weekly and global summary tables, and are annotated accordingly.

5.2 Overall the percentage of Diamond Black and Diamond Grey results falling within the allowable moisture range lies at 90% of the total number of acceptable tests, as defined within the Environment Agency's guidelines contained in LFE4 for works of this nature.

Cell 3 (Sub-Cell A) – Quantitative Analysis (Accepted Results) as per LFE4 (p36)		
Total no. of Tests within acceptable moisture content	◆ + ◆ + ✧	206
No. of Passes *(diamond black)*	◆	180
No. of Failures <0% air voids *(diamond grey)*	◆	5
No. of Failures >5% air void *(diamond white)*	✧	21
Total Diamond Black & Diamond Grey	◆ + ◆	185
Diamond Black & Diamond Grey (as % of total acceptable tests)	$\frac{◆ + ◆}{◆ + ◆ + ✧}$ X 100	90%

Works phase permeability tests returned satisfactory results (less than 9×10^{-9}) throughout, with 12 tests in total covering 23,000m3 (one per 2,000 m3).

Cell 3 (Sub-Cell A) - Permeability Results		
Cell reference	**Permeability**	**Lab Certificate Ref**
A4_C5[P]	7.68×10^{-11}	GSTL 27912
A56_C11[P]	1.73×10^{-10}	GSTL 28603
B6_C5[P]	5.42×10^{-11}	GSTL 27912
C5_C1[P]	2.53×10^{-10}	GSTL-27718
C5_P6	1.38×10^{-10}	GSTL 28019
C7_CI[P]	4.52×10^{-10}	GSTL 27495
D5_C1[P]	2.79×10^{-10}	GSTL-27718
D6_C3 [P]	8.78×10^{-11}	GSTL 27871
D7_C2[P]	3.5×10^{-10}	GSTL 27668
E4_C1[P]	3.16×10^{-10}	GSTL 27495
E5_2.2[P]	5.83×10^{-10}	GSTL 28390
E7_P3	3.27×10^{-10}	GSTL 28019

ANNEX A

Newport City Council

Docksway Waste Disposal Site

Area 2 Landfill Development - Cell 3 Clay Lining

Compaction Trial Report

Project Reference: 2506

June 2015

Environmental Services
Engineering and Construction
Environment and the Economy
Newport City Council
Civic Centre
Newport
NP20 4UR

TABLE OF CONTENTS

1. Introduction

1.1. This report details the nature, scope and findings of a clay compaction trial conducted at Docksway Waste Disposal Site, Newport in June 2015. The trial was conducted prior to the development of a new landfill liner, its primary purpose being to establish a working method by which the clay offered by the contractor could be laid and compacted to comply with the requirements of the specification.

1.2. The clay is to be sourced from Lias horizons at Bishop's Cleeve, Gloucestershire. This material has been successfully used at Docksway for previous lining works, so there was little doubt as to its suitability. Nonetheless, pre-contract suitability testing was carried out to establish any significant variations in its properties, to confirm its suitability and to derive a final material specification. The results of these tests are detailed in Annex 1

1.3. The trial was attended by the CQA Engineer and the CQA Consultant, and by Mr Andrew Miles, the project's representative for Jim Davies Civil Engineering Ltd. The CQA Engineer, advised by the CQA Consultant, directed the trial in accordance with the methodology prescribed in the CQA Plan Annex B designed to ensure a representative and consistent approach to the proceedings.

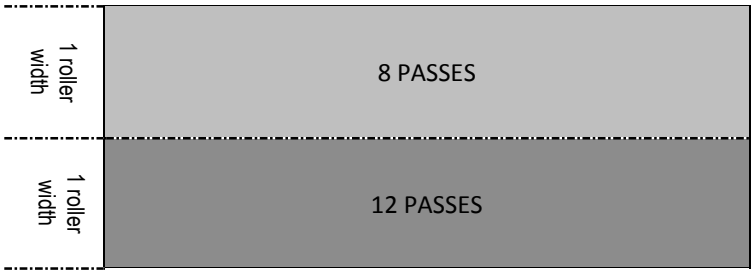
2. The Trial

2.1. The trial was conducted on June 25th and 26th 2015, directly onto the natural subgrade within the footprint of the proposed cell. The material under consideration was a stiff blue-grey clay, slightly gravelly with clod sized consolidations.

2.2. The clay's moisture content (as provided) was visibly low, necessitating the addition of water (via a towed bowser) and thorough mixing with the excavator. All personnel on site were experienced with this particular material from previous lining works, so a consensus was arrived at during conditioning to determine at an acceptable degree of wetting, based on field plasticity tests and reasoned judgement.

2.3. The weather was bright, dry, sunny and warm; hence the subgrade was thoroughly dampened to prevent suction before the first layer of material was laid at a 250mm thickness using a 360° excavator.

2.4. Compaction was achieved using a Bomag BW213 PDH pad-footed vibro-roller equipped with a 7.6 tonne drum delivering 225kN centrifugal force. In applying the test methodology provided by the CQA plan, the trial pad was separated longitudinally into 2 rips, each equal to the width of the drum and approximately 15m long. This approach provided an efficient comparison of 12 and 8 passes of the compactor (diag 1).



<<<<<<<direction of compaction >>>>>>>

2.5. Four layers were placed in total, the first two with a pre-compacted thickness of 250mm and layers three and four with a pre-compacted thickness of 300mm. Core samples were taken at each layer at both levels of compaction. The tests undertaken and their results are summarised in table 1 and can be found at Annex 2 in their entirety.

8 Compaction Passes							
Layer	Sample Ref	MC	Bulk Density	Dry Density	Perm	MC	Dry Density
1	TP_1.08	21	2.00	1.66	2.4×10^{-10}	22.2	1.56
2	TP_2.08	20	2.08	1.73	1.98×10^{-10}	21.7	1.54
3	TP_3.08	18	1.94	1.64	4.46×10^{-10}	18.5	1.67
4	TP_4.08	20	2.16	1.8	9.41×10^{-11}	20.8	1.77
12 Compaction Passes							
Layer	Sample Ref	MC	Bulk Density	Dry Density	Perm	MC	Dry Density
1	TP_1.12	20	2.02	1.68	1.26×10^{-10}	21.1	1.64
2	TP_2.12	17	1.95	1.67	2.2×10^{-10}	18.9	1.6
3	TP_3.12	19	2.18	1.83	7.41×10^{-11}	20.9	1.63
4	TP_4.12	19	2.00	1.69	1.87×10^{-10}	20.5	1.71

Table 1 - Core Cutter Results (Densities & Perms)

2.6. In addition to the core samples, four random bulk samples were taken throughout the trial to determine the material's plasticity limits, and supplementary MCV testing was carried out in the field on sub-samples corresponding to the lab samples. The results are summarised in table 2, and can be found at Annex 2 in their entirety.

Sample Ref	MC	LL	PL	PI	MCV	% passing .425mm	Class
TP_B1	18	43	21	22	8.5	100	CI
TP_B2	23	46	25	21	9	100	CI
TP_B3	23	48	25	23	11.2	100	CI
TP_B4	23	49	26	23	11.3	100	CI

Table 2 - Bulk Sample Results (Classification)

3. Findings

3.1. Refer to Annex 2 for the compaction trial's lab results in their entirety.

3.2. Following compaction of the final layer both rips were excavated with a slip trench to allow an assessment of the homogeneity achieved. The main focus of attention was on whether the layers had been effectively melded to form one homogenous mass and whether any clods were remaining. Both compactive efforts resulted in good intra-layer homogeneity, with no discernible dis-continuities visible in either rip. It was noted that the clay compacted with 12 passes exhibited a higher resistance to the action of the excavator's bucket, in that less material was plucked from the side of the trench.

3.3. In terms of clod destruction, only the stiffest particles remained, none of which exceeded the guidelines of LFE 4 (Table 4, p16) stating 125mm, and no significant proliferation of these particles was observed.

3.4. Shear vane testing throughout the day confirmed that the material in its compacted form was able to withstand trafficking, with results consistently reading in excess of 90 kN/m^2.

3.5. From the lab results, maximum dry density from the field samples was found to be 1.85 Mg/cm^3 at an optimum moisture content of 15%. From the source testing MDD was found to be 1.84 Mg/cm^3. The compaction curves are presented at Chart 1, alongside the field density results, source testing density results and the 0%, 5% and 10% air void curves (based on material SG of 2.7).

3.6. Within the field samples there is little correlation between density and the comparative compactive efforts; 12 passes and 8 passes successfully compacted the clay to within 0-5% air voids. Both efforts also showed samples with densities approaching 10% air voids (notably in samples with lower MC). Similarly, both efforts show seemingly anomalous densities below the 0% air voids line.

3.7. All samples submitted from the field trial indicated permeability rates below the maximum $1x10^{-9}$, with moisture contents ranging from 18.5% - 22.2% (see table 1, page 2).

3.8. The pre-trial suitability testing on lab-compacted samples (table 3 and Annex 1) also indicate that the clay can achieve permeabilities well below the maximum $1x10^{-9}$ across MCs ranging from 17% (near optimum) to 27.1 (near plastic limit).

Sample Ref	MC	Dry Density	Perm	Comment
2506-PRE-07	22.9	1.67	$1.38x10^{-10}$	*Remoulded (2.5 kg compaction), original MC*
	17	1.739	$3.71x10^{-10}$	*Remoulded (2.5 kg compaction), optimum MC + 2%*
	27.1	1.608	$3.43x10^{-10}$	*Remoulded (2.5 kg compaction), MC at Plastic Limit*
2506-PRE-08	23.4	1.66	$2.33x10^{-10}$	*Remoulded (2.5 kg compaction), original MC*
	17.2	1.76	$3.69x10^{-10}$	*Remoulded (2.5 kg compaction), optimum MC + 2%*
	26.2	1.623	$1.1x10^{-10}$	*Remoulded (2.5 kg compaction), MC at Plastic Limit*

Table 3 - Permeability & MC (lab-compacted source material)

4. Conclusions

4.1. The results indicate that the required maximum permeability of $1x10^{-9}$ is achievable at moisture contents ranging from optimum (15%) to the upper MCs of the samples tested (27%), and that the material can be compacted to a maximum of 5% air voids with the compaction plant used at either of the rates applied. It is advised that compaction be applied at the maximum rate of 12 passes over 300mm clay thickness.

4.2. A lower limit of 18% MC (3% above OMC) has been advised to the contractor to help provide a degree of plasticity to the clay, thereby limiting cracking under load. An upper limit of 25% will be applied in line with the lowest workable plastic limit measured.

4.3. The trial provided a useful appreciation of the potential wetting requirements for the clay and confirmed that water control and mixing will require a vigilant approach by the contractor. The contractor is familiar with this material and has a good relationship with the supplier, who has historically been responsive to the contractor's requests for moisture adjustment at source. The contractor has stated that water provision will be available throughout the term of the contract in the form of a tractor towed bowser.

4.4. In terms of reducing the clod content it is advised that on site mixing be undertaken regardless of the material's perceived moisture content, i.e. that the clay be processed on site prior to placement regardless of whether it needs wetting.

4.5. It is recommended that the material be tested for suitability on an on-going basis by testing for PSD, optimum moisture content and maximum dry density.

4.6. A testing regimen has been drafted for the works, as detailed in Table 4. The CQA Engineer is empowered to vary these requirements at his discretion, but in essence this regimen is to be regarded as a minimum.

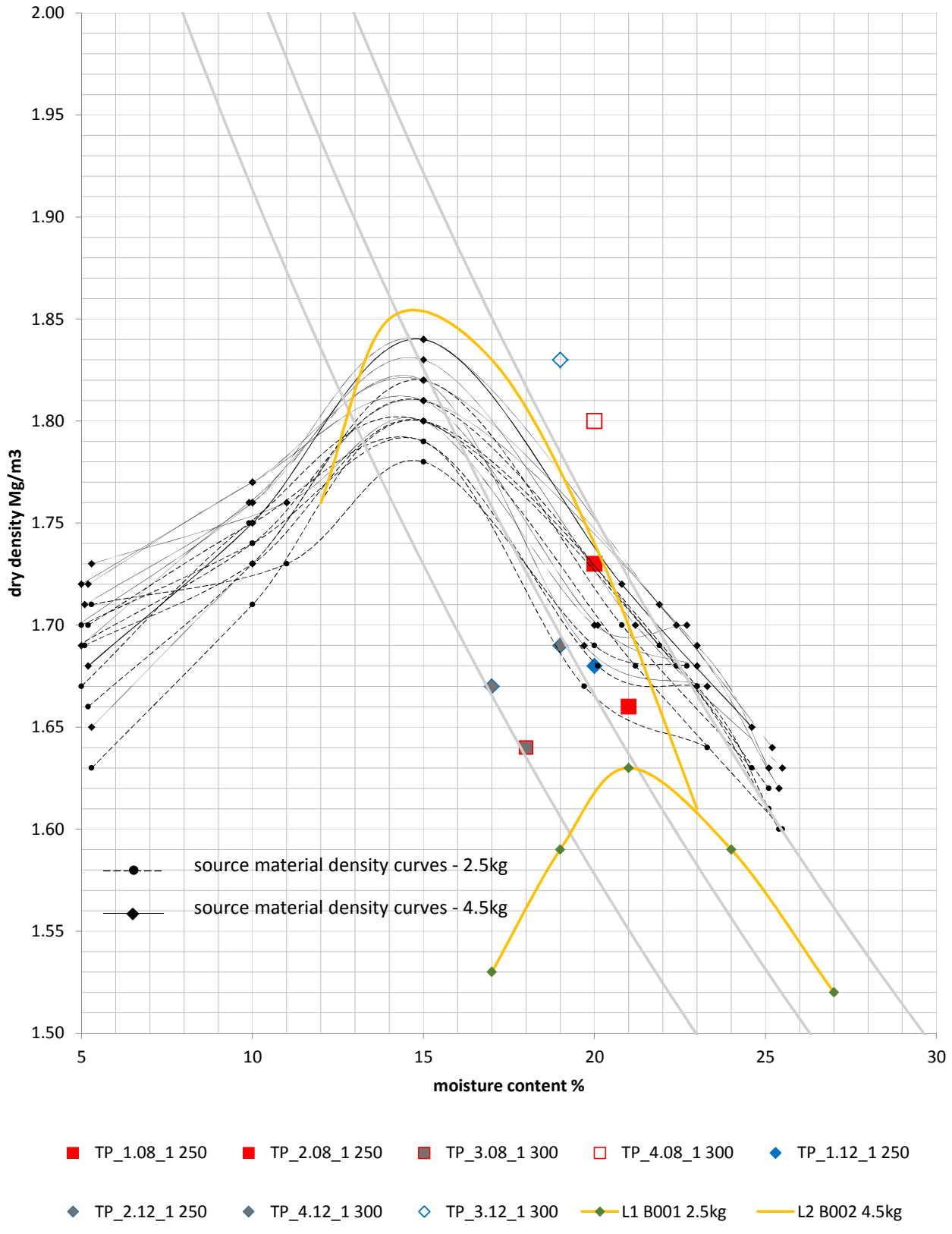
Table 4 - Testing Schedule (Works Phase)

Test	Frequency	Pass Criteria	Notes
Lift Thickness	Direct observation, measuring pins	300mm	
Topographic Survey	Commencing surface and completed surface of liner	Min. thickness of clay liner 1.2m	
MCV [prior to compaction]	1 per day	9 - 16	Field check only
In situ density by core cutter	1 per 25m grid cell	5% Air Voids	
Moisture Content	1 per 25m grid cell	18% - 25%	
Atterberg limits	1 per 25m grid cell	LL ≤90% PL 10 – 65%	
PSD	1 per 2000m^3 clay placed	To include >80% passing 63 microns	
Max Dry Density & OMC	1 per 2000m^3 clay placed	-	
Permeability	1 per 2000m^3 clay placed	1×10^{-9} m/s	
Hand shear vane	As required	Min 40 kPa (mean of 3 adjacent tests)	Field check only
Photographs	As required	-	For record purposes

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

CHART 1 - Compaction Trial Density Results, 25th & 26th June 2015

(Refer to GSTL Certifacte(s) 27192 & 27402)



Annex 1

Laboratory Report

2788

GEO Site & Testing Services Ltd

Contract Number: 27192

Client's Reference: **NCC_2506**

Report Date: **06-07-2015**

Client **Jim Davies Civil Engineering Ltd**
Ty Gwyn,
Banalog Terrace,
Hollybush,
Blackwood
NP12 0SG

Contract Title: **Docksway Landfill - Newport**

For the attention of: **Meirion Humphreys**

Date Received: **10-06-2015**

Date Commenced: **10-06-2015**

Date Completed: **06-07-2015**

Test Description	Qty
Moisture Content 1377 : 1990 Part 2 : 3.2 - * UKAS	8
4 Point Liquid & Plastic Limit (LL/PL) 1377 : 1990 Part 2 : 4.3 & 5.3 - * UKAS	8
Particle Density (Gas Jar) BS 1377 : 1990 Part 2 : 8.2 - * UKAS	8
Dry Den/MC (2.5kg Rammer Method 1 Litre Mould) 1377 : 1990 Part 4 : 3.3 - * UKAS	8
Dry Den/MC (4.5kg Rammer Method 1 Litre Mould) 1377 : 1990 Part 4 : 3.5 - * UKAS	8
MCV/Moisture Content Relation 1377 : 1990 Part 4 : 5.5 - * UKAS	5
Determination of Permeability in a triaxial cell BS1377 Part 6 :1990 Clause 6 - * UKAS	2

Notes: ~~**Observations and Interpretations are outside the UKAS Accreditation**~~
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

Laboratory Report

2788

GEO Site & Testing Services Ltd

Contract Number: 27192

Test Description	Qty
Procedure for the Determination of the Permeability of Clayey Soils in a Triaxial Cell Using the Accelerated Permeability Test Environment Agency Method P1-398/TR/2 - * UKAS	4
Hand Vane - @ Non Accredited Test	80
Quick Undrained Triaxial Compression Test - Multi-stage Loading of a single specimen (100mm diameter) 1377 : 1990 Part 7 : 9 - * UKAS	8
Extra Over Item (4 Days Over)	9
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

Client ref: NCC_2506

Location: Docksway Landfill - Newport

Contract Number: 27192-160615

Hole Number	Sample Number	Type	Depth (m)	Description of Sample*
2506-PRE-01				Greyish brown silty CLAY.
2506-PRE-02				Greyish brown silty CLAY.
2506-PRE-03				Greyish brown silty CLAY.
2506-PRE-04				Greyish brown silty CLAY.
2506-PRE-05				Greyish brown silty CLAY.
2506-PRE-06				Greyish brown silty CLAY.
2506-PRE-07				Greyish brown silty CLAY.
2506-PRE-08				Greyish brown silty CLAY.

Note: Results on this table are in summary format and may not meet the requirements of the relevant standards, additional information is held by the laboratory

GSTL
GEO SITE & TESTING SERVICES LTD

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)
Date: 24.6.15

UKAS TESTING
2788

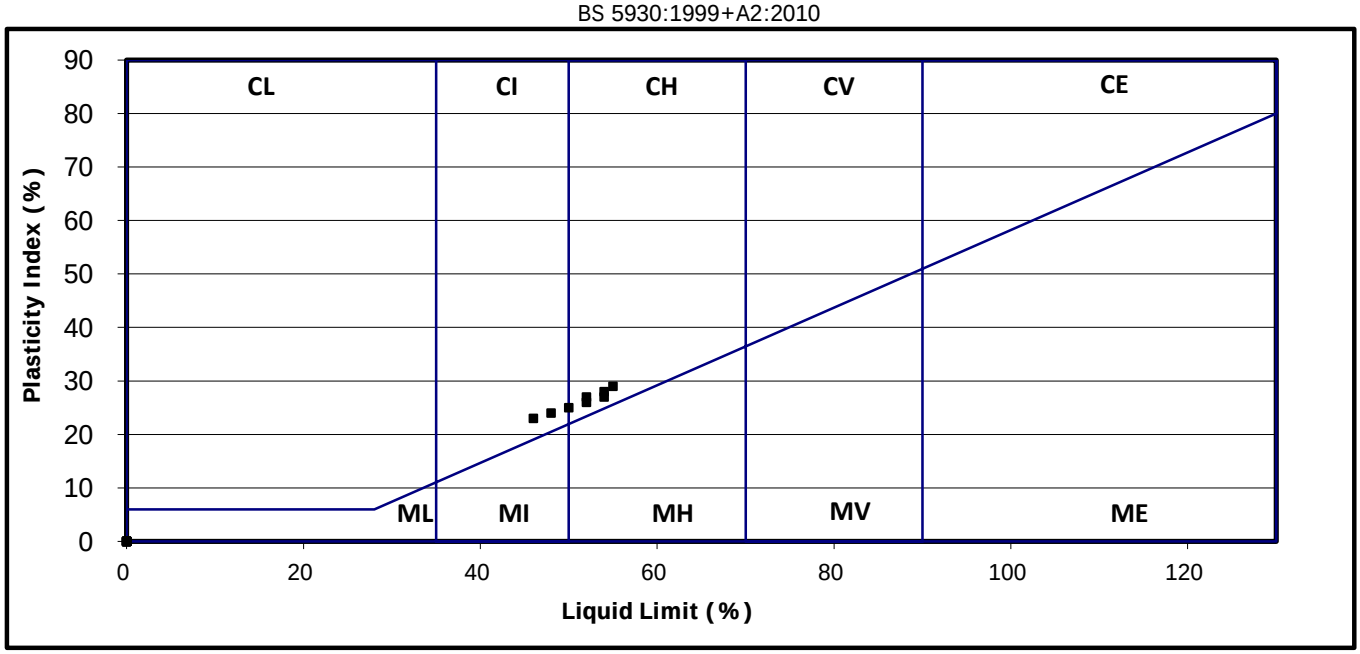
Test Report: **Method of the Determination of the plastic limit and plasticity index**
BS 1377 : Part 2 : 1990 Method 5

Client ref: NCC_2506
Location: Docksway Landfill - Newport
Contract Number: 27192-160615

Hole / Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3 / 4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
2506-PRE-0			22	52	25	27	100	CH High Plasticity
2506-PRE-0			23	52	26	26	100	CH High Plasticity
2506-PRE-0			22	54	26	28	100	CH High Plasticity
2506-PRE-0			23	50	25	25	100	CI / H Inter / High Plasticity
2506-PRE-0			21	48	24	24	100	CI Intermediate Plasticity
2506-PRE-0			21	46	23	23	100	CI Intermediate Plasticity
2506-PRE-0			23	54	27	27	100	CH High Plasticity
2506-PRE-0			23	55	26	29	100	CH High Plasticity

Symbols: **NP : Non Plastic** **# : Liquid Limit and Plastic Limit Wet Sieved**

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.
BS 5930:1999+A2:2010



For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)

Date: 24.6.15

UKAS TESTING 2788

SUMMARY OF SOIL DENSITY TESTS.

(B.S. 1377 : PART 2 : 7.2 & 8.2: 1990)

Client ref: NCC_2506
Location: Docksway Landfill - Newport
Contract Number: 27192-100615
Hole Number: As Stated
Sample Number: N/A
Depth (m) : As Stated
Sample Type: S/B

Location Number	Sample Number	Depth m from	Depth m to	Moisture Content %	Bulk Density Mg/m3	Dry Density Mg/m3	Method of Laboratory compaction (kg Rammer)	Particle Density Mg/m3	Mg/m3	Remarks
2506-PRE 01								2.54		
2506-PRE 02								2.71		
2506-PRE 03								2.67		
2506-PRE 04								2.66		
2506-PRE 05								2.65		
2506-PRE 06								2.53		
2506-PRE 07								2.62		
2506-PRE 08								2.66		

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GEO Site & Testing Services Limited

Checked by
Paul Evans
Quality Manager

Approved by
Ben Sharp
Contracts Manager

Date of approval: 24/06/15

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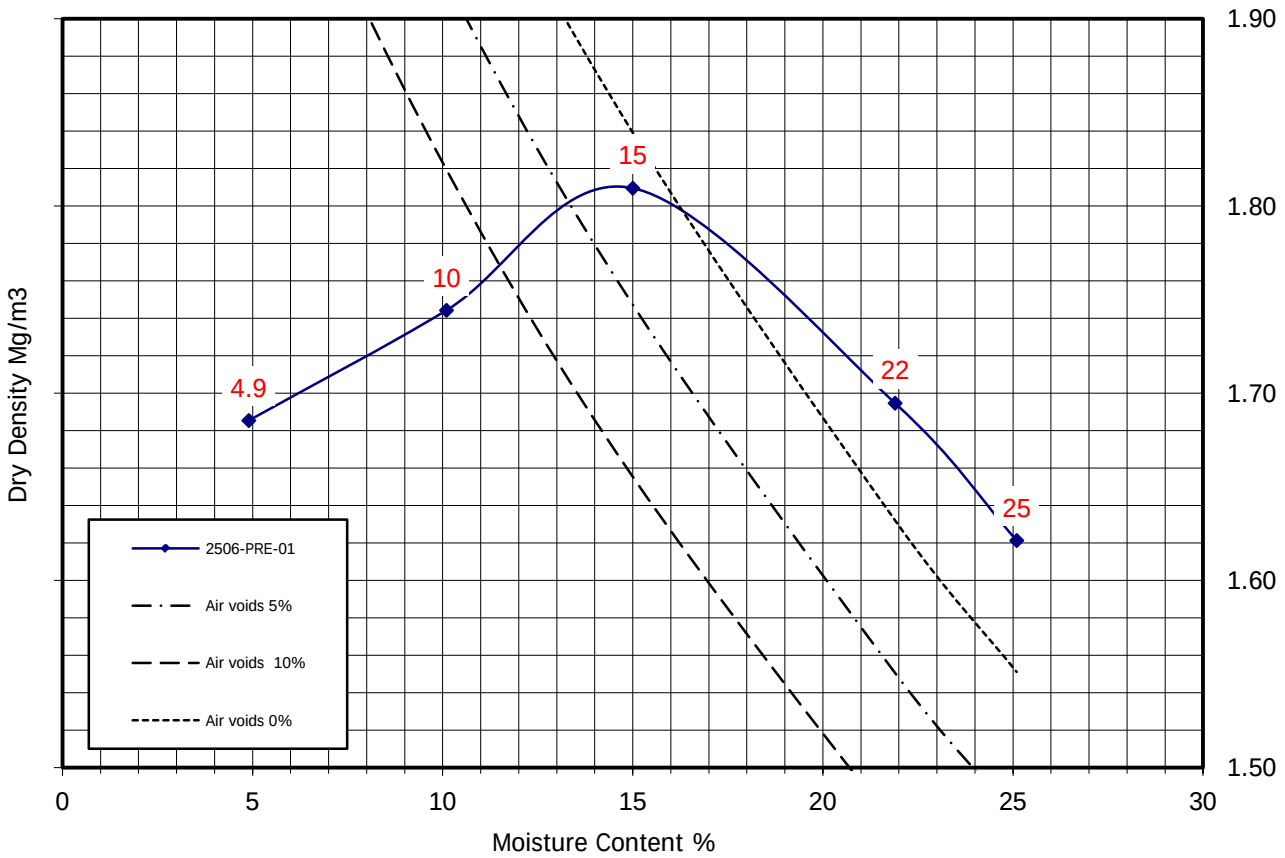
Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**		
Location:	**Docksway Landfill - Newport**		
Contract Number:	**27192-**		
Hole Number:	**2506-PRE-01**		
Sample Number:	**N/A**		
Depth (m):	**N/A**	**-**	**N/A**
Sample Type:	**B**		



Compaction Point:	**1**	**2**	**3**	**4**	**5**
Moisture Content:	4.9	10	15	21.9	25.1
Bulk Density (Mg/m^3):	1.77	1.92	2.08	2.07	2.03
Dry Density (Mg/m^3):	1.69	1.74	1.81	1.69	1.62

Initial Moisture Content:	**22**	Method of Compaction:	**2.5kg Rammer**	
Particle Density (Mg/m^3):	**2.54 Measured**	Material Retained on 37.5 mm Test Sieve (%):	**0**	
Maximum Dry Density (mg/m^3):	**1.81**	Material Retained on 20.0 mm Test Sieve (%):	**0**	
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**3.2.4.1**	

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: **24.6.15**

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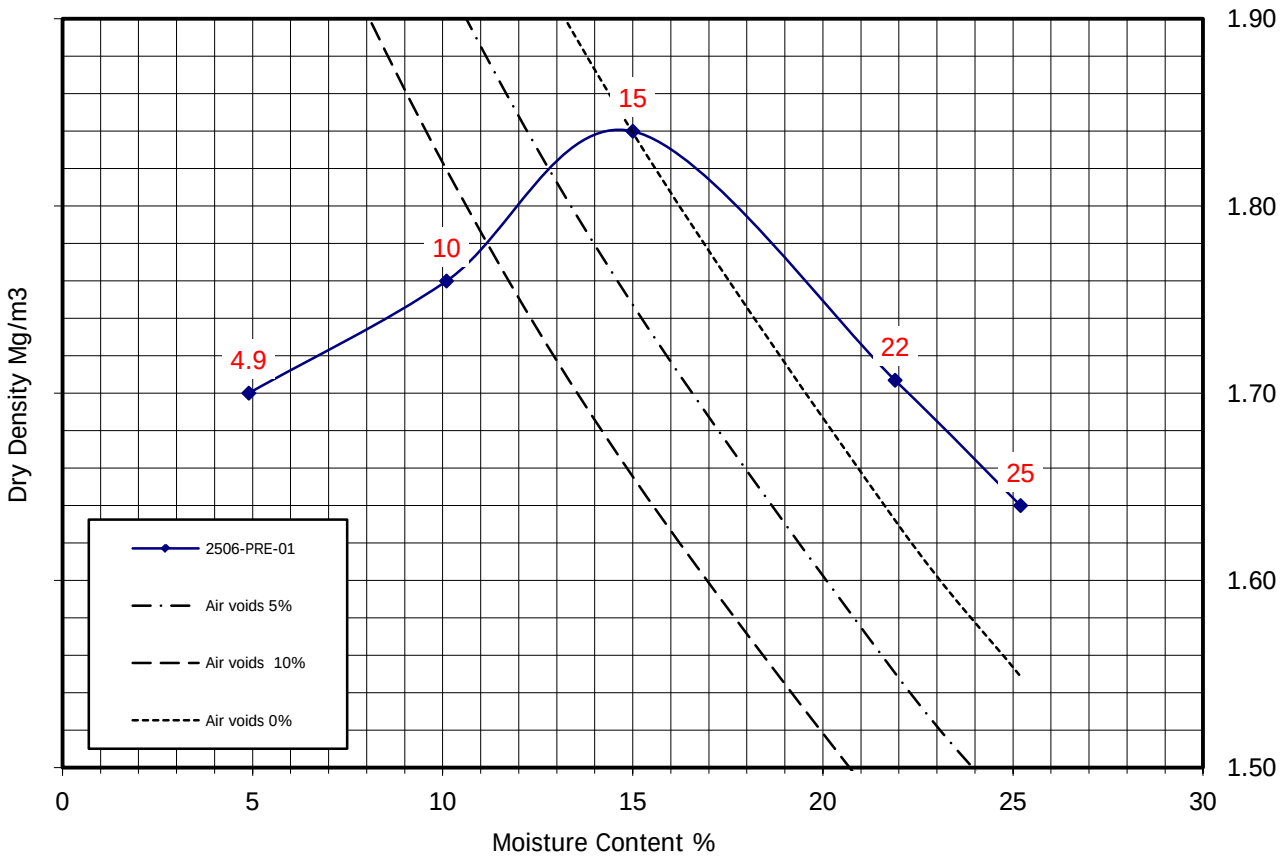
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**		
Location:	**Docksway Landfill - Newport**		
Contract Number:	**27192-**		
Hole Number:	**2506-PRE-01**		
Sample Number:	**N/A**		
Depth (m):	**N/A**	**-**	**N/A**
Sample Type:	**B**		



Compaction Point:	**1**	**2**	**3**	**4**	**5**
Moisture Content:	4.9	10	15	21.9	25.2
Bulk Density (Mg/m^3):	1.78	1.94	2.12	2.08	2.05
Dry Density (Mg/m^3):	1.70	1.76	1.84	1.71	1.64

Initial Moisture Content:		**22**	Method of Compaction:	**4.5kg Rammer**	
Particle Density (Mg/m^3):	**2.54**	**Measured**	Material Retained on 37.5 mm Test Sieve (%):		**0**
Maximum Dry Density (mg/m^3):		**1.84**	Material Retained on 20.0 mm Test Sieve (%):		**0**
Optimum Moisture Content (%):		**15**	Sample Preparation Clause:		**3.2.4.1**

Remarks:

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GEO Site & Testing Services Limited

Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: **24.6.15**

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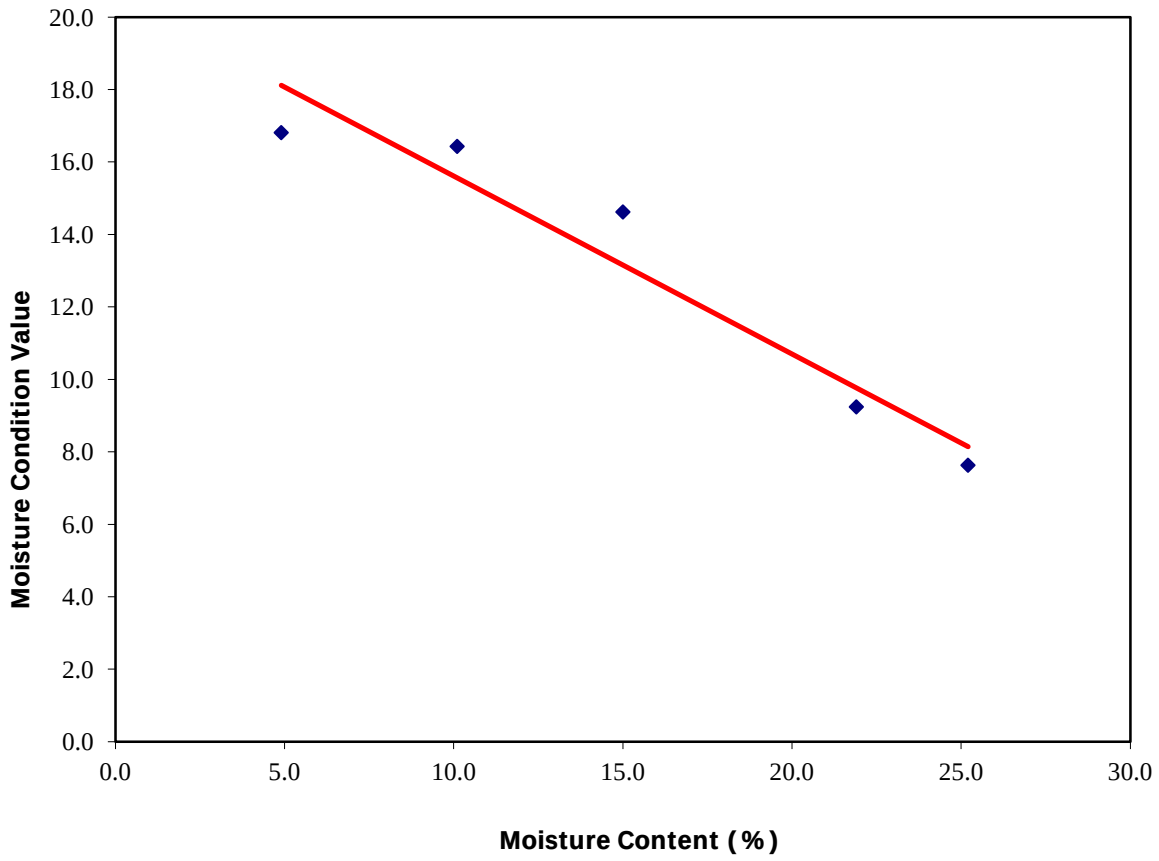
Moisture Condition Value Calibration

BS 1377:Part 4:1990

Client ref:	**NCC_2506**
Location:	**Docksway Landfill - Newport**
Contract Number:	**27192-**
Hole Number:	**2506-PRE-01**
Sample Number:	**N/A**
Depth (m) :	**N/A**
Sample Type	**B**

Initial Moisture Content (%).:	**21.6**
Single/Separate Samples Tested.	**Single**
Material Retained on the 20mm BS Test Sieve (%):	**0**



Test Results.

Test Number.	1	2	3	4	5
Moisture Content (%)	4.9	10.1	15.0	21.9	25.2
MCV Value	16.8	16.4	14.6	9.2	7.6

*** reading unobtainable.**

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Checked by
Ben Sharp (Contracts Manager)
Date approved:

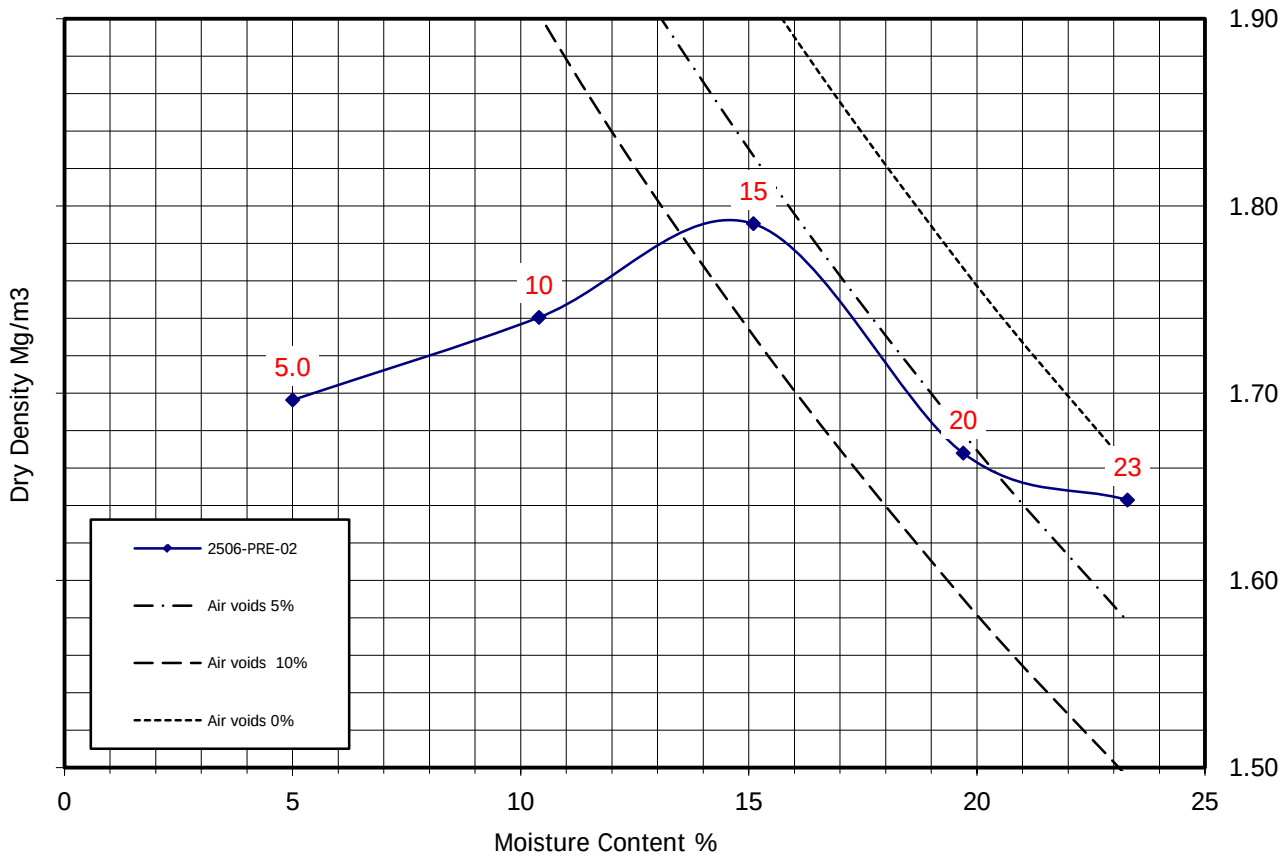
Approved by
Emma Sharp (Office Manager)
24/6/15

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**
Location:	**Docksway Landfill - Newport**
Contract Number:	**27192-**
Hole Number:	**2506-PRE-02**
Sample Number:	**N/A**
Depth (m):	**N/A - N/A**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	5.0	10	15	19.7	23.3
Bulk Density (Mg/m^3):	1.78	1.92	2.06	2.00	2.03
Dry Density (Mg/m^3):	1.70	1.74	1.79	1.67	1.64

Initial Moisture Content:	**23**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.71 Measured**	Material Retained on 37.5 mm Test Sieve (%):	**0**
Maximum Dry Density (mg/m^3):	**1.79**	Material Retained on 20.0 mm Test Sieve (%):	**0**
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

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GEO Site & Testing Services Limited

Checked By:
Emma Sharp

Approved By:
Paul Evans

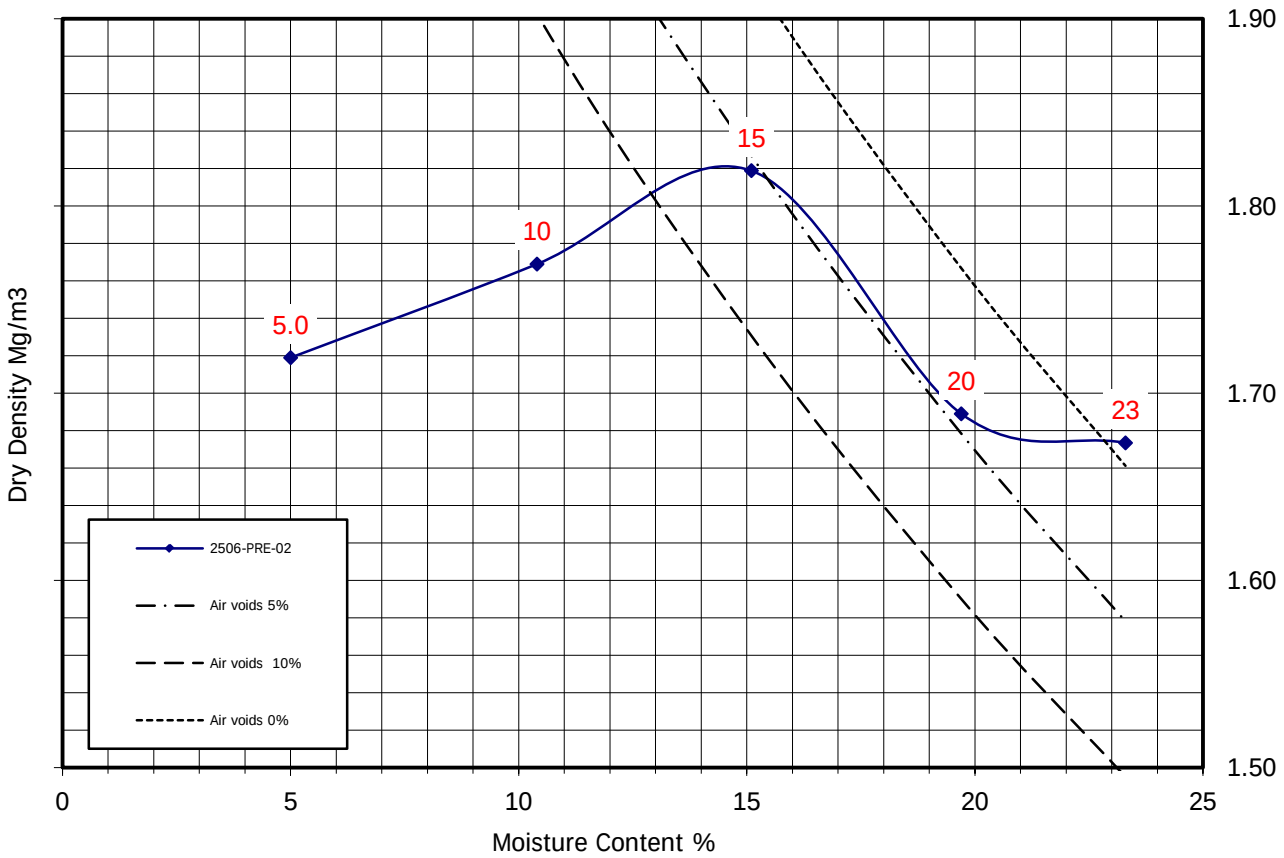
Date Approved: **24.6.15**

UKAS TESTING
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**		
Location:	**Docksway Landfill - Newport**		
Contract Number:	**27192-**		
Hole Number:	**2506-PRE-02**		
Sample Number:	**N/A**		
Depth (m):	**N/A**	**-**	**N/A**
Sample Type:	**B**		



Compaction Point:	1	2	3	4	5
Moisture Content:	5.0	10	15	19.7	23.3
Bulk Density (Mg/m^3):	1.80	1.95	2.09	2.02	2.06
Dry Density (Mg/m^3):	1.72	1.77	1.82	1.69	1.67

Initial Moisture Content:		**23**	Method of Compaction:	**4.5kg Rammer**	
Particle Density (Mg/m^3):	**2.71**	**Measured**	Material Retained on 37.5 mm Test Sieve (%):		**0**
Maximum Dry Density (mg/m^3):		**1.82**	Material Retained on 20.0 mm Test Sieve (%):		**0**
Optimum Moisture Content (%):		**15**	Sample Preparation Clause:		**3.2.4.1**

Remarks:

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GEO Site & Testing Services Limited

Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: **24.6.15**

UKAS TESTING
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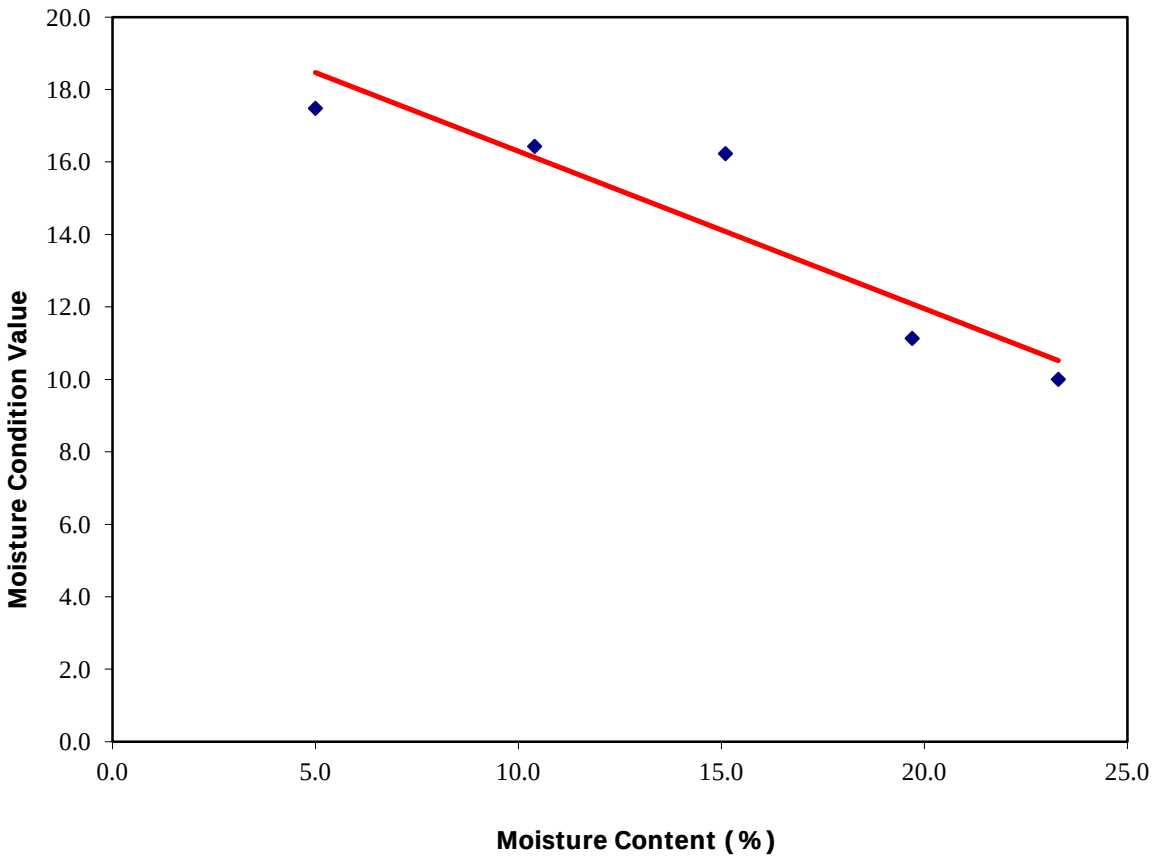
Moisture Condition Value Calibration

BS 1377:Part 4:1990

Client ref:	**NCC_2506**
Location:	**Docksway Landfill - Newport**
Contract Number:	**27192-**
Hole Number:	**2506-PRE-02**
Sample Number:	**N/A**
Depth (m) :	**N/A**
Sample Type	**B**

Initial Moisture Content (%).:	**23.3**
Single/Separate Samples Tested.	**Single**
Material Retained on the 20mm BS Test Sieve (%):	**0**



Test Results.

Test Number.	1	2	3	4	5
Moisture Content (%)	5.0	10.4	15.1	19.7	23.3
MCV Value	17.5	16.4	16.2	11.1	10.0

*** reading unobtainable.**

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Checked by
Ben Sharp (Contracts Manager)
Date approved:

Approved by
Emma Sharp (Office Manager)
24/6/15

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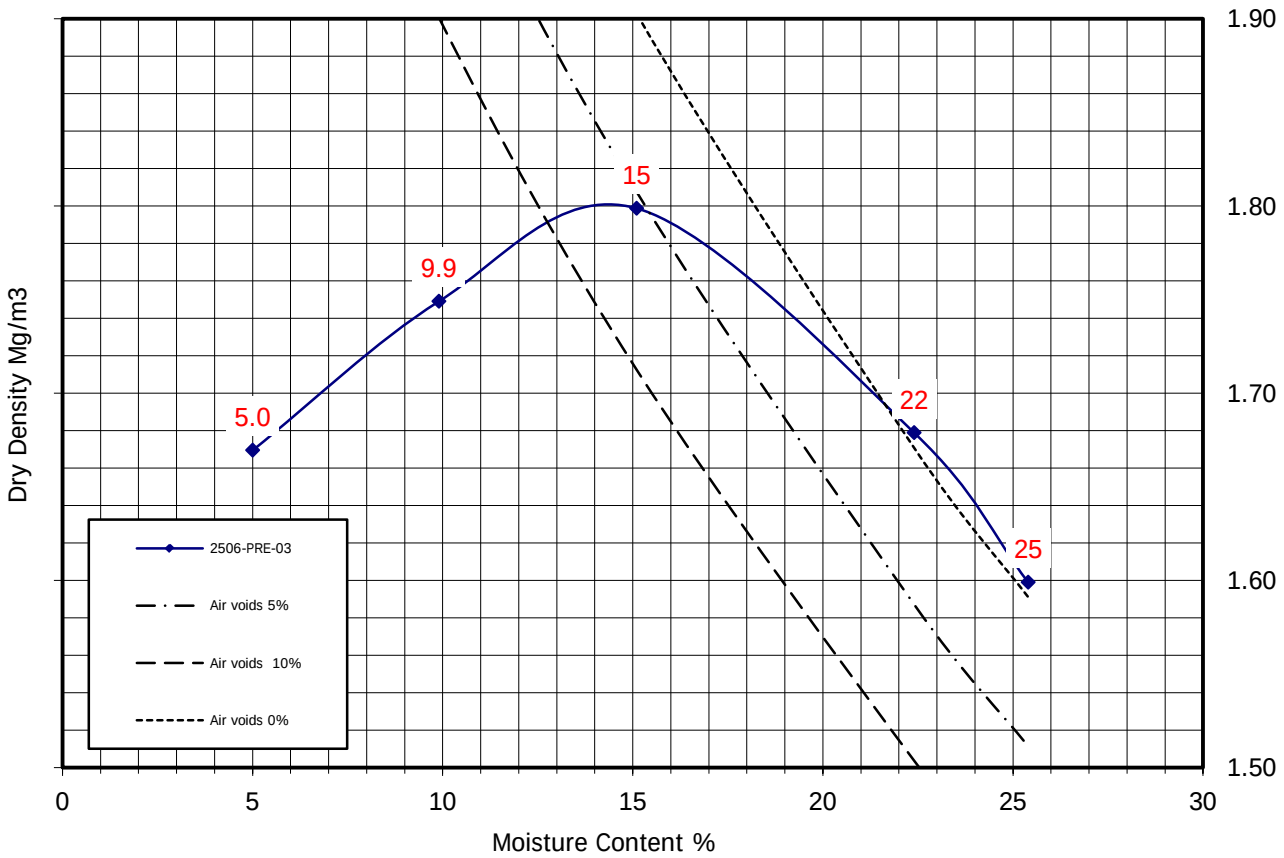
Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**		
Location:	**Docksway Landfill - Newport**		
Contract Number:	**27192-**		
Hole Number:	**2506-PRE-03**		
Sample Number:	**N/A**		
Depth (m):	**N/A**	**-**	**N/A**
Sample Type:	**B**		



Compaction Point:	**1**	**2**	**3**	**4**	**5**
Moisture Content:	5.0	9.9	15	22.4	25.4
Bulk Density (Mg/m^3):	1.75	1.92	2.07	2.05	2.01
Dry Density (Mg/m^3):	1.67	1.75	1.80	1.68	1.60

Initial Moisture Content:	**22**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.67 Measured**	Material Retained on 37.5 mm Test Sieve (%):	**0**
Maximum Dry Density (mg/m^3):	**1.80**	Material Retained on 20.0 mm Test Sieve (%):	**0**
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

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Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: **24.6.15**

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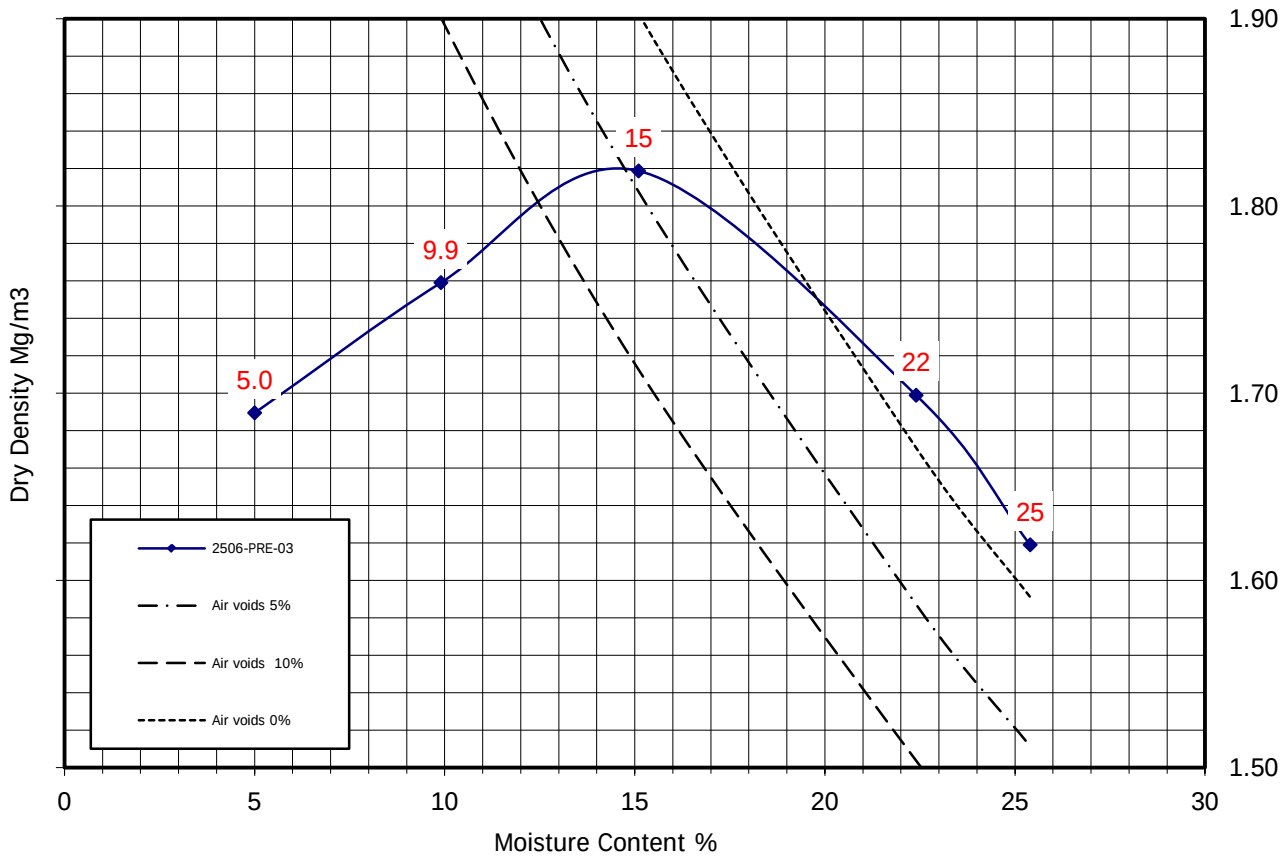
Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**
Location:	**Docksway Landfill - Newport**
Contract Number:	**27192-**
Hole Number:	**2506-PRE-03**
Sample Number:	**N/A**
Depth (m):	**N/A - N/A**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	5.0	9.9	15	22.4	25.4
Bulk Density (Mg/m^3):	1.77	1.93	2.09	2.08	2.03
Dry Density (Mg/m^3):	1.69	1.76	1.82	1.70	1.62

Initial Moisture Content:	**22**	Method of Compaction:	**4.5kg Rammer**
Particle Density (Mg/m^3):	**2.67 Measured**	Material Retained on 37.5 mm Test Sieve (%):	**0**
Maximum Dry Density (mg/m^3):	**1.82**	Material Retained on 20.0 mm Test Sieve (%):	**0**
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

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Date Approved: **24.6.15**

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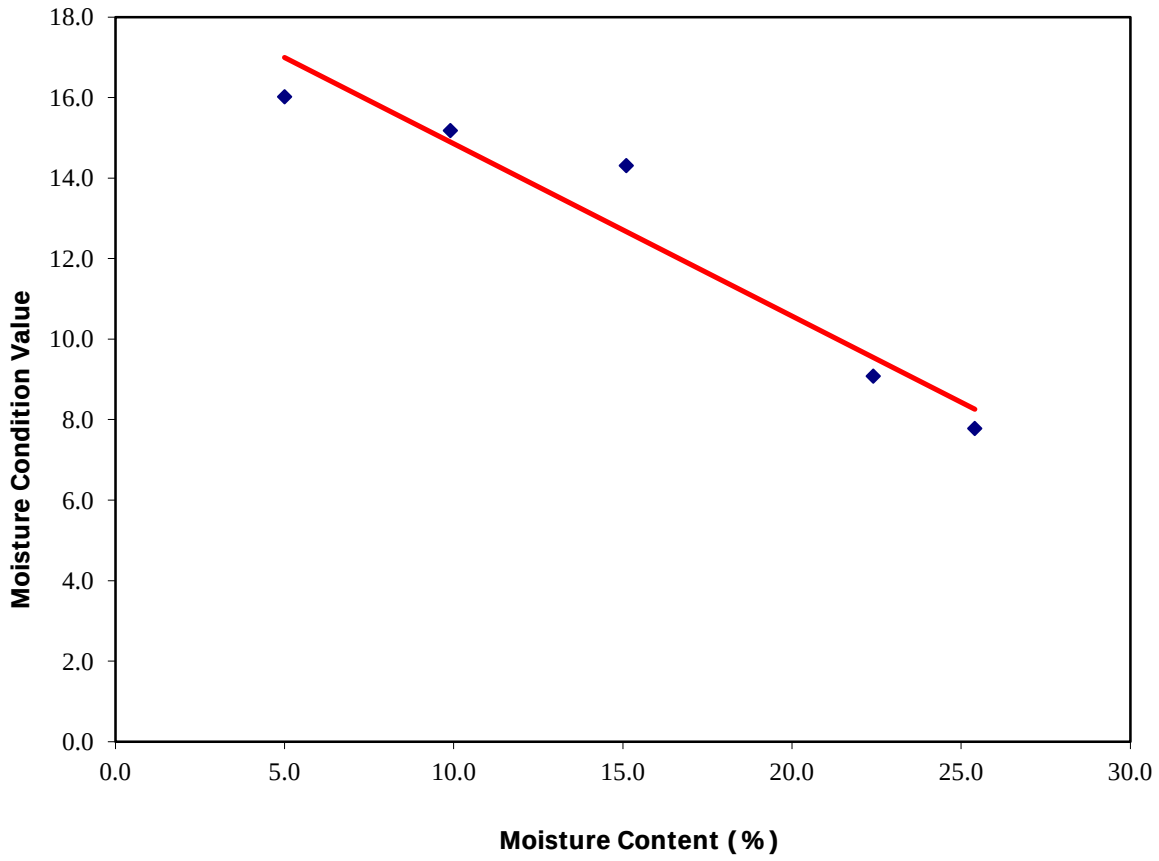
Moisture Condition Value Calibration

BS 1377:Part 4:1990

Client ref:	**NCC_2506**
Location:	**Docksway Landfill - Newport**
Contract Number:	**27192-**
Hole Number:	**2506-PRE-03**
Sample Number:	**N/A**
Depth (m) :	**N/A**
Sample Type	**B**

Initial Moisture Content (%).:	**22.4**
Single/Separate Samples Tested.	**Single**
Material Retained on the 20mm BS Test Sieve (%):	**0**



Test Results.

Test Number.	1	2	3	4	5
Moisture Content (%)	5.0	9.9	15.1	22.4	25.4
MCV Value	16.0	15.2	14.3	9.1	7.8

*** reading unobtainable.**

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Checked by
Ben Sharp (Contracts Manager)
Date approved:

Approved by
Emma Sharp (Office Manager)
24/6/15

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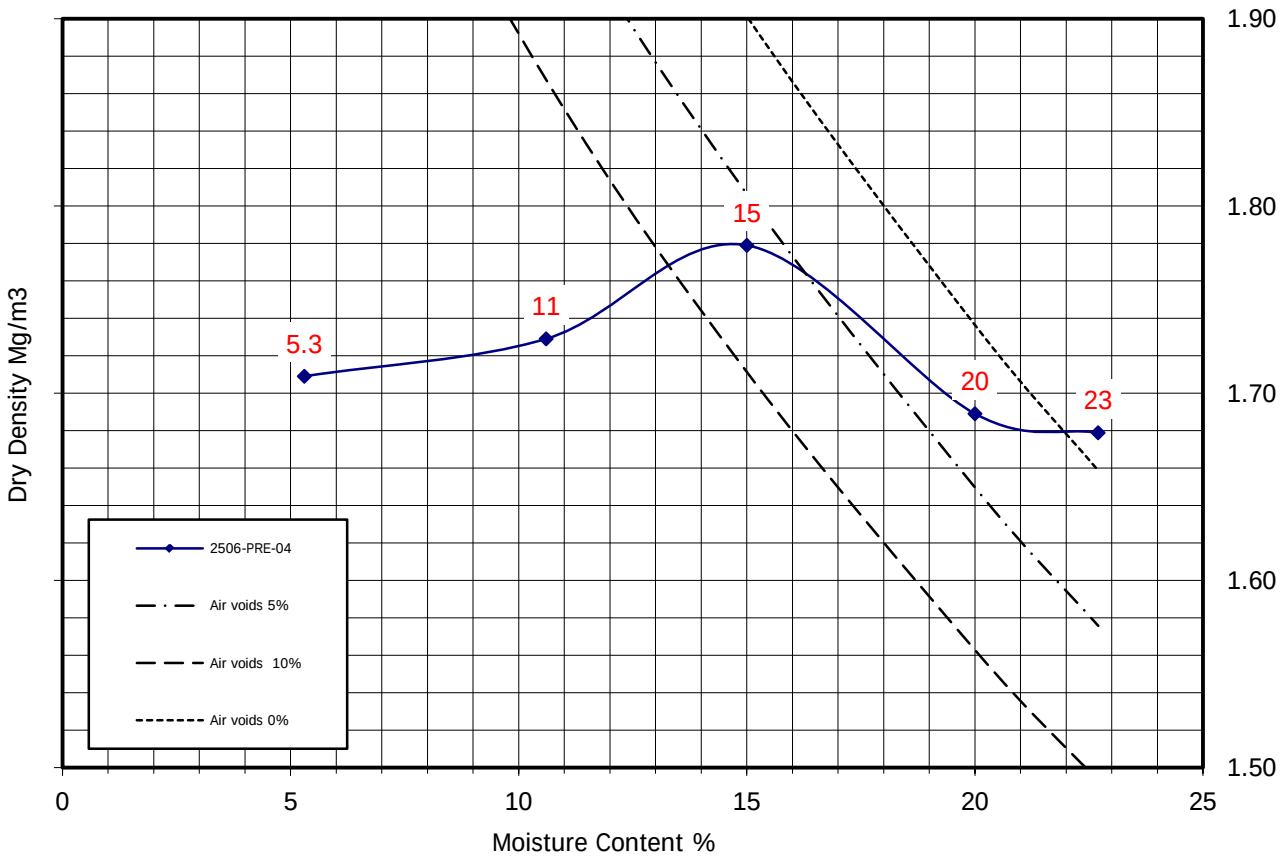
Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**		
Location:	**Docksway Landfill - Newport**		
Contract Number:	**27192-**		
Hole Number:	**2506-PRE-04**		
Sample Number:	**N/A**		
Depth (m):	**N/A**	**-**	**N/A**
Sample Type:	**B**		



Compaction Point:	**1**	**2**	**3**	**4**	**5**
Moisture Content:	5.3	11	15	20.0	22.7
Bulk Density (Mg/m^3):	1.80	1.91	2.05	2.03	2.06
Dry Density (Mg/m^3):	1.71	1.73	1.78	1.69	1.68

Initial Moisture Content:	**23**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.66 Measured**	Material Retained on 37.5 mm Test Sieve (%):	**0**
Maximum Dry Density (mg/m^3):	**1.78**	Material Retained on 20.0 mm Test Sieve (%):	**0**
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

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GEO Site & Testing Services Limited

Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: **24.6.15**

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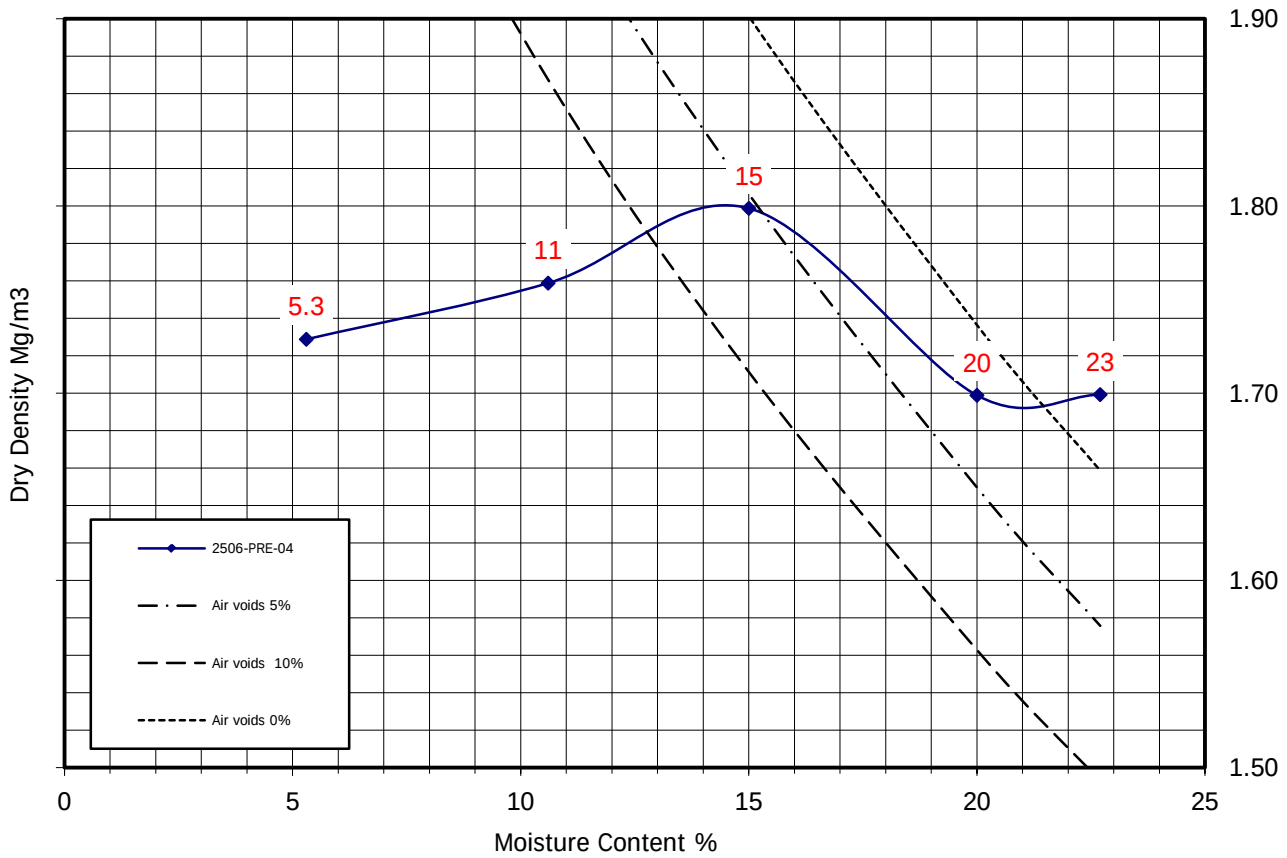
Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**
Location:	**Docksway Landfill - Newport**
Contract Number:	**27192-**
Hole Number:	**2506-PRE-04**
Sample Number:	**N/A**
Depth (m):	**N/A - N/A**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	5.3	11	15	20.0	22.7
Bulk Density (Mg/m^3):	1.82	1.95	2.07	2.04	2.08
Dry Density (Mg/m^3):	1.73	1.76	1.80	1.70	1.70

Initial Moisture Content:	**23**	Method of Compaction:	**4.5kg Rammer**
Particle Density (Mg/m^3):	**2.66 Measured**	Material Retained on 37.5 mm Test Sieve (%):	**0**
Maximum Dry Density (mg/m^3):	**1.80**	Material Retained on 20.0 mm Test Sieve (%):	**0**
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

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GEO Site & Testing Services Limited

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Emma Sharp

Approved By:
Paul Evans

Date Approved: **24.6.15**

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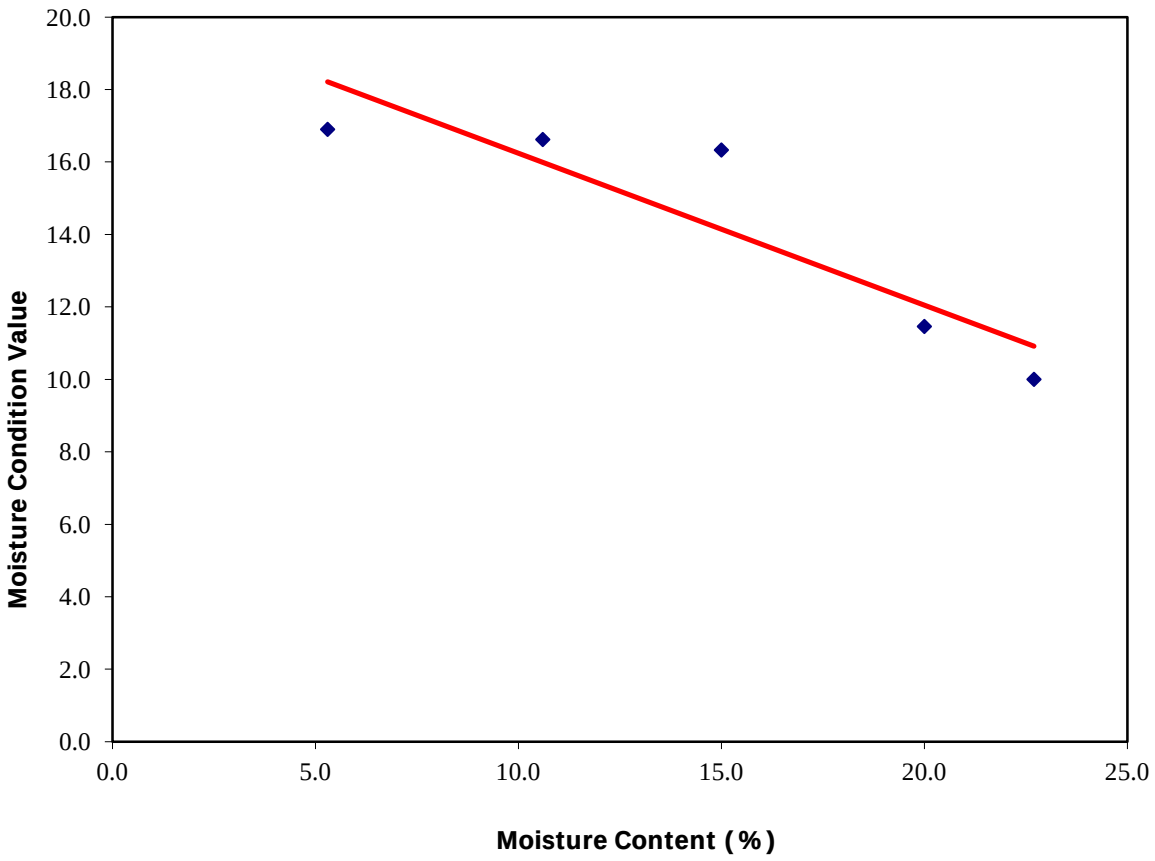
Moisture Condition Value Calibration

BS 1377:Part 4:1990

Client ref:	**NCC_2506**
Location:	**Docksway Landfill - Newport**
Contract Number:	**27192-**
Hole Number:	**2506-PRE-04**
Sample Number:	**N/A**
Depth (m) :	**N/A**
Sample Type	**B**

Initial Moisture Content (%).:	**22.7**
Single/Separate Samples Tested.	**Single**
Material Retained on the 20mm BS Test Sieve (%):	**0**



Test Results.

Test Number.	1	2	3	4	5
Moisture Content (%)	5.3	10.6	15.0	20.0	22.7
MCV Value	16.9	16.6	16.3	11.5	10.0

*** reading unobtainable.**

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Checked by
Ben Sharp (Contracts Manager)
Date approved:

Approved by
Emma Sharp (Office Manager)
24/6/15

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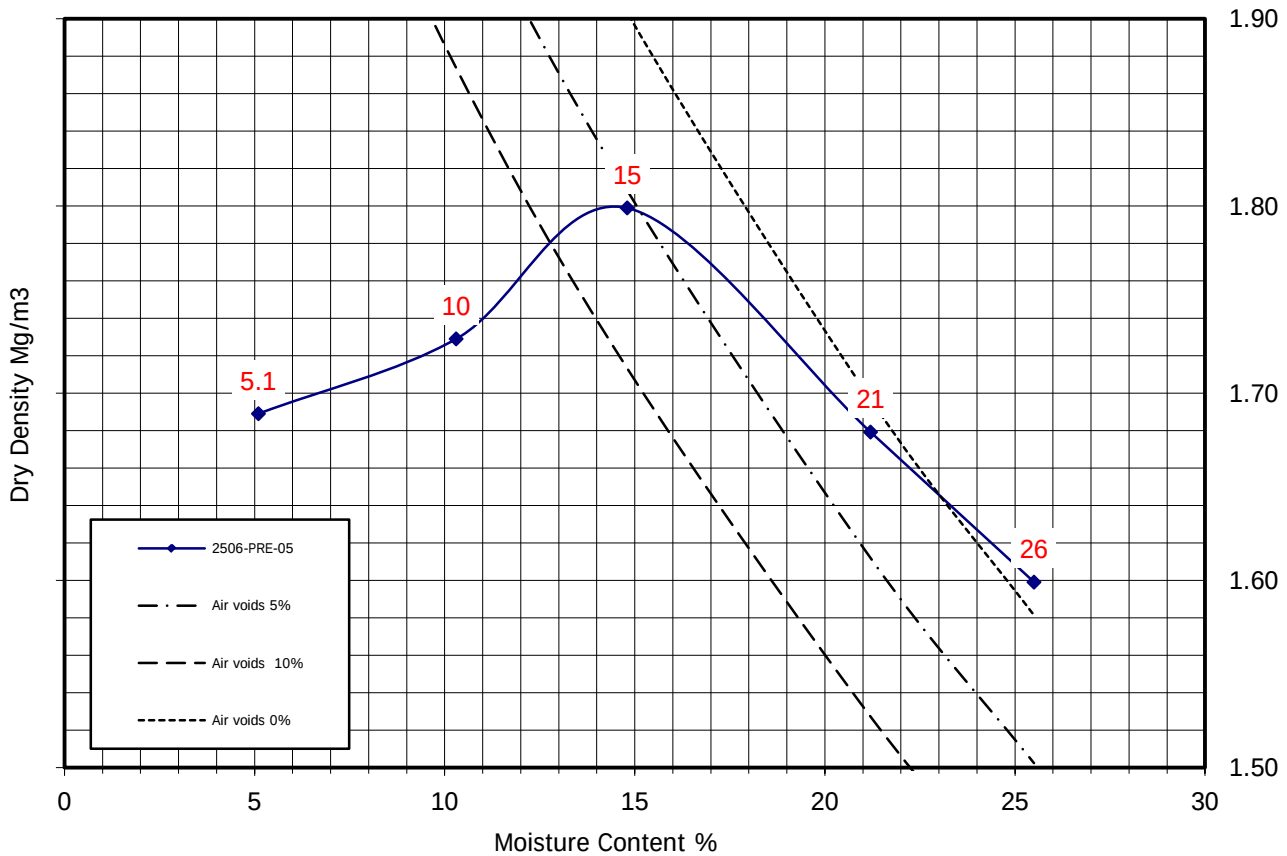
Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**		
Location:	**Docksway Landfill - Newport**		
Contract Number:	**27192-**		
Hole Number:	**2506-PRE-05**		
Sample Number:	**N/A**		
Depth (m):	**N/A**	**-**	**N/A**
Sample Type:	**B**		



Compaction Point:	**1**	**2**	**3**	**4**	**5**
Moisture Content:	5.1	10	15	21.2	25.5
Bulk Density (Mg/m^3):	1.78	1.91	2.07	2.04	2.01
Dry Density (Mg/m^3):	1.69	1.73	1.80	1.68	1.60

Initial Moisture Content:		**21**	Method of Compaction:	**2.5kg Rammer**	
Particle Density (Mg/m^3):	**2.65**	**Measured**	Material Retained on 37.5 mm Test Sieve (%):		**0**
Maximum Dry Density (mg/m^3):		**1.80**	Material Retained on 20.0 mm Test Sieve (%):		**0**
Optimum Moisture Content (%):		**15**	Sample Preparation Clause:		**3.2.4.1**

Remarks:

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GEO Site & Testing Services Limited

Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: **24.6.15**

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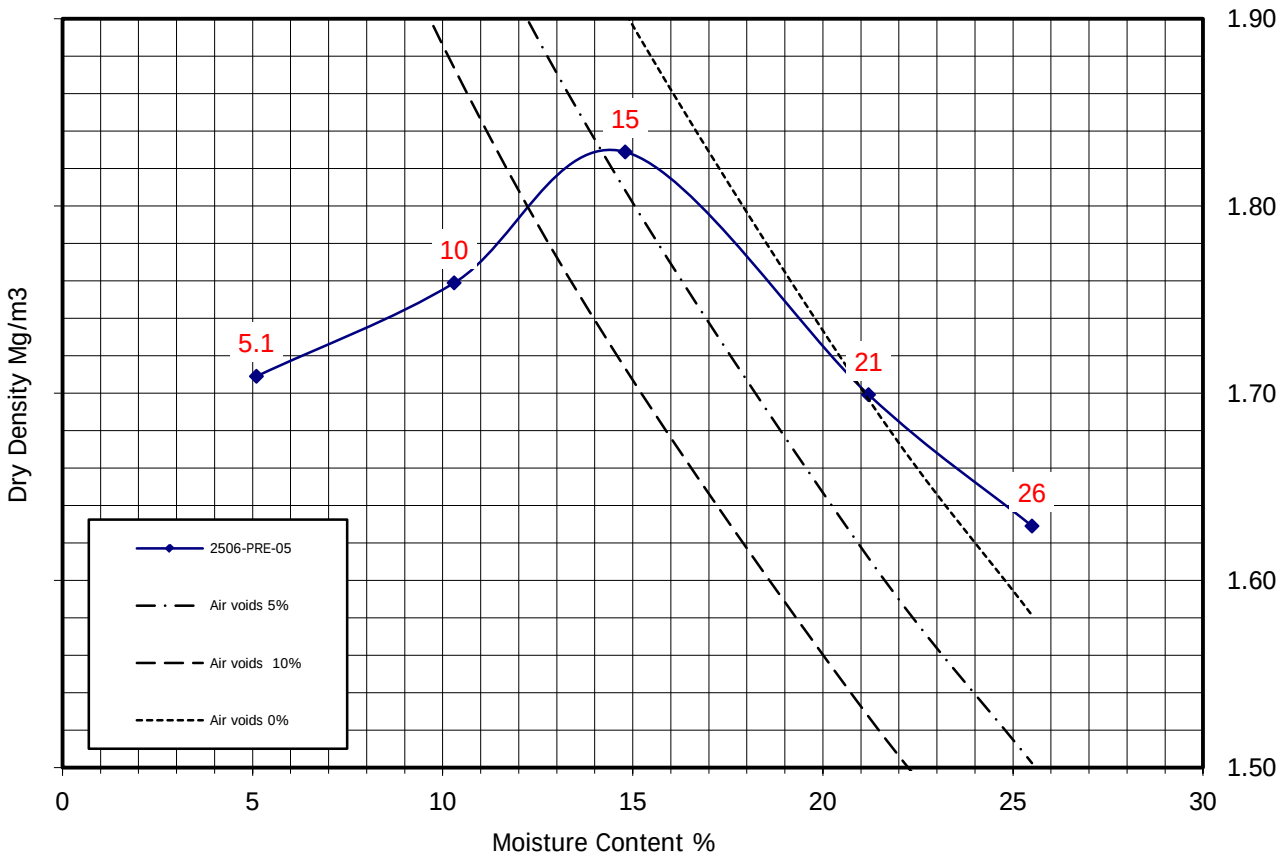
Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**
Location:	**Docksway Landfill - Newport**
Contract Number:	**27192-**
Hole Number:	**2506-PRE-05**
Sample Number:	**N/A**
Depth (m):	**N/A - N/A**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	5.1	10	15	21.2	25.5
Bulk Density (Mg/m^3):	1.80	1.94	2.10	2.06	2.04
Dry Density (Mg/m^3):	1.71	1.76	1.83	1.70	1.63

Initial Moisture Content:	**21**	Method of Compaction:	**4.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Measured**	Material Retained on 37.5 mm Test Sieve (%):	**0**
Maximum Dry Density (mg/m^3):	**1.83**	Material Retained on 20.0 mm Test Sieve (%):	**0**
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

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GEO Site & Testing Services Limited

Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: **24.6.15**

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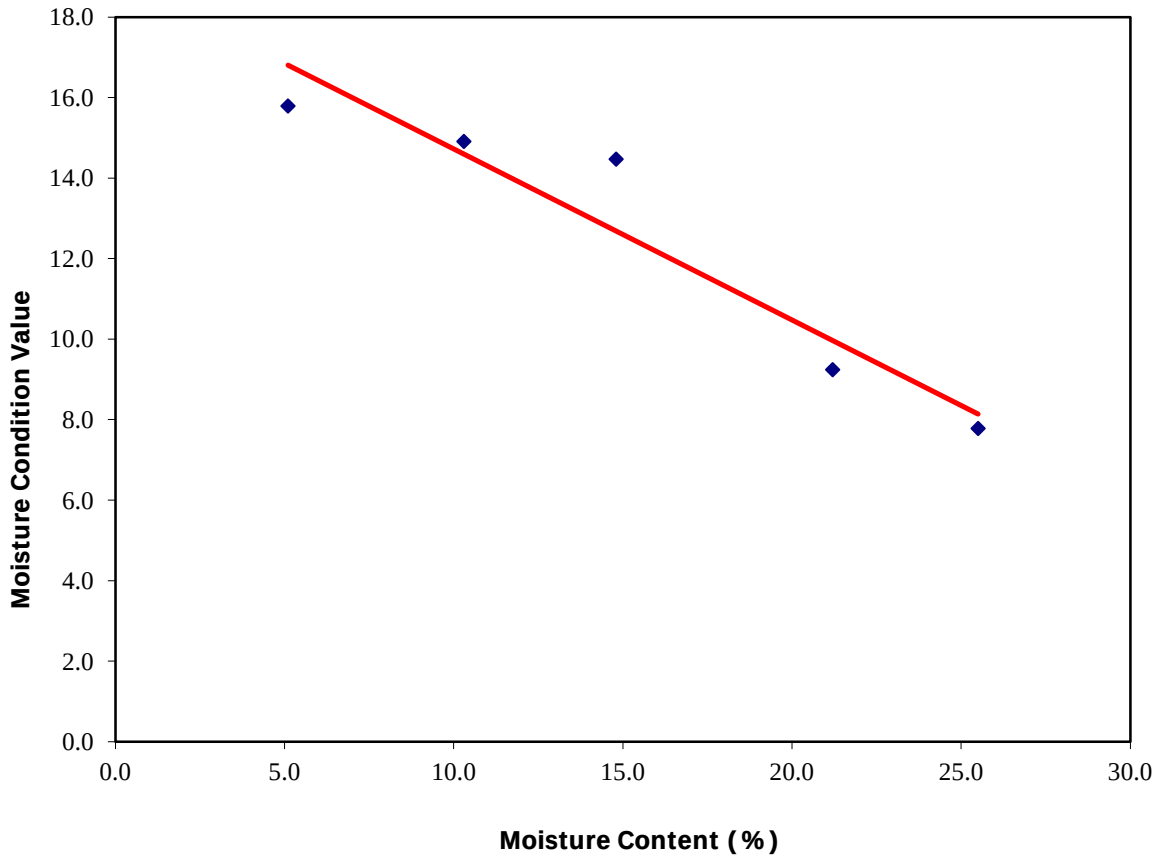
Moisture Condition Value Calibration

BS 1377:Part 4:1990

Client ref:	**NCC_2506**
Location:	**Docksway Landfill - Newport**
Contract Number:	**27192-**
Hole Number:	**2506-PRE-05**
Sample Number:	**N/A**
Depth (m) :	**N/A**
Sample Type	**B**

Initial Moisture Content (%).:	**21.2**
Single/Separate Samples Tested.	**Single**
Material Retained on the 20mm BS Test Sieve (%):	**0**



Test Results.

Test Number.	1	2	3	4	5
Moisture Content (%)	5.1	10.3	14.8	21.2	25.5
MCV Value	15.8	14.9	14.5	9.2	7.8

*** reading unobtainable.**

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Checked by
Ben Sharp (Contracts Manager)
Date approved:

Approved by
Emma Sharp (Office Manager)
24/6/15

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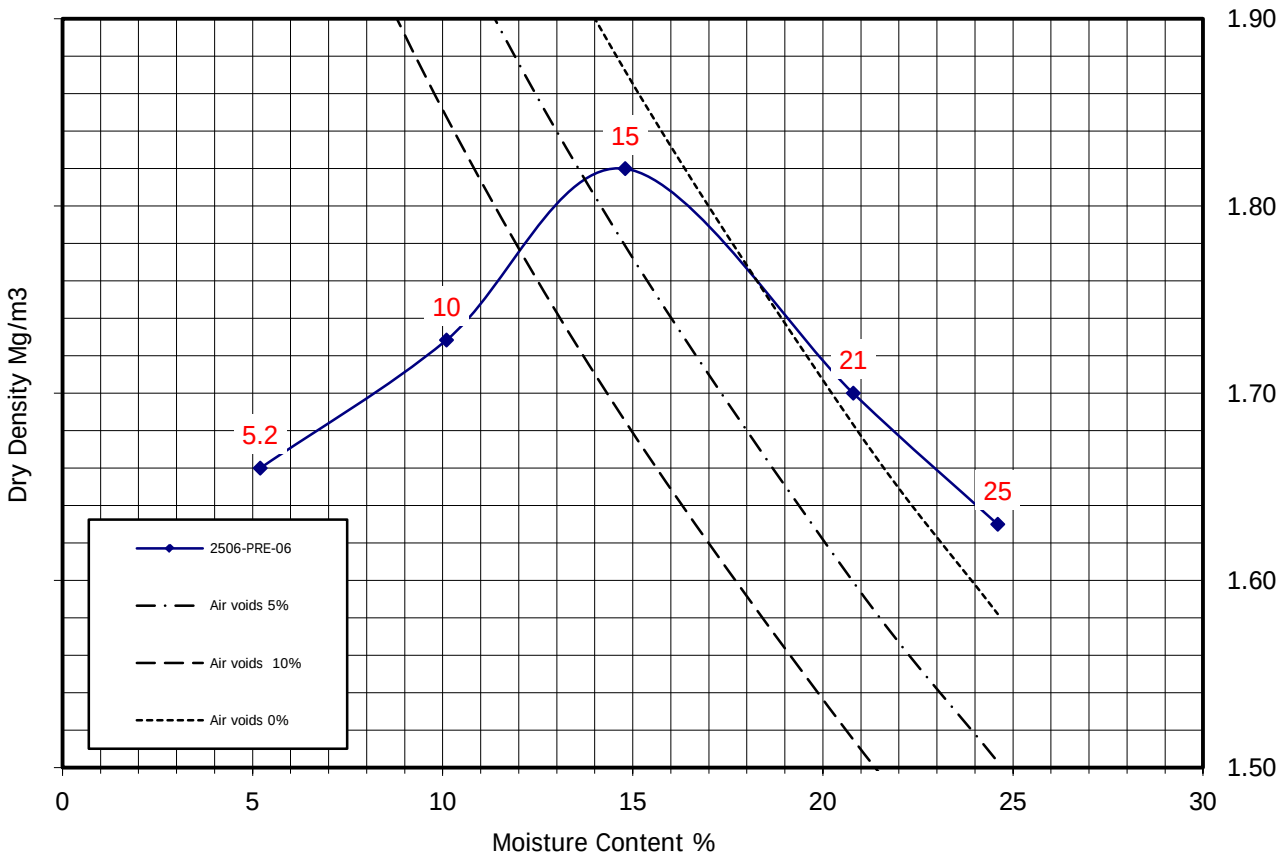
Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**		
Location:	**Docksway Landfill - Newport**		
Contract Number:	**27192-**		
Hole Number:	**2506-PRE-06**		
Sample Number:	**N/A**		
Depth (m):	**N/A**	**-**	**N/A**
Sample Type:	**B**		



Compaction Point:	**1**	**2**	**3**	**4**	**5**
Moisture Content:	5.2	10	15	20.8	24.6
Bulk Density (Mg/m^3):	1.75	1.90	2.09	2.05	2.03
Dry Density (Mg/m^3):	1.66	1.73	1.82	1.70	1.63

Initial Moisture Content:		**21**	Method of Compaction:	**2.5kg Rammer**	
Particle Density (Mg/m^3):	**2.59**	**Measured**	Material Retained on 37.5 mm Test Sieve (%):		**0**
Maximum Dry Density (mg/m^3):		**1.82**	Material Retained on 20.0 mm Test Sieve (%):		**0**
Optimum Moisture Content (%):		**15**	Sample Preparation Clause:		**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: **24.6.15**

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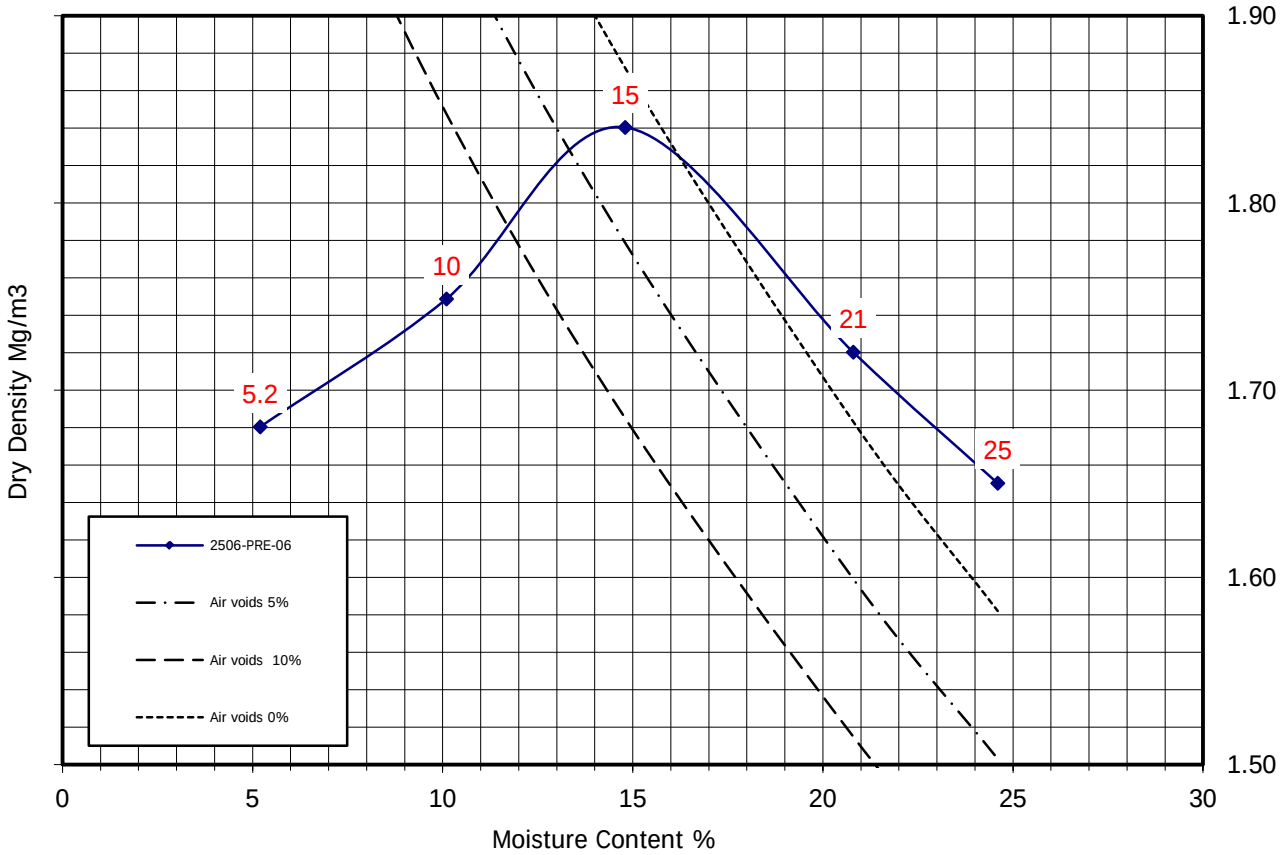
Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**		
Location:	**Docksway Landfill - Newport**		
Contract Number:	**27192-**		
Hole Number:	**2506-PRE-06**		
Sample Number:	**N/A**		
Depth (m):	**N/A**	**-**	**N/A**
Sample Type:	**B**		



Compaction Point:	1	2	3	4	5
Moisture Content:	5.2	10	15	20.8	24.6
Bulk Density (Mg/m^3):	1.77	1.93	2.11	2.08	2.06
Dry Density (Mg/m^3):	1.68	1.75	1.84	1.72	1.65

Initial Moisture Content:	**21**	Method of Compaction:	**4.5kg Rammer**	
Particle Density (Mg/m^3):	**2.59 Measured**	Material Retained on 37.5 mm Test Sieve (%):	**0**	
Maximum Dry Density (mg/m^3):	**1.84**	Material Retained on 20.0 mm Test Sieve (%):	**0**	
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**3.2.4.1**	

Remarks:

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GEO Site & Testing Services Limited

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Emma Sharp

Approved By:
Paul Evans

Date Approved: **24.6.15**

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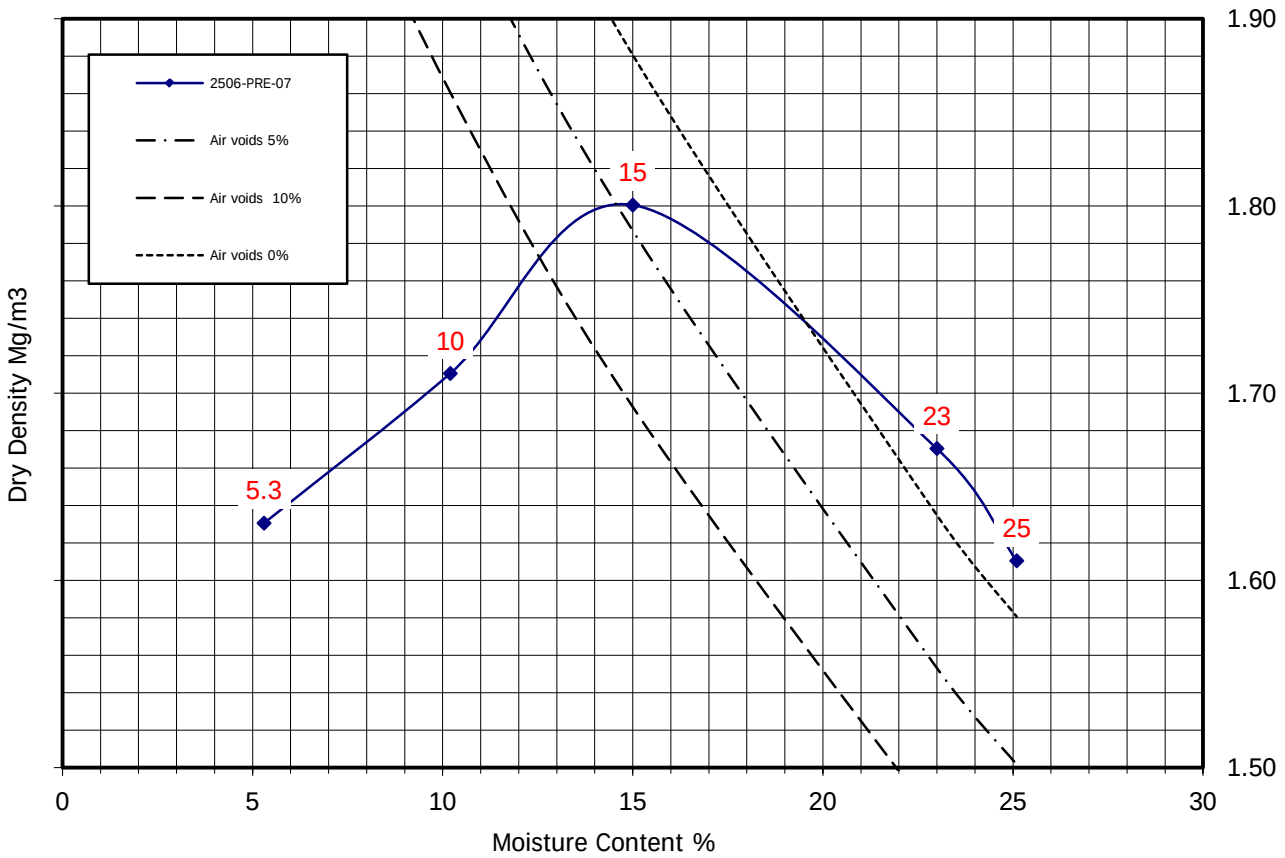
Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**
Location:	**Docksway Landfill - Newport**
Contract Number:	**27192-**
Hole Number:	**2506-PRE-07**
Sample Number:	**N/A**
Depth (m):	**N/A - N/A**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	5.3	10	15	23.0	25.1
Bulk Density (Mg/m^3):	1.72	1.88	2.07	2.05	2.01
Dry Density (Mg/m^3):	1.63	1.71	1.80	1.67	1.61

Initial Moisture Content:	**23**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.62 Measured**	Material Retained on 37.5 mm Test Sieve (%):	**0**
Maximum Dry Density (mg/m^3):	**1.80**	Material Retained on 20.0 mm Test Sieve (%):	**0**
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

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Approved By:
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Date Approved: **24.6.15**

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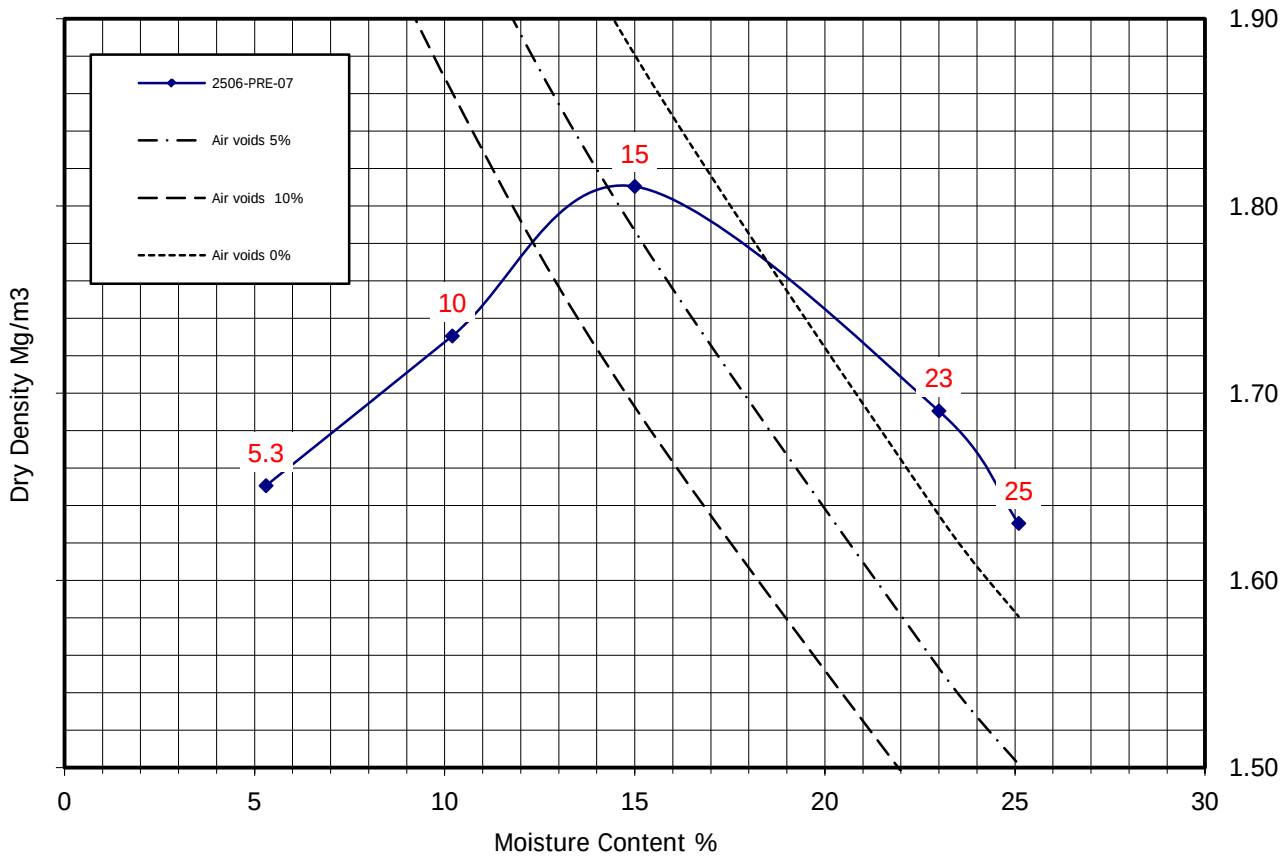
2788

Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**
Location:	**Docksway Landfill - Newport**
Contract Number:	**27192-**
Hole Number:	**2506-PRE-07**
Sample Number:	**N/A**
Depth (m):	**N/A - N/A**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	5.3	10	15	23.0	25.1
Bulk Density (Mg/m^3):	1.74	1.91	2.08	2.08	2.04
Dry Density (Mg/m^3):	1.65	1.73	1.81	1.69	1.63

Initial Moisture Content:	**23**	Method of Compaction:	**4.5kg Rammer**
Particle Density (Mg/m^3):	**2.62 Measured**	Material Retained on 37.5 mm Test Sieve (%):	**0**
Maximum Dry Density (mg/m^3):	**1.81**	Material Retained on 20.0 mm Test Sieve (%):	**0**
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: **24.6.15**

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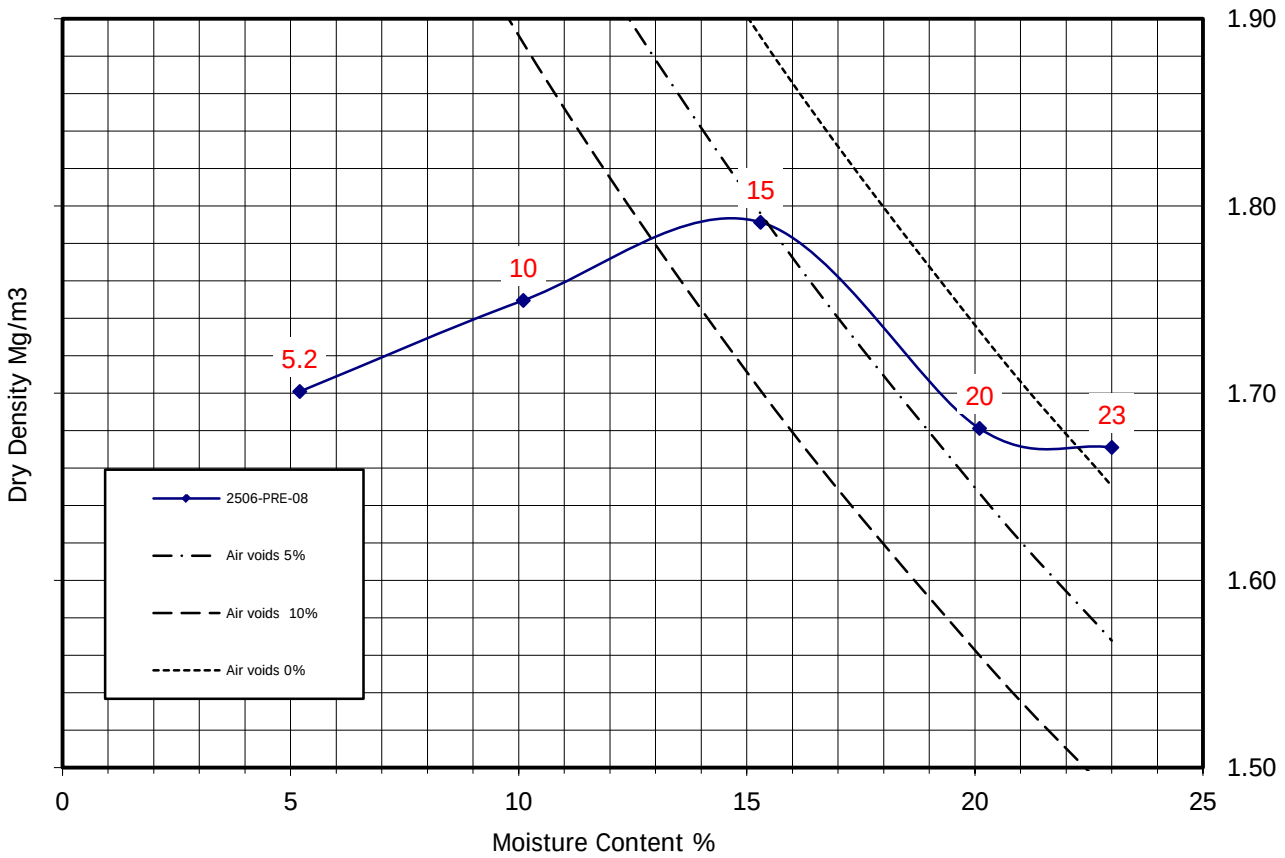
Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**		
Location:	**Docksway Landfill - Newport**		
Contract Number:	**27192-**		
Hole Number:	**2506-PRE-08**		
Sample Number:	**N/A**		
Depth (m):	**N/A**	**-**	**N/A**
Sample Type:	**B**		



Compaction Point:	**1**	**2**	**3**	**4**	**5**
Moisture Content:	5.2	10	15	20.1	23.0
Bulk Density (Mg/m^3):	1.79	1.93	2.07	2.02	2.06
Dry Density (Mg/m^3):	1.70	1.75	1.79	1.68	1.67

Initial Moisture Content:	**23**	Method of Compaction:	**2.5kg Rammer**	
Particle Density (Mg/m^3):	**2.66 Measured**	Material Retained on 37.5 mm Test Sieve (%):	**0**	
Maximum Dry Density (mg/m^3):	**1.79**	Material Retained on 20.0 mm Test Sieve (%):	**0**	
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**3.2.4.1**	

Remarks:

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GEO Site & Testing Services Limited

Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: **24.6.15**

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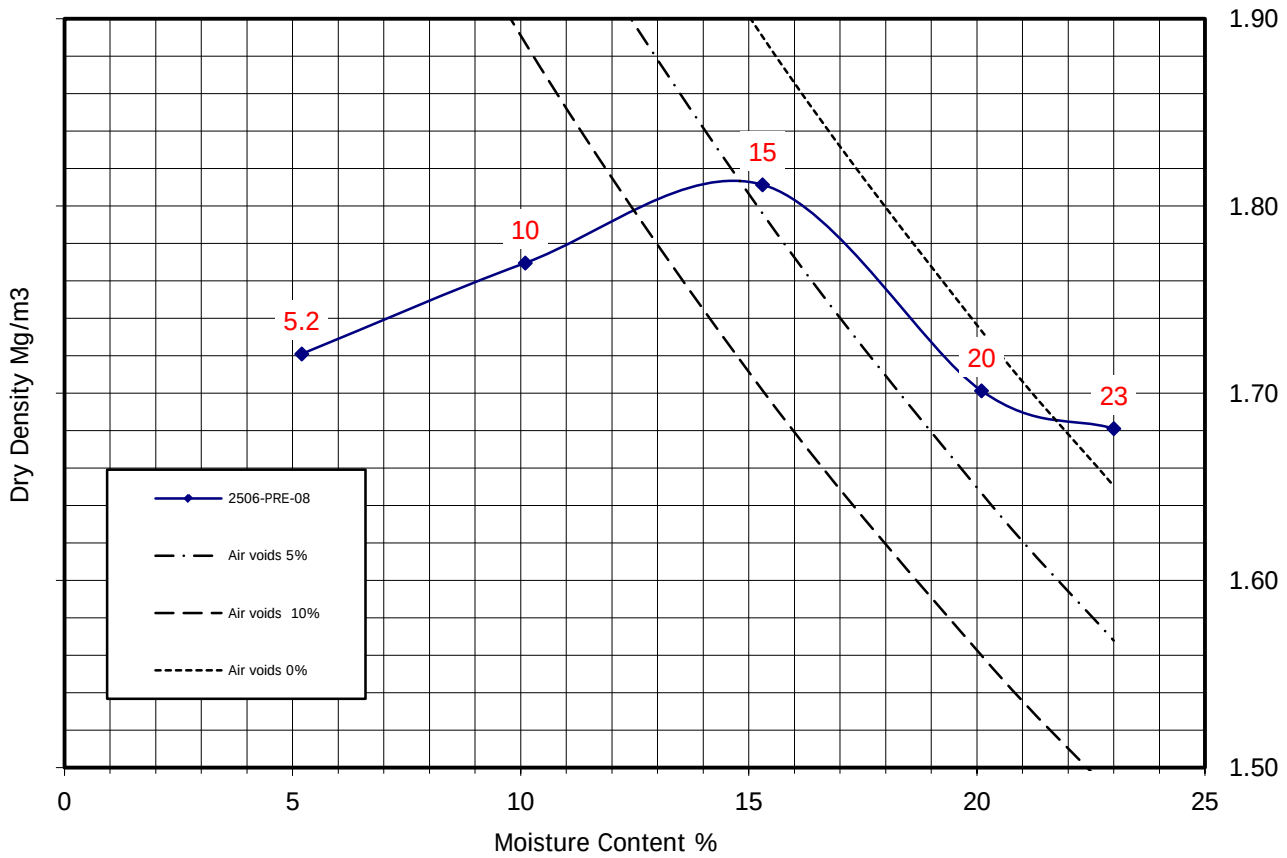
Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**NCC_2506**
Location:	**Docksway Landfill - Newport**
Contract Number:	**27192-**
Hole Number:	**2506-PRE-08**
Sample Number:	**N/A**
Depth (m):	**N/A - N/A**
Sample Type:	**B**



Compaction Point:	1	2	3	4	5
Moisture Content:	5.2	10	15	20.1	23.0
Bulk Density (Mg/m^3):	1.81	1.95	2.09	2.04	2.07
Dry Density (Mg/m^3):	1.72	1.77	1.81	1.70	1.68

Initial Moisture Content:		**23**	Method of Compaction:	**4.5kg Rammer**	
Particle Density (Mg/m^3):	**2.66**	**Measured**	Material Retained on 37.5 mm Test Sieve (%):		**0**
Maximum Dry Density (mg/m^3):		**1.81**	Material Retained on 20.0 mm Test Sieve (%):		**0**
Optimum Moisture Content (%):		**15**	Sample Preparation Clause:		**3.2.4.1**

Remarks:

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GEO Site & Testing Services Limited

Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: **24.6.15**

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		2506-PRE-07
Sample No.		
Depth	m	
Date		26/06/2015
Disturbed / Undisturbed		2.5kg Recompacted

Description of Specimen

Greyish brown silty CLAY

Initial Specimen Conditions

Height	mm	115.50
Diameter	mm	104.80
Area	mm^2	8626.06
Volume	cm^3	996.31
Mass	g	2046.40
Dry Mass	g	1665.20
Density	Mg/m^3	2.05
Dry Density	Mg/m^3	1.67
Moisture Content	%	22.9
Voids Ratio		0.586
Specific Gravity (assumed/measured)	kN/m^3	2.65 assumed

Final Specimen Conditions

Moisture Content	%	23.92
Density	Mg/m^3	2.09
Dry Density	Mg/m^3	1.69

Test Setup

Date started	17/06/2015
Date Finished	25/06/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 1
Cell Number	CPerm 1

D P Evans

Checked and Approved By

26/06/15
Date

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Docksway Landfill-Newport

Client Ref
NCC 2506
Contract No
27192

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		2506-PRE-07
Sample No.		
Depth	m	
Date		26/06/2015

Saturation

Cell Pressure Incr.	kPa	35.00
Back Pressure Incr.	kPa	35.00
Differential Pressure	kPa	0.00
Final Cell Pressure	kPa	185.00
Final Pore Pressure	kPa	179.30
Final B Value		1.00

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	185.00
Back Pressure	kPa	85.00
Excess Pore Pressure	kPa	94.30
Pore Pressure at End	kPa	79.30
Consolidated Volume	cm^3	985.41
Consolidated Height	mm	115.08
Consolidated Area	mm^2	8563.14
Vol. Compressibility	m^2/MN	5.3587
Consolidation Coef.	$m^2/yr.$	0.1094
Final Voids Ratio		0.568

Permeability

Cell Pressure	kPa	185.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00127
Average Temperature	'C	20

Vertical Permeability | m/s	**1.38 x 10-10**

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Client Ref

NCC 2506

Contract No

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Docksway Landfill-Newport

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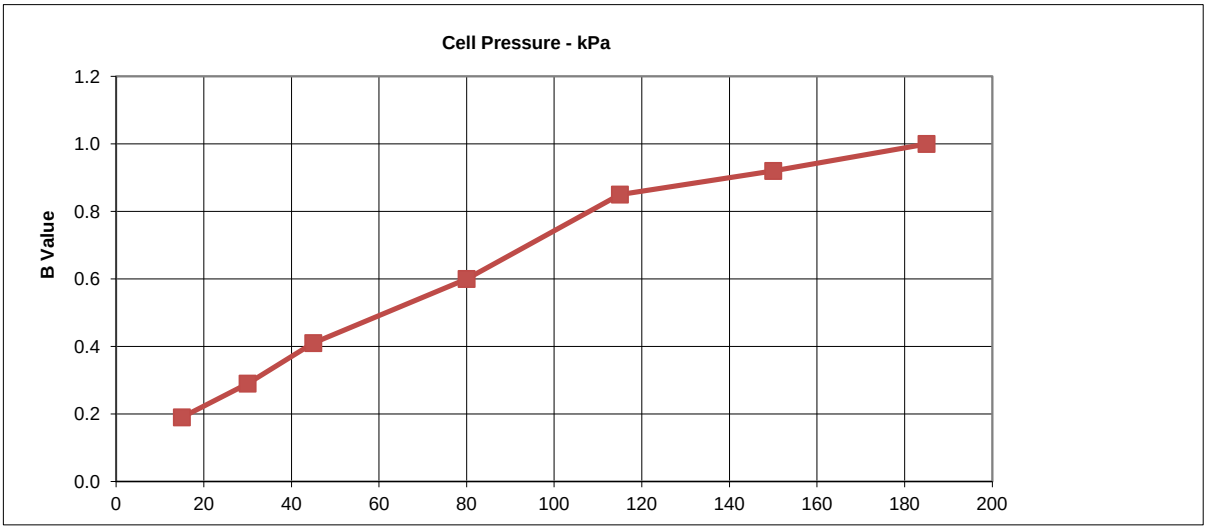
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

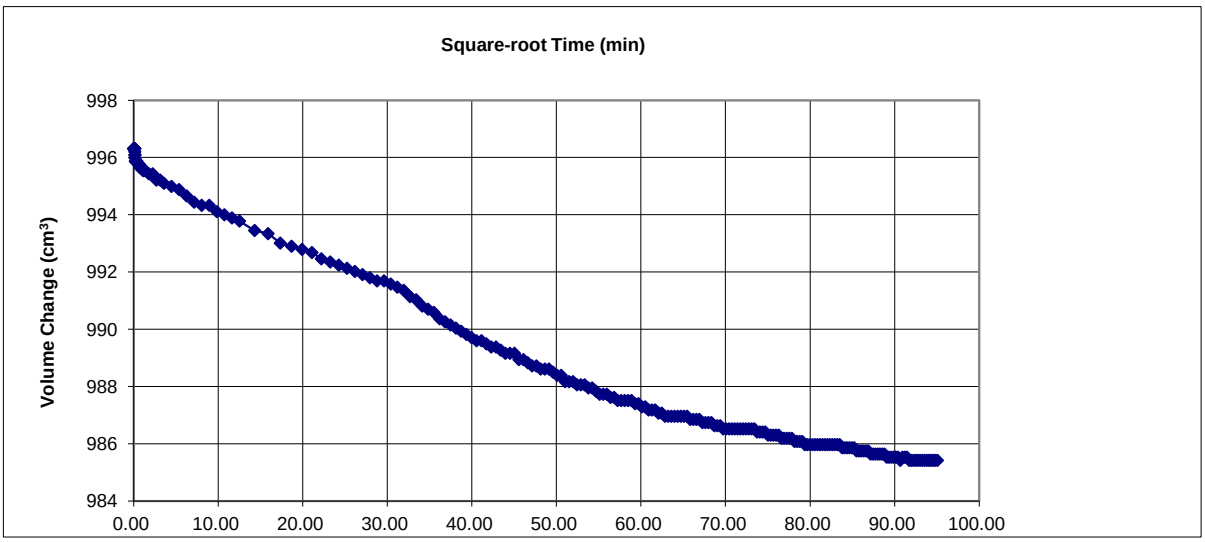
Specimen Details

Borehole		2506-PRE-07
Sample No.		
Depth	m	
Date		26/06/2015

Saturation Stage



Consolidation Stage



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Date

Client Ref

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Contract No

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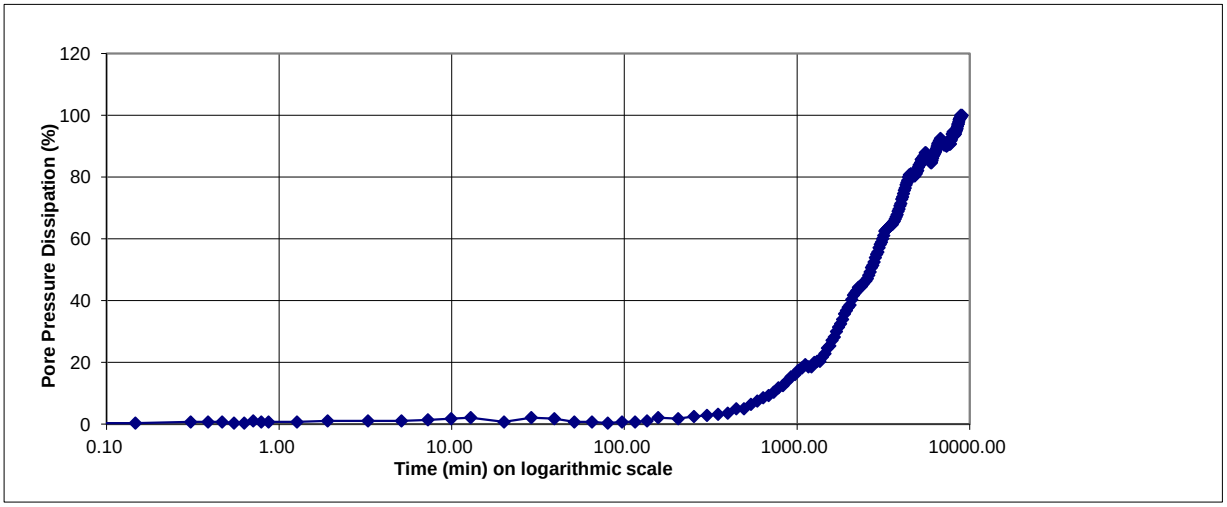
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

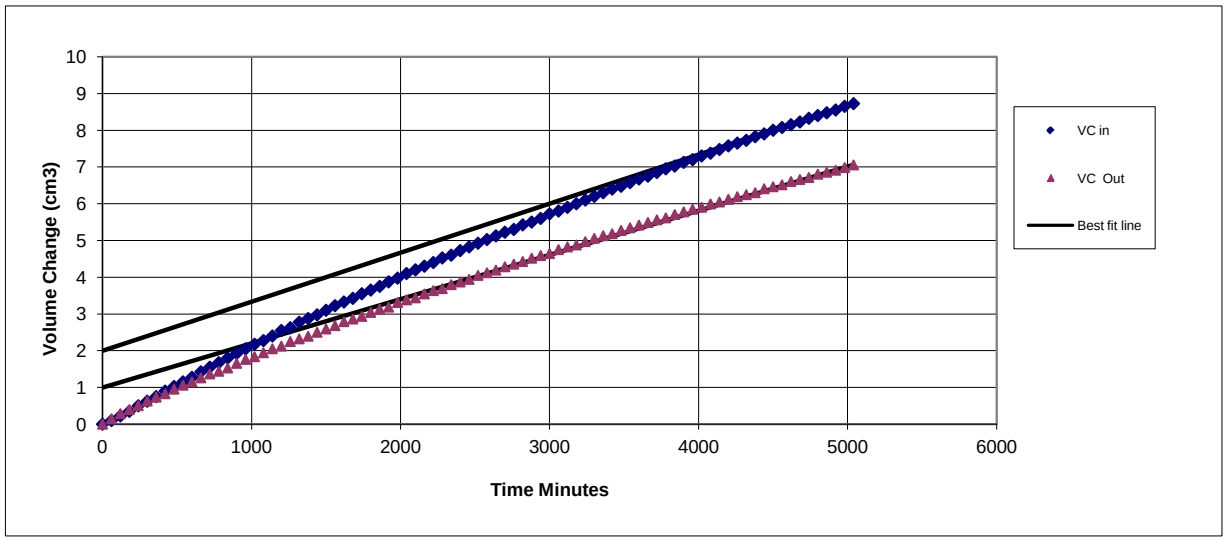
Specimen Details

Borehole		2506-PRE-07
Sample No.		
Depth	m	
Date		26/06/2015

Consolidation Stage



Permeability Stage



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26/06/15
Date

Client Ref
NCC 2506

Docksway Landfill-Newport

Contract No
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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		2506-PRE-08
Sample No.		
Depth	m	
Date		27/06/2015
Disturbed / Undisturbed		2.5kg Recompacted

Description of Specimen

Greyish brown silty CLAY

Initial Specimen Conditions

Height	mm	115.60
Diameter	mm	104.90
Area	mm^2	8642.53
Volume	cm^3	999.08
Mass	g	2051.00
Dry Mass	g	1662.50
Density	Mg/m^3	2.05
Dry Density	Mg/m^3	1.66
Moisture Content	%	23.4
Voids Ratio		0.593
Specific Gravity (assumed/measured)	kN/m^3	2.65 assumed

Final Specimen Conditions

Moisture Content	%	24.38
Density	Mg/m^3	2.09
Dry Density	Mg/m^3	1.68

Test Setup

Date started	17/06/2015
Date Finished	26/06/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 2
Cell Number	CPerm 2

D P Evans

Checked and Approved By

27/06/15
Date

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GEO Site & Testing Services Limited

Docksway Landfill-Newport

Client Ref

NCC 2506

Contract No

27192

UKAS TESTING
2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		2506-PRE-08
Sample No.		
Depth	m	
Date		27/06/2015

Saturation

Cell Pressure Incr.	kPa	100.00
Back Pressure Incr.	kPa	95.00
Differential Pressure	kPa	5.00
Final Cell Pressure	kPa	550.00
Final Pore Pressure	kPa	171.60
Final B Value		0.95

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	450.00
Back Pressure	kPa	350.00
Excess Pore Pressure	kPa	95.00
Pore Pressure at End	kPa	350.00
Consolidated Volume	cm^3	989.08
Consolidated Height	mm	115.21
Consolidated Area	mm^2	8584.86
Vol. Compressibility	m^2/MN	0.4450
Consolidation Coef.	$m^2/yr.$	0.1054
Final Voids Ratio		0.577

Permeability

Cell Pressure	kPa	450.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00214
Average Temperature	'C	20

Vertical Permeability | m/s	**2.33 x 10-10**

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Checked and Approved By

27/06/15
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Client Ref

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Contract No

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Docksway Landfill-Newport

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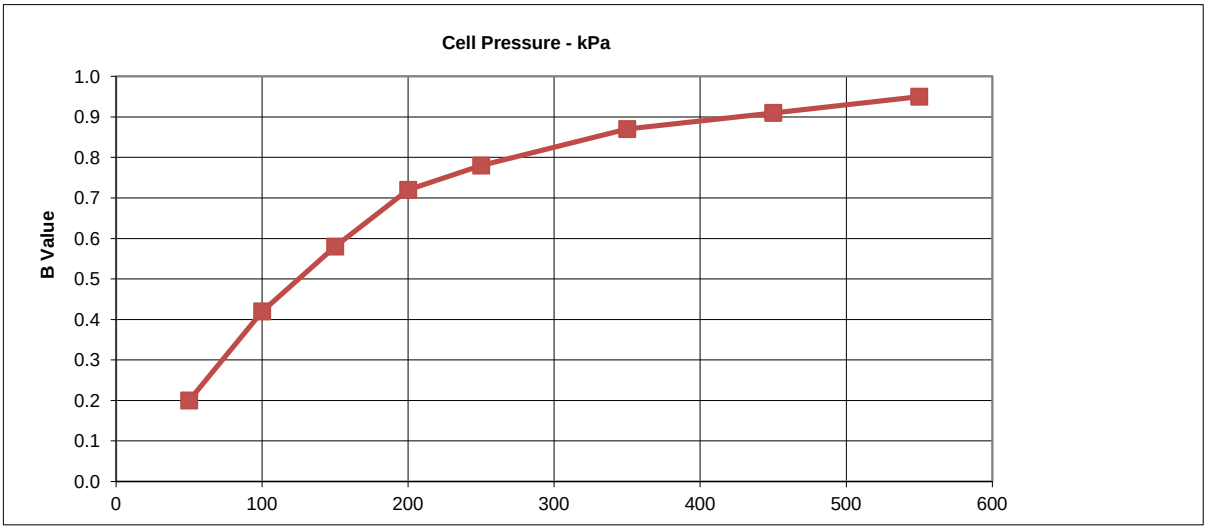
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

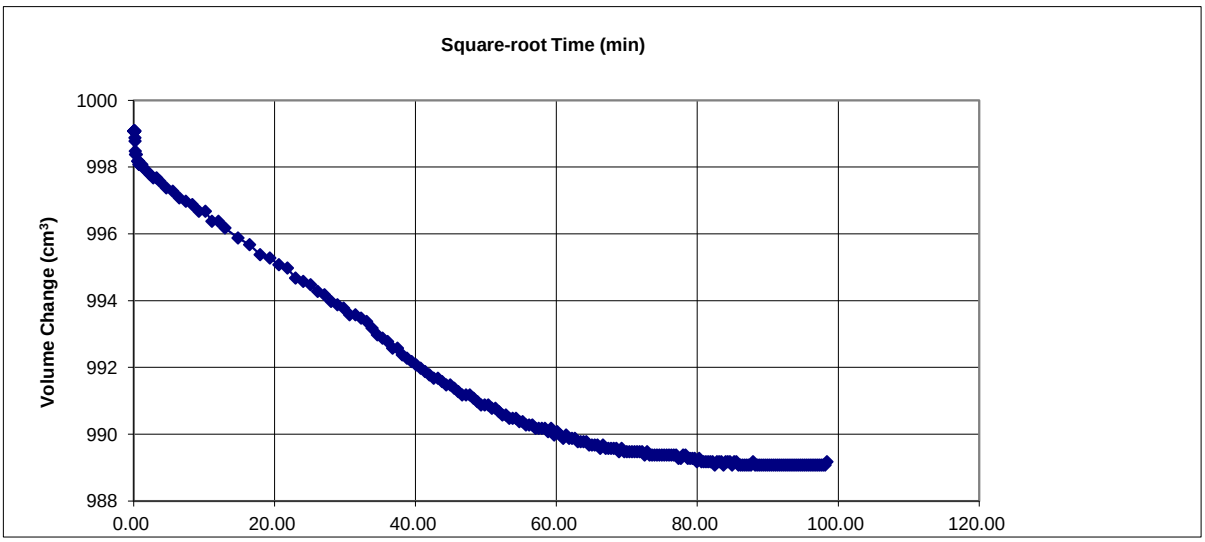
Specimen Details

Borehole		2506-PRE-08
Sample No.		
Depth	m	
Date		27/06/2015

Saturation Stage



Consolidation Stage



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Client Ref
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Docksway Landfill-Newport

Contract No
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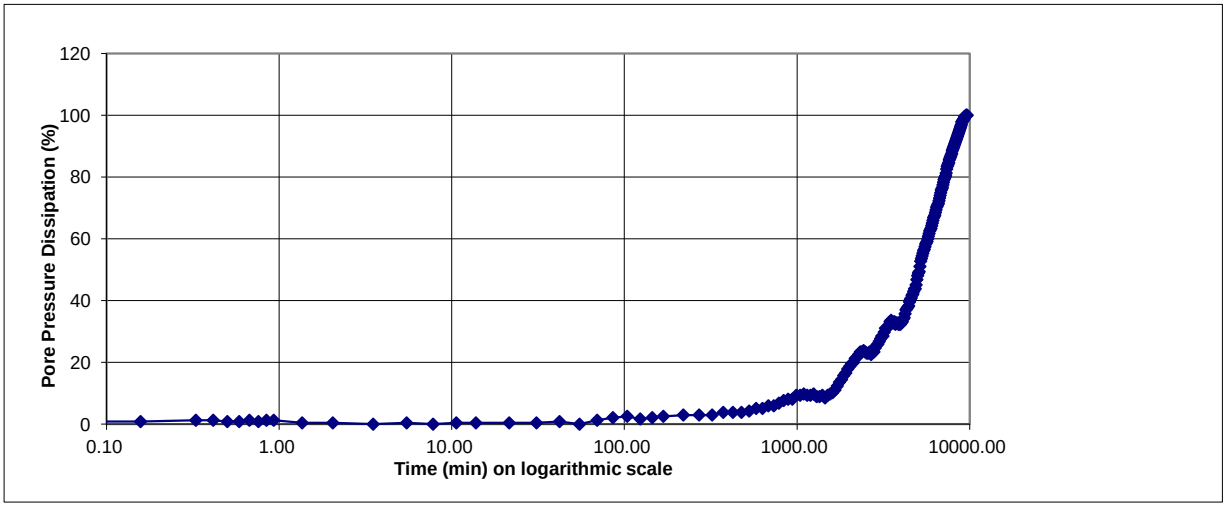
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

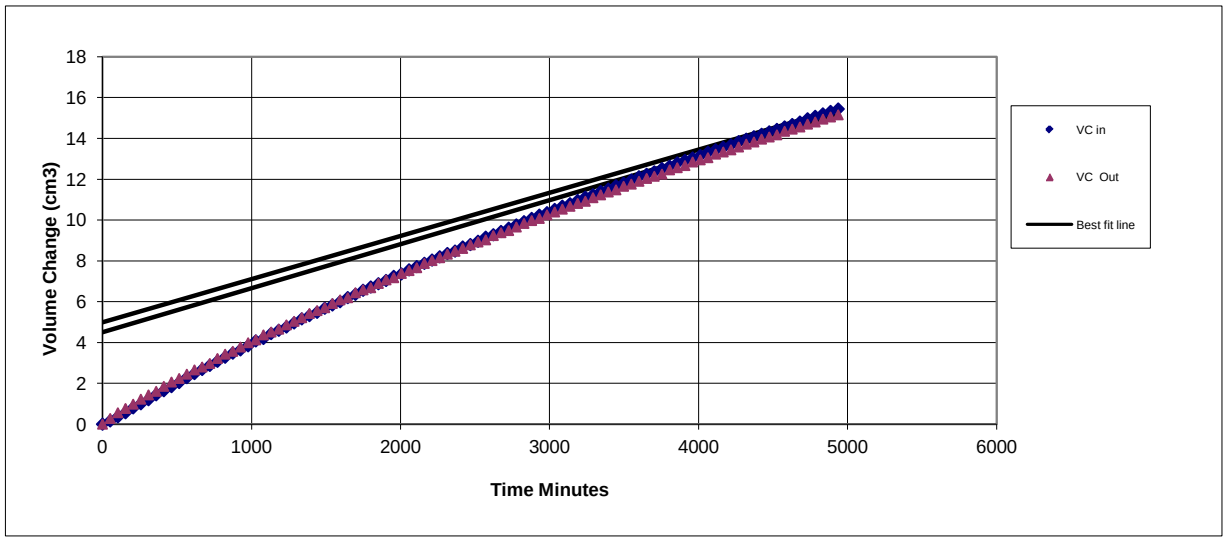
Specimen Details

Borehole		2506-PRE-08
Sample No.		
Depth	m	
Date		27/06/2015

Consolidation Stage



Permeability Stage



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Docksway Landfill-Newport

Client Ref
NCC 2506

Contract No
27192

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Permeability in a Triaxial Cell

as per Accelerated test (Environment Agency Report P1-398/TR/2)

Specimen Details

Borehole		2506-PRE-07
Sample No.		OMC+2
Depth	m	
Date		06/07/2015
Disturbed / Undisturbed		
		2.5kg Recompacted

Description of Specimen

Greyish brown silty CLAY

Initial Specimen Conditions

Height	mm	115.50
Diameter	mm	104.80
Area	mm^2	8626.06
Volume	cm^3	996.31
Mass	g	2026.50
Dry Mass	g	1732.50
Density	Mg/m^3	2.034
Dry Density	Mg/m^3	1.739
Moisture Content	%	17.0
Voids Ratio		
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	17.61
Density	Mg/m^3	2.05
Dry Density	Mg/m^3	1.74

Test Setup

Date started	30/06/2015
Date Finished	04/07/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPERM 1
Cell Number	CPERM 1

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Checked and Approved By

06/07/15
Date

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Docksway Landfill-Newport

Client Ref
NCC 2506
Contract No
27192

Permeability in a Triaxial Cell

as per Accelerated test (Environment Agency Report P1-398/TR/2)

Specimen Details

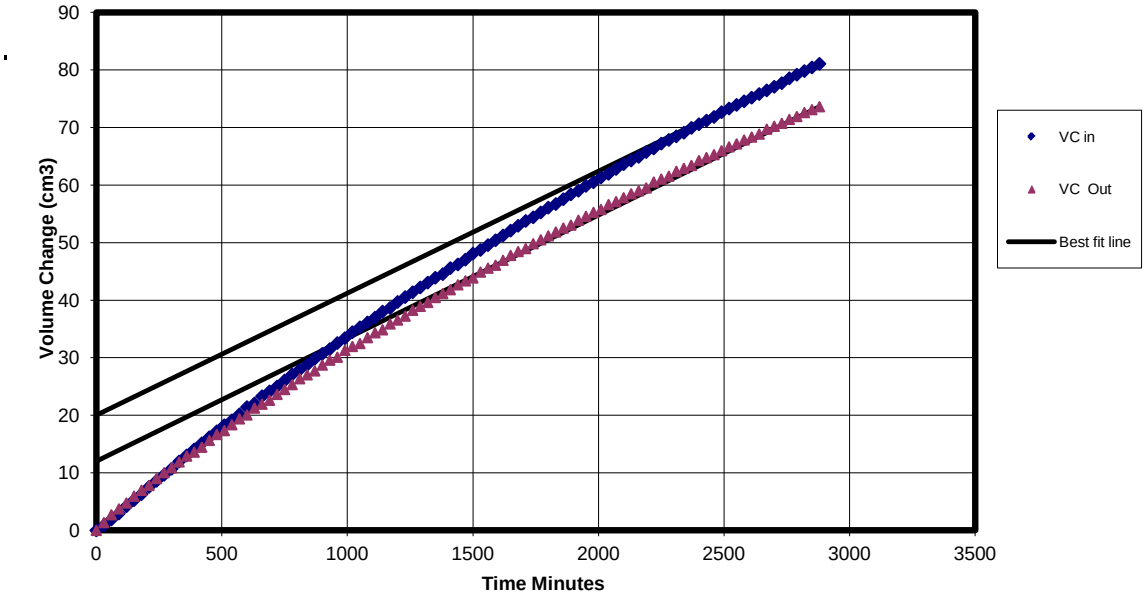
Borehole		2506-PRE-07
Sample No.		OMC+2
Depth	m	
Date		06/07/2015

Permeability

Cell Pressure	kPa	550.00
Inlet Pressure	kPa	425.00
Outlet Pressure	kPa	300.00
Mean Rate of Flow	ml/min	0.02130
Average Temperature	'C	22
Outlet Pressure	kPa	300.00

B Value

Post test	
Final B value	0.92



Corrected Vertical Permeability I m/s	**3.71 x 10-10**

D P Rands

Checked and Approved By

06/07/15
Date

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Client Ref

NCC 2506

Contract No

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Docksway Landfill-Newport

Permeability in a Triaxial Cell

as per Accelerated test (Environment Agency Report P1-398/TR/2)

Specimen Details

Borehole		2506-PRE-07
Sample No.		Plastic Limit
Depth	m	
Date		30/06/2015
Disturbed / Undisturbed		
		2.5kg Recompacted

Description of Specimen

Greyish brown silty CLAY

Initial Specimen Conditions

Height	mm	115.50
Diameter	mm	104.80
Area	mm^2	8626.06
Volume	cm^3	996.31
Mass	g	2035.60
Dry Mass	g	1602.20
Density	Mg/m^3	2.043
Dry Density	Mg/m^3	1.608
Moisture Content	%	27.1
Voids Ratio		
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	27.05
Density	Mg/m^3	2.04
Dry Density	Mg/m^3	1.61

Test Setup

Date started	25/06/2015
Date Finished	29/06/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm1
Cell Number	CPerm1

D P Evans

Checked and Approved By

30/06/15
Date

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Client Ref

NCC 2506

Contract No

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Docksway Landfill- Newport

Permeability in a Triaxial Cell

as per Accelerated test (Environment Agency Report P1-398/TR/2)

Specimen Details

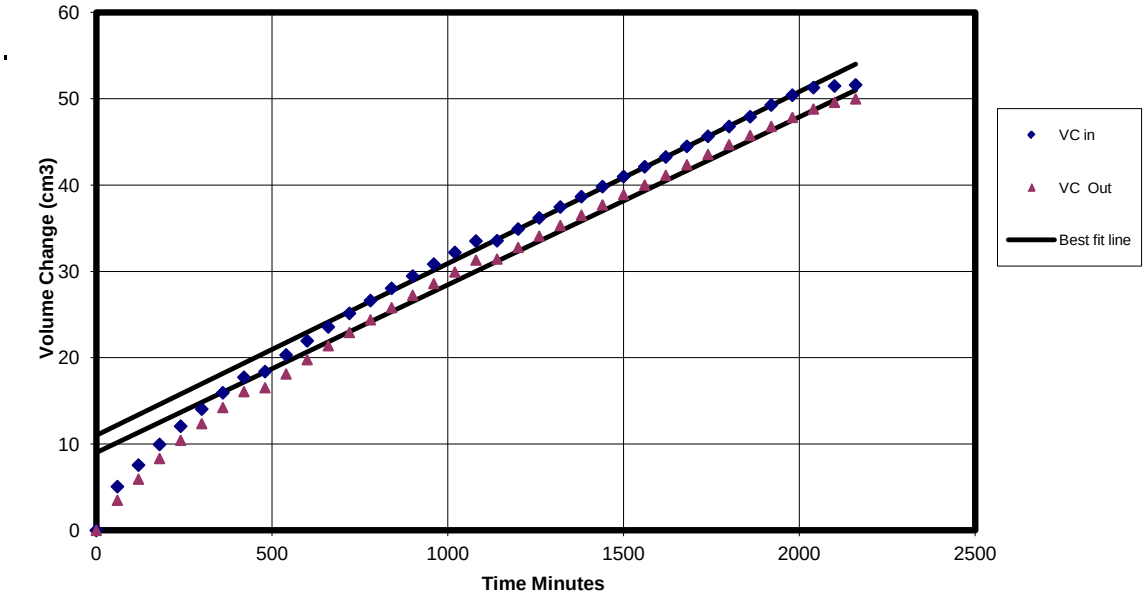
Borehole		2506-PRE-07
Sample No.		Plastic Limit
Depth	m	
Date		30/06/2015

Permeability

Cell Pressure	kPa	550.00
Inlet Pressure	kPa	425.00
Outlet Pressure	kPa	300.00
Mean Rate of Flow	ml/min	0.01968
Average Temperature	'C	22
Outlet Pressure	kPa	300.00

B Value

Post test Final B value	0.92



Corrected Vertical Permeability I m/s	**3.43 x 10-10**

D P Rands

Checked and Approved By

30/06/15
Date

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Client Ref

NCC 2506

Contract No

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Docksway Landfill- Newport

Permeability in a Triaxial Cell

as per Accelerated test (Environment Agency Report P1-398/TR/2)

Specimen Details

Borehole		2506-PRE-08
Sample No.		OMC+2
Depth	m	
Date		06/07/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Greyish brown silty CLAY

Initial Specimen Conditions

Height	mm	127.50
Diameter	mm	100.00
Area	mm^2	7853.98
Volume	cm^3	1001.38
Mass	g	2037.50
Dry Mass	g	1738.20
Density	Mg/m^3	2.035
Dry Density	Mg/m^3	1.736
Moisture Content	%	17.2
Voids Ratio		
Specific Gravity (assumed/measured)	kN/m^3	2.65 assumed

Final Specimen Conditions

Moisture Content	%	18.05
Density	Mg/m^3	2.05
Dry Density	Mg/m^3	1.74

Test Setup

Date started	30/06/2015
Date Finished	04/07/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPERM 4
Cell Number	CPERM 4

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Checked and Approved By

06/07/15
Date

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Docksway Landfill-Newport

Client Ref
NCC 2506
Contract No
27192

Permeability in a Triaxial Cell

as per Accelerated test (Environment Agency Report P1-398/TR/2)

Specimen Details

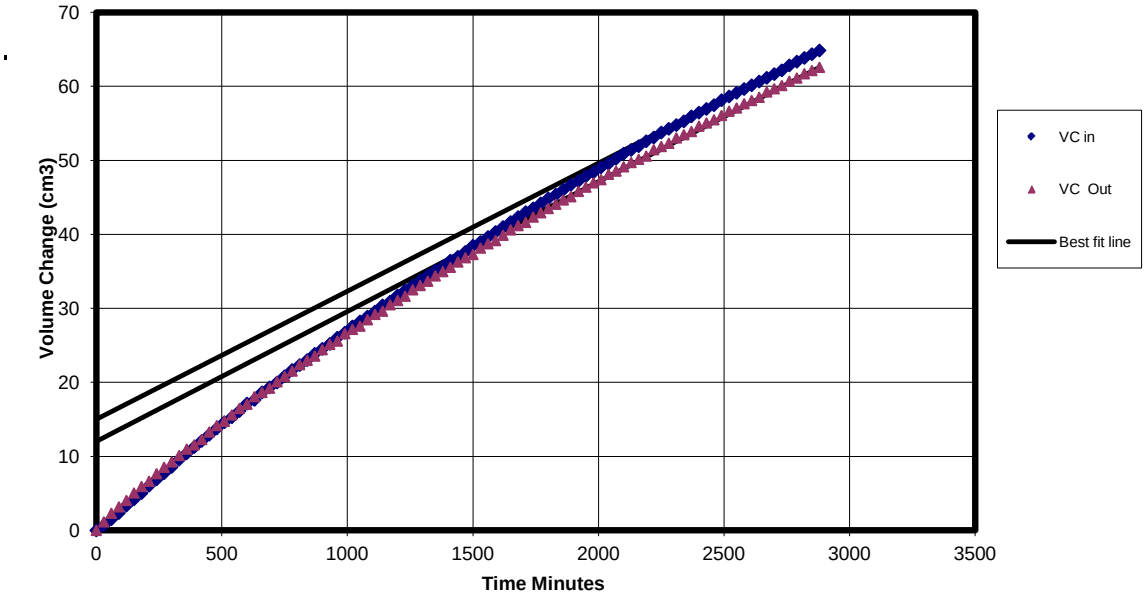
Borehole		2506-PRE-08
Sample No.		OMC+2
Depth	m	
Date		06/07/2015

Permeability

Cell Pressure	kPa	550.00
Inlet Pressure	kPa	425.00
Outlet Pressure	kPa	300.00
Mean Rate of Flow	ml/min	0.01743
Average Temperature	'C	22
Outlet Pressure	kPa	300.00

B Value

Post test	
Final B value	0.92



Corrected Vertical Permeability I m/s	**3.69 x 10-10**

D P Ryan

Checked and Approved By

06/07/15
Date

UKAS TESTING 2788

Client Ref

NCC 2506

Contract No

27192

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Docksway Landfill-Newport

Permeability in a Triaxial Cell

as per Accelerated test (Environment Agency Report P1-398/TR/2)

Specimen Details

Borehole		2506-PRE-08
Sample No.		Plastic Limit
Depth	m	
Date		01/07/2015
Disturbed / Undisturbed		
		2.5kg Recompacted

Description of Specimen

Greyish brown silty CLAY

Initial Specimen Conditions

Height	mm	115.60
Diameter	mm	104.90
Area	mm^2	8642.53
Volume	cm^3	999.08
Mass	g	2046.50
Dry Mass	g	1621.20
Density	Mg/m^3	2.048
Dry Density	Mg/m^3	1.623
Moisture Content	%	26.2
Voids Ratio		
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	26.63
Density	Mg/m^3	2.05
Dry Density	Mg/m^3	1.62

Test Setup

Date started	26/06/2015
Date Finished	30/06/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm2
Cell Number	CPerm2

D P Evans

Checked and Approved By

01/07/15
Date

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Client Ref

NCC 2506

Contract No

27192

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Docksway Landfill-Newport

Permeability in a Triaxial Cell

as per Accelerated test (Environment Agency Report P1-398/TR/2)

Specimen Details

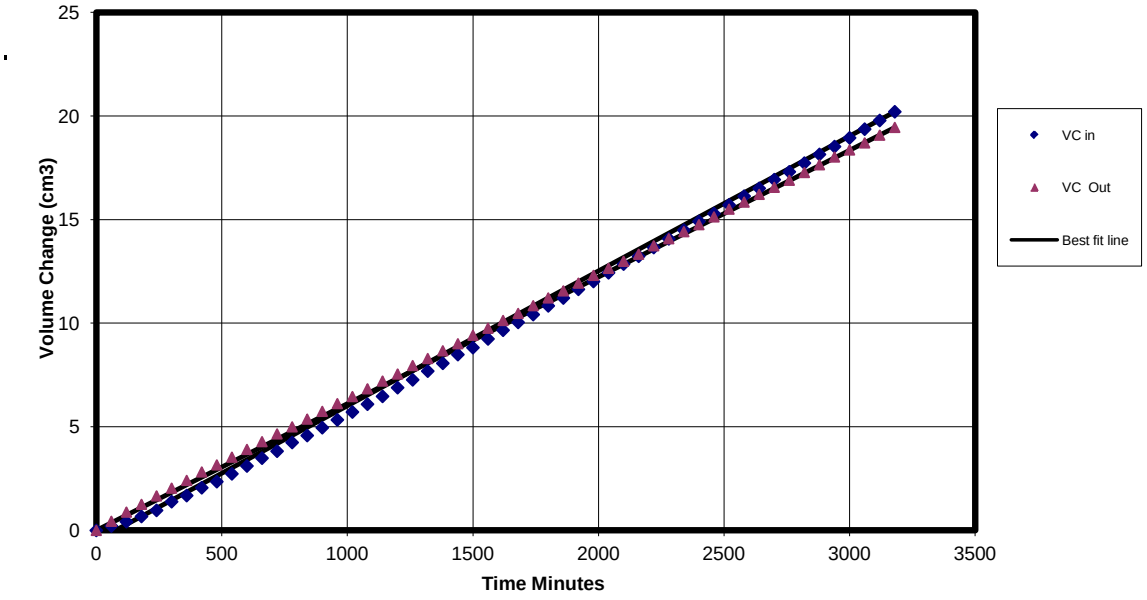
Borehole		2506-PRE-08
Sample No.		Plastic Limit
Depth	m	
Date		01/07/2015

Permeability

Cell Pressure	kPa	550.00
Inlet Pressure	kPa	425.00
Outlet Pressure	kPa	300.00
Mean Rate of Flow	ml/min	0.00631
Average Temperature	'C	22
Outlet Pressure	kPa	300.00

B Value

Post test Final B value	0.92



Corrected Vertical Permeability I m/s	**1.1 x 10-10**

D P Ryan

Checked and Approved By

01/07/15
Date

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Client Ref

NCC 2506

Contract No

27192

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Docksway Landfill-Newport

SUMMARY OF SHEAR STRENGTH TESTS (TOTAL STRESS)

(B.S. 1377 : PART 7 : 1990)

Client ref: NCC_2506
Location: Docksway Landfill - Newport
Contract Number: 27192-

Borhole Number	Sample Number	Sample Depth m	Moisture Content %	Bulk Density Mg/m³	Dry Density Mg/m³	Undrained Triaxial Compession Tests (Total Stress)						Hand Vane kPa	
						Size mm	Lateral Pressure s_3 kPa	Cohesion 1/2(s_1-s_3) kPa	Average Cohesion kPa	Failure Strain %	Type of Failure	Peak	Residual
2506-PRE-01		2.5KG				19						90	20
												>232	
												>232	
												>232	
												86	15
		4.5KG										95	26
												>232	
												>232	
												>232	
												91	23

SYMBOLS: RM: Remoulded MS: Multistage B: Brittle P: Plastic C: Compound Vane Size : 1

GSTL
GEO Site & Testing Services Limited

B. Sharp — **Checked by:**

D P Evans — **Approved by:**

24/06/15 — **Date of approval:**

SUMMARY OF SHEAR STRENGTH TESTS (TOTAL STRESS)

(B.S. 1377 : PART 7 : 1990)

Client ref: NCC_2506
Location: Docksway Landfill - Newport
Contract Number: 27192-

Borhole Number	Sample Number	Sample Depth m	Moisture Content %	Bulk Density Mg/m³	Dry Density Mg/m³	Undrained Triaxial Compession Tests (Total Stress)						Hand Vane kPa	
						Size mm	Lateral Pressure s_3 kPa	Cohesion $1/2(s_1-s_3)$ kPa	Average Cohesion kPa	Failure Strain %	Type of Failure	Peak	Residual
2506-PRE-02		2.5KG				19						104	33
												>232	
												>232	
												>232	
												91	40
		4.5KG										104	33
												>232	
												>232	
												>232	
												91	40

SYMBOLS: **RM: Remoulded** **MS: Multistage** **B: Brittle** **P: Plastic** **C: Compound** **Vane Size :** 1

GSTL
GEO Site & Testing Services Limited

B. Sharp — **Checked by:**

D P Evans — **Approved by:**

24/06/15 — **Date of approval:**

SUMMARY OF SHEAR STRENGTH TESTS (TOTAL STRESS)

(B.S. 1377 : PART 7 : 1990)

Client ref: NCC_2506
Location: Docksway Landfill - Newport
Contract Number: 27192-

Borhole Number	Sample Number	Sample Depth m	Moisture Content %	Bulk Density Mg/m^3	Dry Density Mg/m^3	Undrained Triaxial Compession Tests (Total Stress)						Hand Vane kPa	
						Size mm	Lateral Pressure s_3 kPa	Cohesion $1/2(s_1-s_3)$ kPa	Average Cohesion kPa	Failure Strain %	Type of Failure	Peak	Residual
2506-PRE-03		2.5KG				19						88	17
												>232	
												>232	
												>232	
												83	13
		4.5KG										94	19
												>232	
												>232	
												>232	
												92	21

SYMBOLS: RM: Remoulded MS: Multistage B: Brittle P: Plastic C: Compound Vane Size : 1

GSTL
GEO Site & Testing Services Limited

B. Sharp — Checked by:

D P Evans — Approved by:

24/06/15 — Date of approval:

SUMMARY OF SHEAR STRENGTH TESTS (TOTAL STRESS)

(B.S. 1377 : PART 7 : 1990)

Client ref: NCC_2506
Location: Docksway Landfill - Newport
Contract Number: 27192-

Borhole Number	Sample Number	Sample Depth m	Moisture Content %	Bulk Density Mg/m³	Dry Density Mg/m³	Undrained Triaxial Compession Tests (Total Stress)						Hand Vane kPa	
						Size mm	Lateral Pressure s_3 kPa	Cohesion $1/2(s_1-s_3)$ kPa	Average Cohesion kPa	Failure Strain %	Type of Failure	Peak	Residual
2506-PRE-04		2.5KG				19						100	32
												>232	
												>232	
												>232	
												86	35
		4.5KG										100	32
												>232	
												>232	
												>232	
												86	35

SYMBOLS: **RM: Remoulded** **MS: Multistage** **B: Brittle** **P: Plastic** **C: Compound** **Vane Size :** 1

GSTL
GEO Site & Testing Services Limited

B. Sharp — **Checked by:**

D P Evans — **Approved by:**

24/06/15 — **Date of approval:**

SUMMARY OF SHEAR STRENGTH TESTS (TOTAL STRESS)

(B.S. 1377 : PART 7 : 1990)

Client ref: NCC_2506
Location: Docksway Landfill - Newport
Contract Number: 27192-

Borhole Number	Sample Number	Sample Depth m	Moisture Content %	Bulk Density Mg/m³	Dry Density Mg/m³	Undrained Triaxial Compession Tests (Total Stress)						Hand Vane kPa	
						Size mm	Lateral Pressure s_3 kPa	Cohesion $1/2(s_1-s_3)$ kPa	Average Cohesion kPa	Failure Strain %	Type of Failure	Peak	Residual
2506-PRE-05		2.5KG				19						88	22
												>232	
												>232	
												>232	
												83	17
		4.5KG										88	22
												>232	
												>232	
												>232	
												83	17

SYMBOLS: RM: Remoulded MS: Multistage B: Brittle P: Plastic C: Compound Vane Size : 1

GSTL
GEO Site & Testing Services Limited

B. Sharp — **Checked by:**

D P Evans — **Approved by:**

24/06/15 — **Date of approval:**

SUMMARY OF SHEAR STRENGTH TESTS (TOTAL STRESS)

(B.S. 1377 : PART 7 : 1990)

Client ref: NCC_2506
Location: Docksway Landfill - Newport
Contract Number: 27192-

Borhole Number	Sample Number	Sample Depth m	Moisture Content %	Bulk Density Mg/m^3	Dry Density Mg/m^3	Undrained Triaxial Compession Tests (Total Stress)						Hand Vane kPa	
						Size mm	Lateral Pressure s_3 kPa	Cohesion $1/2(s_1-s_3)$ kPa	Average Cohesion kPa	Failure Strain %	Type of Failure	Peak	Residual
2506-PRE-06		2.5KG				19						91	22
												>232	
												>232	
												>232	
												85	17
		4.5KG										99	21
												>232	
												>232	
												>232	
												81	14

SYMBOLS: RM: Remoulded MS: Multistage B: Brittle P: Plastic C: Compound Vane Size : 1

GSTL
GEO Site & Testing Services Limited

B. Sharp — Checked by:

D P Evans — Approved by:

24/06/15 — Date of approval:

SUMMARY OF SHEAR STRENGTH TESTS (TOTAL STRESS)

(B.S. 1377 : PART 7 : 1990)

Client ref: NCC_2506
Location: Docksway Landfill - Newport
Contract Number: 27192-

Borhole Number	Sample Number	Sample Depth m	Moisture Content %	Bulk Density Mg/m³	Dry Density Mg/m³	Undrained Triaxial Compession Tests (Total Stress)						Hand Vane kPa	
						Size mm	Lateral Pressure s_3 kPa	Cohesion $1/2(s_1-s_3)$ kPa	Average Cohesion kPa	Failure Strain %	Type of Failure	Peak	Residual
2506-PRE-07		2.5KG				19						86	17
												>232	
												>232	
												>232	
												85	15
		4.5KG										94	19
												>232	
												>232	
												>232	
												84	16

SYMBOLS: **RM: Remoulded** **MS: Multistage** **B: Brittle** **P: Plastic** **C: Compound** **Vane Size :** 1

GSTL
GEO Site & Testing Services Limited

B. Sharp — **Checked by:**

D P Evans — **Approved by:**

24/06/15 — **Date of approval:**

SUMMARY OF SHEAR STRENGTH TESTS (TOTAL STRESS)

(B.S. 1377 : PART 7 : 1990)

Client ref: NCC_2506
Location: Docksway Landfill - Newport
Contract Number: 27192-

Borhole Number	Sample Number	Sample Depth m	Moisture Content %	Bulk Density Mg/m³	Dry Density Mg/m³	Undrained Triaxial Compession Tests (Total Stress)						Hand Vane kPa	
						Size mm	Lateral Pressure s_3 kPa	Cohesion $1/2(s_1-s_3)$ kPa	Average Cohesion kPa	Failure Strain %	Type of Failure	Peak	Residual
2506-PRE-08		2.5KG				19						106	35
												>232	
												>232	
												>232	
												95	41
		4.5KG										102	24
												>232	
												>232	
												>232	
												93	16

SYMBOLS: RM: Remoulded MS: Multistage B: Brittle P: Plastic C: Compound Vane Size : 1

GSTL GEO Site & Testing Services Limited

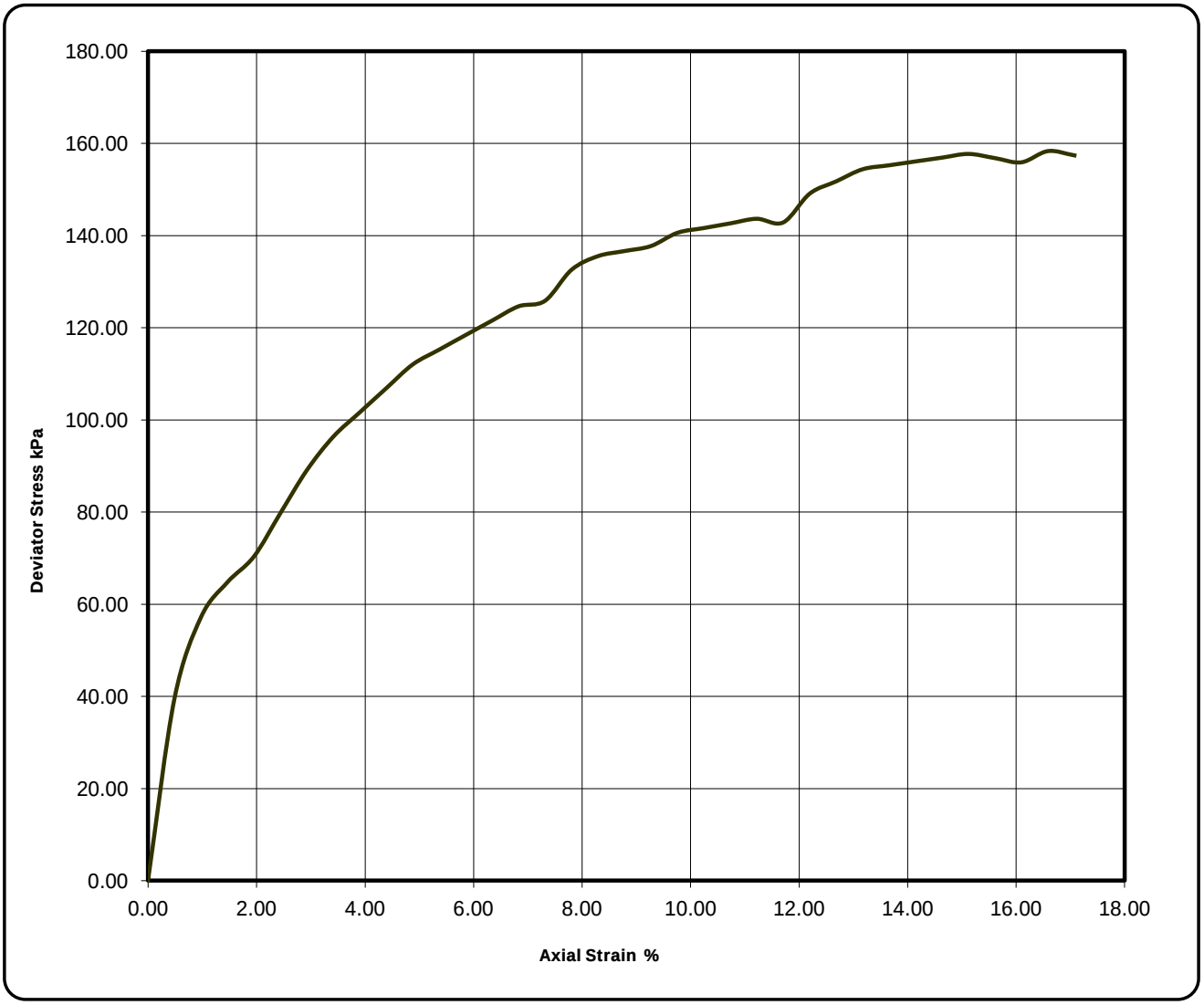
B. Sharp — Checked by:

D P Evans — Approved by:

24/06/15 — Date of approval:

Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**NCC_2506**
Location:	**Docksway Landfill Newport**
Contract Number:	**27192-100615**
Hole Number	**2506-PRE-01**
Sample Number:	**N/A**
Depth (m) :	**N/A - N/A**
Sample Description :	**Greyish brown silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Strength (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	22.0	2.07	1.69	50	126	63	7.3	Compound	Rate of strain = 2 %/min
				100	144	72	11.2		Latex Membrane used mm thickness
				200	158	79	16.6		

GSTL
GEO Site & Testing Services Limited

Checked By

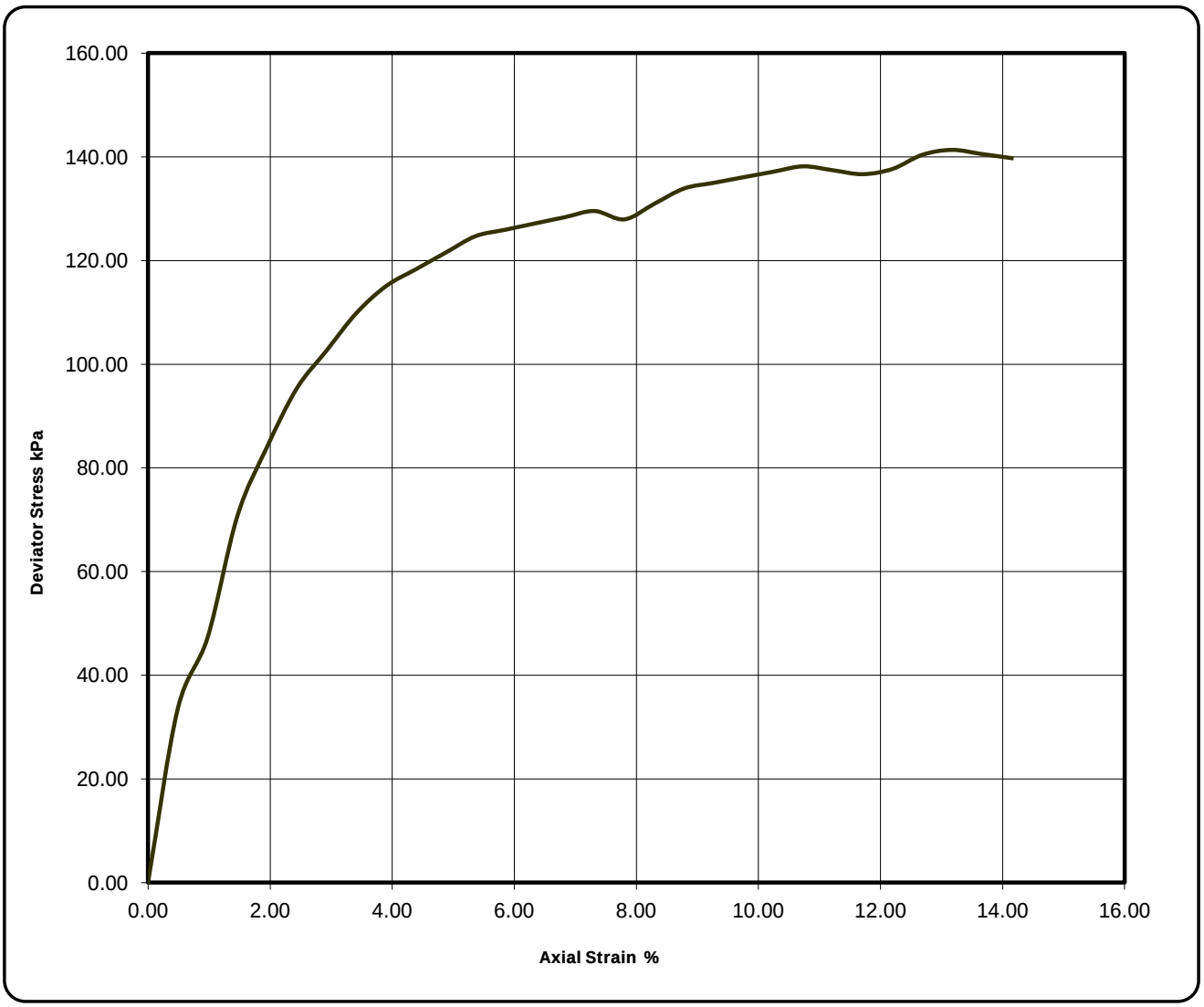
Approved By: D P Rands

UKAS TESTING 2788

Date Approved: 30.6.15

Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**NCC_2506**
Location:	**Docksway Landfill Newport**
Contract Number:	**27192-100615**
Hole Number	**2506-PRE-02**
Sample Number:	**N/A**
Depth (m) :	**N/A - N/A**
Sample Description :	**Greyish brown silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Strength (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	23.0	2.06	1.67	50	130	65	7.3	Compound	Rate of strain = 2 %/min
				100	138	69	10.7		Latex Membrane used mm thickness
				200	141	71	13.2		

GSTL
GEO Site & Testing Services Limited

Checked By

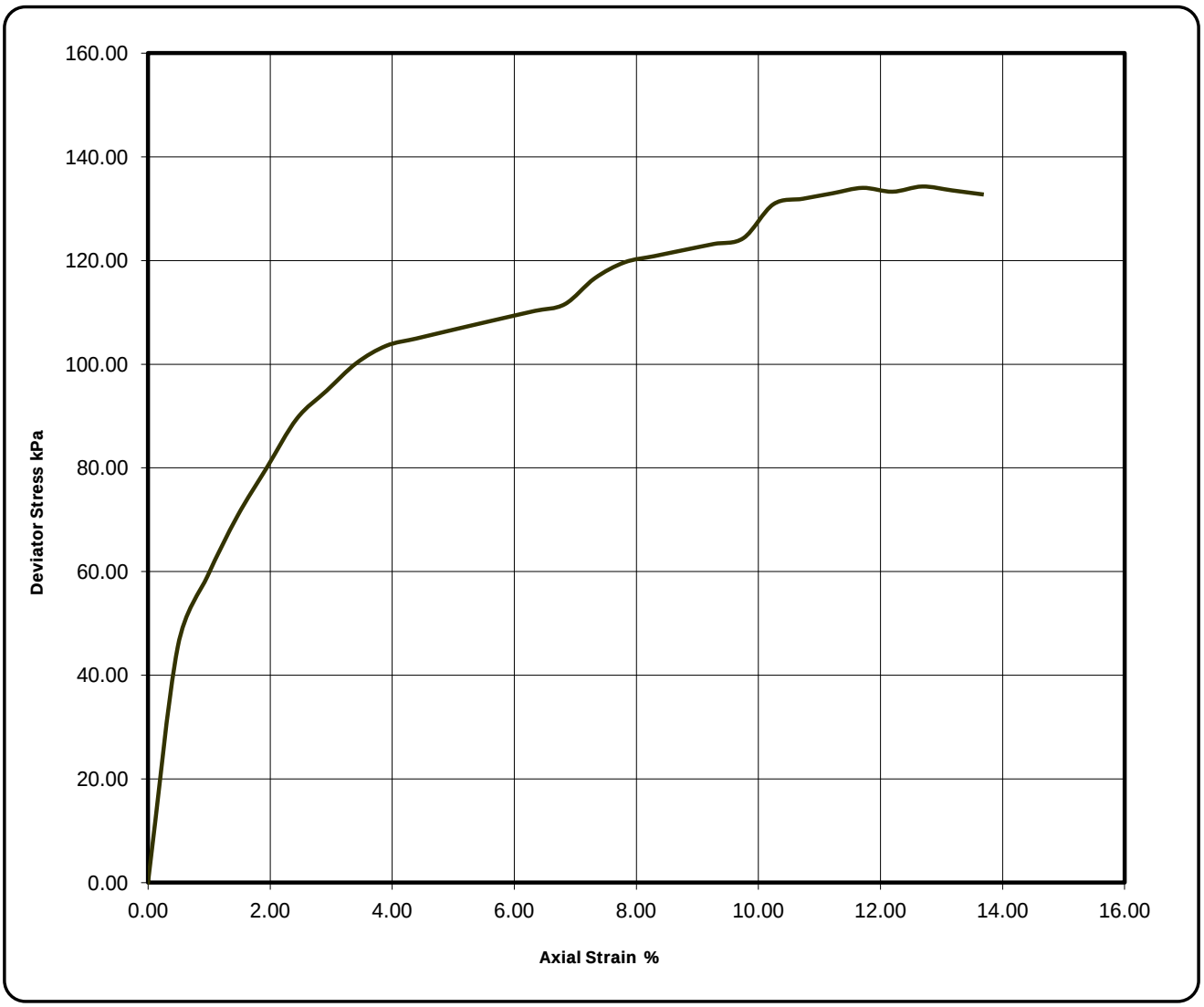
Approved By:

UKAS TESTING 2788

Date Approved: 30.6.15

Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**NCC_2506**
Location:	**Docksway Landfill Newport**
Contract Number:	**27192-100615**
Hole Number	**2506-PRE-03**
Sample Number:	**N/A**
Depth (m) :	**N/A - N/A**
Sample Description :	**Greyish brown silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Strength (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	22.0	2.07	1.70	50	112	56	6.8	Compound	Rate of strain = 2 %/min
				100	124	62	9.8		Latex Membrane used mm thickness
				200	134	67	12.7		

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GEO Site & Testing Services Limited

Checked By

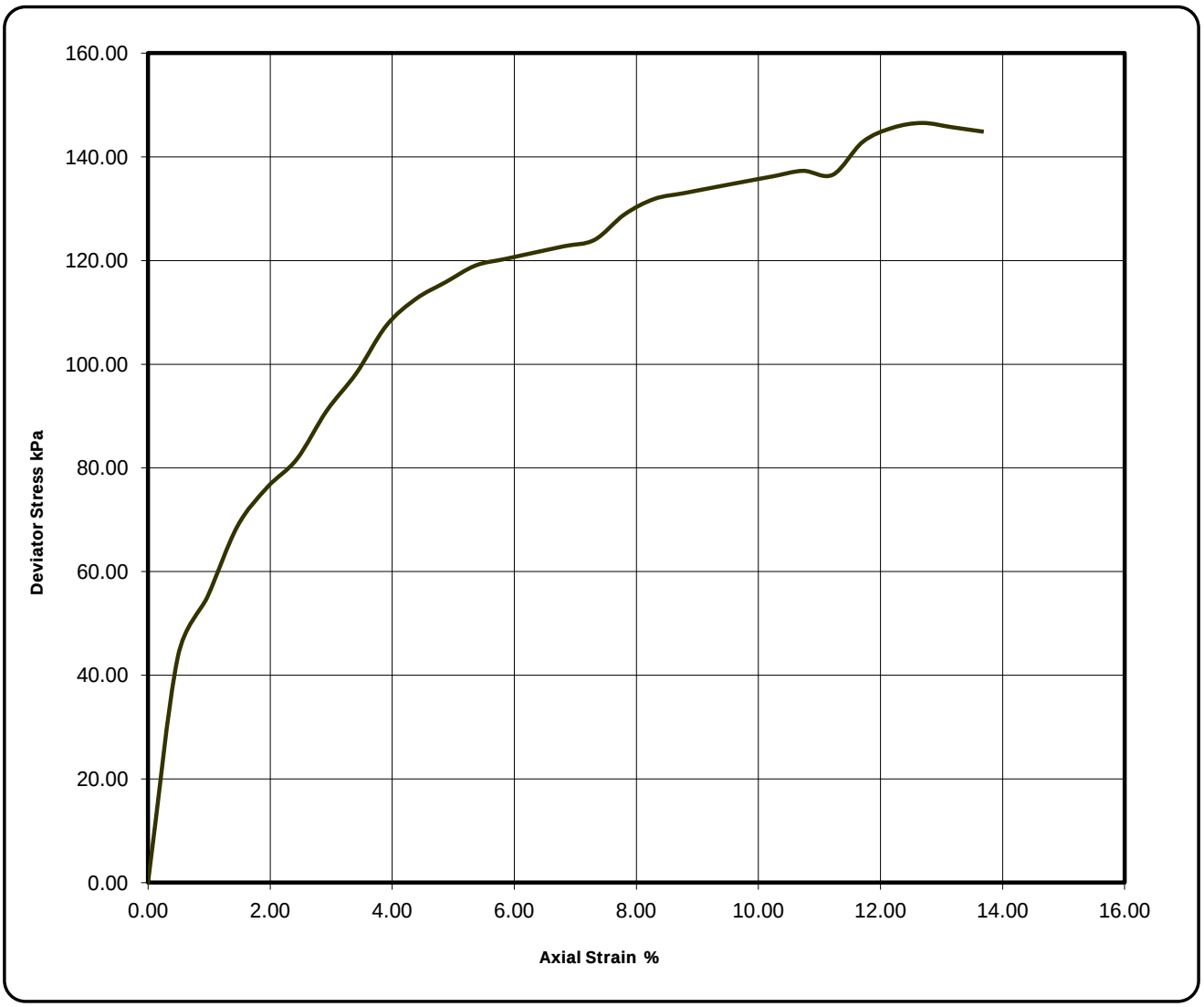
Approved By:

UKAS TESTING 2788

Date Approved: 30.6.15

Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**NCC_2506**
Location:	**Docksway Landfill Newport**
Contract Number:	**27192-100615**
Hole Number	**2506-PRE-04**
Sample Number:	**N/A**
Depth (m) :	**N/A - N/A**
Sample Description :	**Greyish brown silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Strength (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	23.0	2.08	1.69	50	124	62	7.3	Compound	Rate of strain = 2 %/min
				100	137	69	10.7		Latex Membrane used mm thickness
				200	147	73	12.7		

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GEO Site & Testing Services Limited

Checked By

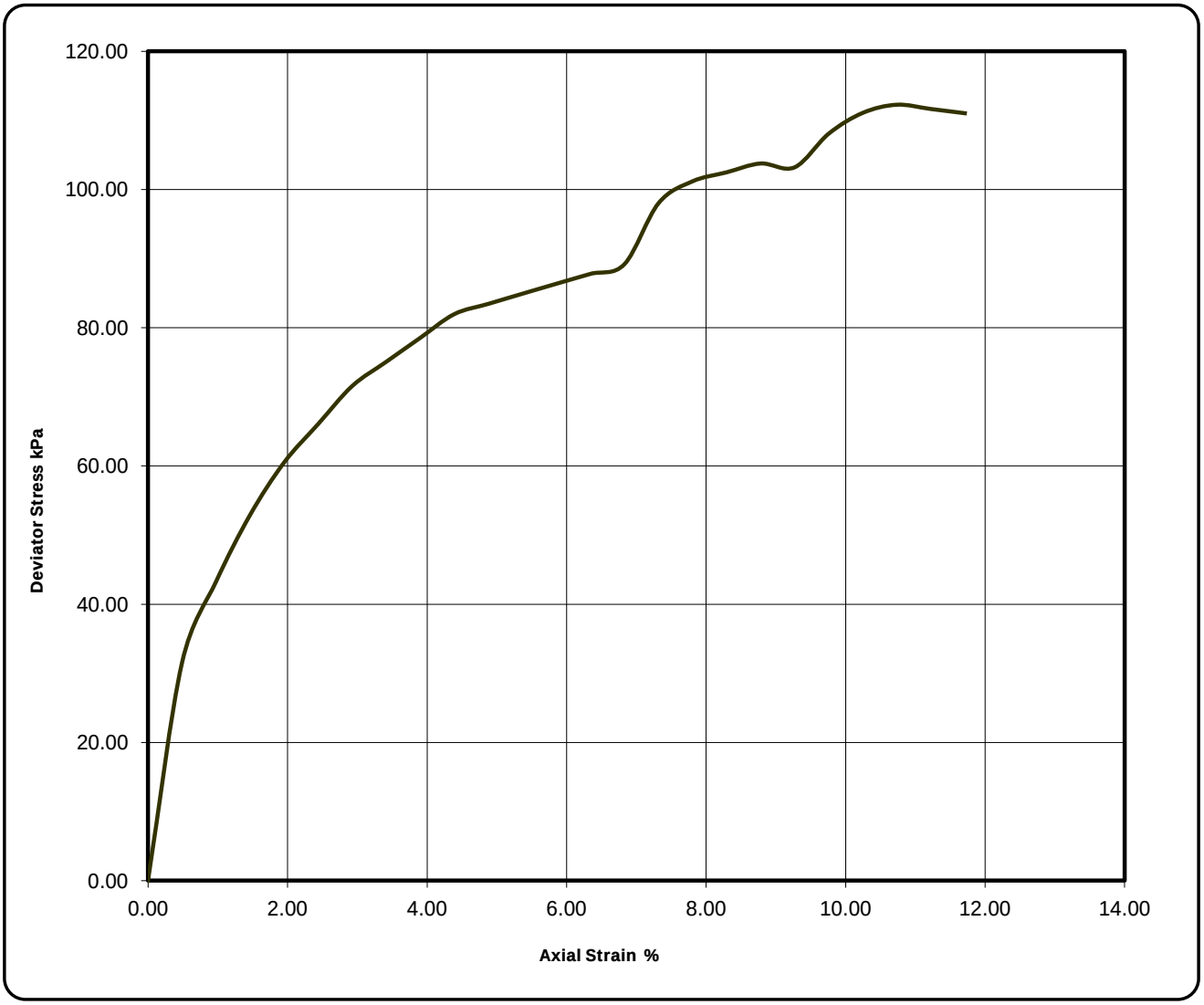
Approved By: D P Rands

Date Approved: 30.6.15

UKAS TESTING 2788

Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**NCC_2506**
Location:	**Docksway Landfill Newport**
Contract Number:	**27192-100615**
Hole Number	**2506-PRE-05**
Sample Number:	**N/A**
Depth (m) :	**N/A - N/A**
Sample Description :	**Greyish brown silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Strength (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	21.0	2.06	1.70	50	89	45	6.8	Compound	Rate of strain = 2 %/min
				100	104	52	8.8		Latex Membrane used mm thickness
				200	112	56	10.7		

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GEO Site & Testing Services Limited

Checked By

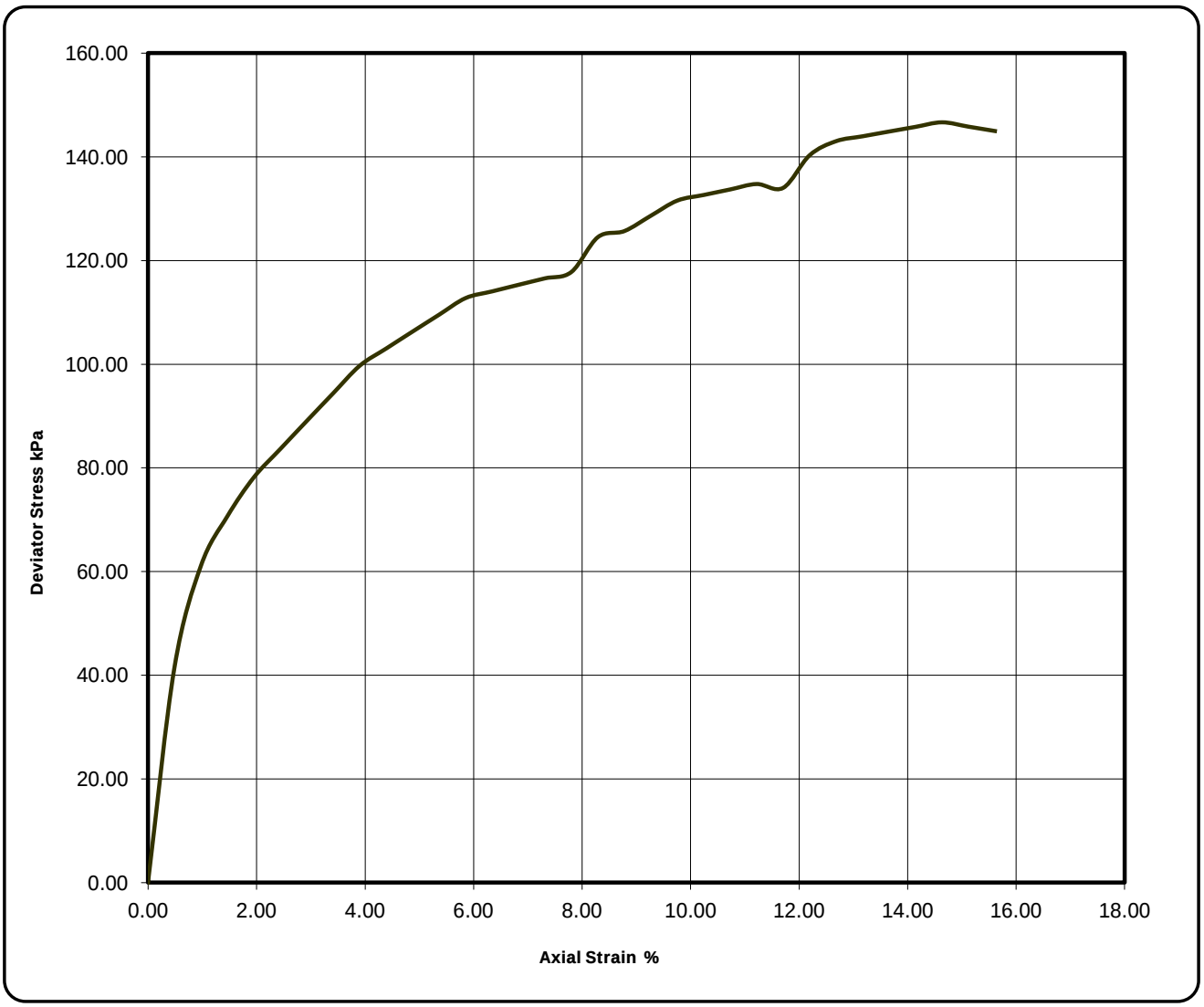
Approved By:

UKAS TESTING 2788

Date Approved: 30.6.15

Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**NCC_2506**
Location:	**Docksway Landfill Newport**
Contract Number:	**27192-100615**
Hole Number	**2506-PRE-06**
Sample Number:	**N/A**
Depth (m) :	**N/A - N/A**
Sample Description :	**Greyish brown silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Strength (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	21.0	2.06	1.71	50	118	59	7.8	Compound	Rate of strain = 2 %/min
				100	135	67	11.2		Latex Membrane used mm thickness
				200	147	73	14.6		

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GEO Site & Testing Services Limited

Checked By

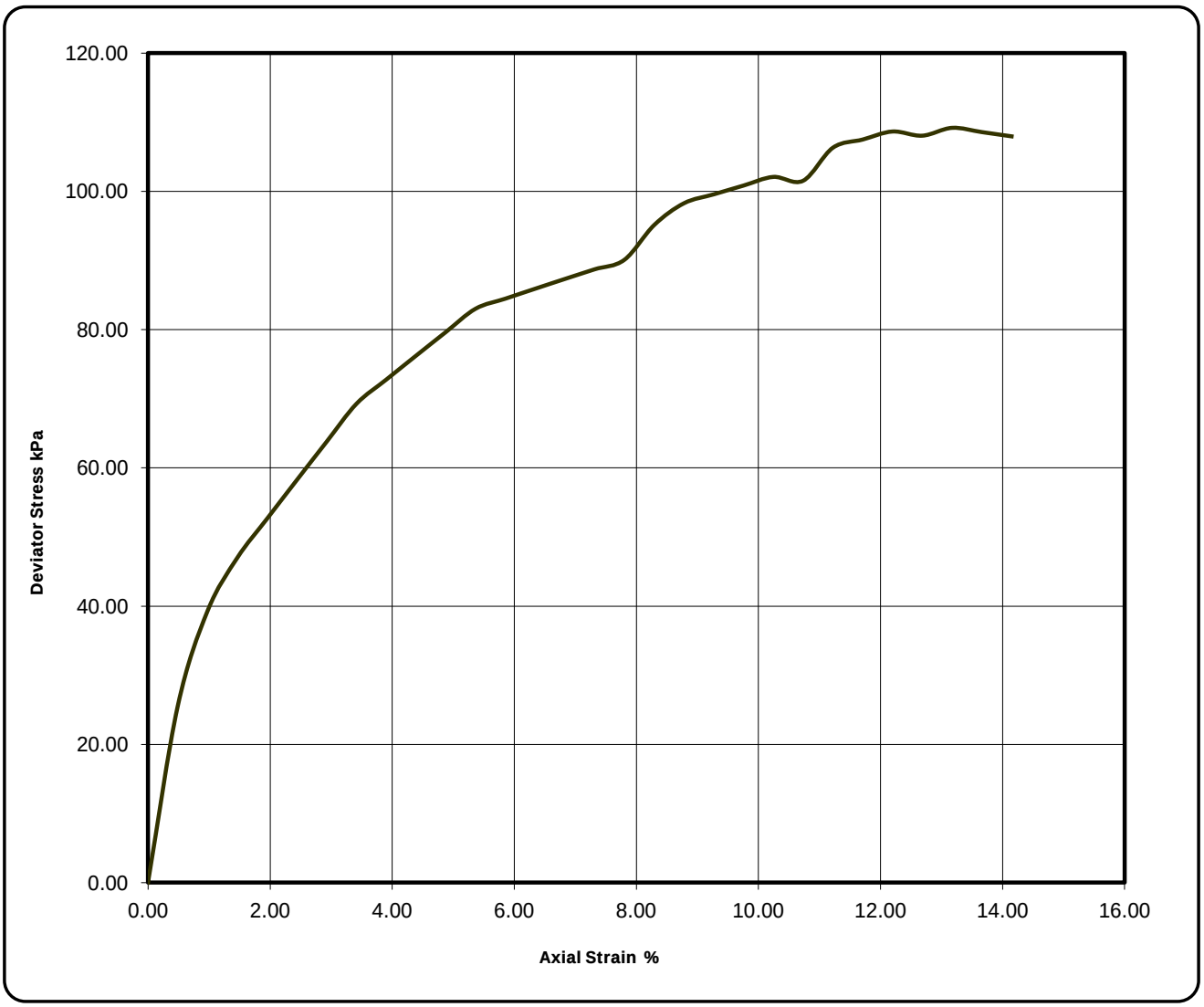
Approved By: D P Evans

UKAS TESTING 2788

Date Approved: 30.6.15

Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**NCC_2506**
Location:	**Docksway Landfill Newport**
Contract Number:	**27192-100615**
Hole Number	**2506-PRE-07**
Sample Number:	**N/A**
Depth (m) :	**N/A - N/A**
Sample Description :	**Greyish brown silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Strength (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	23.0	2.07	1.68	50	90	45	7.8	Compound	Rate of strain = 2 %/min
				100	102	51	10.2		Latex Membrane used mm thickness
				200	109	55	13.2		

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GEO Site & Testing Services Limited

Checked By

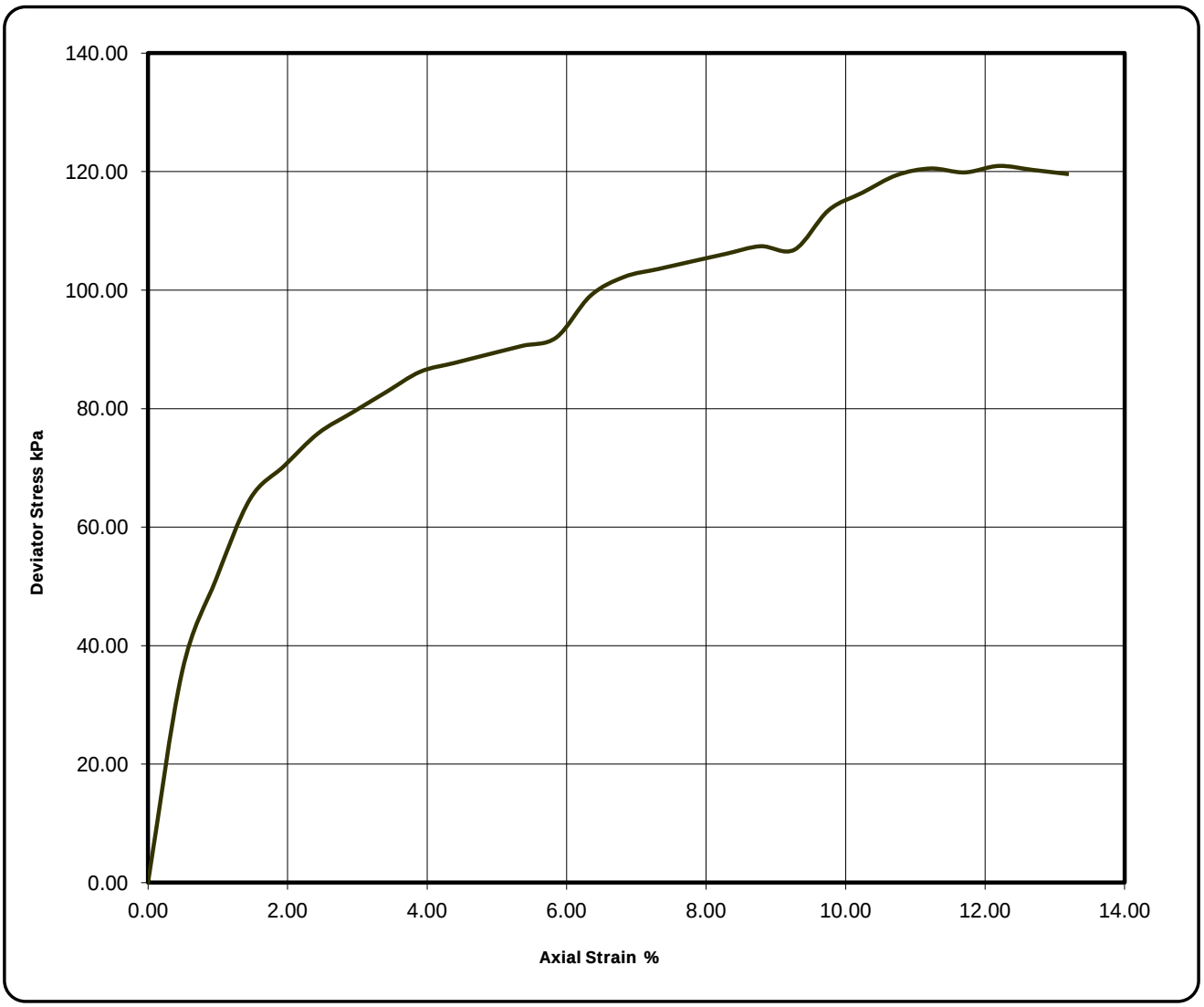
Approved By:

UKAS TESTING 2788

Date Approved: 30.6.15

Test Report: **Undrained Shear Strength in Triaxial Compression**
BS 1377 : Part7 : Clause 8 : 1990 Multistage Test
without measurement of Pore Pressure

Client ref:	**NCC_2506**
Location:	**Docksway Landfill Newport**
Contract Number:	**27192-100615**
Hole Number	**2506-PRE-08**
Sample Number:	**N/A**
Depth (m) :	**N/A - N/A**
Sample Description :	**Greyish brown silty CLAY.**



Diameter (mm): 103 Height (mm): 200 Test: 100mm Multistage

Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Deviator Stress (kPa)	Shear Strength (kPa)	Failure Strain (%)	Mode of Failure	Remarks Sample taken from Top of tube
A	22.9	2.06	1.68	50	92	46	5.9	Compound	Rate of strain = 2 %/min
				100	107	54	8.8		Latex Membrane used mm thickness
				200	121	60	12.2		

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Checked By

Approved By: D P Rands

UKAS TESTING 2788

Date Approved: 30.6.15

Annex 2

Laboratory Report

2788

GEO Site & Testing Services Ltd

Contract Number: 27402

Client's Reference: **NCC_2506**

Report Date: **23-07-2015**

Client **Jim Davies Civil Engineering Ltd**
Ty Gwyn,
Banalog Terrace,
Hollybush,
Blackwood
NP12 0SG

Contract Title: **Docksway Landfill - Newport**

For the attention of: **Meirion Humphreys**

Date Received: **01-07-2015**

Date Commenced: **01-07-2015**

Date Completed: **23-07-2015**

Test Description	Qty
Moisture Content 1377 : 1990 Part 2 : 3.2 - * UKAS	7
4 Point Liquid & Plastic Limit (LL/PL) 1377 : 1990 Part 2 : 4.3 & 5.3 - * UKAS	7
PSD Wet Sieve method 1377 : 1990 Part 2 : 9.2 - * UKAS	4
Bulk/Dry Density 1377 : 1990 Part 4 : 4.3/4.4 - * UKAS	12
Determination of Permeability in a triaxial cell BS1377 Part 6 :1990 Clause 6 - * UKAS	8
Extra Over Item (4 Days Over)	24
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

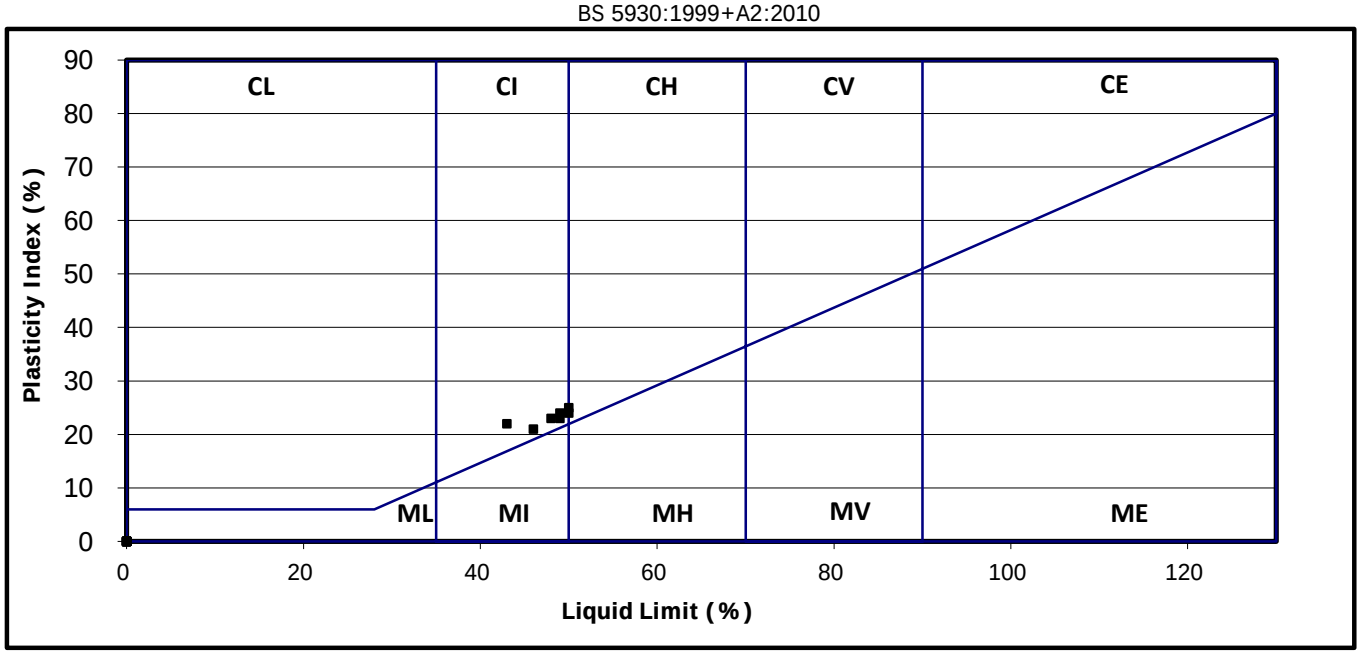
Test Report: **Method of the Determination of the plastic limit and plasticity index**
BS 1377 : Part 2 : 1990 Method 5

Client ref: N/A
Location: Docksway Landfill
Contract Number: 27402-

Hole / Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3/4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
2506/TP_B1			18	43	21	22	100	CI Intermediate Plasticity
2506/TP_B2			23	46	25	21	100	CI Intermediate Plasticity
2506/TP_B3			23	48	25	23	100	CI Intermediate Plasticity
2506/TP_B4			23	49	26	23	100	CI Intermediate Plasticity
2506/B6_B1			22	49	25	24	100	CI Intermediate Plasticity
2506/C5_B1			23	50	26	24	100	CI/H Inter/High Plasticity
2506/B5_B1			22	50	25	25	100	CI/H Inter/High Plasticity

Symbols: **NP : Non Plastic** **# : Liquid Limit and Plastic Limit Wet Sieved**

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.
BS 5930:1999+A2:2010



For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)

Date: 20.7.15

UKAS TESTING 2788

Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

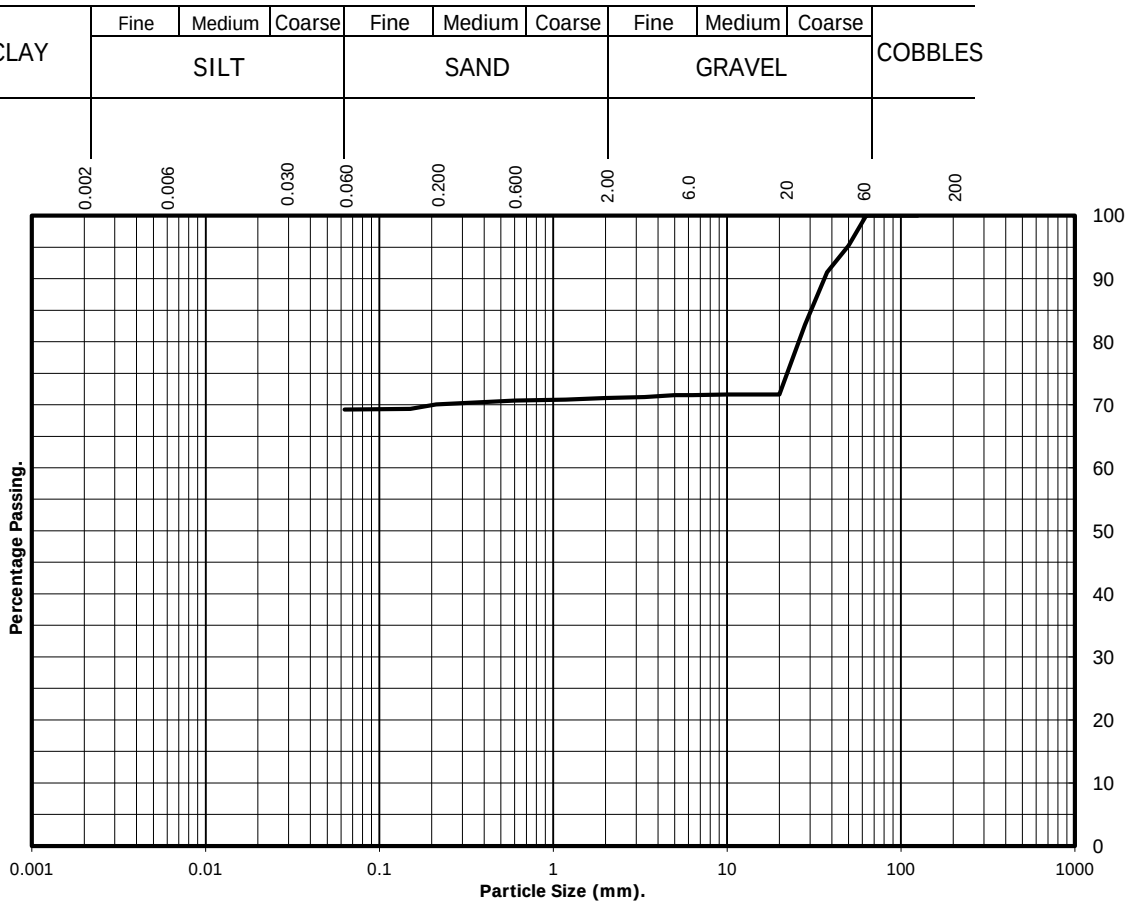
Wet Sieve, Clause 9.2

Client ref:	**NCC_2506**	**Sample Number:**	**N/A**
Contract Number:	**27402-010715**	**Depth from (m):**	**N/A**
Hole Number:	**B1**	**Depth to (m):**	**N/A**
		Sample Type:	**B**

Location: **Docksway Landfill**

Description: **Brown sandy gravelly fine to medium silty CLAY.**

BS Test Sieve	% Passing
125	100
90	100
75	100
63	100
50	95
37.5	91
28	83
20	72
14	72
10	72
6.3	72
5.0	72
3.35	71
2.00	71
1.18	71
0.60	71
0.425	70
0.300	70
0.212	70
0.150	69
0.063	69



Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	69	2	29	0	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: Emma Sharp (Office Manager)

Date: 23.7.15

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GEO SITE & TESTING SERVICES LTD

UKAS TESTING
2788

Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

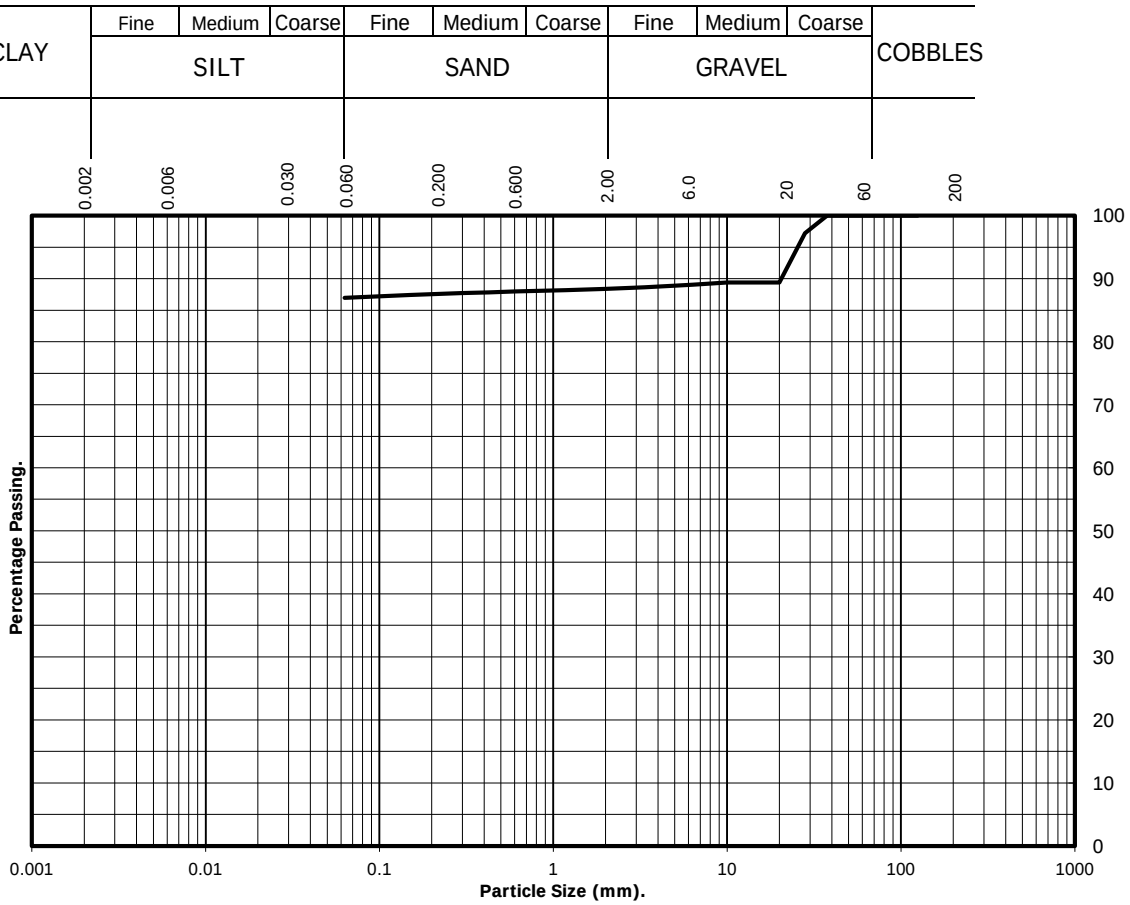
Wet Sieve, Clause 9.2

Client ref:	**NCC_2506**	**Sample Number:**	**N/A**
Contract Number:	**27402-010715**	**Depth from (m):**	**N/A**
Hole Number:	**B2**	**Depth to (m):**	**N/A**
		Sample Type:	**B**

Location: **Docksway Landfill**

Description: **Brown sandy gravelly fine to medium silty CLAY.**

BS Test Sieve	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	97
20	89
14	89
10	89
6.3	89
5.0	89
3.35	89
2.00	88
1.18	88
0.60	88
0.425	88
0.300	88
0.212	88
0.150	87
0.063	87



Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	87	1	12	0	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: Emma Sharp (Office Manager)

Date: 23.7.15

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GEO SITE & TESTING SERVICES LTD

UKAS TESTING
2788

Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

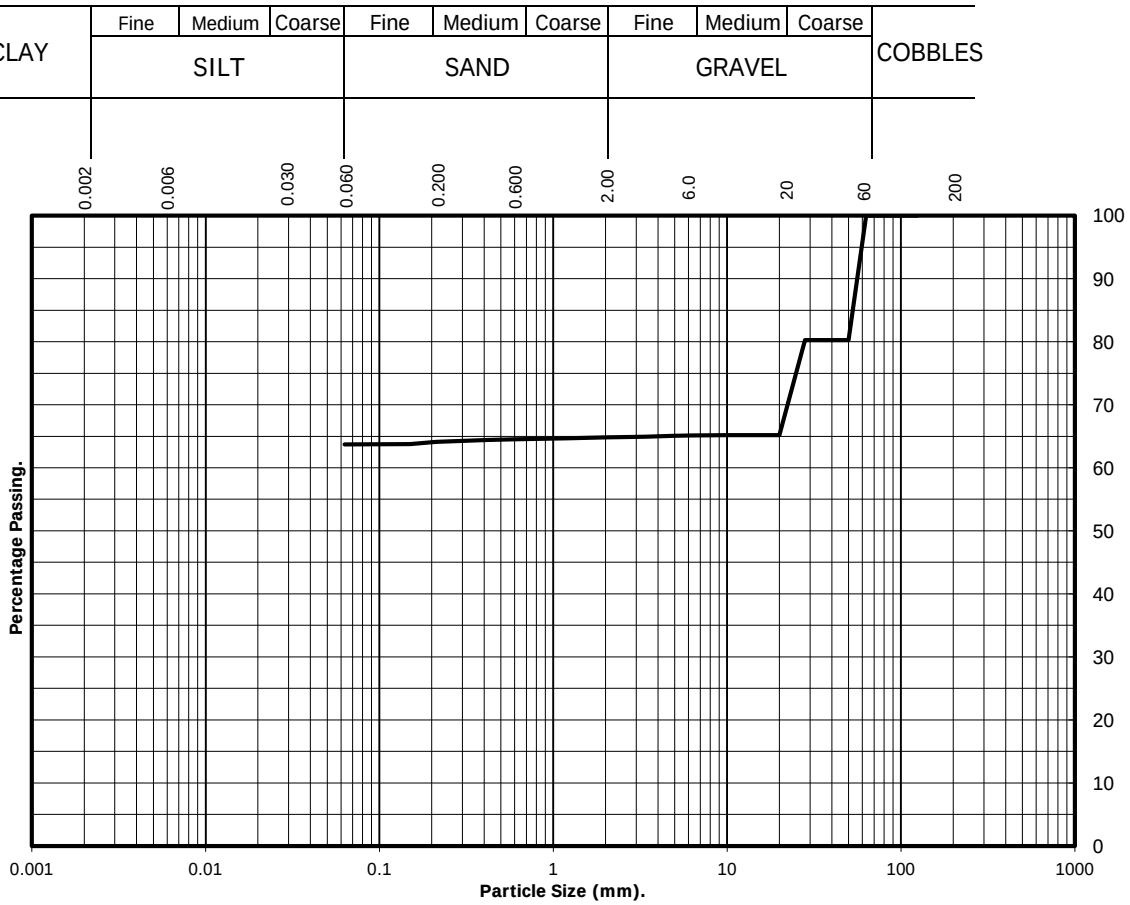
Wet Sieve, Clause 9.2

Client ref:	**NCC_2506**	**Sample Number:**	**N/A**
Contract Number:	**27402-010715**	**Depth from (m):**	**N/A**
Hole Number:	**B3**	**Depth to (m):**	**N/A**
		Sample Type:	**B**

Location: **Docksway Landfill**

Description: **Brown sandy gravelly fine to medium silty CLAY.**

BS Test Sieve	% Passing
125	100
90	100
75	100
63	100
50	80
37.5	80
28	80
20	65
14	65
10	65
6.3	65
5.0	65
3.35	65
2.00	65
1.18	65
0.60	65
0.425	64
0.300	64
0.212	64
0.150	64
0.063	64



Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	64	1	35	0	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: Emma Sharp (Office Manager)

Date: 23.7.15

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UKAS TESTING
2788

Test Report:

Particle Size Distribution Test
BS 1377 Part 2:1990.

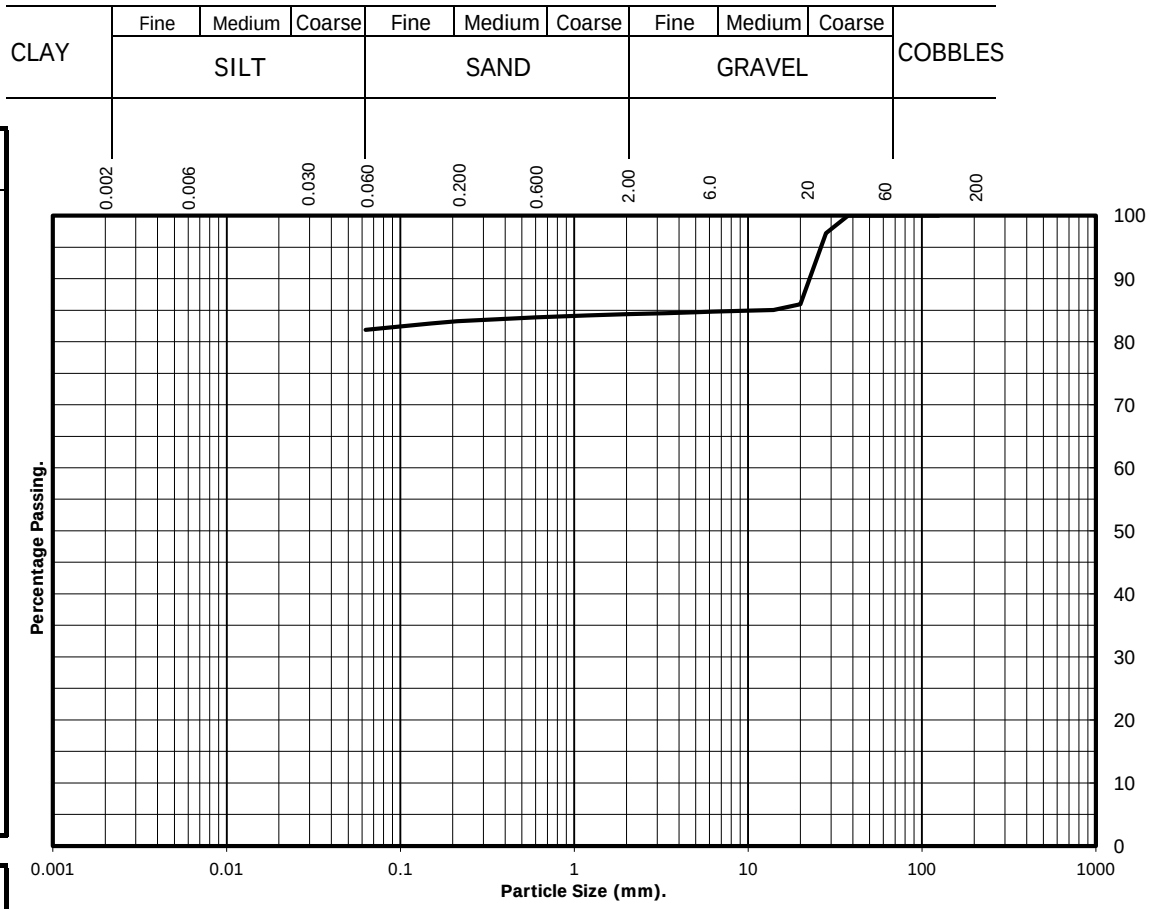
Wet Sieve, Clause 9.2

Client ref:	**NCC_2506**	**Sample Number:**	**N/A**
Contract Number:	**27402-010715**	**Depth from (m):**	**N/A**
Hole Number:	**B4**	**Depth to (m):**	**N/A**
		Sample Type:	**B**

Location: **Docksway Landfill**

Description: **Brown sandy gravelly fine to medium silty CLAY.**

BS Test Sieve	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	97
20	86
14	85
10	85
6.3	85
5.0	85
3.35	85
2.00	84
1.18	84
0.60	84
0.425	84
0.300	83
0.212	83
0.150	83
0.063	82



Particle Diameter	% Passing
0.02	#
0.006	#
0.002	#

	Silt and Clay	Sand	Gravel	Cobbles	Soil Fraction
	82	2	16	0	Total Percentage

Remarks:

#- not determined

For and behalf of GEO Site & Testing Services Ltd

Authorised By: Emma Sharp (Office Manager)

Date: 23.7.15

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UKAS TESTING
2788

SUMMARY OF SOIL DENSITY TESTS.

(B.S. 1377 : PART 2 : 7.2 & 8.2: 1990)

Client ref: N/A
Location: Docksway Landfill
Contract Number: 27402-010715
Hole Number: As Stated
Sample Number: N/A
Depth (m) : As Stated
Sample Type: S/B

Location Number	Sample Number	Depth m from	Depth m to	Moisture Content %	Bulk Density Mg/m3	Dry Density Mg/m3	Method of Laboratory compaction (kg Rammer)	Particle Density Mg/m3	Mg/m3	Remarks
2506	TP_1.08_1			21	2.00	1.66				
2506	TP_1.12_1			20	2.02	1.68				
2506	TP_2.08_1			20	2.08	1.73				
2506	TP_2.12_1			17	1.95	1.67				
2506	TP_3.08_1			18	1.94	1.64				
2506	TP_3.12_1			19	2.18	1.83				
2506	TP_4.08_1			20	2.16	1.80				
2506	TP_4.12_1			19	2.00	1.69				
2506	B5_C1			17	2.09	1.79				
2506	C5_C1			21	1.87	1.56				
2506	D5_C1			18	1.92	1.63				
2506	E5_C1			15	1.84	1.60				

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D P Evans

Checked by
Paul Evans
Quality Manager

Approved by
Ben Sharp
Contracts Manager

Date of approval: 20/07/15

UKAS TESTING 2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP1.08
Sample No.		
Depth	m	
Date		17/07/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Grey silty CLAY

Initial Specimen Conditions

Height	mm	131.00
Diameter	mm	100.00
Area	mm^2	7853.98
Volume	cm^3	1028.87
Mass	g	1960.80
Dry Mass	g	1604.20
Density	Mg/m^3	1.91
Dry Density	Mg/m^3	1.56
Moisture Content	%	22.2
Voids Ratio		0.700
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	22.84
Density	Mg/m^3	1.94
Dry Density	Mg/m^3	1.58

Test Setup

Date started	06/07/2015
Date Finished	16/07/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 1
Cell Number	CPerm 1

DP Evans

Checked and Approved By

UKAS TESTING 2788

17/07/15

Date

Client Ref

GSTL

GEO Site & Testing Services Limited

Docksway Landfill-Newport

Contract No

27402

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP1.08
Sample No.		
Depth	m	
Date		17/07/2015

Saturation

Cell Pressure Incr.	kPa	35.00
Back Pressure Incr.	kPa	33.50
Differential Pressure	kPa	1.50
Final Cell Pressure	kPa	200.00
Final Pore Pressure	kPa	191.40
Final B Value		0.96

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	200.00
Back Pressure	kPa	100.00
Excess Pore Pressure	kPa	91.40
Pore Pressure at End	kPa	100.00
Consolidated Volume	cm^3	1017.17
Consolidated Height	mm	130.50
Consolidated Area	mm^2	7794.44
Vol. Compressibility	m^2/MN	1.4512
Consolidation Coef.	$m^2/yr.$	0.1244
Final Voids Ratio		0.680

Permeability

Cell Pressure	kPa	200.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00181
Average Temperature	'C	20

Verticle Permiability Kv m/s	**2.4 x 10-10**

D P Evans

Checked and Approved By

17/07/15
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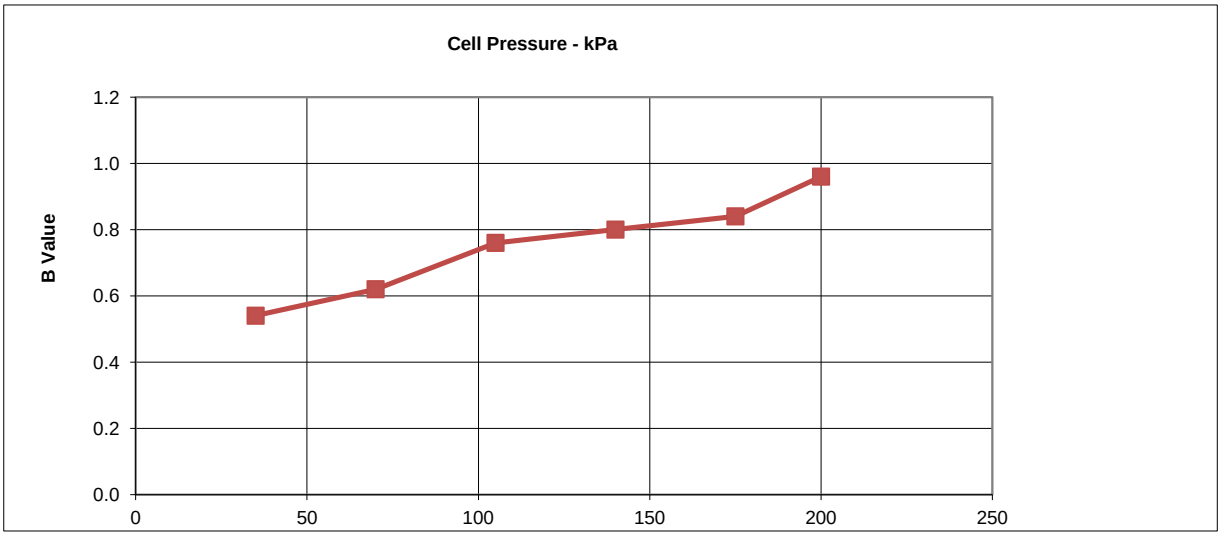
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

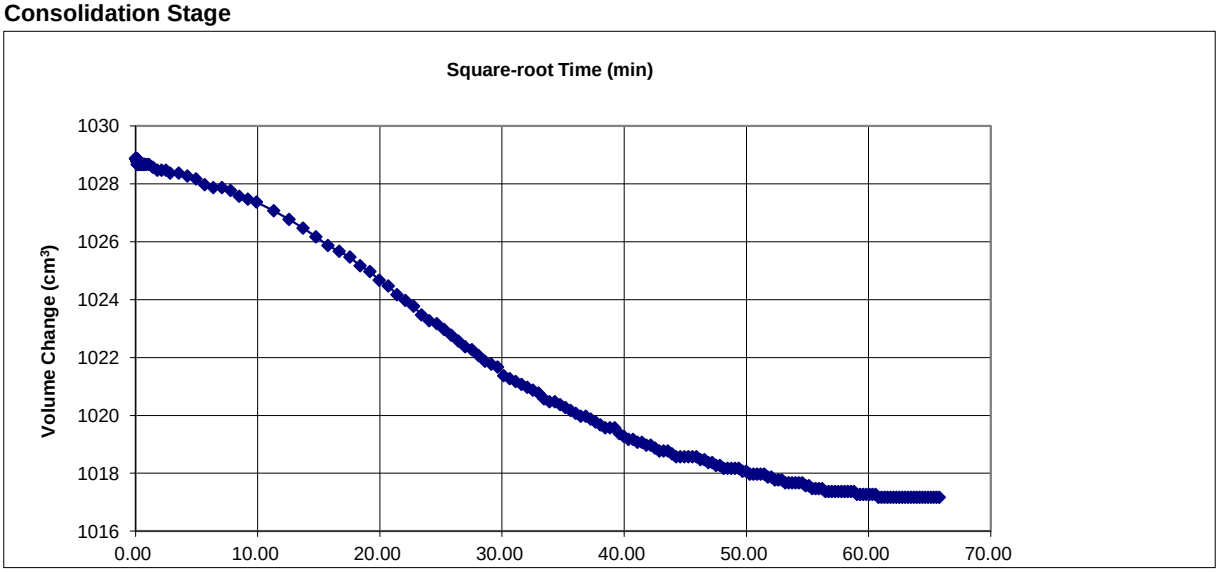
Specimen Details

Borehole		TP1.08
Sample No.		
Depth	m	
Date		17/07/2015

Saturation Stage



Consolidation Stage



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Client Ref

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Docksway Landfill-Newport

Contract No

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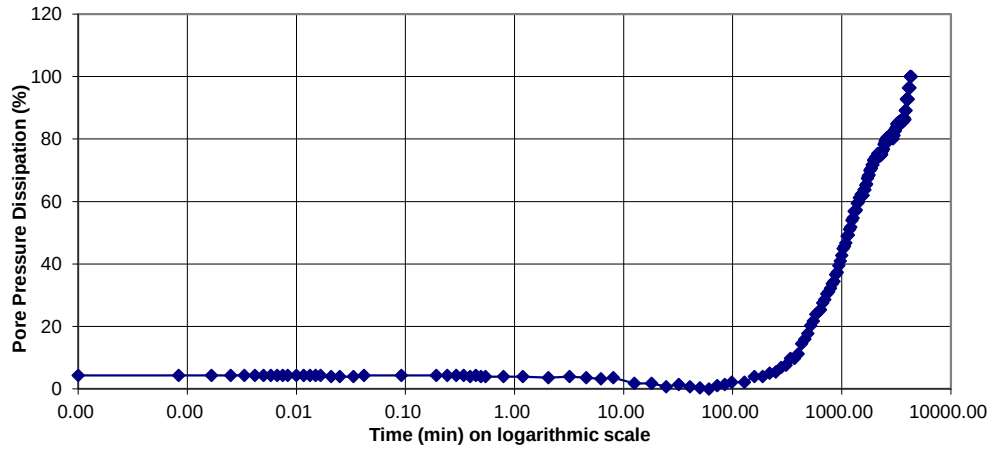
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

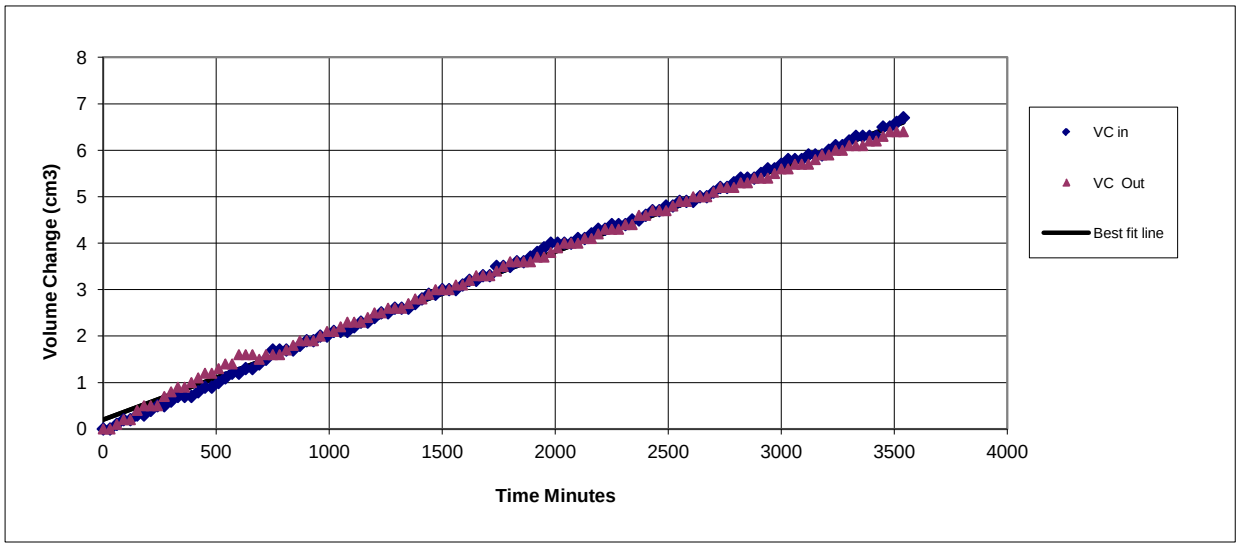
Specimen Details

Borehole		TP1.08
Sample No.		
Depth	m	
Date		17/07/2015

Consolidation Stage



Permeability Stage



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17/07/15
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Client Ref

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GEO Site & Testing Services Limited

Docksway Landfill-Newport

Contract No

27402

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP1.12
Sample No.		
Depth	m	
Date		17/07/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Orange brown/grey silty CLAY

Initial Specimen Conditions

Height	mm	127.00
Diameter	mm	101.00
Area	mm^2	8011.85
Volume	cm^3	1017.50
Mass	g	2020.00
Dry Mass	g	1667.70
Density	Mg/m^3	1.99
Dry Density	Mg/m^3	1.64
Moisture Content	%	21.1
Voids Ratio		0.617
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	21.11
Density	Mg/m^3	2.02
Dry Density	Mg/m^3	1.67

Test Setup

Date started	06/07/2015
Date Finished	16/07/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 2
Cell Number	CPerm 2

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Docksway Landfill-Newport

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP1.12
Sample No.		
Depth	m	
Date		17/07/2015

Saturation

Cell Pressure Incr.	kPa	50.00
Back Pressure Incr.	kPa	47.50
Differential Pressure	kPa	2.50
Final Cell Pressure	kPa	500.00
Final Pore Pressure	kPa	476.00
Final B Value		0.95

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	500.00
Back Pressure	kPa	400.00
Excess Pore Pressure	kPa	100.00
Pore Pressure at End	kPa	400.00
Consolidated Volume	cm^3	998.00
Consolidated Height	mm	126.19
Consolidated Area	mm^2	7909.48
Vol. Compressibility	m^2/MN	1.1067
Consolidation Coef.	$m^2/yr.$	0.1916
Final Voids Ratio		0.586

Permeability

Cell Pressure	kPa	500.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00097
Average Temperature	'C	20

Vertical Permeability | m/s	**1.26 x 10-10**

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17/07/15
Date

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Contract No

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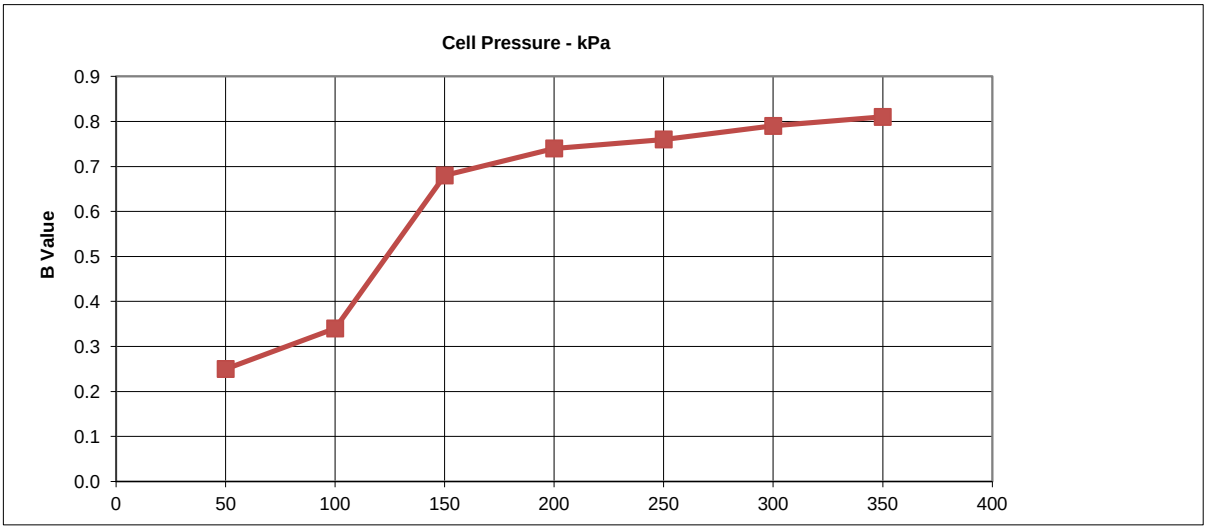
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

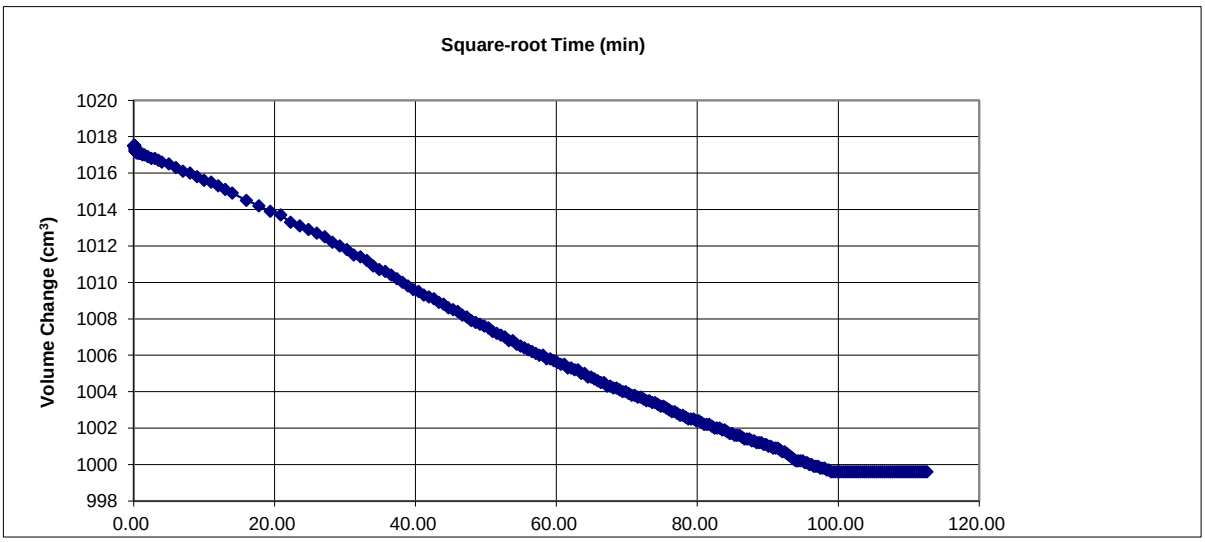
Specimen Details

Borehole		TP1.12
Sample No.		
Depth	m	
Date		17/07/2015

Saturation Stage



Consolidation Stage



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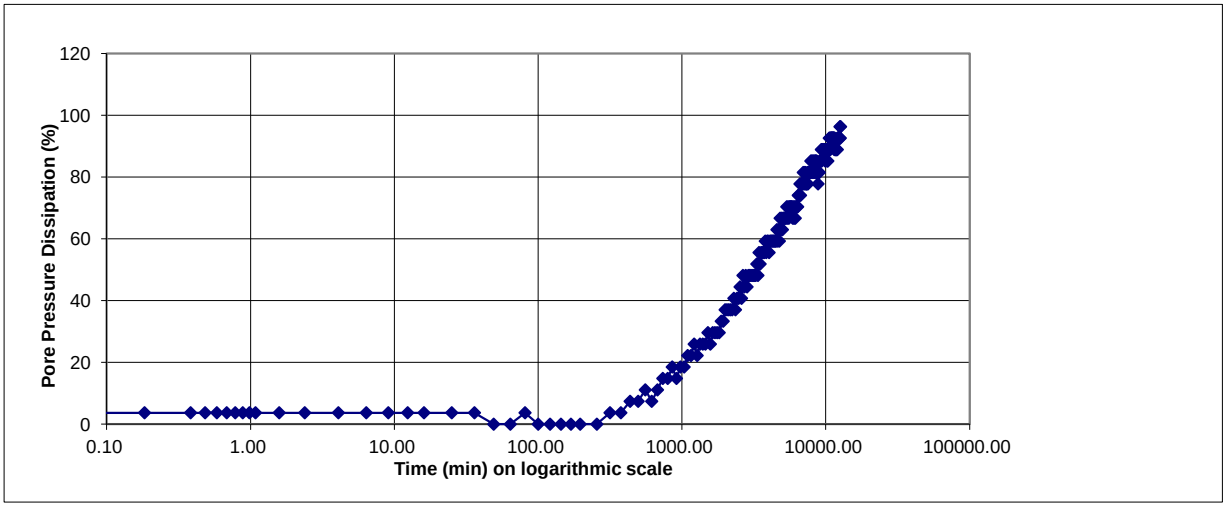
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

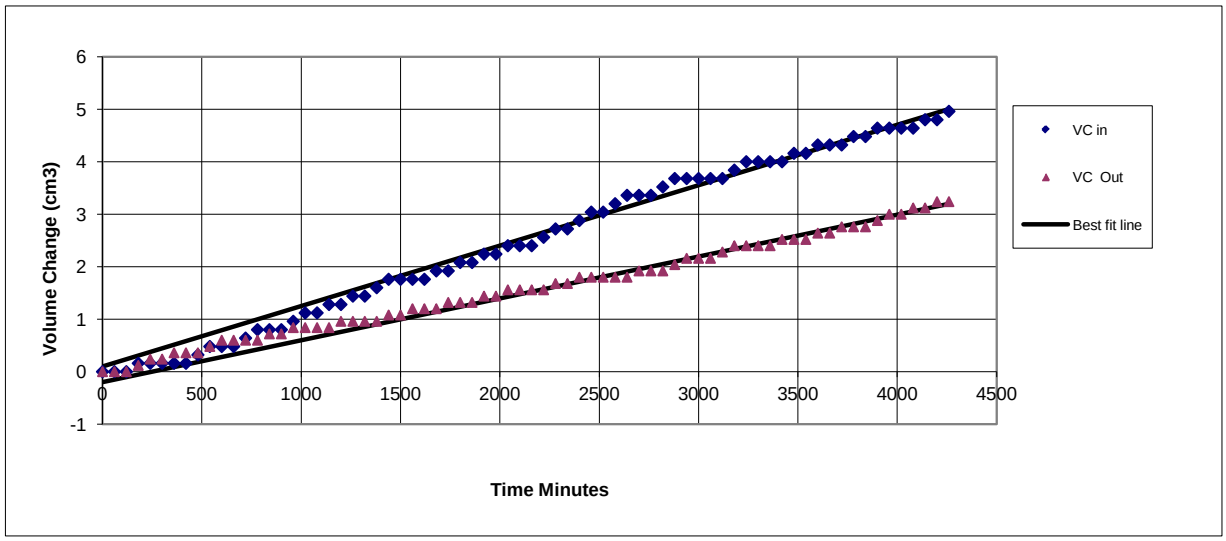
Specimen Details

Borehole		TP1.12
Sample No.		
Depth	m	
Date		17/07/2015

Consolidation Stage



Permeability Stage



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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP2.08
Sample No.		
Depth	m	
Date		18/07/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Grey silty CLAY

Initial Specimen Conditions

Height	mm	129.00
Diameter	mm	102.00
Area	mm^2	8171.28
Volume	cm^3	1054.10
Mass	g	1978.10
Dry Mass	g	1625.60
Density	Mg/m^3	1.88
Dry Density	Mg/m^3	1.54
Moisture Content	%	21.7
Voids Ratio		0.718
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	22.93
Density	Mg/m^3	1.99
Dry Density	Mg/m^3	1.62

Test Setup

Date started	06/07/2015
Date Finished	15/07/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 3
Cell Number	CPerm 3

D P Rands

Checked and Approved By

UKAS TESTING 2788

Date 18/07/15

Client Ref

GSTL GEO Site & Testing Services Limited

Docksway Landfill-Newport

Contract No 27402

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP2.08
Sample No.		
Depth	m	
Date		18/07/2015

Saturation

Cell Pressure Incr.	kPa	100.00
Back Pressure Incr.	kPa	100.00
Differential Pressure	kPa	0.00
Final Cell Pressure	kPa	300.00
Final Pore Pressure	kPa	297.00
Final B Value		1.00

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	300.00
Back Pressure	kPa	200.00
Excess Pore Pressure	kPa	97.00
Pore Pressure at End	kPa	200.00
Consolidated Volume	cm^3	1002.70
Consolidated Height	mm	126.90
Consolidated Area	mm^2	7905.65
Vol. Compressibility	m^2/MN	2.9873
Consolidation Coef.	$m^2/yr.$	0.5027
Final Voids Ratio		0.635

Permeability

Cell Pressure	kPa	300.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00152
Average Temperature	'C	20

Verticle Permiability Kv m/s	**1.98 x 10-10**

D P Ward

Checked and Approved By

18/07/15
Date

UKAS TESTING 2788

Client Ref

GSTL
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Docksway Landfill-Newport

Contract No

27402

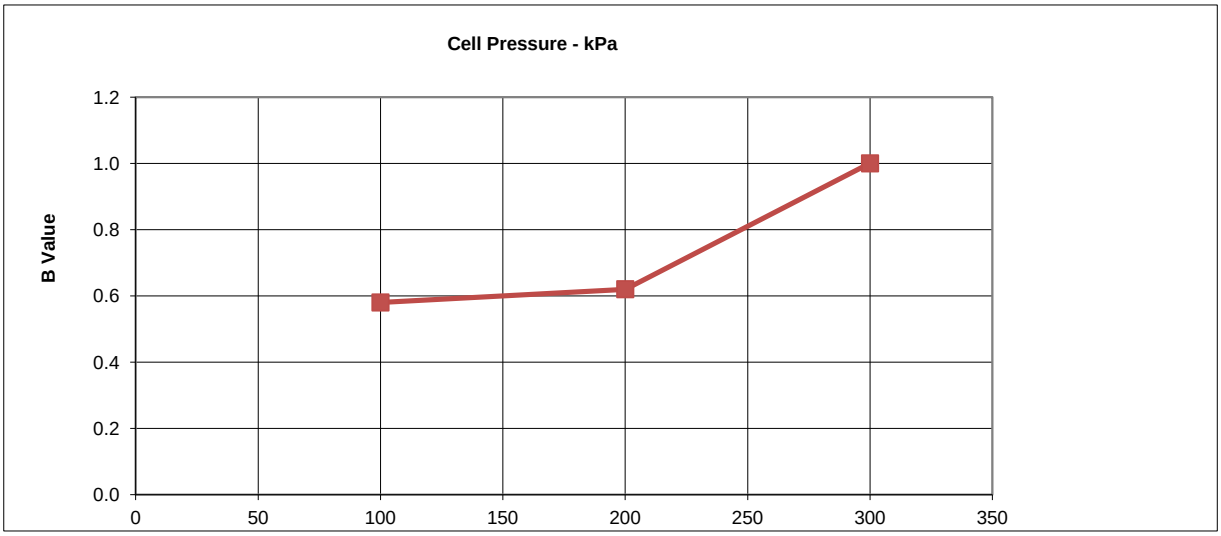
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

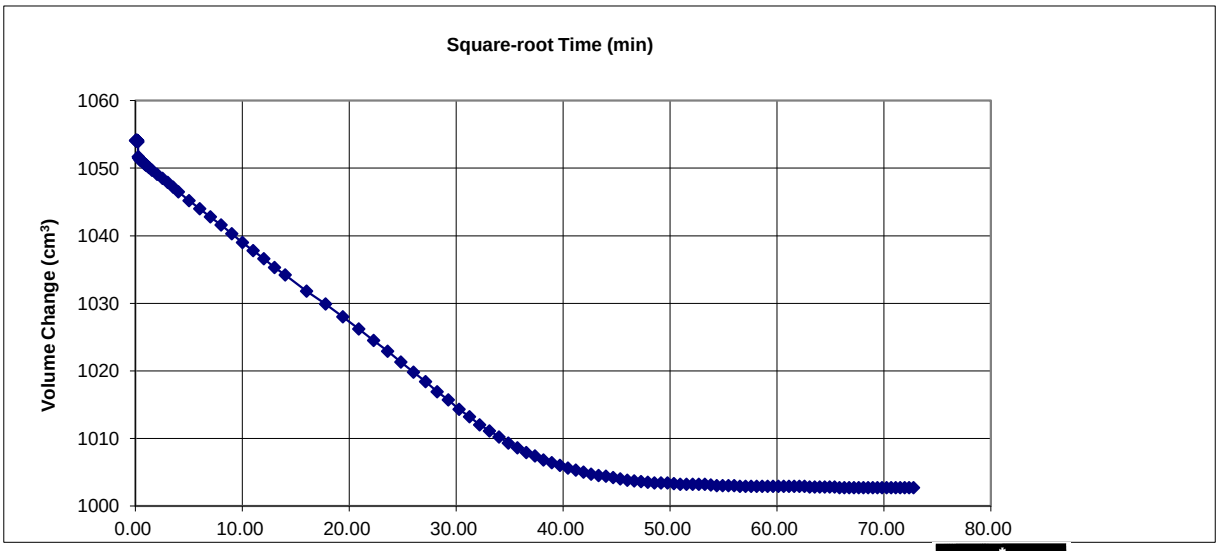
Specimen Details

Borehole		TP2.08
Sample No.		
Depth	m	
Date		18/07/2015

Saturation Stage



Consolidation Stage



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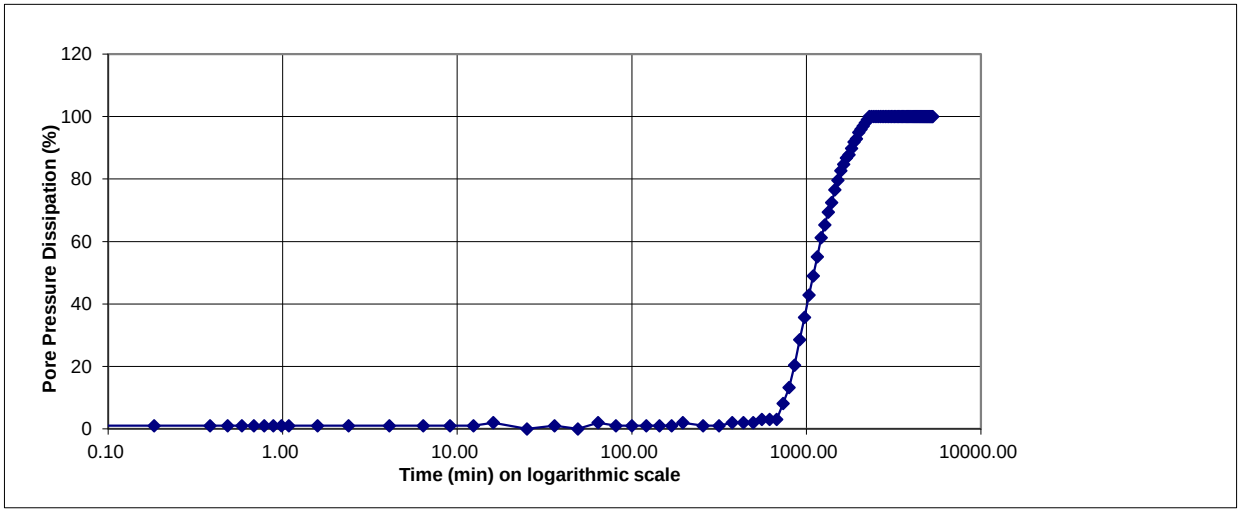
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

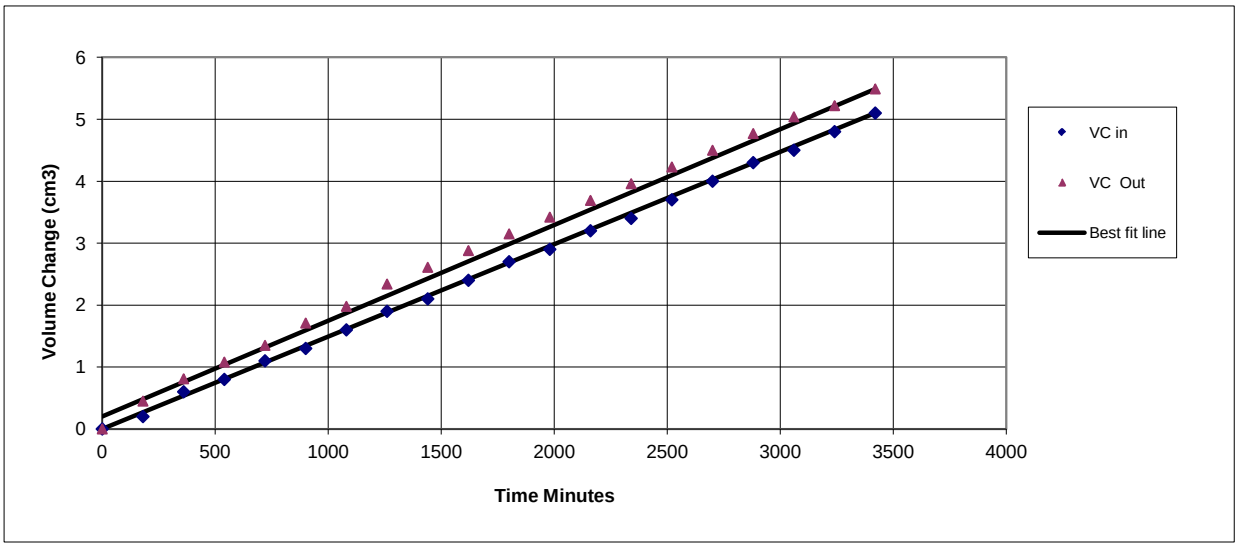
Specimen Details

Borehole		TP2.08
Sample No.		
Depth	m	
Date		18/07/2015

Consolidation Stage



Permeability Stage



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Docksway Landfill-Newport

Contract No

27402

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP2.12
Sample No.		
Depth	m	
Date		18/07/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Grey silty CLAY

Initial Specimen Conditions

Height	mm	131.00
Diameter	mm	101.00
Area	mm^2	8011.85
Volume	cm^3	1049.55
Mass	g	1994.50
Dry Mass	g	1677.90
Density	Mg/m^3	1.90
Dry Density	Mg/m^3	1.60
Moisture Content	%	18.9
Voids Ratio		0.658
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	19.83
Density	Mg/m^3	1.94
Dry Density	Mg/m^3	1.62

Test Setup

Date started	06/07/2015
Date Finished	15/07/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 4
Cell Number	CPerm 4

D P Evans

Checked and Approved By

18/07/15
Date

Client Ref

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GEO Site & Testing Services Limited

Docksway Landfil-Newport

Contract No

27402

UKAS TESTING
2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP2.12
Sample No.		
Depth	m	
Date		18/07/2015

Saturation

Cell Pressure Incr.	kPa	35.00
Back Pressure Incr.	kPa	35.00
Differential Pressure	kPa	0.00
Final Cell Pressure	kPa	145.00
Final Pore Pressure	kPa	140.10
Final B Value		1.00

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	145.00
Back Pressure	kPa	45.00
Excess Pore Pressure	kPa	95.10
Pore Pressure at End	kPa	45.00
Consolidated Volume	cm^3	1036.85
Consolidated Height	mm	130.47
Consolidated Area	mm^2	7947.22
Vol. Compressibility	m^2/MN	32.2062
Consolidation Coef.	$m^2/yr.$	0.1272
Final Voids Ratio		0.638

Permeability

Cell Pressure	kPa	145.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00165
Average Temperature	'C	20

Vertical Permeability I m/s	**2.2 x 10-10**

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Contract No

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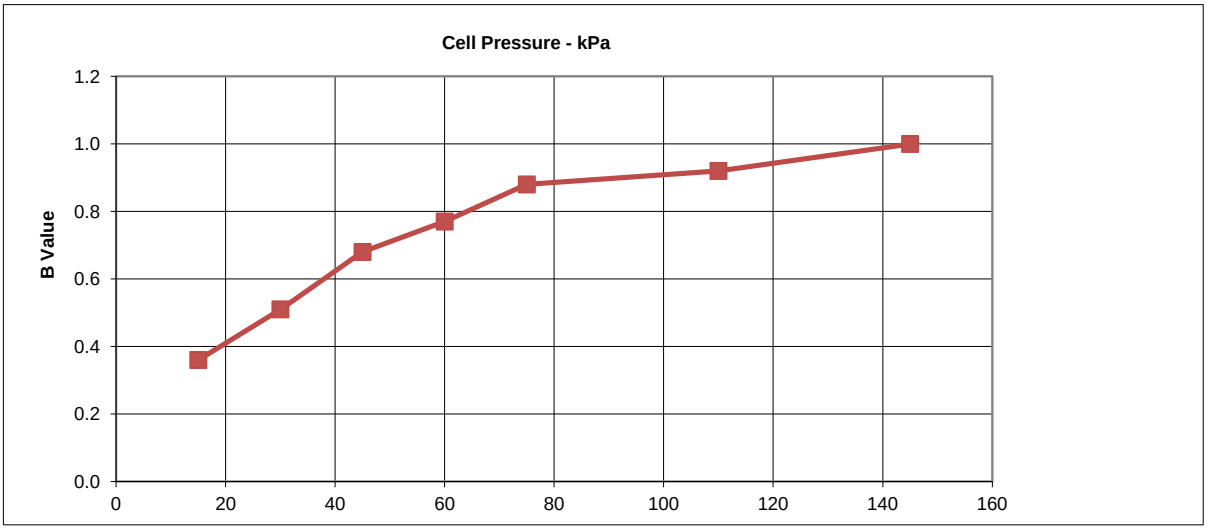
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

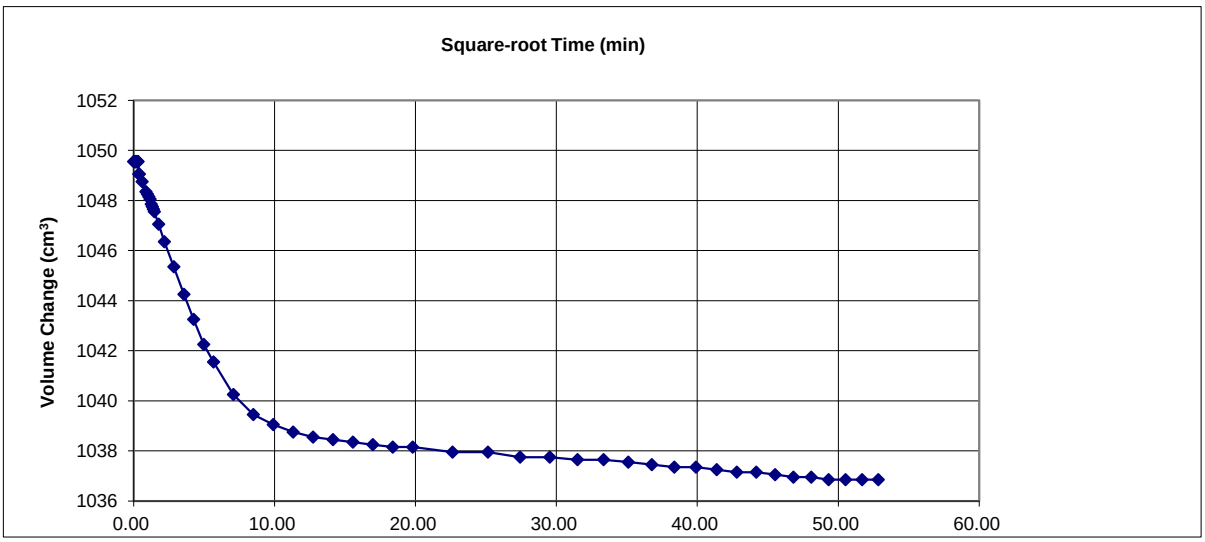
Specimen Details

Borehole		TP2.12
Sample No.		
Depth	m	
Date		18/07/2015

Saturation Stage



Consolidation Stage



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Permeability in a Triaxial Cell

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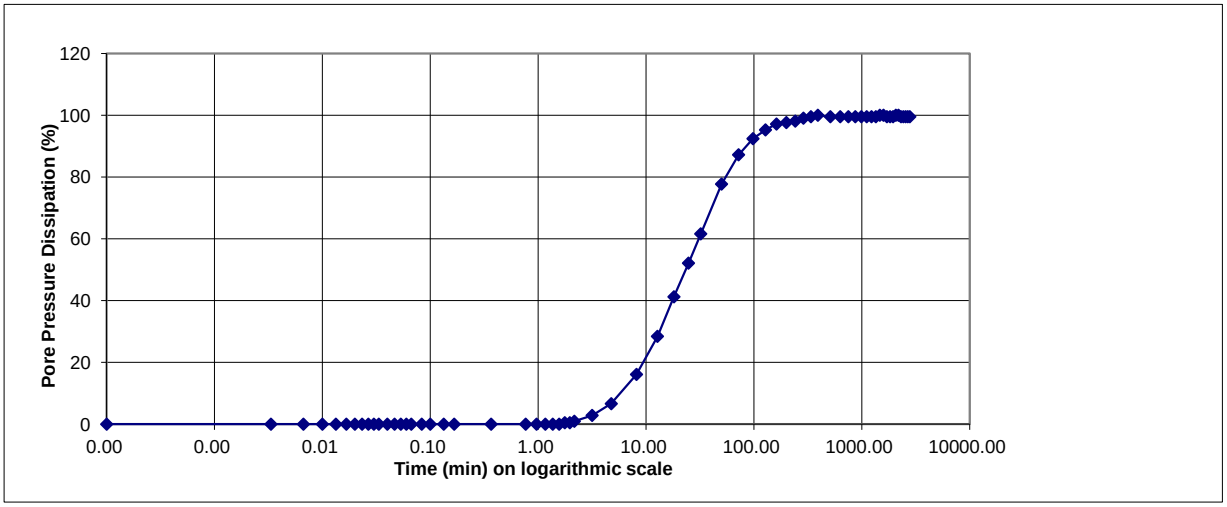
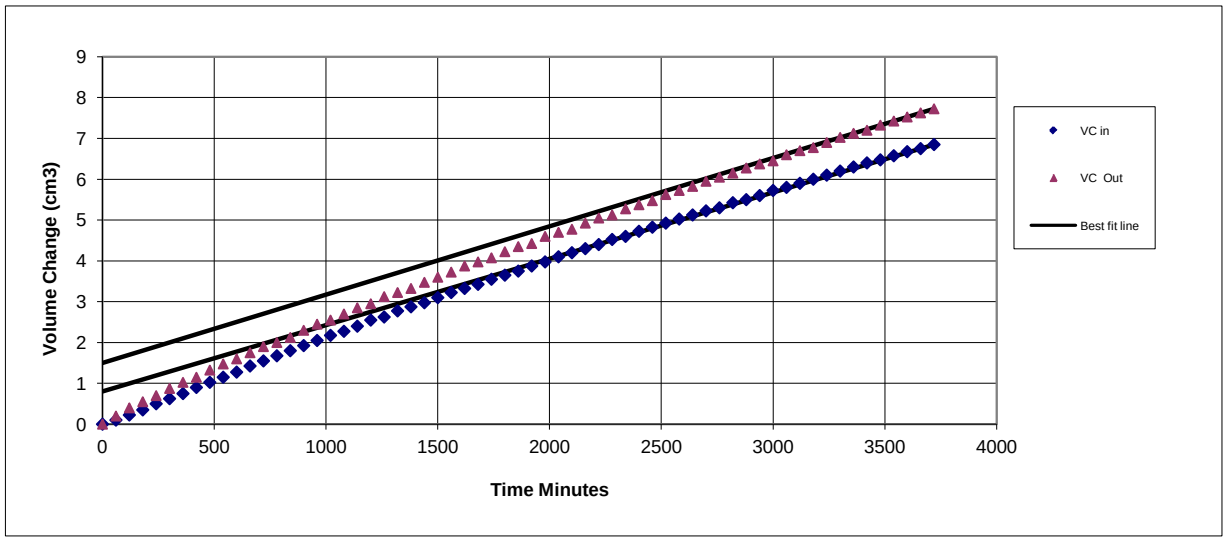
Specimen Details

Borehole		TP2.12
Sample No.		
Depth	m	
Date		18/07/2015

Consolidation Stage



Permeability Stage



D P Evans

Checked and Approved By

18/07/15
Date

Client Ref

Docksway Landfil-Newport

Contract No

27402

GSTL
GEO Site & Testing Services Limited

UKAS TESTING
2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP3.08
Sample No.		
Depth	m	
Date		17/07/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Grey silty CLAY

Initial Specimen Conditions

Height	mm	129.00
Diameter	mm	98.00
Area	mm^2	7542.96
Volume	cm^3	973.04
Mass	g	1929.30
Dry Mass	g	1627.80
Density	Mg/m^3	1.98
Dry Density	Mg/m^3	1.67
Moisture Content	%	18.5
Voids Ratio		0.584
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	19.88
Density	Mg/m^3	2.12
Dry Density	Mg/m^3	1.77

Test Setup

Date started	06/07/2015
Date Finished	16/07/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 5
Cell Number	CPerm 5

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP3.08
Sample No.		
Depth	m	
Date		17/07/2015

Saturation

Cell Pressure Incr.	kPa	100.00
Back Pressure Incr.	kPa	95.00
Differential Pressure	kPa	5.00
Final Cell Pressure	kPa	600.00
Final Pore Pressure	kPa	164.60
Final B Value		0.95

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	600.00
Back Pressure	kPa	500.00
Excess Pore Pressure	kPa	95.00
Pore Pressure at End	kPa	500.00
Consolidated Volume	cm^3	921.24
Consolidated Height	mm	126.71
Consolidated Area	mm^2	7275.26
Vol. Compressibility	m^2/MN	0.4769
Consolidation Coef.	$m^2/yr.$	0.5604
Final Voids Ratio		0.500

Permeability

Cell Pressure	kPa	600.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00314
Average Temperature	'C	20

Vertical Permeability I m/s	**4.46 x 10-10**

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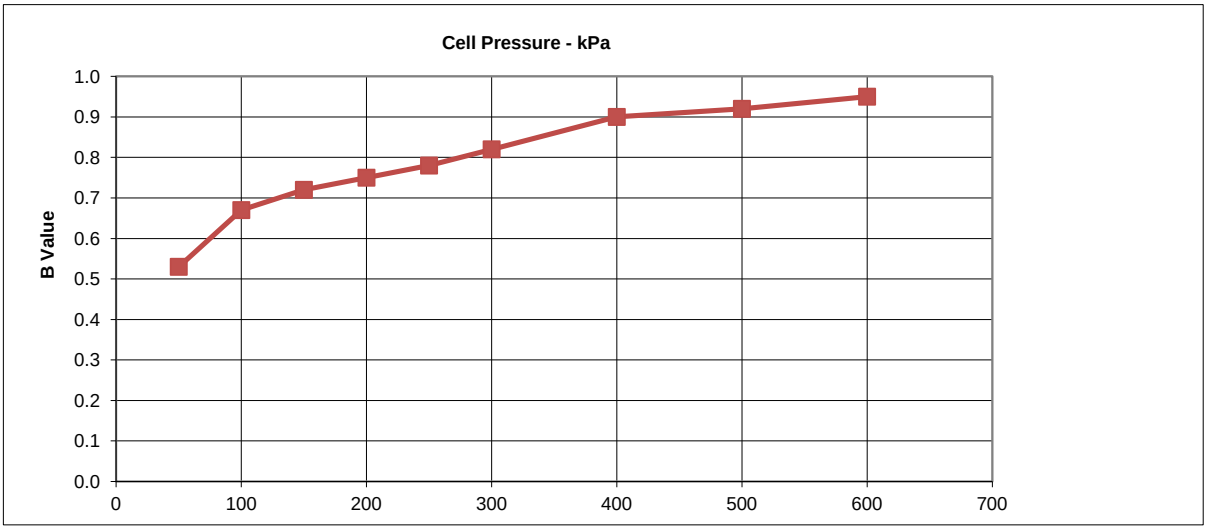
BS 1377 : Part 6 : 1990 Clause 6

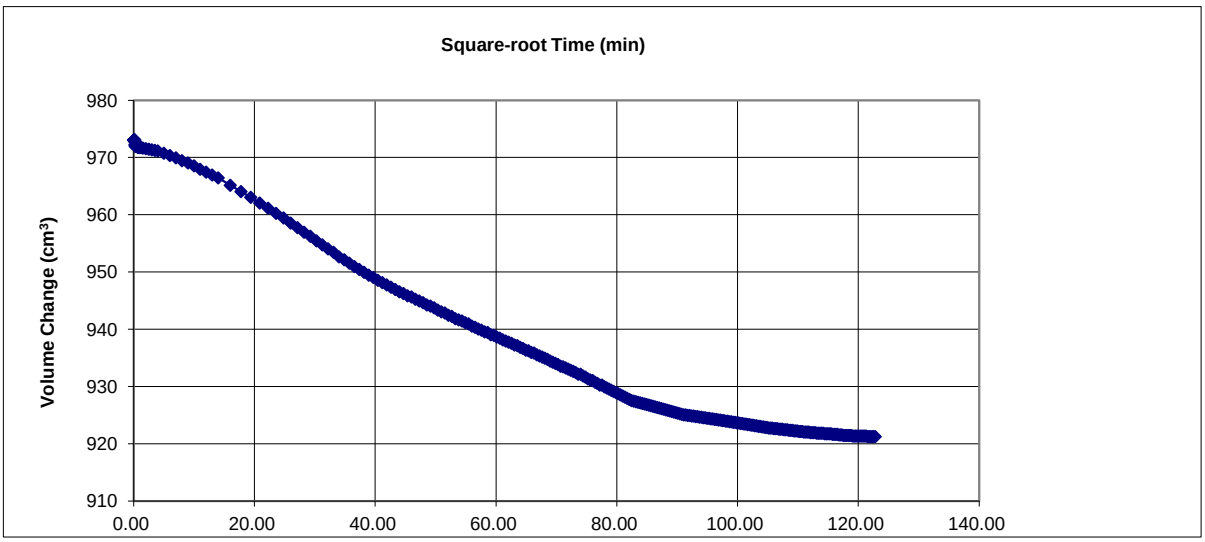
Specimen Details

Borehole		TP3.08
Sample No.		
Depth	m	
Date		17/07/2015

Saturation Stage



Consolidation Stage



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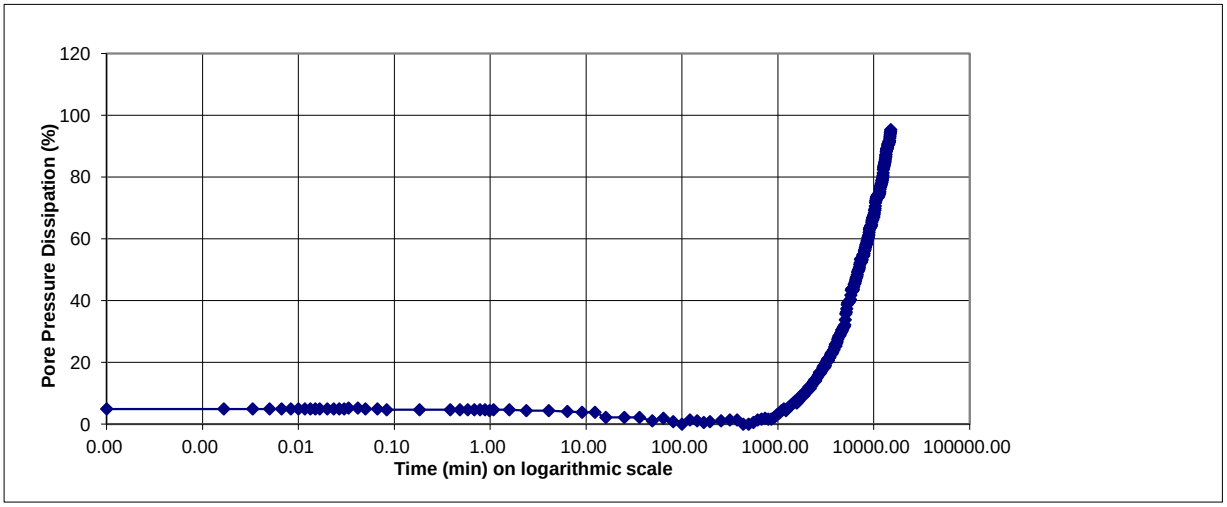
BS 1377 : Part 6 : 1990 Clause 6

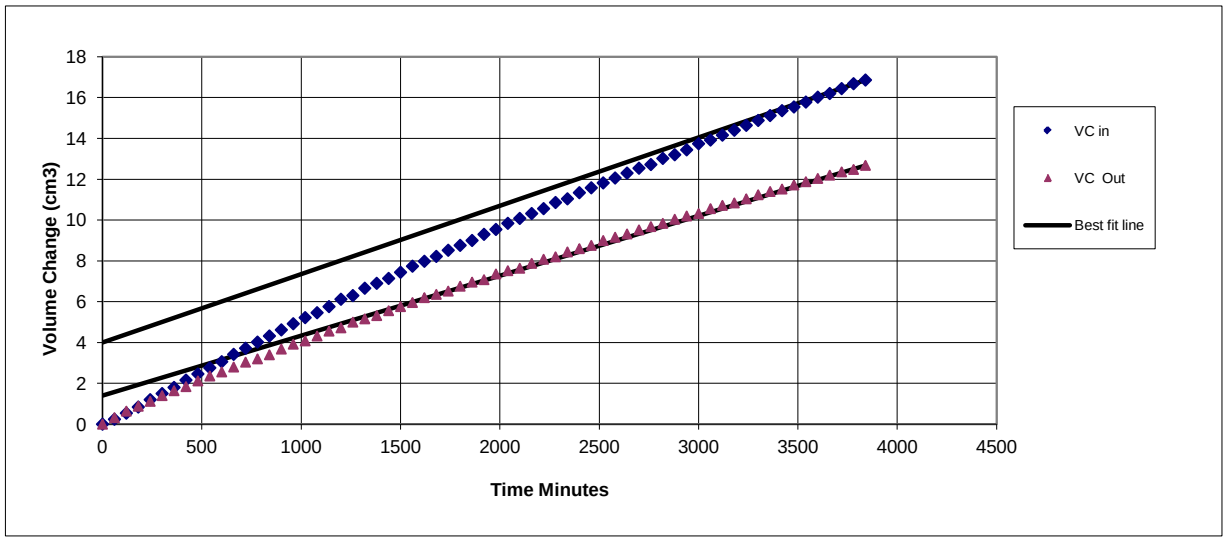
Specimen Details

Borehole		TP3.08
Sample No.		
Depth	m	
Date		17/07/2015

Consolidation Stage



Permeability Stage



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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP3.12
Sample No.		
Depth	m	
Date		22/07/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Grey silty CLAY

Initial Specimen Conditions

Height	mm	131.00
Diameter	mm	100.00
Area	mm^2	7853.98
Volume	cm^3	1028.87
Mass	g	2022.10
Dry Mass	g	1672.80
Density	Mg/m^3	1.97
Dry Density	Mg/m^3	1.63
Moisture Content	%	20.9
Voids Ratio		0.630
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	21.90
Density	Mg/m^3	2.00
Dry Density	Mg/m^3	1.64

Test Setup

Date started	10/07/2015
Date Finished	20/07/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 6
Cell Number	CPerm 6

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Docksway Landfill-Newport

Contract No

27402

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP3.12
Sample No.		
Depth	m	
Date		22/07/2015

Saturation

Cell Pressure Incr.	kPa	60.00
Back Pressure Incr.	kPa	59.00
Differential Pressure	kPa	1.00
Final Cell Pressure	kPa	360.00
Final Pore Pressure	kPa	352.00
Final B Value		0.98

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	360.00
Back Pressure	kPa	260.00
Excess Pore Pressure	kPa	92.00
Pore Pressure at End	kPa	260.00
Consolidated Volume	cm^3	1019.57
Consolidated Height	mm	130.61
Consolidated Area	mm^2	7806.65
Vol. Compressibility	m^2/MN	4.6488
Consolidation Coef.	$m^2/yr.$	0.0983
Final Voids Ratio		0.615

Permeability

Cell Pressure	kPa	360.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00054
Average Temperature	'C	20

Verticle Permiability Kv m/s	**7.41 x 10-11**

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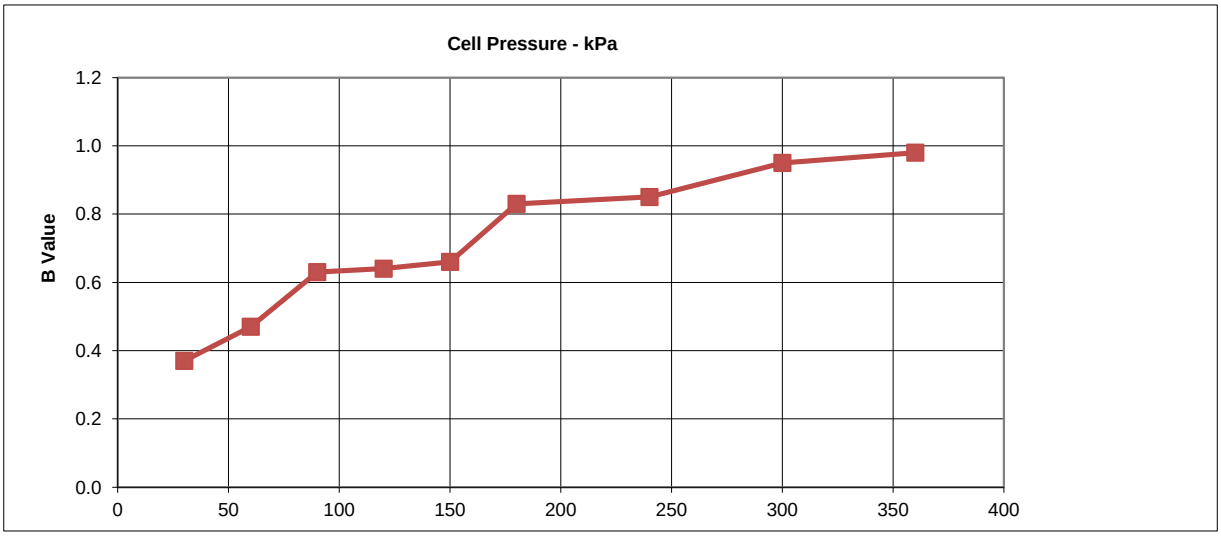
BS 1377 : Part 6 : 1990 Clause 6

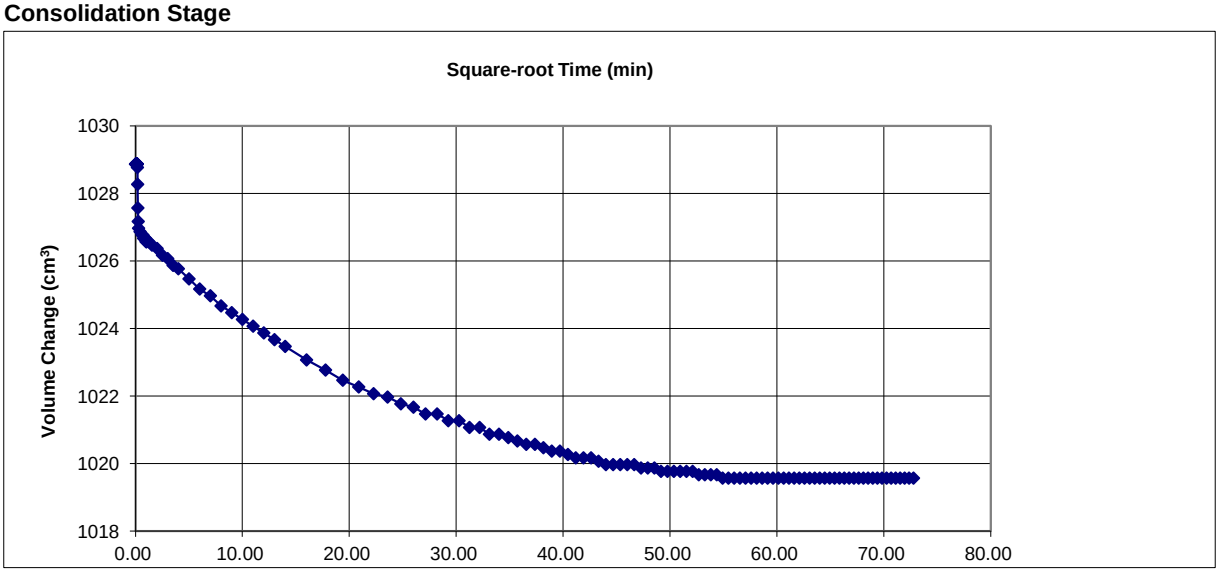
Specimen Details

Borehole		TP3.12
Sample No.		
Depth	m	
Date		22/07/2015

Saturation Stage



Consolidation Stage



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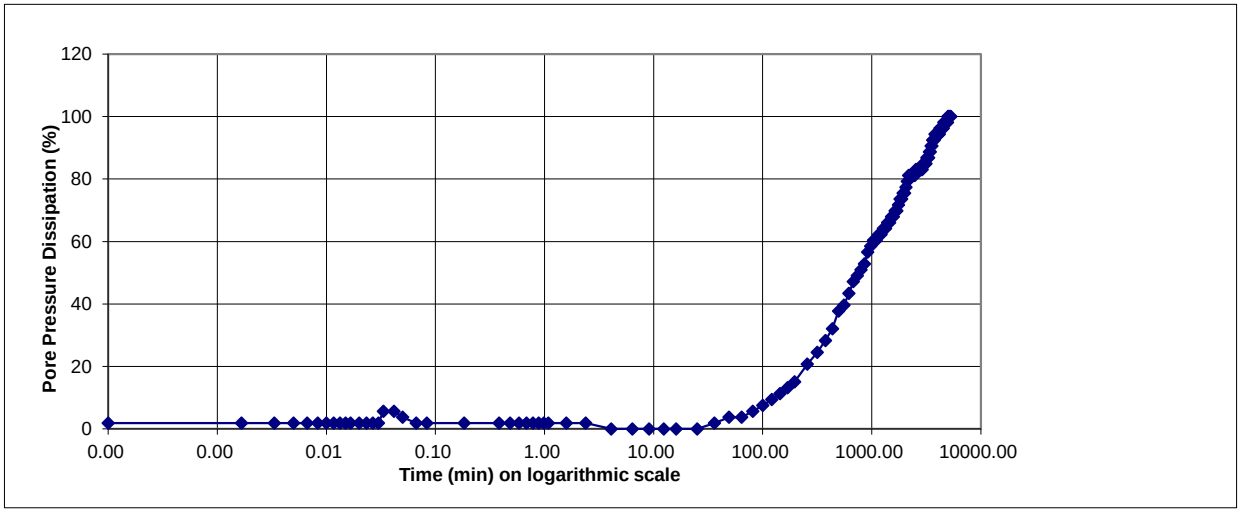
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

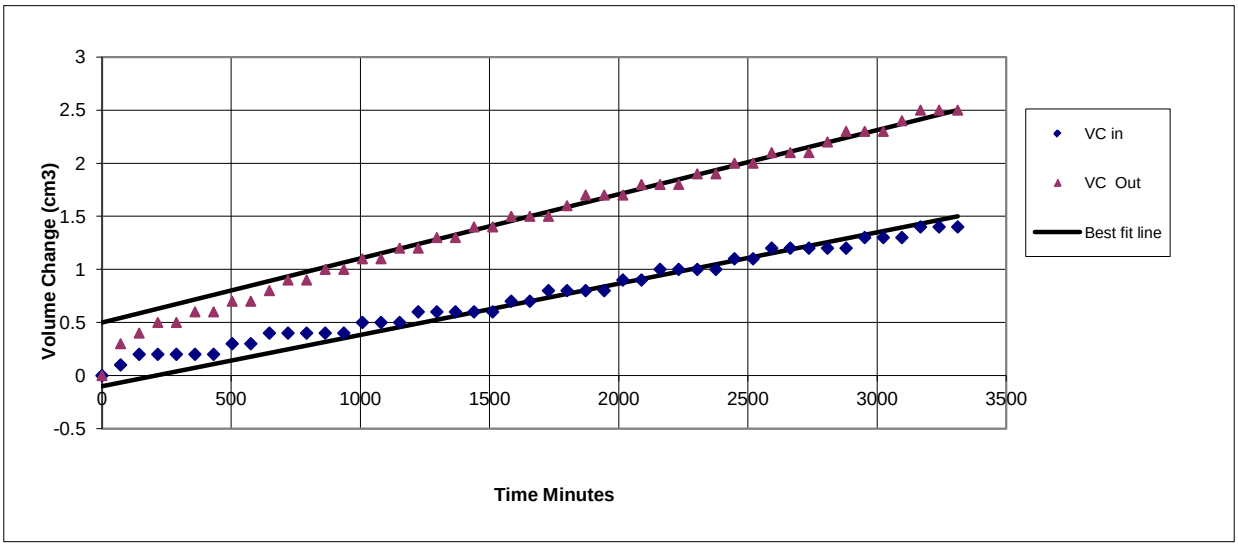
Specimen Details

Borehole		TP3.12
Sample No.		
Depth	m	
Date		22/07/2015

Consolidation Stage



Permeability Stage



D P Rang

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Docksway Landfill-Newport

Contract No

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP4.08
Sample No.		
Depth	m	
Date		22/07/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Grey silty CLAY

Initial Specimen Conditions

Height	mm	120.00
Diameter	mm	100.00
Area	mm^2	7853.98
Volume	cm^3	942.48
Mass	g	2014.60
Dry Mass	g	1667.20
Density	Mg/m^3	2.14
Dry Density	Mg/m^3	1.77
Moisture Content	%	20.8
Voids Ratio		0.498
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	21.89
Density	Mg/m^3	2.21
Dry Density	Mg/m^3	1.81

Test Setup

Date started	10/07/2015
Date Finished	21/07/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 7
Cell Number	CPerm 7

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22/07/15
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GEO Site & Testing Services Limited

Docksway Landfill-Newport

Contract No

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP4.08
Sample No.		
Depth	m	
Date		22/07/2015

Saturation

Cell Pressure Incr.	kPa	50.00
Back Pressure Incr.	kPa	48.00
Differential Pressure	kPa	2.00
Final Cell Pressure	kPa	350.00
Final Pore Pressure	kPa	336.50
Final B Value		0.96

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	350.00
Back Pressure	kPa	250.00
Excess Pore Pressure	kPa	100.00
Pore Pressure at End	kPa	250.00
Consolidated Volume	cm^3	921.28
Consolidated Height	mm	119.10
Consolidated Area	mm^2	7736.20
Vol. Compressibility	m^2/MN	9.0434
Consolidation Coef.	$m^2/yr.$	0.2249
Final Voids Ratio		0.464

Permeability

Cell Pressure	kPa	350.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00075
Average Temperature	'C	20

Vertical Permeability | m/s	**9.41 x 10-11**

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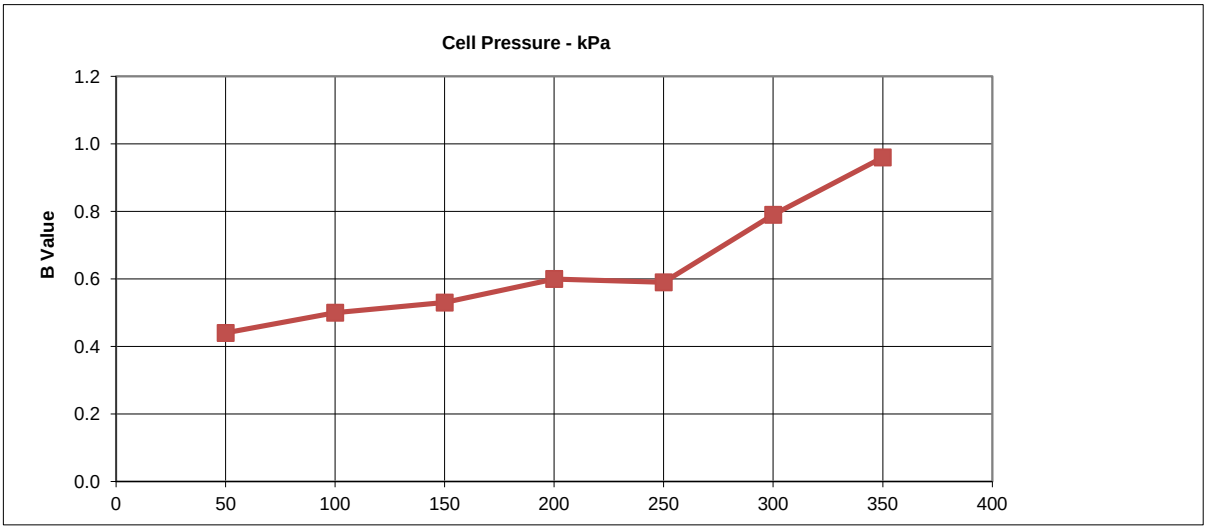
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP4.08
Sample No.		
Depth	m	
Date		22/07/2015

Saturation Stage



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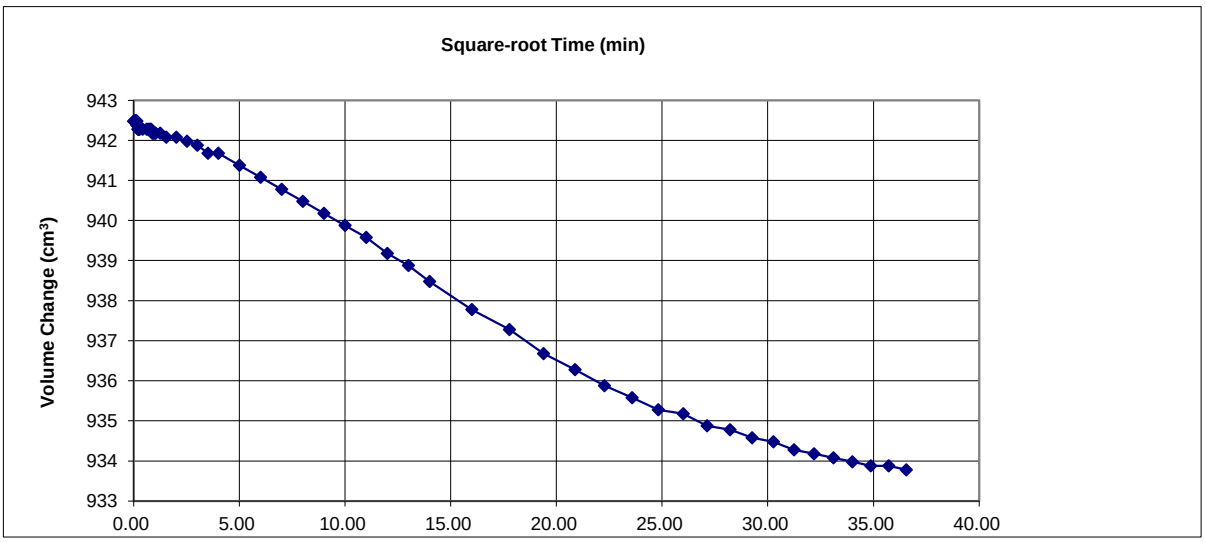

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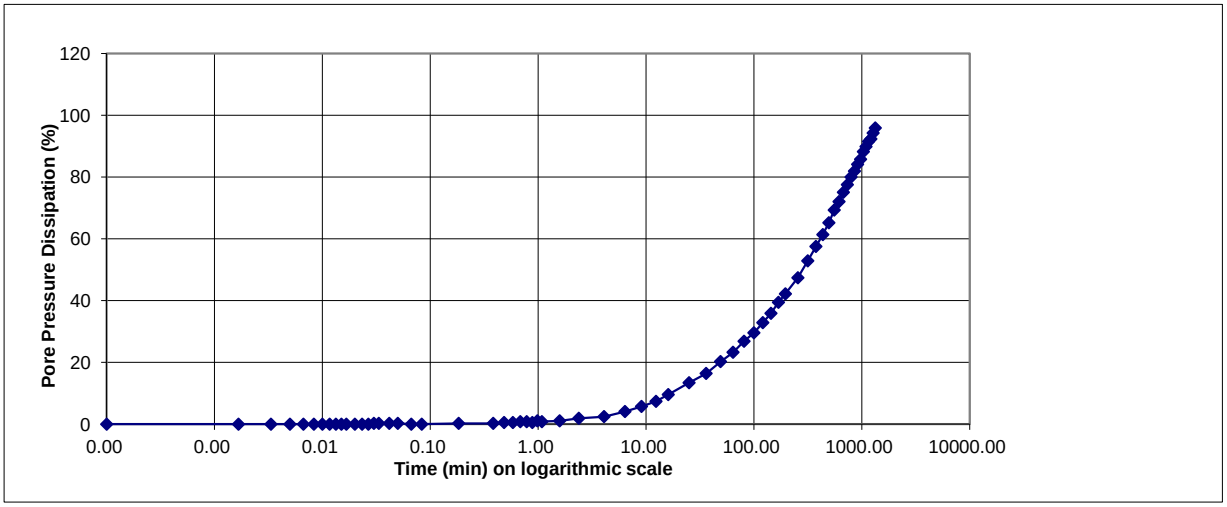
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

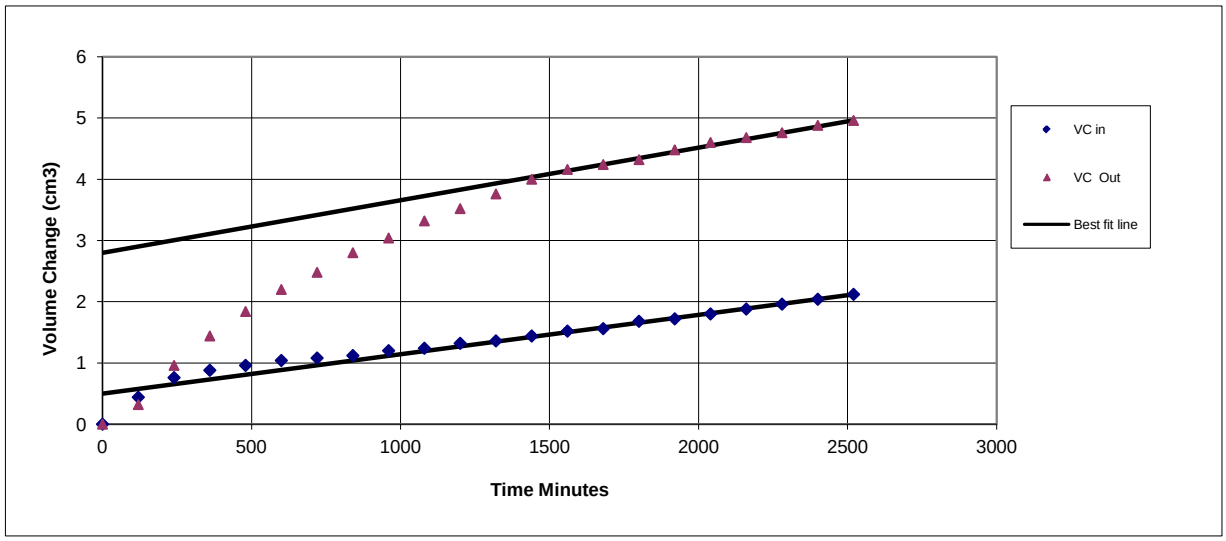
Specimen Details

Borehole		TP4.08
Sample No.		
Depth	m	
Date		22/07/2015

Consolidation Stage



Permeability Stage



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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP4.12
Sample No.		
Depth	m	
Date		22/07/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Grey silty CLAY

Initial Specimen Conditions

Height	mm	124.00
Diameter	mm	100.00
Area	mm^2	7853.98
Volume	cm^3	973.89
Mass	g	2007.60
Dry Mass	g	1666.00
Density	Mg/m^3	2.06
Dry Density	Mg/m^3	1.71
Moisture Content	%	20.5
Voids Ratio		0.549
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	21.67
Density	Mg/m^3	1.74
Dry Density	Mg/m^3	1.43

Test Setup

Date started	11/07/2015
Date Finished	21/07/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 8
Cell Number	CPerm 8

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP4.12
Sample No.		
Depth	m	
Date		22/07/2015

Saturation

Cell Pressure Incr.	kPa	100.00
Back Pressure Incr.	kPa	99.00
Differential Pressure	kPa	1.00
Final Cell Pressure	kPa	200.00
Final Pore Pressure	kPa	292.00
Final B Value		0.99

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	200.00
Back Pressure	kPa	100.00
Excess Pore Pressure	kPa	94.00
Pore Pressure at End	kPa	100.00
Consolidated Volume	cm^3	964.39
Consolidated Height	mm	123.60
Consolidated Area	mm^2	7802.91
Vol. Compressibility	m^2/MN	8.1504
Consolidation Coef.	$m^2/yr.$	0.1038
Final Voids Ratio		0.534

Permeability

Cell Pressure	kPa	200.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00145
Average Temperature	'C	20

Verticle Permiability Kv m/s	**1.87 x 10-10**

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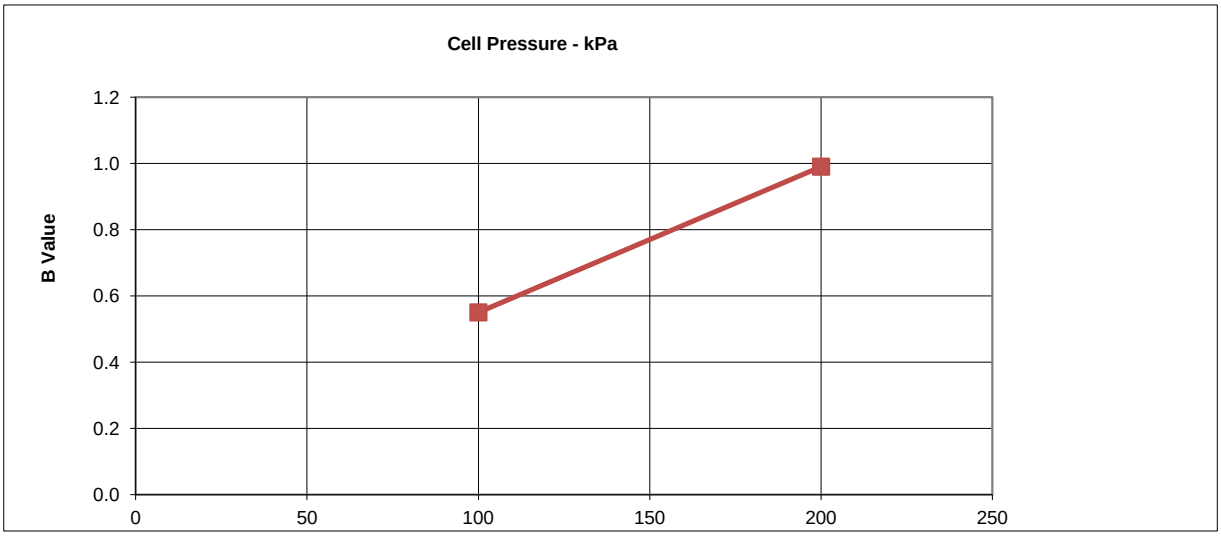
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		TP4.12
Sample No.		
Depth	m	
Date		22/07/2015

Saturation Stage



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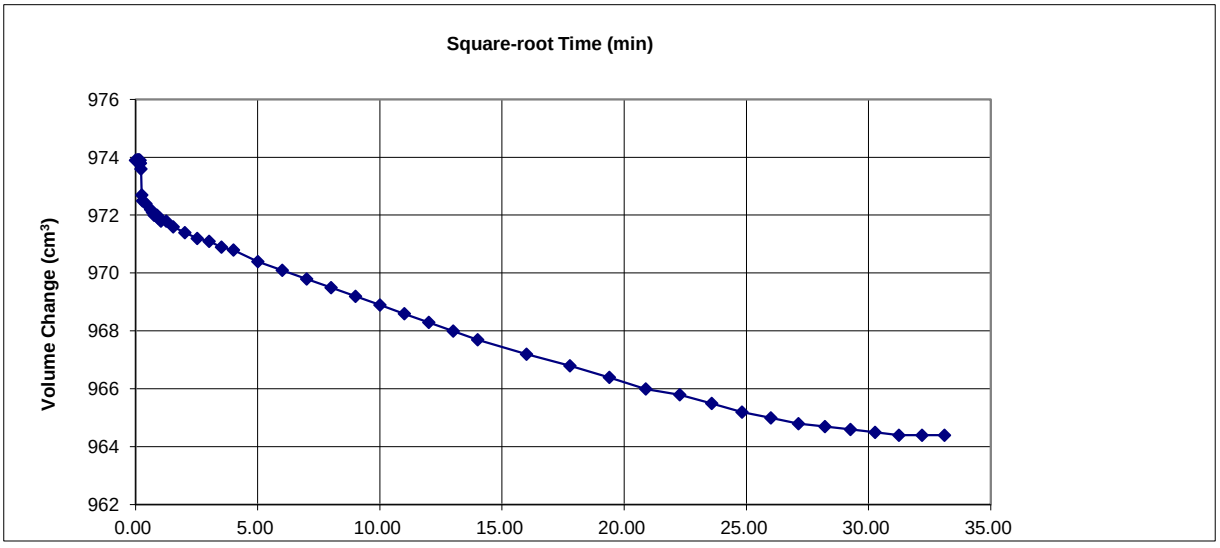

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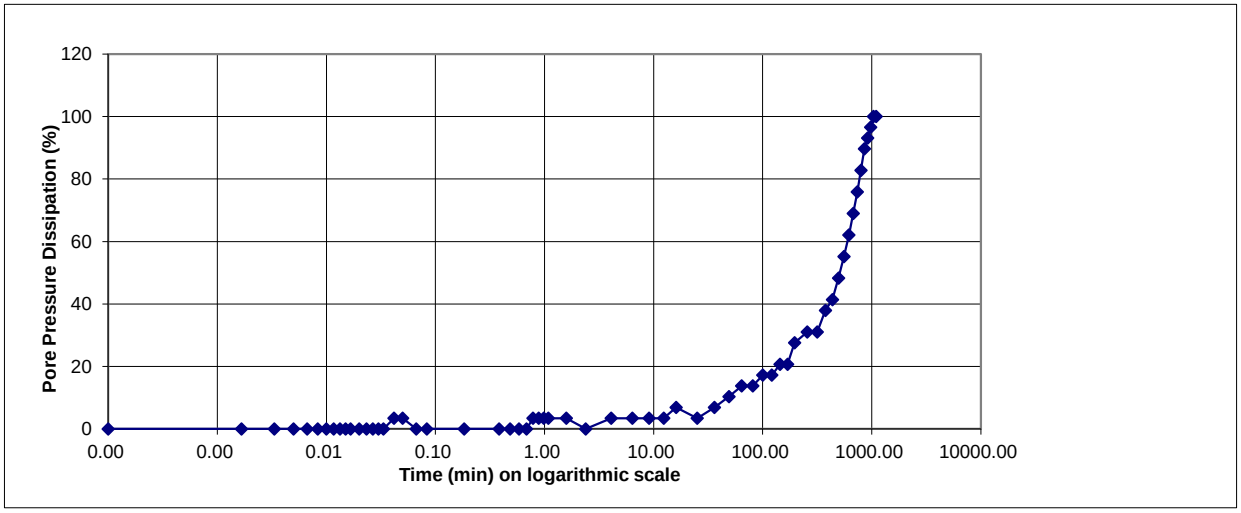
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

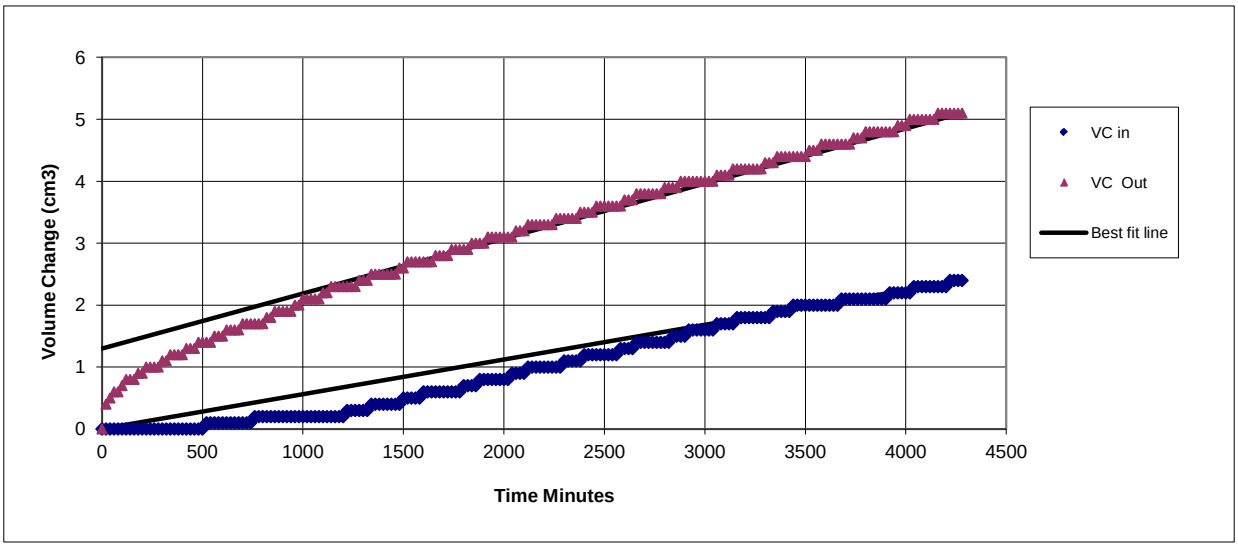
Specimen Details

Borehole		TP4.12
Sample No.		
Depth	m	
Date		22/07/2015

Consolidation Stage



Permeability Stage



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Docksway Landfill-Newport

Contract No

27402

ANNEX B

Newport City Council

Docksway Waste Disposal Site

Area 2 Landfill Development - Cell 3 Clay Lining

CQA Plan

Project Reference: 2506

June 2015

Environmental Services
Engineering and Construction
Environment and the Economy
Newport City Council
Civic Centre
Newport
NP20 4UR

Document Control Sheet

Project Name: Cell 3 Clay Lining

Project Ref: 2506

Report Title: CQA Plan

Document Ref: 2506_CQA_01

Date: June 2015

	Name	Position	Signature	Date
Prepared	Meirion Humphreys	Engineering Assistant		19.06.2015
Reviewed / Approved				

Revision	Page	Description	Prepared	Reviewed	Approved

TABLE OF CONTENTS

1 General

1.1 Introduction

1.1.1 This Construction Quality Assurance (CQA) Plan has been prepared by Peter Brett Associates (PBA) and addresses the detailed requirements for the sourcing, placement and compaction of the engineered clay liner for the Docksway Landfill, Area 2 construction in Cell 2 including the lining of the outer perimeter bund of Cell 2.

1.2 Definitions

1.2.1 This CQA Plan is devoted to Construction Quality Assurance. In the context of this document, Construction Quality Assurance and Construction Quality Control are defined as follows:-

1.2.2 Construction Quality Assurance (CQA) - A planned and systematic pattern of all means and actions designed to provide confidence that items or services meet contractual and regulatory requirements, and will perform satisfactorily in service. However the process records results at the point of measurement and cannot be treated as a guarantee or warranty of fit for purpose.

1.2.3 Construction Quality Assurance refers to means and actions employed by the CQA Engineer, to monitor conformity of the lining system preparation, production, and installation to this CQA plan, the Contract drawings and Specifications. CQA is provided by a party independent from production and installation.

1.2.4 Construction Quality Control (CQC) - Those actions which provide a means to measure and regulate the characteristics of an item or service to contractual requirements.

1.2.5 Construction Quality Control refers to those actions taken by the Contractor, or the Employer to ensure that the materials and the workmanship meet the requirements of the plans and specifications.

1.2.6 "Employer" means the person or persons, firm, company or other body who own or have responsibility for the facility. The Employer has entered into a contract with the Contractor for the execution of the Works specified in the Specification and Contract

Drawings. The Employer may be represented on site by personal representatives or other parties, e.g. the CQA Consultant.

1.2.7 "Contractor" means the person or persons, firm, company or other body to whom the Contract has been awarded by the Employer, and includes the Contractors personal representatives or other parties, e.g. Sub-Contractors. The Contractor is the party responsible for the preparation and construction of the works to the Specifications as detailed, within the CQA Plan and Contract Documents under the technical supervision of the Engineer.

1.2.8 "CQA Consultant" means the person, firm or company appointed by the Employer to act on his behalf for the proper execution of the Works. A personal representative will be appointed for the Works or part thereof.

1.2.9 “CQA Site Engineer” is a representative of the CQA Consultant who is normally located at the site for the duration of the Works.

1.2.10 “Engineer” means the person appointed by the Employer to act as Engineer for the purposes of the Contract.

1.3 Duties

1.3.1 For projects covered by this CQA Plan, the CQA Consultant and the Contractor have been preselected on the basis of their qualifications in particular disciplines. In the case of the CQA Consultant, the personnel of the CQA Team include:-

1.3.2 "CQA Project Manager", who operates from the offices of the CQA Consultant and may attend site progress or pre-construction meetings. The CQA Project Manager:

i. reviews all designs, plans, and specifications;

ii. reviews other site-specific documentation, including proposed layouts, and Contractor's qualifications;

~~iii. administers the CQA programme, i.e., assigns tasks and instructs CQA personnel, reviews field reports, and provides review of CQA related issues;~~

~~iv. provides quality control of the CQA personnel;~~

v. reviews all changes to the design, plans, and specifications;

vi. reviews the Record Drawings; and

vii. prepares the final report.

1.3.3 The CQA Project Manager may delegate some or all of these duties to the CQA Site Engineer as required.

1.3.4 "CQA Site Engineer" who is a representative of the CQA Consultant and is located at the site: The CQA Site Engineer:

~~viii. acts as the on-site representative of the CQA Consultant;~~

ix. familiarises all CQA Monitors with the site, and the CQA requirements for the project;

x. manages the daily activities of the CQA Monitors;

xi. attends all CQA-related meetings (e.g. Preconstruction and Progress);

xii. prepares, or oversees the ongoing preparation of the Record Drawings;

xiii. assigns locations for testing and sampling;

xiv. reviews all CQA Monitors' daily reports and logs;

xv. reports to the CQA Project Manager, and logs in his daily report any relevant observations;

xvi. oversees the collection and shipping of all samples for laboratory testing;

xvii. reviews results of laboratory testing and makes appropriate recommendations;

xviii. reports any unresolved deviations from this CQA Plan to the CQA Project Manager;

xix. provides all logs and relevant data to the CQA Project Manager for the preparation of the final report;

xx. reviews all Certifications and Documentation from the Contractor. and makes appropriate recommendations;

xxi. notes and brings to the attention of the Contractor any on-site activities that could result in damage to the clay lining.

xxii. Carries out duties delegated by the CQA Project Manager.

1.3.5 "CQA Monitors" (as required), who are representatives of the CQA Consultant and are located at the site. The duties of the CQA Monitors include monitoring of

i. on-site conformance testing;

ii. all placement operations;

iii. sampling for conformance testing by the Laboratory;

1.3.6 In addition to these specific duties, all CQA Monitors will take note of any on-site activities that could result in damage to the clay lining, reporting these to the Contractor and CQA Site Engineer.

1.4 Relationship with Other Documents

1.4.1 In the event of ambiguity or conflict between this CQA Plan and other Contract Documents, then in general the Specification shall take precedence, followed by the Contract Documents, and thence this CQA Plan. Should resolution on this basis not be possible, then the Engineer shall decide on which interpretation is applicable.

2 Clay Source Approval

2.1 Conformance

2.1.1 The CQA Project Manager shall establish and confirm in writing that the clay proposed for the landfill liner should, when placed, be capable of meeting the Specification requirements for permeability. This shall be achieved by reviewing source approval laboratory test results on the clay prior to any clay being utilised on site. Source approval tests must include a minimum of 3 determinations of particle density. To determine the suitability of the clay source the CQA Project manager will review all available information to ensure that the clay meets the relevant suitability and acceptance criteria.

2.1.2 The CQA Project Manager will continue to monitor the performance of the clay over the duration of the Works and make appropriate recommendations when necessary.

2.2 Placement Approval

2.2.1 No clay shall be placed on site until such time as the CQA Project Manager has reviewed all of the relevant source information, and given written approval of the source to the Contractor and Employer.

3 Compaction Trials

3.1 Preparation

3.1.1 Once a suitable clay source has been identified and approved by the CQA Project Manager, small quantities of the clay shall be imported to the lining works area for use in placement compaction trials. A level area of the cell floor, approximately 15m x 6m, shall be utilised. The Site CQA Engineer shall inspect the subgrade and shall verify its acceptability for use.

3.2 Placement and sampling

3.2.1 The clay shall be spread, levelled and compacted utilising the same plant and methodology as those envisaged for the Works. This shall be undertaken in a number of layers to suit the clay until ~~a minimum of 3 layers of clay have~~ the full construction thickness has been placed. After spreading but prior to compaction of a layer, a sample shall be taken for the determination of the moisture condition value (MCV). The clay shall be compacted using a suitable roller with a total of 12 passes per drum for each layer. After 6 passes of the roller on each layer, three in situ density samples shall be taken and each sample tested for moisture content and dry density. This process shall be repeated after 8 and 12 passes of the roller.

Addendum *The use of a padfoot roller will result in a heavily cuspated surface, making viable sample extraction difficult. It is proposed that the sample is not extracted from a layer until its subsequent layer has been placed and compacted. This method will*

3.2.2 One bulk disturbed sample shall be taken from the clay layer for the determination of particle size distribution, liquid and plastic limits.

3.3 Once sampling has been completed for each layer, a further clay layer shall be placed and compacted. The layer thickness and number of plant passes shall be determined from the test results to hand. Sampling and testing shall be carried out as for the first layer. This shall be repeated until the full thickness of the trial pad has been placed.

3.4 Testing

3.4.1 The determination of the in situ density of compacted material will be by the Core Cutter method. The cores shall be used for laboratory determination of dry density and moisture content.

3.4.2 On completion of the MCV test, the compacted sample shall be tested for undrained shear strength (using a hand vane) and for moisture content.

3.4.3 On completion of the trial pad two pits shall be carefully excavated, at the approximate third points of the pad. The side walls of the pits shall be examined for the extent of inter-lift bonding and material remoulding.

3.4.4 The layering and testing process may be repeated as many times as is deemed necessary by the CQA Project Manager, varying clay layer thicknesses, plant passes, and if required, varying plant type and category.

3.4.5 On completion, the trial area may be incorporated into the engineered clay fill beneath the clay liner.

3.5 Results and Specification

3.5.1 On the basis of the above trials and in conjunction with the source approval testing, the placement methodology for the works shall be specified. This shall generally state the following:

i. placement moisture condition value range
ii. maximum clay clod particle size
iii. clay moisture conditioning methodology
iv. clay compacted layer thickness
v. compaction plant type and size
vi. compaction plant passes per lift
vii. maximum compacted air voids content

3.5.2 This listing is not exclusive, and other criteria may also be stipulated by the CQA Project Manager, dependent on clay and plant characteristics.

3.5.3 A table similar to the example shown below will be issued along with the placement methodology as listed above.

Table 2 – Anticipated Testing Schedule (Works Phase)*			
TEST	FREQUENCY**	PASS	NOTES
Lift Thickness	Direct observation, measuring pins	tbc by trial pad	To be confirmed by trial pad
Topographic Survey	Commencing surface and completed surface of liner	Minimum thickness of clay liner 1.2m	
MCV [prior to compaction]	1 per day	tbc by trial pad	
In situ density by core cutter	On a 25m grid	95% of MDD 5% Air Voids	MDD tbc from source approval tests.
Atterberg limits	1 per 2000m^3 clay placed	LL 50 – 90% PL 10 – 60%	Approx 20 tests
PSD	1 per 2000m^3 clay placed	To include >80% passing 63 microns	Approx 20 tests
Permeability	1 per 2000m^3 clay placed	1×10^{-9} m/s	Approx 20 tests
Hand shear vane	As required	Min 40 kPa (mean of 3 adjacent tests)	Field check only

Photographs	As required	None	For record purposes

TABLE 1

* For a full breakdown of testing requirements refer to Tables 3 & 4, Annex 1.

**These are guidelines only; sampling will be undertaken at the discretion of the CQA site engineer.

***Comprehensive pass criteria will only become available following the compaction trial and review of the subsequent lab data.

4 Clay Placement

4.1 Placement Monitoring for Engineered Fill

4.1.1 Engineered clay fill below the liner shall be placed and compacted using the same methodology as for the liner itself, described below. Engineered clay fill shall not be required to meet any permeability criteria, and site control testing shall be limited to the determination of the moisture condition value (MCV), to ensure that the material is in a suitable condition for placement. One MCV test shall be carried out for every 250m3 placed.

4.2 Placement Monitoring for Clay Liner

4.2.1 Clay shall be placed strictly in adherence with the placement methodology determined in Section 3.4 unless otherwise approved by the CQA Project Manager on the basis of subsequent test results and field records. The CQA Site Engineer will check that the clay liner is placed to the correct thickness in a uniform manner throughout and that good practice techniques are employed by the Contractor to ensure bonding between layers with adequate compaction.

4.2.2 Clay layers will be placed by end tipping in a logical and agreed direction of working. The Contractor will provide a full time banksman to direct plant at the advancing edge and guide plant operators with regard to the layer thickness. All clay shall be compacted and/or sealed by the end of the working day. Each clay layer shall be completed as fully as practicable before the overlying layer is commenced, unless otherwise agreed by the CQA Project Manager or CQA Site Engineer.

4.2.3 Once the clay has been placed, measures shall be taken to avoid excessive drying and/or desiccation of the surface, or excessive wetting prior to placement of any drainage media. This shall be achieved as necessary by the use of polythene sheeting, or similar, laid over the clay surface, or by some other suitable means approved by the CQA Project Manager such as overfilling and subsequent trimming to level.

4.2.4 Should such drying/wetting occur, then the affected clay shall be removed and replaced. Desiccated or softened clay will be rejected based on a visual examination of the surface by the CQA Site Engineer, who will determine the extent of the area to

be remediated. Replacement clay shall be subject to the same monitoring programme as the originally placed clay.

4.2.5 A monitoring programme shall be instigated by the CQA Project Manager, which will check that all clay imported is from the approved source and is as specified in Section 2.2. Furthermore, the monitoring programme shall check that all clay is placed in accordance with the methodology specified in Section 3.4 with respect to lift thicknesses, MCV limits and compaction plant passes. In addition the Contractor shall undertake classification testing of the emplaced material to demonstrate that the material is in accordance with the grading and plasticity requirements. Classification testing shall comprise Atterberg Limits (BS1377:Part 2:1990: Clauses 4.3 and 5.3) and Particle Size Distribution (BS1377:Part 2:1990: Clauses 9.2,9.3 and 9.5 – Wet Sieve and Hydrometer)

4.2.6 The Site CQA Engineer shall instigate a testing regime on emplaced clay, which will include MCV, clay moisture content and dry density immediately after placement.

4.3 Testing Frequency for Clay Liner

4.3.1 Placement monitoring tests will be undertaken on a 25m grid with one test performed on each compacted layer. Classification testing shall be undertaken at a frequency of 1 test per 2000m3. The CQA Project Manager may vary this at any time at his discretion. Each sampling location shall be uniquely referenced. The CQA Project Manager will approve the test method to be utilised. Determination of the permeability of the compacted clay liner shall be undertaken in accordance with Section 5.5 below.

4.4 Placement Test Method

4.4.1 The CQA Project Manager shall approve the test methods to be utilised for the above testing regime. They shall conform to BS1377: Part 9: 1990 and to Clause 2.4 (core cutter method).

4.5 Test Failure and Remedial Works

4.5.1 The placed clay liner material shall meet the relevant conformance criteria, as in the clay source material specification.

4.5.2 In the event of any test results not being acceptable, the CQA Project Manager shall discuss these with the Contractor. The extent of remedial works (e.g. further passes of compaction plant; clay removal) shall be agreed between the CQA Project Manager and the Contractor. Any areas requiring remedial action shall be retested in accordance with section 4.3 above.

4.5.3 Should such events occur at an abnormally high frequency, the Contractor shall be required to cease clay placement whilst an investigation is undertaken by the CQA Project Manager. Such an investigation will review some or all of the following, as well as other factors deemed appropriate by the CQA Project Manager:

i. source clay characteristics altered (e.g. variations in natural moisture contents, PI etc.)

ii. inefficient Contractor's plant or working methodology

iii. inappropriate test methods or acceptance criteria

iv. defective test equipment or testing procedures

4.5.4 The CQA Project Manager shall ensure that the problem is rectified before authorising the recommencement of clay placement.

5 Clay Liner Permeability Testing and Acceptance

5.1 Test Method

5.1.1 During clay liner placement 100mm diameter cores shall be taken from the clay, to BS1377:Part 9:1990:Clause 2.4 at a minimum frequency of 1 per 2,000m3, or as required by the CQA Project Manager. These shall be subjected to Triaxial Permeability Testing, and the clay liner shall be deemed suitable if all cores tested exhibit a coefficient of permeability, k, of not greater than 1 x 10-9 m/s. The testing laboratory shall have UKAS accreditation for the appropriate test method.

5.1.2 Two cores shall be taken from each test location. One core shall be tested for permeability, and the other retained until all test results are available. Should there be any untoward discrepancy in test results, then the retained sample shall be tested.

5.2 Liner Acceptance

5.2.1 The CQA Project Manager shall deem the clay acceptable when:

i. it has been verified that the Contractor's setting out, construction thickness and slope gradients conform with the Specification, Drawings and Contract;

ii. placement, including interlift bonding, has been undertaken correctly;

iii. the clay has been placed in a uniform manner, as verified by the monitoring regime outlined in Section 4;

iv. if applicable, the final surface of the clay is suitable to accept a geotextile separator;

v. all permeability cores exhibit a coefficient of permeability, k, of not greater than 1 x 10^{-9} m/s;

vi. all classification tests show conformance to the material source specification.

6 Documentation

6.1 General

6.1.1 The CQA Project Manager will document that all quality assurance requirements have been addressed and satisfied.

6.1.2 The Site CQA Engineer will maintain at the site a complete file of plans and specifications, CQA plan, checklists, test procedures, daily logs, and other pertinent documents.

i. Receipt Acknowledgements of Contractor's Submission

6.1.3 The CQA Project Manager is to obtain the following documents at various times throughout the course of the clay liner placement.

i. Laboratory test results of source clay;

ii. Working method for clay liner placement;

iii. Working method for clay liner protection;

iv. Specification for all clay compaction plant used during the works;

v. Survey drawings of post and pre liner placement to prove material thicknesses.

6.1.4 The CQA Project Manager is to

i. Acknowledge receipt in writing immediately

ii. Review the documentation and then, in writing, either acknowledge that the documentation is acceptable, or provide a listing of adjustments or additional documentation to be provided.

6.1.5 Upon receipt of these adjustments/additional documentation from the Contractor the CQA Project Manger will again undertake the above procedures.

6.1.6 Should the CQA Project Manager not receive information, or the information is unsatisfactory or not in compliance with the Specification then the CQA Project Manager at his discretion may reject any clay supplied or installed, and the Works shall not be allowed to proceed until receipt of satisfactory information.

6.2 Daily Records

6.2.1 The CQA Project Manager shall obtain from the Contractor Daily Reports summarising the Contractors activities. In addition the CQA Project Manager shall maintain a Daily Diary which will contain, inter alia:-

i. Prevailing weather conditions

ii. Contractors site labour and plant

iii. Engineers site assistants

iv. Work undertaken (cross referenced to Site Layout Plan)

v. Construction problems and solutions

vi. Record of site visitors

6.2.2 Additionally, the CQA Project Manager shall maintain field notes in a logical and systematic manner, minutes and memorandums of all meetings/discussions with the Employer/Contractor/Earthwork Contractor or any other person, observation logs and testing data sheets.

6.2.3 All of the above will be utilised for, and included within, the CQA Report.

6.3 Observation Logs and Testing Data Sheets

6.3.1 Observation logs and testing data sheets maintained by the CQA Project Manager will contain, as a minimum, the following information:

i. an identifying sheet number for cross referencing and document control;

ii. date, project name, location, and other identification;

iii. data on weather conditions;

iv. a site plan showing all proposed work areas and test locations; referenced to Layout Plan;

v. descriptions and locations of ongoing construction, referenced to Layout Plan;

vi. equipment and personnel in each work area, including subcontractors (if any);

vii. a summary of test results;

viii. calibrations or recalibrations of test equipment, and actions taken as a result of recalibration;

ix. decisions made regarding acceptance of units of work, and/or corrective actions to be taken in instances of substandard quality;

x. signature of the CQA personnel.

6.4 Construction Problems

6.4.1 The Employer will be made aware of any significant recurring non-conformance with Specifications. The CQA Project Manager will determine the cause of the non-conformance and recommend appropriate changes in procedures or Specifications. These changes will be submitted to the Employer for approval. When this type of evaluation is made, the results will be documented, and any revision to procedures or specifications will be approved by the Employer and CQA Project Manager, and will form an addendum to the Specification.

6.5 Photographs

6.5.1 Photographs will serve as a record of work progress, problems, and mitigation activities. The basic file will contain colour prints. Negatives will also be stored in a separate file in chronological order. Selected prints may form part of the CQA Report.

6.6 As Constructed Drawings

6.6.1 The CQA Project Manager shall check and approve "As Constructed Drawings" which will indicate the actual construction details installed.

6.6.2 As Constructed Drawings shall be to scale, and shall include:

i. underside levels of clay liner on a grid basis;

ii. completion levels of clay liner on a grid basis;

iii. test locations and/or sample test grid location;

iv. location of permeability cores;

v. cross-referencing system to any relevant photographs and construction problems.

6.6.3 The As Constructed Drawings approved by the CQA Project Manager will form part of the CQA Report.

6.7 Construction Quality Certificates

6.7.1 The CQA Project Manager shall issue Construction Quality Certificates on completion of the works or parts thereof to the Contractor and the Employer.

6.7.2 The CQA Project Manager shall not issue any Completion Certificates until all records documentation has been received from the Contractor, all laboratory test results are satisfactory, all liner installation and protection works have been satisfactorily completed and the as constructed drawings have been checked.

6.8 Completion Report

6.8.1 At the completion of the Project the CQA Project Manager will provide to the Employer and Environment Agency a signed "Report on the Construction Quality Assurance Monitoring for the Clay Liner" (abbreviated as "CQA Report") which will describe the works undertaken in compliance with the plans and Specification, physical sampling and testing, and any other observations the Engineer regards as pertinent. As a minimum it shall include:

i. project description
ii. contractors submissions
iii. daily logs/records
iv. photographic records
v. as constructed drawings
vi. completion certificates.

Annex 1 - Schedule of Testing & Performance Criteria

TABLE 2 – Schedule of Testing						
Clause	**Work, Goods or Material**		**Test**	**Frequency of Testing (Indicative Minimum)**	**Test Certificate**	**Comments**
Suitability Testing						
	Class	General Description				
601, 615 ,631 to 637, 640	2(A, B, D)	Cohesive Material (Imported)	Grading	Minimum of 8 per source	Required	
			Moisture Content & Plasticity Index	Minimum of 8 per source		
			MDD and OMC (2.5kg)	Minimum of 8 per source		
			MDD and OMC (4.5kg)	Minimum of 8 per source		
			Specific Gravity	Minimum of 8 per source		
			Permeability (triaxial on re-compacted)	Minimum of 8 per source		
			Undrained shear strength (on re-compacted sample)	Minimum of 8 per source		
			MCV/MC relationship (5 points)	Minimum of 6 per source		
Acceptable Materials						
	Class	General Description				
601, 615, 631 to 637, 640	2(A, B, D)	Cohesive Material (Imported)	Moisture Content and Plasticity Index	1 per 25m by 25m grid per layer	Required	
			MDD and OMC (4.5kg)	1 per 2000 m^3		
			MCV	1 per 25m by 25m grid per layer		

TABLE 2 – Schedule of Testing - continued						
Clause	**Work, Goods or Material**	**Test**	**Frequency of Testing (Indicative Minimum)**	**Test Certificate**	**Comments**	
Compliance Testing						
Compaction of Fills						
Clause	**Class**	**General Description**	**Tests**	**Frequency**		
612	2 (A, B, D)		Field Dry Density	1 per 25m by 25m grid per layer	Required	Core Cutter
			Moisture Content	1 per 25m by 25m grid per layer		Core Cutter
			Permeability (triaxial)	1 per 2000m^3		Core Cutter (Duplicate core cutter samples required)
			% air voids calculation	1 per 25m by 25m grid per layer		Calculation
			Undrained shear strength	1 per 25m by 25m grid per layer		Hand shear vane. 3 at each field dry density location.

TABLE 3 – Specified Performance Criteria							
Class	**General material description**	**Typical use**	**Permitted Constituents (All subject to requirements of Clause 601)**	**Material Properties Required for Acceptability**			**Compaction Requirements**
				Property (See Exceptions in previous column)	**Defined and Tested in Accordance with:**	**Acceptable Limits within**	
						Lower / **Upper**	
2A,B,D	Cohesive material	General Fill	Any materials, or combination of materials other than chalk	Moisture Content	BS 1377: Part 2	TBC / TBC	End Product - 95% of Maximum Dry Density (4.5kg) with up to 5% Air Voids
				Permeability	BS 1377: Part 6	- / 1 x 10^{-9}	
				Undrained Shear Strength	Clause 633 SHW	40 kN/m^2 / -	

ANNEX C

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**1**
Date Commencing:	**29th June 2015**

1 Introductory Information

1.1 Much of the information described below relates to initial site set-up and repetitive elements of the works, and will not be repeated for each weekly progress report unless significant deviations or additions are made. It is intended to restrict the weekly reports to progress summaries and discussions of issues and events pertinent at the time.

2 Enablement

2.1 Access to the cell was enabled by the construction of a temporary ramp from the access road descending into the cell floor, utilising imported demolition material. A clay runway was laid on the cell floor to provide a travel-way, with the proviso that excessive travel over this material may render it unsuitable to remain as part of the final liner. The condition of this material would be assessed prior to it being overlaid, with further tests taken if deemed necessary.

Access Track

2.2 A control grid was set out using road pins as markers at each cell node. They were positioned by the CQA engineer using GPS enabled survey equipment, with the commencing level being recorded at each node. It is intended to re-survey the nodes following the placement of each layer to provide a thickness check at completion.

3 Material Conditioning and Placement

3.1 The spell of dry and warm weather previous to the works period, and the contractor's wish to minimise haulage costs, meant that the clay at the stockpile was in an overly dry state.

3.2 Thorough conditioning was necessary, and initially an excavator was utilised at both the loading area and the tipping face to mix the material with added water. The weather also necessitated the sub-grade be thoroughly wetted immediately prior to placement to prevent moisture being sucked from the clay, and that the laid clay be periodically wetted following placement to maintain its condition. Mixing, pre-wetting and ongoing wetting placed a high demand on the water bowser, creating somewhat of a

Contractor: Jim Davies Civil Engineering Ltd
CQA Engineer: Meirion Humphreys
Week No.: **1**
Date Commencing: **29th June 2015**

bottleneck in supply during the first few days. Given the slow supply and the high water demand, it was decided to blade the clay in three 100mm wetted layers, with compaction being carried out following a total placement of 300mm thickness, in accordance with the CQA plan. Blading in 100mm layers served the purpose of providing extra conditioning for the clay and allowed wetting of the intermediate layers.

3.3 The compactor used was a Bomag BW213 PDH pad-footed vibro-roller.

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**1**
Date Commencing:	**29th June 2015**

Wetting to maintain condition following compaction

Wetting & conditioning at tipping face

Compaction Plant

Compacted Clay

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**1**
Date Commencing:	**29th June 2015**

4 Sampling & Testing

4.1 Cores and bulk samples are to be taken randomly at each cell location and dispatched to the lab (GSTL at Llanelli) using their own courier. The labs have indicated a one month turnaround for the samples, which seems unusually long for relatively simple tests. Concerns have been raised that progress may be affected unless the contractor wishes to lay clay at risk whilst awaiting results.

4.2 Cores and bulk samples are to be named according to their cell reference and layer number. Additional cores taken for permeability tests are to be suffixed with **[P]**.

4.3 MCV tests were undertaken twice per day on clay deposited at the tipping face to indicate material condition. Early indications are that the clay is being placed toward the dry end of the permitable moisture range, and that moisture content will need to be carefully controlled and that the excavators will need to be thorough in their efforts to provide a consistent material.

5 Weekly Observations

5.1 Clay placement began on 29th June 2015 at Cell E5 and progressed steadily throughout the working week to cover cells D5, D6, C5, B6, C6 and B5. It has been decided that no cells will be overlaid until results are received.

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

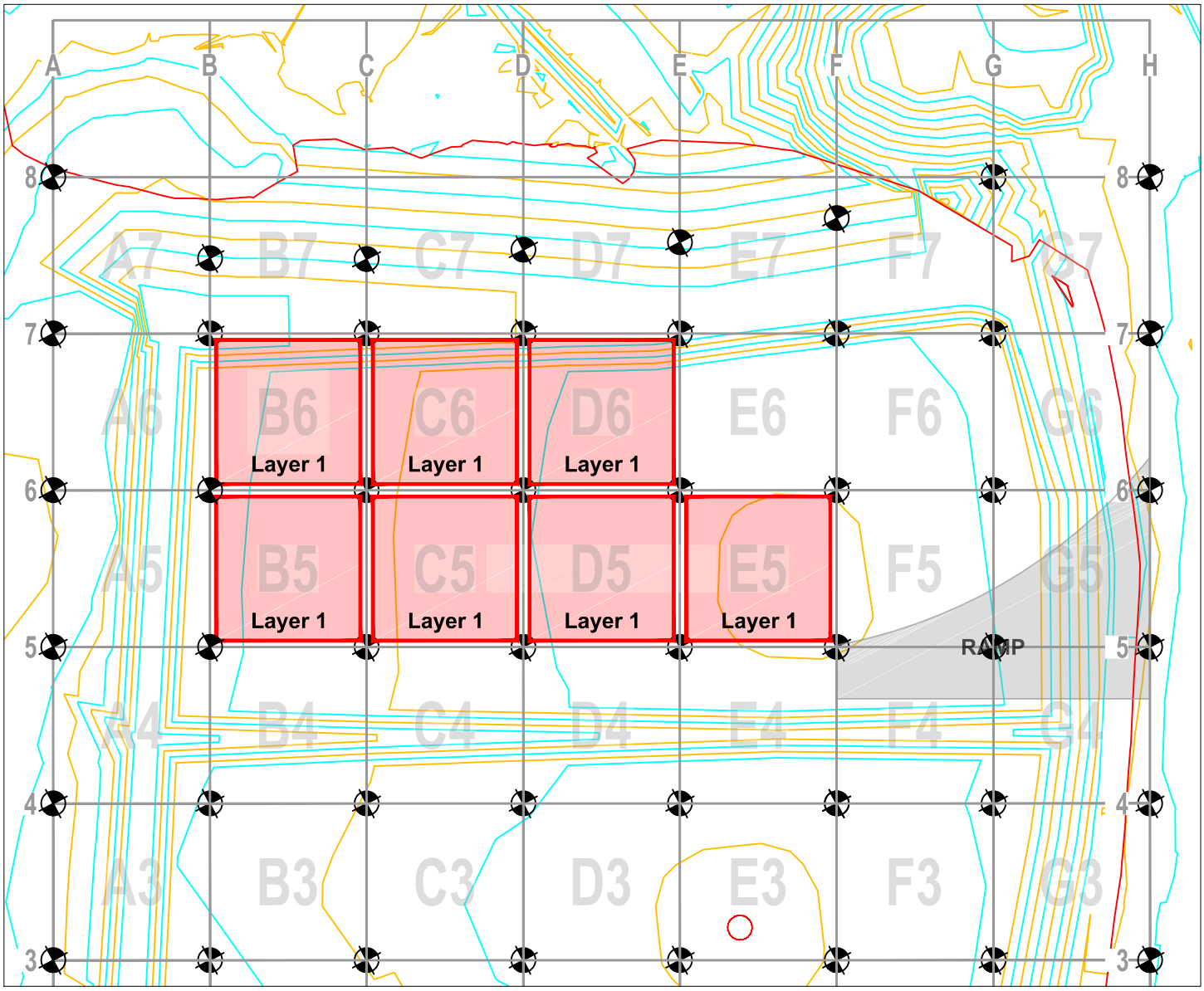
Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**1**
Date Commencing:	**29th June 2015**

5.2 Hot and dry weather conditions prevail. Providing adequate water to the stockpile for conditioning, as well as to the tipping face and the wider site is slowing progress. Contractor has been informed and instructed to offer a solution.

MCV Testing

core samples



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary [	CQA Engineer:	Meirion Humphreys	Comments
	Week : 1	Commencing: 29.06.2015	1. Volumes quoted are nominal based on 25 m x 25m grid sqaure x 300mm uncompacted layer. Approximations are used where partial cells exist.
			2. Dry & warm / hot weather all week.

Cell Ref	Volume Laid (m³)	Sample Taken			
	(BF) 0	Core	Bulk	Core (perm)	Hand Shear Vane
B5 (layer 1)	187	B5_C1	B5-B1		108
C5 (layer 1)	187	C5_C1	C5_B1	C5_C1 [P]	100
D5 (layer 1)	187	D5_C1	D5_B1		119
E5 (layer 1)	187	E5_C1	E5_B1		121
B6 (layer 1)	187	B6_C1	B6_B1		99
C6 (layer 1)	187	C6_B1	C6_B1		108
D6 (layer 1)	187	D6_C1	D6_B1		114
	1309				

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**2**
Date Commencing:	**6th July 2015**

1 Weekly Observations

1.1 The demand on the water bowser was still high during the early stages of the week due a dry stockpile and rapid drying of the as-laid clay. This is resulting in slower than desired progress. To remedy this a sump has been excavated in the stockpile itself to provide the excavators with an arm's reach supply, allowing them to be self sufficient with water. The bowser has now been freed up to service the tipping face, with the added benefit of reduced traffic movements at the stockpile. Clay conditioning at the stockpile was immediately improved, and the second excavator has been positioned there to speed up delivery.

1.2 Clay at layer two has been laid at the contractor's risk (in the absence of lab results). All surfaces were dampened down and scarified with the compactor (non-vibrating) prior to the subsequent layer being laid.

1.3 Visually the clay looks to be very good, however the MCV tests are continuing to show the clay to be at its dry limit, which has been communicated to the contractor.

1.4 Visits from Kate Riley (CQA Consultant), Ian Fisher (client Manager) and Andrew Miles (Contract Manager) during early part of the week.

1.5 All surfaces are being dampened at the beginning and end of each working day and throughout the day as necessary in light of the dry, warm conditions.

1.6 Two core samples from the previous week's work were discovered to have been left in the contractor's cabin and have since been dispatched.

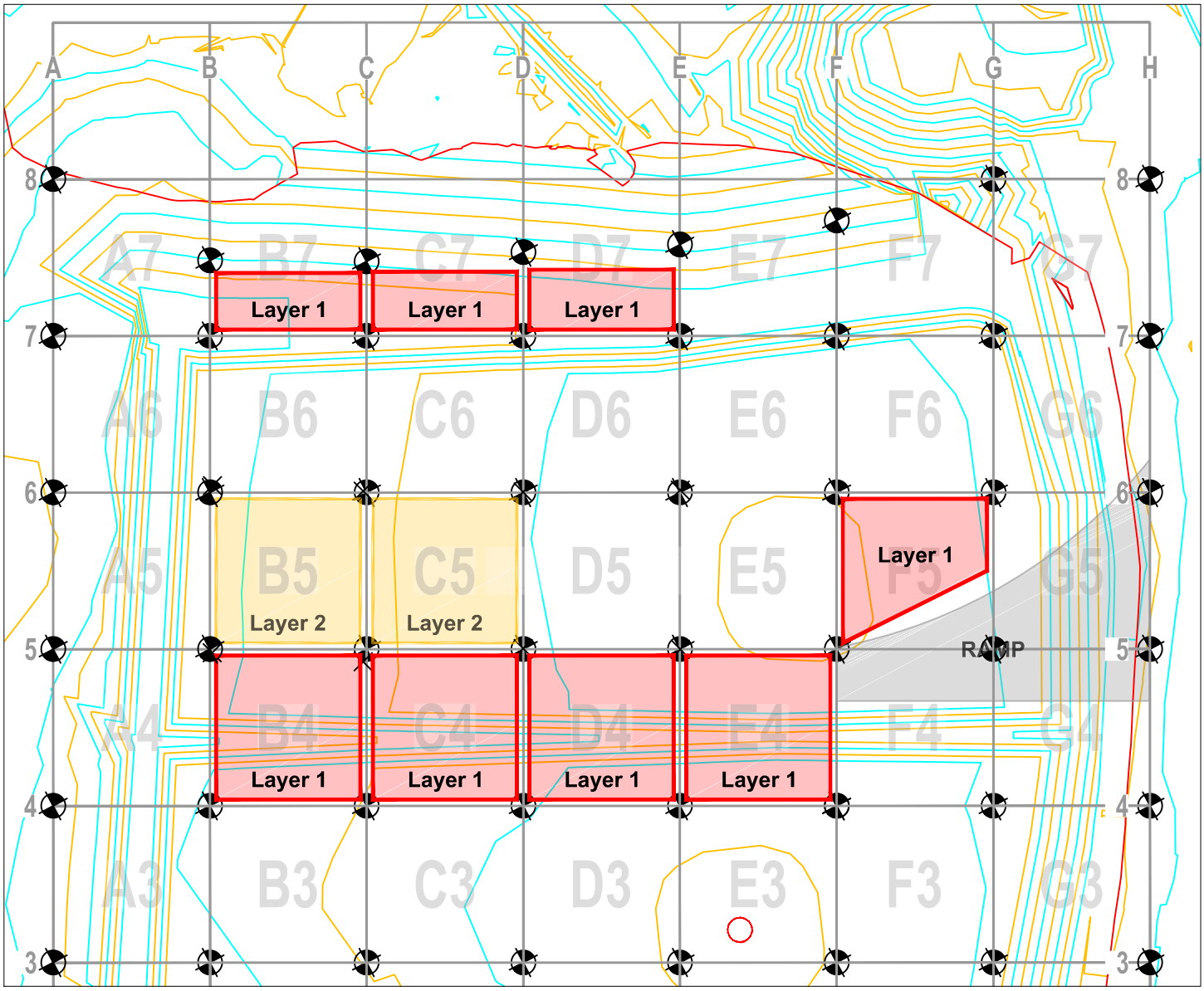
Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**2**
Date Commencing:	**6th July 2015**

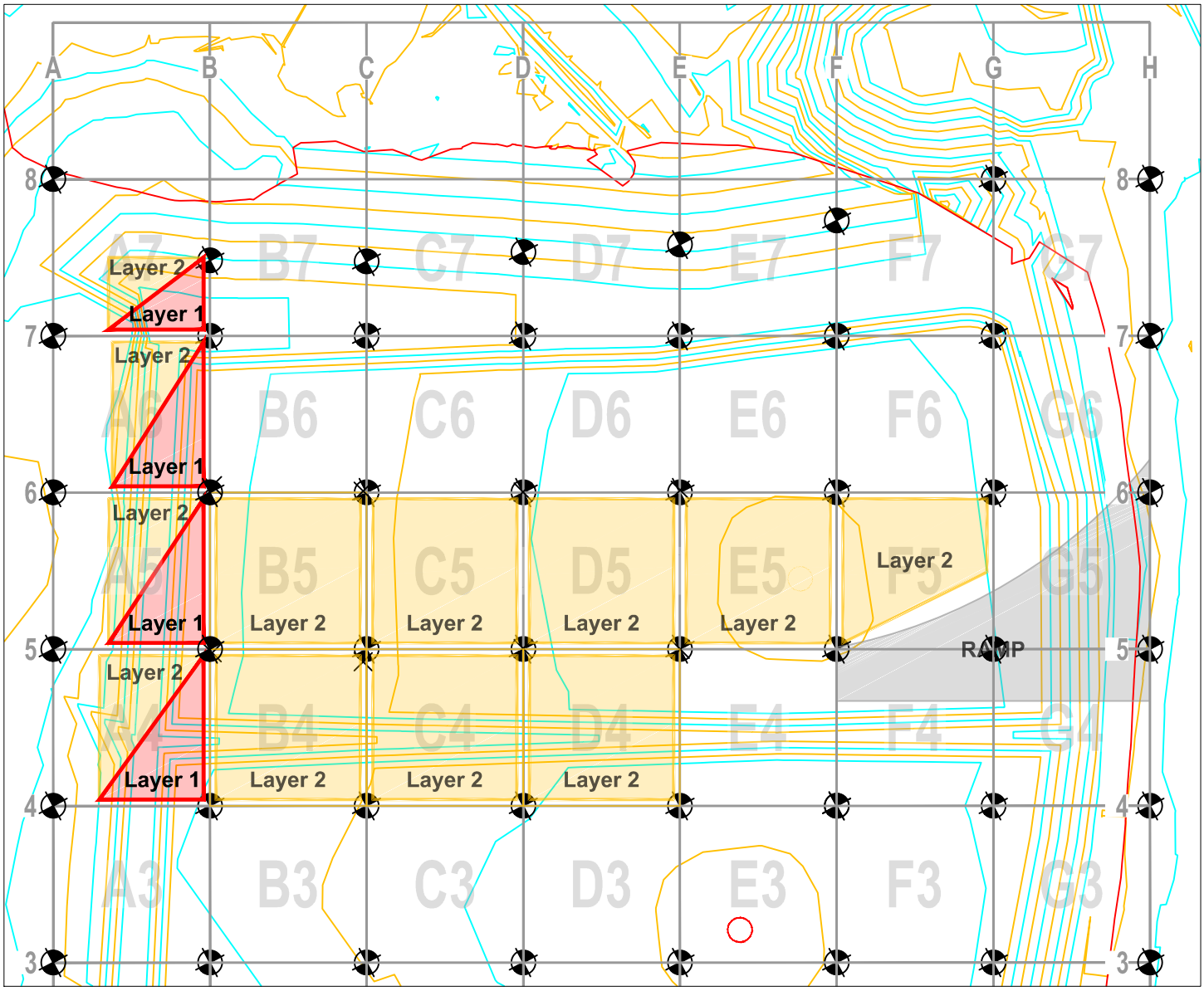
scarifying layer 1



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary	CQA Engineer:	Meirion Humphreys	Comments
	Week : 2	Commencing: 06.07.2015	1. Dry & warm - hot weather all week

Cell Ref	Volume Laid (m³) (BF) 1309	Sample Taken Core	Bulk	Core (perm)	Hand Shear Vane
B4 (layer 1)	187	B4_C1	B4_B1		94
C4 (layer 1)	187	C4_C1	C4_B1		124
D4 (layer 1)	187	D4_C1	D4_B1		89
E4 (layer 1)	187	E4_C1	E4_B1	E4_C1 [P]	118
B5 (layer 2)	187	B5_C2	B5_B2		118
C5 (layer 2)	187	C5_C2	C5_B2		122
B7 (layer 1)	90	B7_C1	B7_B1		116
C7 (L1)	90	C7_C1	C7_B1	C7_C1 [P]	94
D7 (L1)	90	D7_C1	D7_B1		103
	2701				



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary		CQA Engineer:	Meirion Humphreys		Comments
		Week : 3	Commencing: 13.07.2015		1. All layer two clay laid at risk to contractor in absence of lab results. 2. Dry & warm weather all week.
Cell Ref	Volume Laid (m³)	Sample Taken			
	(BF) 2701	Core	Bulk	Core (perm)	Hand Shear Vane
D5 (L2)	187	D5_C2	D5_B2		104
E5 (L2)	187	E5_C2	E5_B2		99
B4 (L2)	187	B4_C2	B4_B2		97
C4 (L2)	187	C4_C2	C4_B2		108
C5 (L2)	187	C5_C2	C5_B2		111
E4 (L2)	187	E4_C2	E4_B2		125
F4 (L2)	187	F4_C2	F4_B2		99
A4 (L1)	90	A4_C1	A4_B1		95
A4 (L2)	90	A4_C2	A4_B2		109
A5 (L1)	90	A5_C1	A5_B1		91
A5 (L2)	90	A5_C2	A5_B2		113
A6 (L1)	90	A6_C1	A6_B1		120
A6 (L2)	90	A6_C2	A6_B2		95
F5 [L2]		F5_C2	F5_B2		102
	4550				

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**3**
Date Commencing:	**13th July 2015**

1 Weekly Observations

1.1 Light rainfall during Monday prevented access to the cell floor by the larger haul vehicles, slowing clay delivery to some degree. This continued through to mid week with additional brief light showers and generally overcast weather.

1.2 Clay conditioning benefited from the damper weather somewhat. Rainfall was not significant to cause excessive water holding; the slightly slaked surface received new clay well.

1.3 Following the onset of drier weather, and with a more efficient conditioning process, the contractor has supplied a 10t haul vehicle to increase clay delivery to the cell floor. Progress was markedly improved, and the clay was, for the first time, bladed out in full 300mm layers.

1.4 Layer two clay was laid once again at the contractor's risk in the absence of lab results. The lab have indicated that results will be provided in the coming week.

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor: Jim Davies Civil Engineering Ltd
CQA Engineer: Meirion Humphreys
Week No.: **4**
Date Commencing: **20th July 2015**

1 Weekly Observations

1.1 The first batch of results were received on Tuesday 24th, with failures in dry density recorded as summarised in table 1.

1.2 The slow provision of data, causing bottlenecks in production, and a lack of site support and customer liaison (which might help better understand the nature of failure or highlight any misgivings in sample preparation) brought about a lack of confidence in GSTL's service provision.

1.3 Apex Testing Solutions conducted a site visit and confirmed that they could assist in core extraction where necessary, and that results could be turned around in 1 to 2 days. It was agreed by all concerned that testing would be carried out by Apex with immediate effect, with the exception of permeability testing. Apex are not accredited for perm testing, therefore GSTL would continue in this capacity.

1.4 In light of the failures it was decided that all cells with outstanding results would not receive any further clay.

1.5 The failed cells were re-tested to provide a clearer indication of the state of the clay. The re-tests were among the first to be dispatched to Apex.

1.6 Excavation into the underlying layers was necessary to enable inspection and potential re-testing (see photo). None of the cells showed signs of overly dry material or significant visible void space, so it was agreed that re-testing was a viable option for all but cell E5 (see para below).

1.7 E5 (layer 1) will be re-laid at a later date due to its higher risk location at the sump of the cell and its reported low moisture content.

1.8 The contractor has began receiving fresh imports of clay in readiness for depletion of the stockpile. The clay is being tipped closer to the cell to reduce traffic movement on site.

1.9 The newer incoming clay has been pre-wetted at source do reduce the need for excessive additions of water, however mixing with the excavators will continue in order to break down any large clods.

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**4**
Date Commencing:	**20th July 2015**

excavating for retests

excavated core

Docksway Waste Disposal Site (Newport City Council)

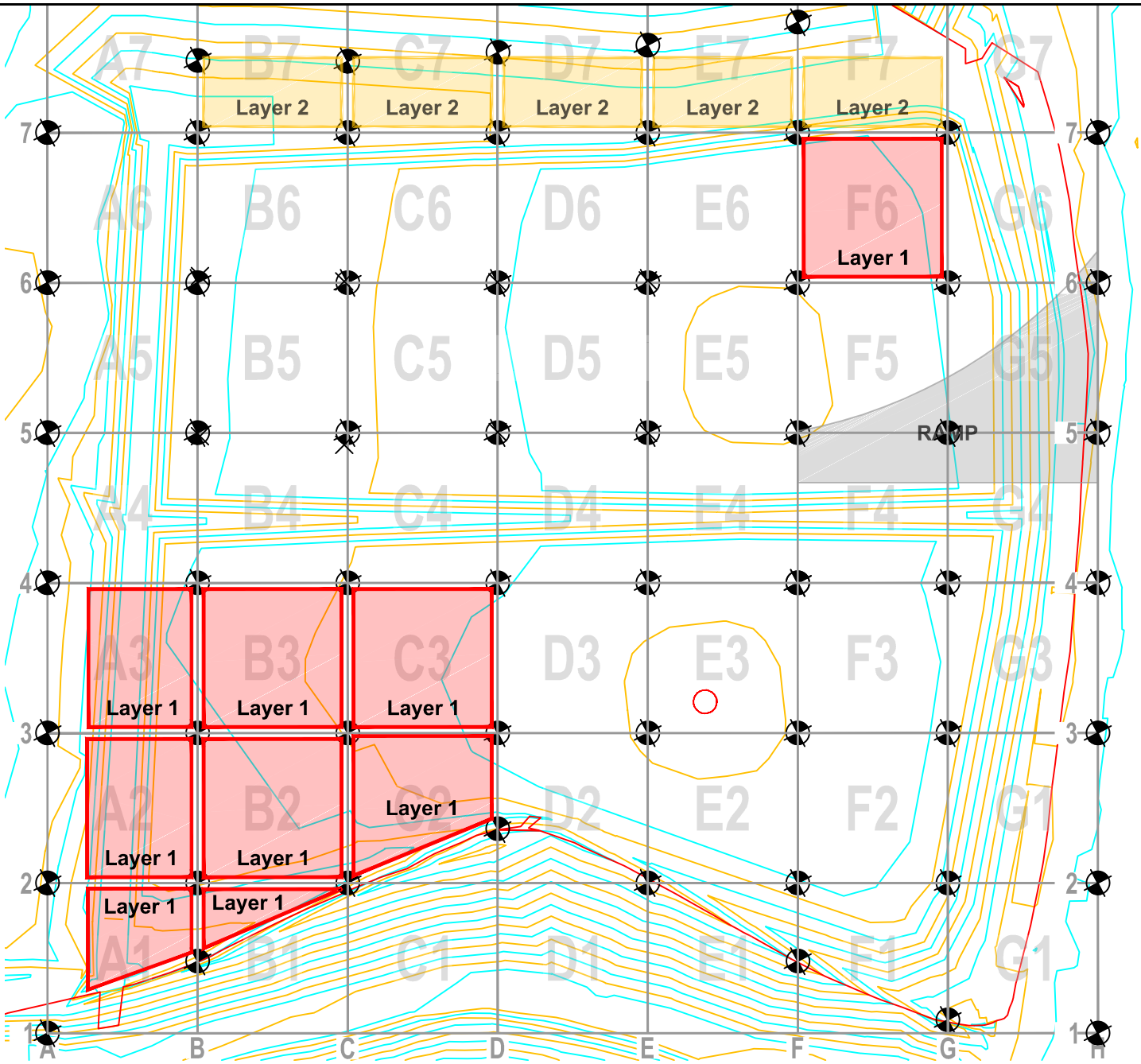
Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**4**
Date Commencing:	**20th July 2015**

overall progress, Week 4

new clay stockpile



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary	CQA Engineer:	Meirion Humphreys	Weather Conditions: Dry all week, notable exception heavy shower Wednesday AM. Caused minor disruption to clay import activities at stockpile
	Week : 4	Commencing: 20.07.2015	

Cell Ref	Volume Laid (m³) (BF) 2701	Sample Taken Core	Bulk	Core (perm)	Hand Shear Vane	Comments
D6 (L2)	187	D6_C2	D6_B2		119	1. First batch of lab results returned this week, indicating failures.
A3 (L1)	90	A3_C1	A3_B1		115	
B7 (L2)	90	B7_C2	B7_B2		117	
C7 (L2)	90	C7_C2	C7_B2		112	
D7 (L2)	90	D7_C2	D7_B2	D7_C2 [P]	112	
E7 (L1)	90	E7_C1	E7_B1		112	
F6 (L1)	187	F6_C1	F6_B1		106	
F7 (L1)	90	F7_C1	F7_B1		99	
B3 (L1)	187	B3_C1	B3_B1		118	
A1 (L1)	50	A1_C1	A1_B1		125	
B1 (L1)	40	B1_C1	B1_B1		128	
B2 (L1)	187	B2_C1	B2_B1		109	
C3 (L1)	187	C3_C1	C3_B1	C3_C1 [P]	111	
	4266					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 1	To be relaid - see E5_C1.1 , 04.09.2015	**E5-C1**	29/06/15				**rejected**	~~15~~	~~1.6~~	27402	
	2 no. re-tests passed	**D5-C1**	30/06/15		**1**			18	1.63	27402	23/07/15
	2 no. re-tests passed	**C5-C1**	01/07/15		**1**			21	1.56	27402	23/07/15
	sampled retrospectively via excavation	**B6-C1**	02/07/15	**1**				18	1.77	6393	
	sampled retrospectively via excavation	**C6-C1**	02/07/15		**1**			18	1.70	27596	
		B5-C1	03/07/15	**1**				17	1.79	27402	
WEEK 2		**B4-C1**	06/07/15	**1**				20	1.68	27495	
		C4-C1	06/07/15	**1**				22	1.69	27495	
	Re-test passed	**D4-C1**	07/07/15			**1**		22	1.75	27495	28/07/15
		E4-C1	07/07/15	**1**				20	1.69	27495	
	2 no. retests passed	**B7-C1**	08/07/15		**1**			22	1.57	27495	28/07/15
		C7-C1	08/07/15	**1**				19	1.75	27495	
		D7-C1	09/07/15	**1**				19	1.73	27495	
	To be relaid	**B5-C2**	10/07/15			**rejected**		~~24~~	~~1.69~~	27596	28/07/15
	Duplicate – Engineer's request	**C5-C1**	10/07/15	**1**				24	1.60	27596	
WEEK 3		**D5-C2**	13/07/15	**1**				23	1.66	27596	
	Excavated to re-work layer 1	**E5-C2**	14/07/15	**Obsolete**				19	1.72	27596	
	1 re-test pass, 1 re-test fail	**B4-C2**	15/07/15		**1**			22	1.50	27668	03/08/15
	2 no. re-tests passed	**C4-C2**	15/07/15			**1**		22	1.75	27668	03/08/15
	Retest Passed - see cert 6645	**F5-C2**	15/07/15		**1**			21	1.61	27668	17/08/15
		C5-C2	16/07/15	**1**				21	1.65	27596	
	2 no. re-tests passed	**D4-C2**	16/07/15		**1**			19	1.66	27668	03/08/15
	2 no. re-tests passed	**E4-C2**	16/07/15			**1**		18	1.89	27668	03/08/15
		A4-C1	17/07/15		**1**			21	1.63	27668	
		A4-C2	17/07/15		**1**			21	1.62	27668	
		A5-C1	17/07/15	**1**				21	1.68	27668	
	No retest ordered	**A5-C2**	17/07/15		**1**			22	1.6	27668	
		A6-C1	17/07/15	**1**				18	1.82	27668	
		A6-C2	17/07/15	**1**				23	1.67	27668	
WEEK 4		**D6-C2**	20/07/15	**1**				21	1.71	27668	
	2 no. retests passed	**B7-C2**	21/07/15		**1**			24	1.5	27668	29/07/15
	Retest passed	**C7-C2**	21/07/15		**1**			22	1.59	27668	29/07/15
	2 no. retests passed	**D7-C2**	21/07/15		**1**			18	1.68	27668	03/08/15
	To be relaid	**E7-C1**	21/07/15		**rejected**			~~20~~	~~1.6~~	27668	03/08/15
		F6-C1	21/07/15	**1**				19	1.73	27668	
	To be reworked – subsequent retest passed	**F7-C1**	21/07/15			**rejected**		~~23~~	~~1.72~~	27668	29/07/15
		C5-C1 R1	23/07/15	**1**				18	1.75	6359	
		C5-C1 R2	23/07/15	**1**				20	1.72	6359	
		D5-C1 R1	23/07/15	**1**				22	1.65	6359	
		D5-C1R2	23/07/15	**1**				21	1.71	6359	

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**5**
Date Commencing:	**27th July 2015**

1 Weekly Observations

1.1 Monday 27th lost to weekend wet weather.

1.2 Occasional wet weather continued to affect progress during the week, with lost production on Tuesday AM following overnight rainfall.

1.3 Plant devoted to maintaining the clay surfaces – excavators deployed to grading the clay surface to remove any slurry that had built up following the wet weather in order to allow drying off and new layers to be laid. All surfaces were re-rolled to provide a key before new clay laid.

1.4 The stockpile is in good overall condition following the rainfall.

1.5 The second and third batch of results from GSTL labs was received on Wed 29th July and Friday 31st July, with further density failures recorded (see summary table 2, attached). A hangover from GSTL's slow turnaround was that and excess of results were received in a single batch, leading to a backlog of resampling required.

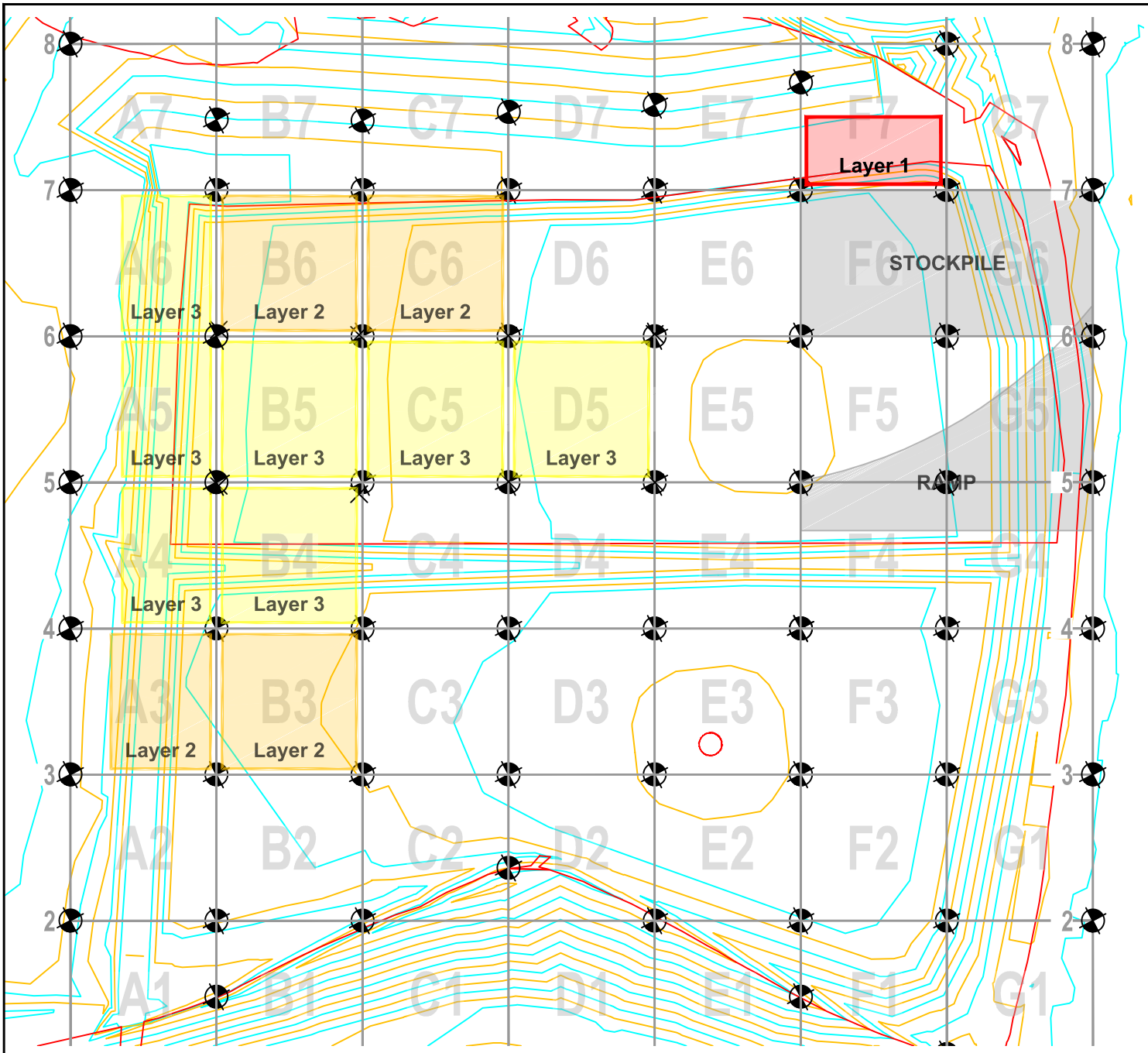
1.6 The reduced production allowed the required retests to be carried out with little impact on progress; all stoppages were the result of bad weather. Richard Anstee of Apex Testing Services assisted on site in the re-test sampling.

1.7 All failed cells were excavated where necessary (see photo's). The excavations offered the opportunity to inspect the clay horizons. Some minor inclusions were observed, but all within specification.

1.8 2 samples (B6[L1], and C6[L1]) were re-sampled to account for previously lost samples.

compacted clay horizon

cell excavated to underlying layer



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary	CQA Engineer:	Meirion Humphreys	Weather Conditions: Damper conditions, sporadic showers throughout week.
	Week : 5	Commencing: 27.07.2015	

Cell Ref	Volume Laid (m³) (BF) 4266	Sample Taken Core	Bulk	Core (perm)	Hand Shear Vane	Comments
B6 (L2)	187	B6_C2	B6_B2		115	1. Monday 27th lost production due to weather.
C6 (L2)	187	C6_C2	C6_B2		112	
E6 (L1)	187	E6_C1	E6_B1		117	
F5 (L1)	187	F5_C1	F5_B1		106	
F7 (L1)	90	F7_C1	F7_B1		121	
A3 (L2)	90	A3_C2	A3_B2		111	
A4 (L3)	90	A4_C3	A4_B3		104	
A5 (L3)	90	A5_C3	A5_B3		109	
A6 (L3)	90	A6_C3	A6_B3		108	
B4 (L3)	187	B4_C3	B4_B3		112	
C4 (L3)	187	C4_C3	C4_B3		108	
C4 (L3)	187	C4_C3	C4_B3		109	
C5 (L3)	187	C5_C3	C5_B3		108	
D5 (L3)	187	D5_C3	D5_B3		116	
	6399					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 5		B5-C2 R1	28/07/15	1				23	1.66	6393	
		B6-C2	28/07/15	1				21	1.68	6393	
		B7-C1 R1	28/07/15	1				21	1.68	6393	
		B7-C1 R2	28/07/15	1				20	1.72	6393	
	Result accepted - marginal failure	C6-C2	28/07/15		1			20	1.65	6394	
	Mis-labelled on certificate as D7-C1	D4-C1 R1	28/07/15	1				18	1.75	6395	
		D4-C1 R1	28/07/15	1				20	1.71	6394	
		B7-C2 R1	29/07/15	1				22	1.64	6432	
		B7-C2 R2	29/07/15	1				23	1.61	6432	
		C5-C2 R2	29/07/15	1				20	1.71	6432	
		C7-C2 R1	29/07/15	1				21	1.64	6432	
	sampled retrospectively via excavation	D6-C1	29/07/15	1				19	1.75	6395	
		E6-C1	29/07/15	1				20	1.7	6395	
		F5-C1	29/07/15	1				21	1.67	6395	
	Mis-labelled on certificate as F7-C2 – reworked and re-sampled	F7-C1	29/07/15	1				22	1.62	6395	
		A4-C3	31/07/15	1				20	1.7	6433	
	Result accepted - very marginal failure	A5-C3	31/07/15		1			19	1.69	6433	
		A6-C3	31/07/15	1				20	1.69	6433	
		B4-C3	31/07/15	1				22	1.64	6434	
		C4-C3	31/07/15	1				21	1.65	6434	
		C5-C3	31/07/15	1				23	1.64	6434	
		D5-C3	31/07/15	1				19	1.69	6433	

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**6**
Date Commencing:	**03rd August 2015**

1 Weekly Observations

1.1 The final retests from the previous week's backlog were taken Monday AM, with the assistance of Apex, to bring sampling up to date.

1.2 The first batch of results from Apex were received during the mid-week, with a significant reduction in pass to fail ratio.

1.3 Recorded failures at cells that were laid during the wetter weather were confined to parts of the site outside of the immediate priority of the client (A1, A2, A3, B1, B2, B3, C2, C3). Work at these cells was desisted as soon as the Asbestos Cell became workable (following the receipt of pass results).

1.4 The compaction plant suffered a breakdown on Monday PM. All non-compacted clay was tracked over to seal before the end of the day.

1.5 A smooth drummed roller was hired in to continue production. Concern was raised as to the suitability of this method, since the compaction methodolgy was based on the method used during the trial. The main cause for concern was the final breking-down of the clay that the pad-footed roller provided. The contractor continued with the smooth roller under the proviso that the clay would be re-rolled when the pad-footed compactor returned to service.

1.6 The results from cells compacted with the smooth roller showed failures in A5 and A6. Instruction was given to excavate and re-lay these cells at the contractor's convenience. All other cells passed.

1.7 Pad-footed compactor returned to service on Wednesday PM. All of Tuesday's work was re-rolled to

smooth drummed roller

smooth clay re-rolled

Docksway Waste Disposal Site (Newport City Council)

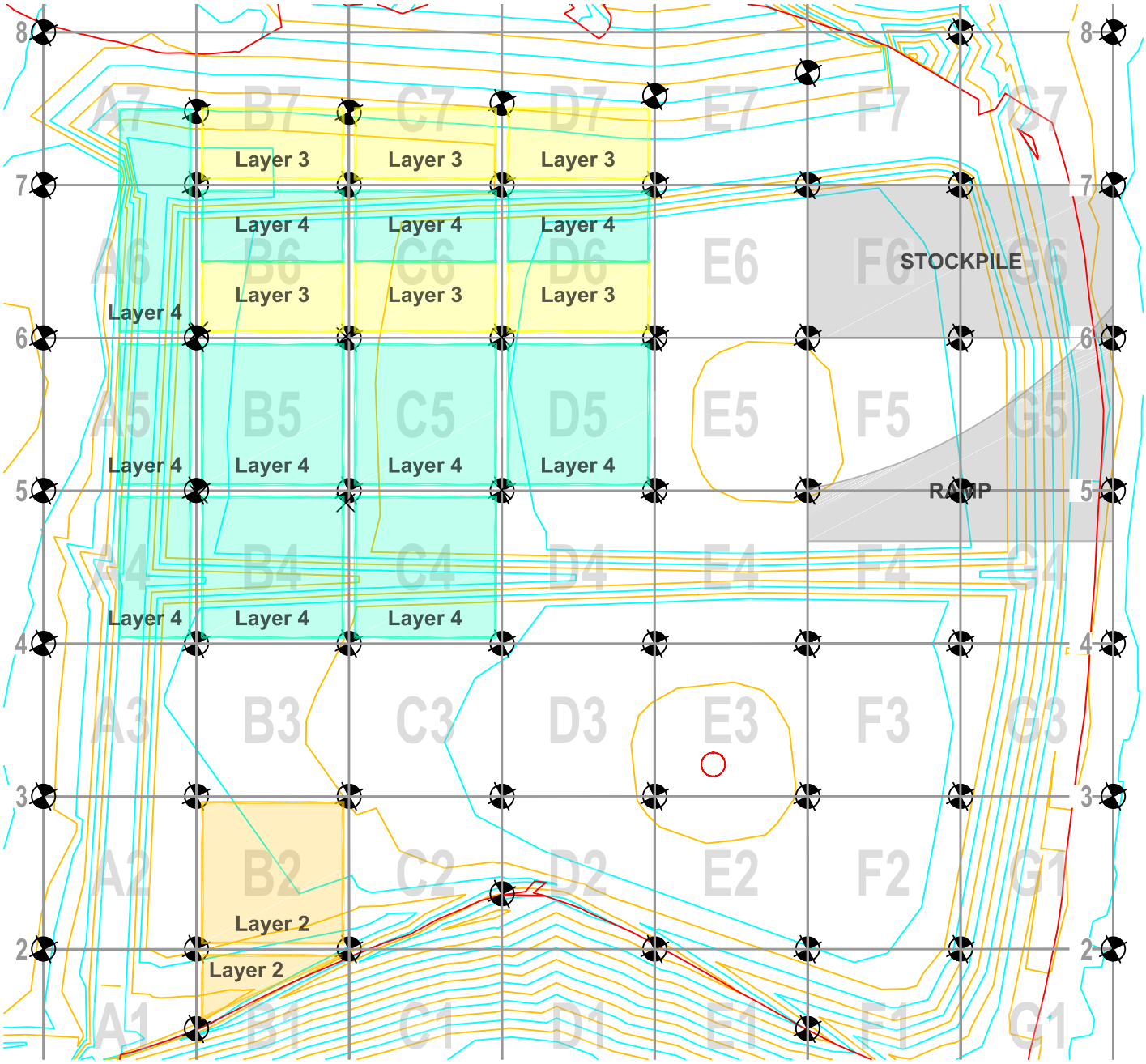
Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**6**
Date Commencing:	**03rd August 2015**

provide a key for the subsequent layer.

1.8 Standing water at the corner of F5, which is the site's low spot, drained down on Wednesday to prevent saturation of the underlying layers. The water situation at this point will be monitored throughout. The presence of the ramp prevents the area from being fully sealed over.



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary		CQA Engineer:	Meirion Humphreys		Weather Conditions:	
		Week : 6	Commencing: 03.08.2015			
Cell Ref	Volume Laid (m³) (BF) 6399	Sample Taken Core	Bulk	Core (perm)	Hand Shear Vane	Comments
B1 [L2]	45	B1_C2	B1_B2		100	
B2 [L2]	45	B2_C2	B2_B2		109	
B6 [L3]	187	B6_C3	B6_B3		105	
A5 [L4]	90	A5_C4	A5_B4		97	
A6 [L4]	90	A6_C4	A6_B4		125	
A7 [L4]	90	A7_C4	A7_B4		108	
B5 [L4]	187	B5_C4	B5_B4		120	
B7 [L3]	90	B7_C3	B7_B3		101	
C6 [L3]	187	C6_C3	C6_B3		98	
C7 [L3]	90	C7_C3	C7_B3		114	
D6 [L3]	187	D6_C3	B6_B3	D6_C3[P]	103	
D7 [L3]	90	D7_C3	D7_B3		99	
A4 [L4]	90	A4_C4	A4_B4		112	
B4 [L4]	187	B4_C4	B4_B4		117	
B6 [L4]	187	B6_C4	B6_B4		104	
C4 [L4]	187	C4_C4	C4_B4		109	
C5 [L4]	187	C5_C4	C5_B4		109	
C6 [L4]	187	C6_C4	C6_B4		117	
D5 [L4]	187	D5_C4	D5_B4		112	
D6 [L4]	187	D6_C4	D6_B4		115	
	9176					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 6	Result accepted as anomaly on strength of second retest pass	**B4-C2 R1**	03/08/15			**1**		21	1.75	6448	
		B4-C2 R2	03/08/15	**1**				21	1.69	6448	
		B6-C3	03/08/15	**1**				20	1.72	6449	
		C4-C2 R1	03/08/15	**1**				20	1.71	6448	
		C4-C2 R2	03/08/15	**1**				21	1.71	6448	
		D4-C2 R1	03/08/15	**1**				19	1.78	6449	
		D4-C2 R2	03/08/15	**1**				21	1.7	6449	
		D7-C2 R1	03/08/15	**1**				18	1.75	6450	
		D7-C2 R2	03/08/15	**1**				20	1.69	6450	
		E4-C2 R1	03/08/15	**1**				18	1.78	6449	
		E4-C2 R2	03/08/15	**1**				18	1.8	6449	
	To be relaid / reworked - see 12.08.2015	**E7-C1 R1**	03/08/15			**rejected**		~~24~~	~~1.66~~	6450	
	To be relaid / reworked - see 12.08.2015	**E7-C1 R2**	03/08/15			**rejected**		~~23~~	~~1.7~~	6450	
	To be relaid / reworked - see 10.08.2015	**A5-C4**	05/08/15		**rejected**			~~20~~	~~1.65~~	6468	
	To be relaid / reworked - see 10.08.2015	**A6-C4**	05/08/15		**rejected**			~~19~~	~~1.68~~	6468	
		A7-C4	05/08/15	**1**				19	1.7	6468	
		B5-C4	05/08/15	**1**				21	1.66	6468	
		B7-C3	05/08/15	**1**				20	1.7	6468	
		C6-C3	05/08/15	**1**				20	1.71	6469	
		C7-C3	05/08/15	**1**				21	1.68	6469	
		D6-C3	05/08/15	**1**				20	1.7	6469	
	2 no. retests passed	**D7-C3**	05/08/15		**1**			19	1.68	6469	05/08/15
		A4-C4	07/08/15	**1**				21	1.68	6507	
		B4-C4	07/08/15	**1**				21	1.67	6507	
		B6-C4	07/08/15	**1**				22	1.65	6507	
		C4-C4	07/08/15	**1**				22	1.64	6508	
		C5-C4	07/08/15	**1**				20	1.69	6507	
		C6-C4	07/08/15	**1**				20	1.71	6507	
	2 no. retests passed	**D5-C4**	07/08/15		**1**			19	1.69	6508	10/08/15
		D6-C4	07/08/15	**1**				21	1.68	6508	

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**7**
Date Commencing:	**10th August 2015**

1 Weekly Observations

1.1 Clay at layers 4 of A5 and A6 excavated as agreed, clay reconditioned and re-compacted on Monday AM.

1.2 Apex personnel on site to assist with sampling, including all retests from previous failures.

1.3 E7 layer 1 excavated and relaid following failure of both re-tests during previous week. New layer to be labelled E7_C1.1

1.4 B7 layer 4 excavated and relaid due to excessively low moisture content. No retests were attempted. New layer sample labelled B7_C4.1.

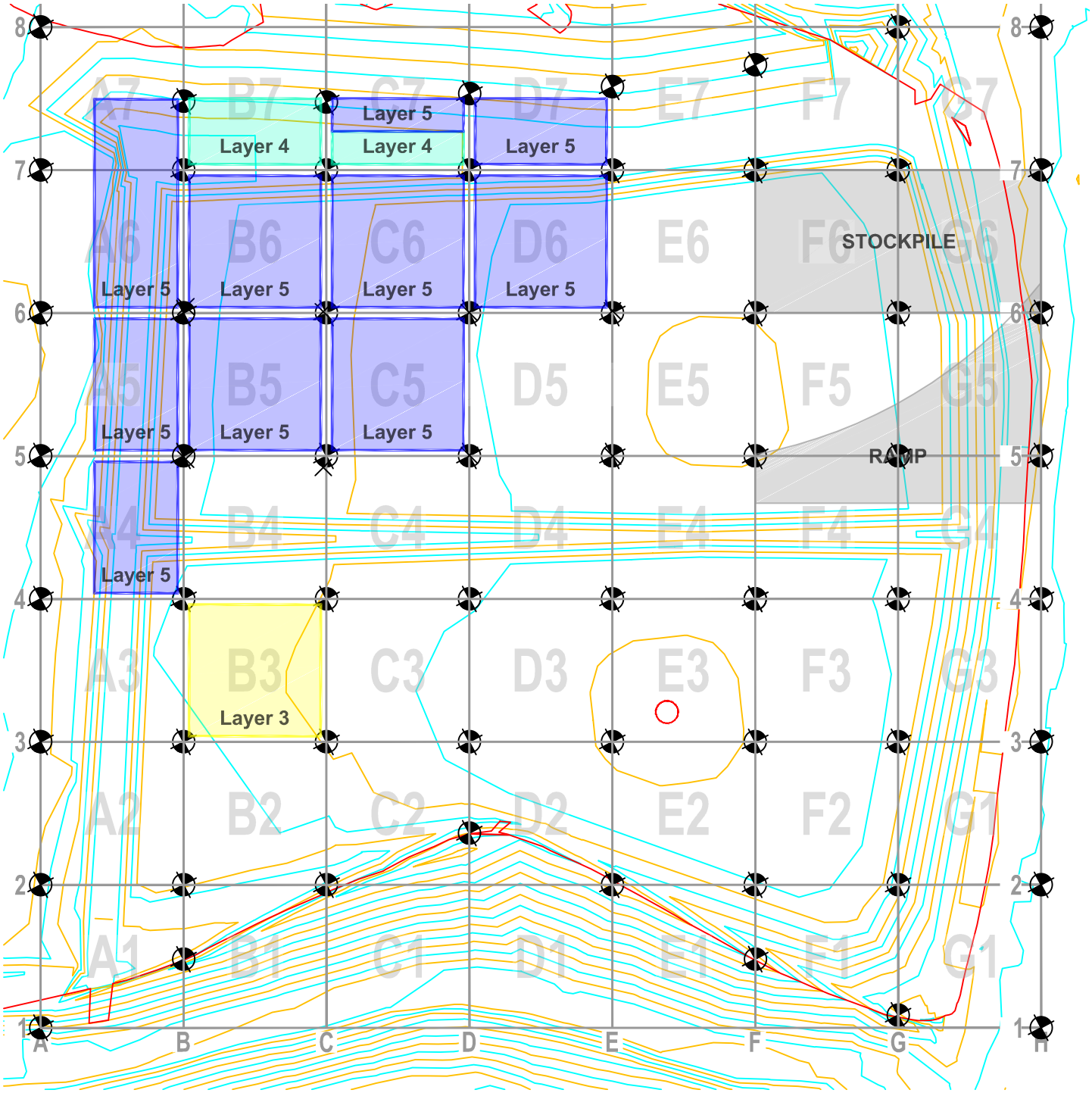
1.5 New stockpile created on cell floor, as clay becomes suitable for heavy traffic. Traffic is confined to a central run-way which will be assessed and repaired upon completion should the need arise.

1.6 Kate Riley and Oliver Estler on site to prepare for handover of CQA Engineer duties for a planned period of absence by the resident CQA engineer.

1.7 Light showers during later part of week turning heavy on Thursday night. No production Friday 14th.

D7 layer 1 excavated

B7 layer 4 excavated



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary		CQA Engineer:	Meirion Humphreys		Weather Conditions:	
		Week : 7	Commencing: 10.08.2015			
Cell Ref	Volume Laid (m³) (BF) 9176	Sample Taken Core	Bulk	Core (perm)	Hand Shear Vane	Comments
B5 [L5]	187	B5_C5	B5_B5		89	
B7 [L4]	90	B7_C4	B7_B4		107	
C5 [L5]	187	C5_C5	C5_B5		103	
C7 [L4]	90	C7_C4	C7_B4		108	
B3 [L3]	187	B3_C3	B3_B3		118	
B6 [L5]	187	B6_C5	B6_B5	B6 _C5 [P]	109	
C6 [L5]	187	C6_C5	C6_B5		120	
A5 [L5]	90	A5_C5	A5_B5		121	
A6 [L5]	90	A6_C5	A6_B5		117	
A4 [L5]	90	A4_C5	A4_B5	A4_C5 [P]	101	
C7 [L5]	90	C7_C5	C7_B5		115	
D6 [L5]	187	D6_C5	D6_B5		117	
D7 [L5]	90	D7_C5	D7_B5		117	
	10928					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities				MC	Density	Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC				
				◆	✧	◆					
WEEK 7	Reworked / relaid	**A5-C4 relaid**	10/08/15	**1**				22	1.64	6510	
	Reworked / relaid	**A6-C4 relaid**	10/08/15	**1**				21	1.66	6510	
		B5-C5	10/08/15	**1**				21	1.69	6510	
	To be relaid / reworked - subsequent retest(s) passed	**B7-C4**	10/08/15		**rejected**			~~16~~	~~1.75~~	6510	12/08/15
		C5-C5	10/08/15	**1**				22	1.64	6586	
		C7-C4	10/08/15	**1**				22	1.65	6510	
		D5-C4 R1	10/08/15	**1**				19	1.7	6511	
		D5-C4 R2	10/08/15	**1**				20	1.71	6511	
		D7-C3 R1	10/08/15	**1**				23	1.66	6511	
		D7-C3 R2	10/08/15	**1**				21	1.69	6511	
	To be relaid /reworked - subsequent retest(s) passed	**B6-C5**	11/08/15		**rejected**			~~20~~	~~1.64~~	6586	12/08/15
		C6-C5	11/08/15	**1**				20	1.67	6586	
		A5-C5	12/08/15	**1**				23	1.64	6608	
		A6-C5	12/08/15	**1**				23	1.64	6608	
		B6-C5 R1	12/08/15	**1**				21	1.68	6608	
	Labelled incorrectly on certificate	**B6-C5 R2**	12/08/15	**1**				21	1.69	6608	
		B7-C4.1	12/08/15	**1**				22	1.66	6608	
		E7-C1.1	12/08/15	**1**				23	1.63	6609	
		A4-C5	13/08/15	**1**				21	1.66	6625	
		C7-C5	13/08/15	**1**				24	1.58	6625	
		D6-C5	13/08/15	**1**				23	1.61	6625	
		D7-C5	13/08/15	**1**				21	1.67	6625	

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**8**
Date Commencing:	**17th August 2015**

1 Weekly Observations

1.1 All observations for this week have been provided by Ian Fisher on behalf of Newport City council.

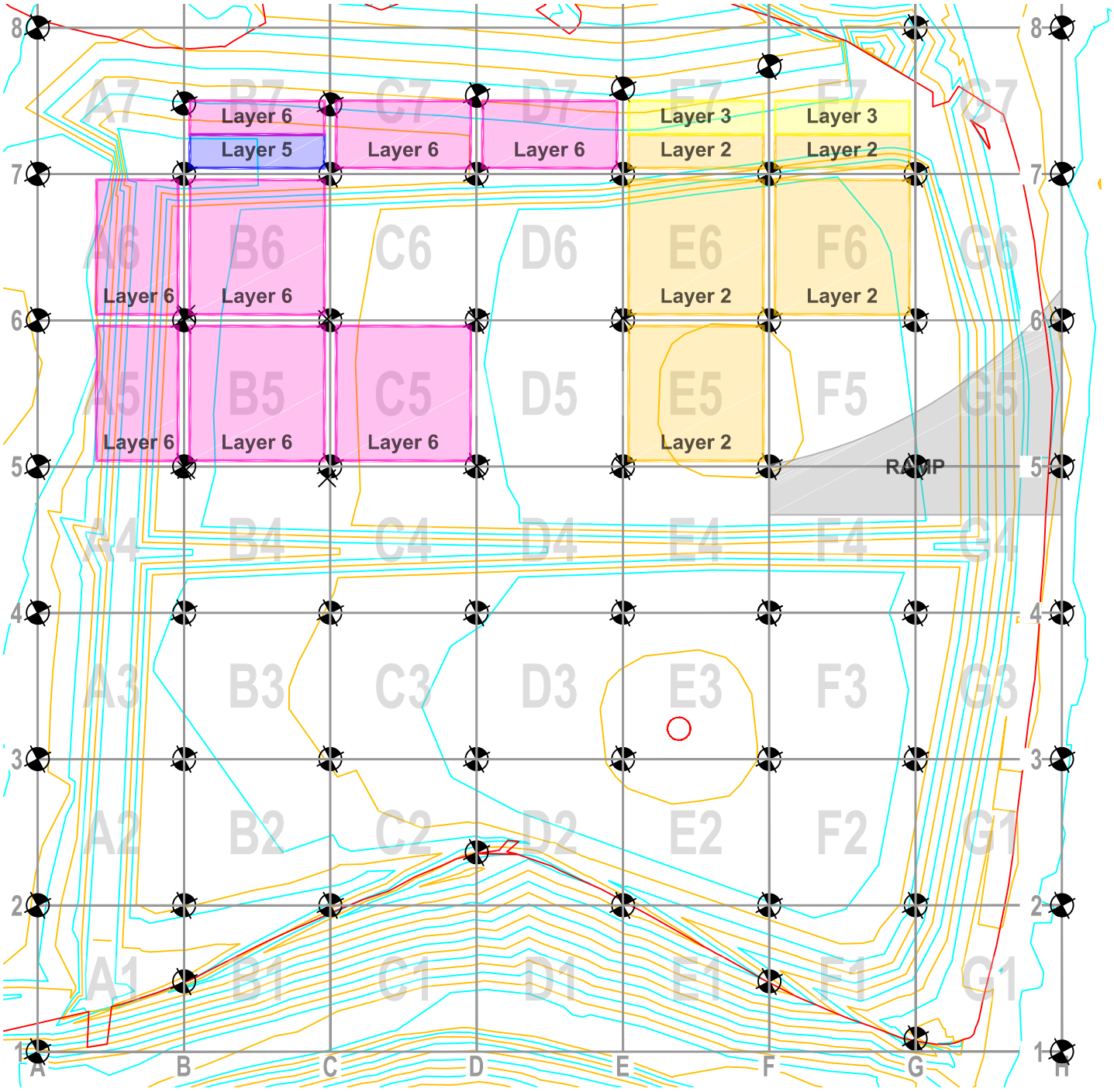
1.2 Following rainfall on Friday 14th some parts of the site remain too damp to work.

1.3 E6 layer 2 – additional tests taken to cover potential gap in data.

1.4 Rain showers on Thursday hindered production on Friday 21st. Clay was graded to remove surface slurry before compaction could take place.

1.5 B5, C5 and D5 have now been completed to a thickness of 1.2m, therefore testing will cease at these cells. Clay laid at these cells from here on will be laid only to achieve the required raise in level, but will continue to be compacted.

1.6 Contractor began stockpiling clay on the cell floor at C3 in readiness for the closure of the ramp at a later date.



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary		CQA Engineer:	Meirion Humphreys		Weather Conditions:	
		Week : 8	Commencing: 17.08.2015			
Cell Ref	Volume Laid (m³)	Sample Taken				
	(BF) 10928	Core	Bulk	Core (perm)	Hand Shear Vane	Comments
A5 [L6]	90	A5_C6	A5_B6			
A6 [L6]	90	A6_C6	A6_B6			
B5 [L6]	187	B5_C6	B5_B6		98	
B6 [L6]	90	B6_C6	B6_B6			
B7 [L5]	90	B7_C5	B7_B5			
C7 [L6]	90	C7_C6	C7_B6		118	
D7 [L6]	90	D7_C6	D7_B6		99	
F5 [L2]	187	F5_C2	F5_B2			
E6 [L2]	187	E6_C2	E6_B2			
E7 [L2]	90	E7_B2	E7_B2	E7_P3	114	
F7 [L2]	90	F7_C2	F7_B2			
E7 [L3]	90	E7_C3	E7_B3			
F6 [C2]	187	F6_C2	F6_B2			
F7 [L3]	90	F7_C3	F7_B3			
C5 [L6]	187			C5_P6	120	
B7 [L6]	90	B7_C6	B7_B6			
	12853					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities				MC	Density	Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC				
				◆	✧	◆					
WEEK 8	IN ABSENTIA – Relief CQA Engineer attending	**A5-C6**	17/08/15	**1**				20	1.74	6645	
	IN ABSENTIA – Result accepted by relief CQA Engineer	**A6-C6**	17/08/15			**1**		22	1.7	6645	
	IN ABSENTIA – Relief CQA Engineer attending - outside CQA remit	**B5-C6**	17/08/15	**N/A**				21	1.68	6645	
	IN ABSENTIA – Relief CQA Engineer attending - outside CQA remit	**B6-C6**	17/08/15	**N/A**				21	1.64	6645	
	IN ABSENTIA – Relief CQA Engineer attending	**B7-C5**	17/08/15	**1**				21	1.64	6646	
	IN ABSENTIA – Relief CQA Engineer attending	**C7-C6**	17/08/15	**1**				22	1.65	6660	
	IN ABSENTIA – Relief CQA Engineer attending	**D7-C6**	17/08/15	**1**				20	1.68	6660	
	IN ABSENTIA – Relief CQA Engineer attending	**F5-C2**	17/08/15	**1**				21	1.69	6645	
	IN ABSENTIA – Relief CQA Engineer attending	**E6-C2**	18/08/15	**1**				21	1.7	6689	
	IN ABSENTIA – Relief CQA Engineer attending	**E7-C2**	18/08/15	**1**				21	1.67	6689	
	IN ABSENTIA – Relief CQA Engineer attending	**F7-C2**	18/08/15	**1**				23	1.66	6689	
	IN ABSENTIA – Relief CQA Engineer attending	**E7-C3**	19/08/15	**1**				20	1.7	6690	
	IN ABSENTIA – Relief CQA Engineer attending	**F6-C2**	19/08/15	**1**				23	1.66	6690	
	IN ABSENTIA – Relief CQA Engineer attending - 2 no. retests passed	**F7-C3**	19/08/15		**1**			18	1.72	6690	
	IN ABSENTIA – Relief CQA Engineer attending	**B7-C6**	20/08/15	**1**				20	1.74	6740	
	IN ABSENTIA – Relief CQA Engineer attending - outside CQA remit	**C5-C6**	20/08/15	**N/A**				18	1.74	6693	
	IN ABSENTIA – Relief CQA Engineer attending	**F7-C3 R1**	20/08/15	**1**				21	1.7	6740	
	IN ABSENTIA – Relief CQA Engineer attending	**F7-C3 R2**	20/08/15	**1**				20	1.74	6740	

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**9**
Date Commencing:	**24th August 2015**

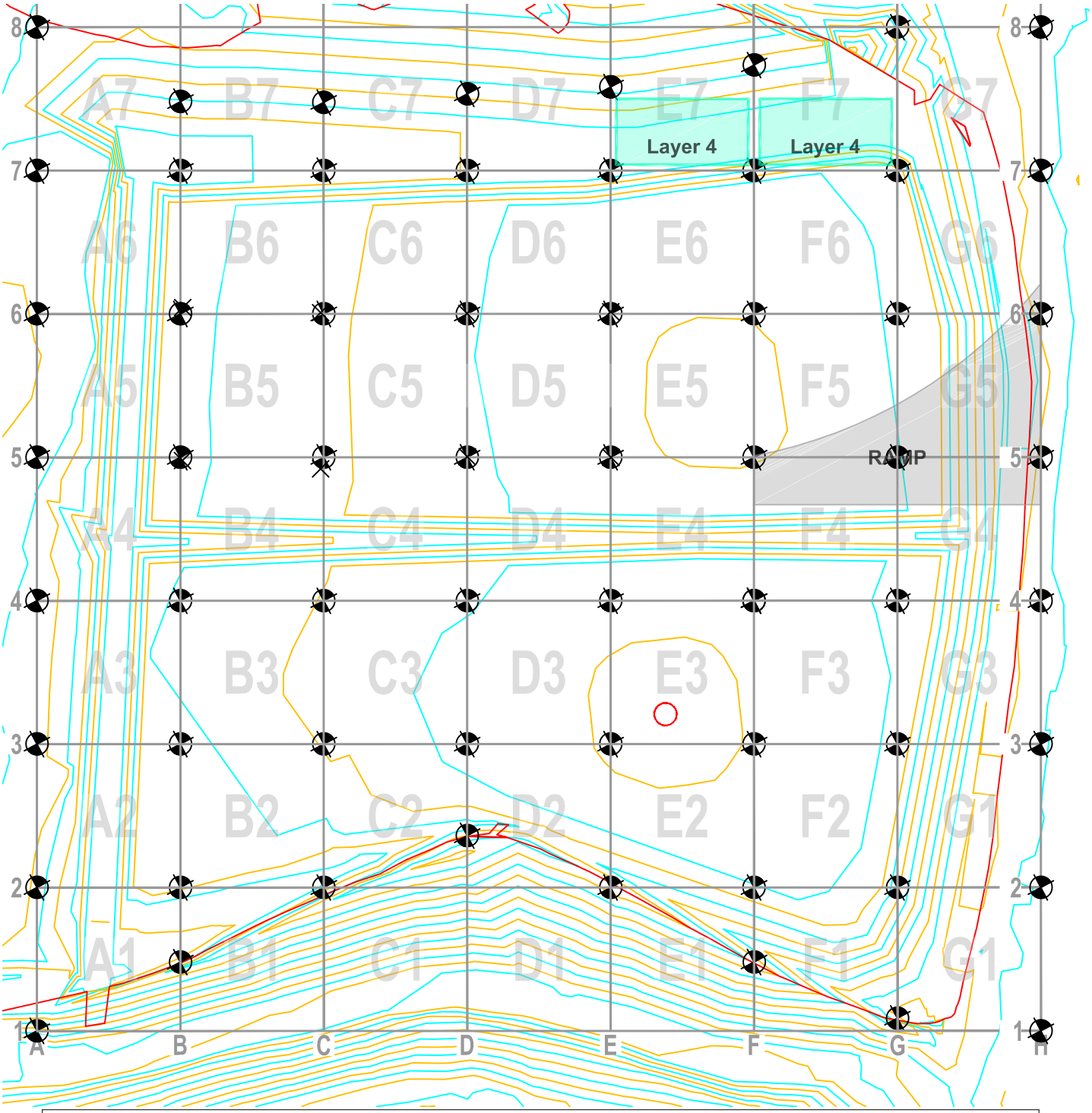
1 Weekly Observations

1.1 All observations for this week have been provided by Olivier Estler on behalf of Peter Brett Associates.

1.2 Significant rainfall prevented production Monday 24th, Tuesday 25th, Wednesday 26th and Thursday 27th. All efforts were devoted to maintaining the stockpile from excessive water absorption, and ensuring that any loose clay was sealed.

1.3 Onset of drier weather from Thursday PM enabled removal of surface slurry in readiness for fresh clay layers on Friday.

1.4 Friday's clay placement concentrated in near-reaching areas to avoid travelling over fragile compacted surface.



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary		CQA Engineer:	Meirion Humphreys		Weather Conditions:	
		Week : 9	Commencing: 24.08.2015			
Cell Ref	Volume Laid (m³)	Sample Taken				
	(BF) 12853	Core	Bulk	Core (perm)	Hand Shear Vane	Comments
E7 [L4]	90	E7_C4	E7_B4		99	
F7 [L4]	90	F7_C4	F7_B4		105	
	13033					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 9	IN ABSENTIA – Relief CQA Engineer attending	**E7-C4**	28/08/15	**1**				25	1.55	6865	
	IN ABSENTIA – Relief CQA Engineer attending	**F7-C4**	28/08/15	**1**				22	1.64	6865	

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**10**
Date Commencing:	**31ST August 2015**

1 Weekly Observations

1.1 No production Monday 31st due to wet weather. Conditions continued to cause difficulties throughout the week, with surfaces becoming rutted with traffic movements.

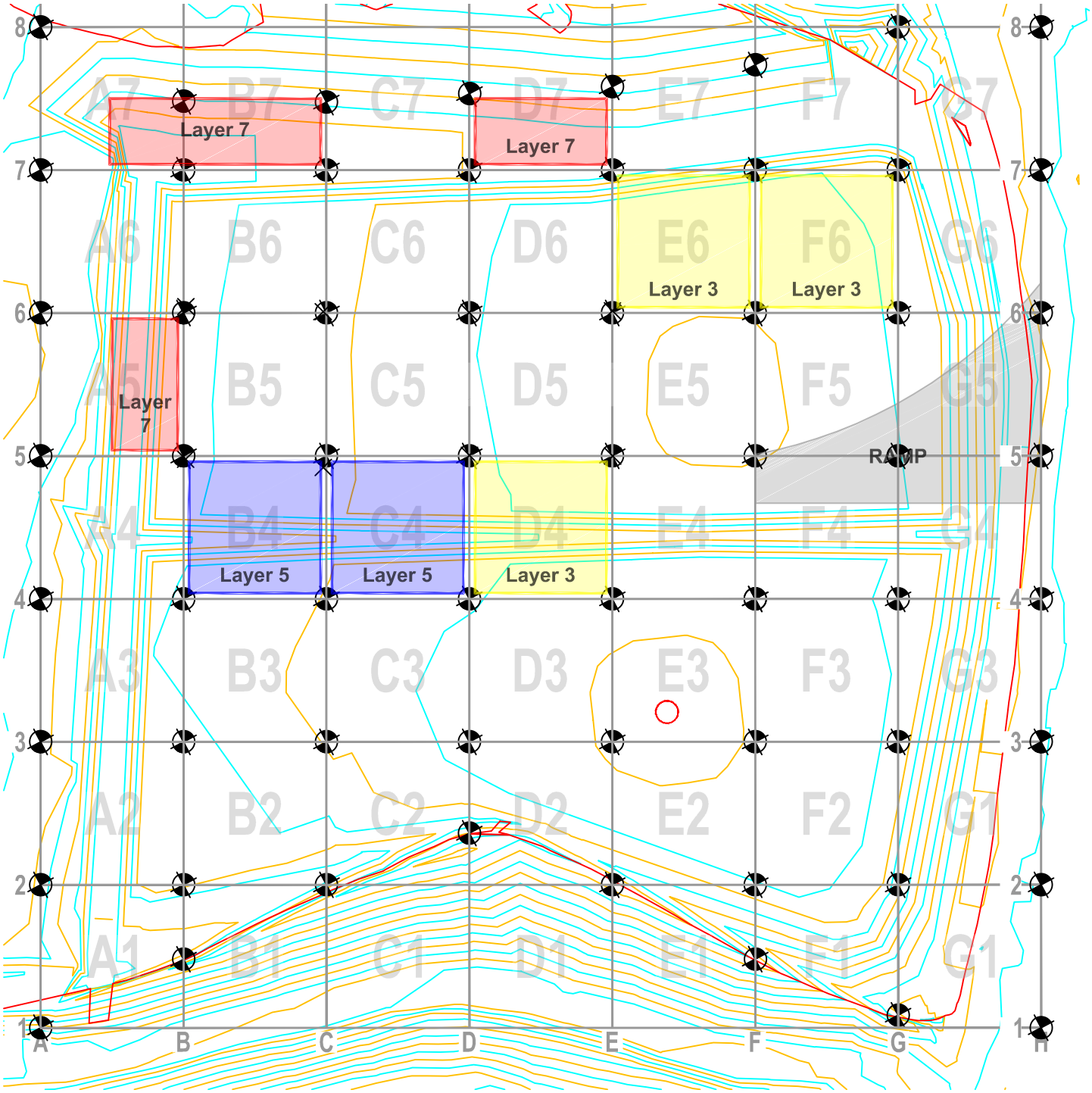
1.2 B7, C7, & D7 laid over-thick – contractor instructed to reduce thickness and re-compact.

1.3 E5 excavated back to sub-grade. Clay re-worked at point of excavation and compacted as per the specification.

1.4 Partial cells are to be combined from here-on to reduce the amount of testing incurred. Bund footprints occupy less than half of a grid width, therefore two cells can be legitimately combined to create an equivalent area of one grid.

1.5 Temporary bowser breakdown mid-week. No impact on quality from a visual perspective.

clay at cell E5 showing dry



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary		CQA Engineer:	Meirion Humphreys		Weather Conditions:	
		Week : 10	Commencing: 31.08.2015			
Cell Ref	Volume Laid (m³) (BF) 13033	Sample Taken				
		Core	Bulk	Core (perm)	Hand Shear Vane	Comments
A5 [L7]	80	A5_C7	A5_B7		120	
B7 [L7]	80	B7_C7	B7_B7		112	
D6 [L6]	187	D6_C6	D6_B6		115	
D7 [L7]	80	D7_C7	D7_B7		113	
F6 [L3]	187	F6_C3	F6_B3		108	
E6 [L3]	187	E6_C3	E6_B3		114	
D4 [L3]	187	D4_C3	D4_B3			
B4 [L5]	187	B4_C5	B4_B5			
C4 [L5]	187	C4_C5	C4_B5			
E5 [L1.1]	187	E5_C1.1	E5_B1.1			
	14582					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 10	Includes A6_C7	**A5-C7**	02/09/15	1				23	1.62	6898	
		B7-C7	02/09/15	1				25	1.58	6898	
	Outside CQA remit – 1.2m achieved at layer 5	**D6-C6**	02/09/15	N/A				25	1.58	6898	07/09/15
	Retested and passed as CD7_C7	**D7-C7**	02/09/15				1	26	1.57	6898	09/09/15
		E6-C3	02/09/15	1				23	1.64	6899	
		F6-C3	02/09/15	1				23	1.64	6898	
		D4-C3	03/09/15	1				20	1.71	7000	
		B4-C5	04/09/15	1				22	1.64	7001	
		C4-C5	04/09/15	1				21	1.64	7001	
	2 no. retests Passed	**E5-C1.1**	04/09/15		1			20	1.64	7001	07/09/15

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**11**
Date Commencing:	**7th September 2015**

1 Weekly Observations

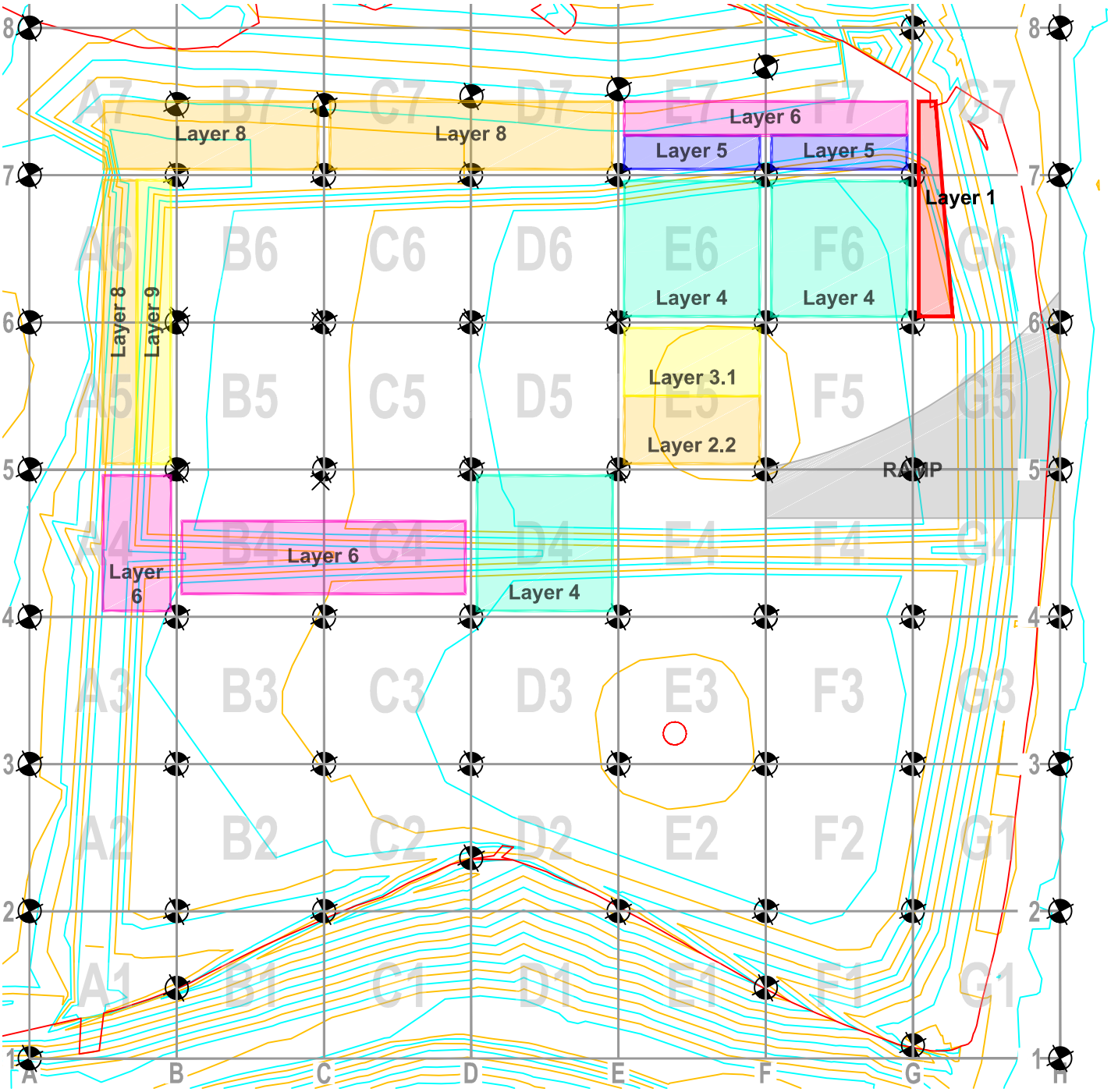
1.1 Cells B, C and D7 re-rolled to gain density following failed cores.

1.2 Bottom of batter at G6 cleaned and benched to allow tie-in of bund at foot of slope.

1.3 Clay seems to be applied at the wet end of the scale. Contractor informed and advised to reduce water application.

1.4 Failed cells at D6, D7 and B7 were deeply scarified and allowed to dry before re-compacting. Retests were taken on a pro rata basis, as unanimously agreed.

cells D7, B7 and D6 scraped and dried before re-compaction



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary		CQA Engineer:	Meirion Humphreys		Weather Conditions:	
		Week : 11	Commencing: 07.09.2015			
Cell Ref	Volume Laid (m³)	Sample Taken				
	(BF) 14582	Core	Bulk	Core (perm)	Hand Shear Vane	Comments
E6 [L4]	187	E6_C4	E6_B4		109	
F6 [L4]	187	F6_C4	F6_B4			
CD7 [L7]	150	CD7_C7	CD7_B7		113	
A4 [L6]	90	A4_C6	A4_B6			
A56 [L8]	187	A56_C8	A56_B8		115	
D4 [L4]	187	D4_C4	D4_B4			
E7 [L5]	90	E7_C5	E7_B5			
F7 [L5]	90	F7_C5	F7_B5		108	
BC4 [L6]		BC4_C6	BC4_B6			
E5 [L2.2]	90	E5_C2.2	E5_B2.2			
AB7 [L8]	90	AB7_C8	AB7_B8	E5_2.2[P]		
G67 [L1]	25	G67_C1	G67_B1			
A56 [L9]	187	A56_C9	A56_B9			
CD7 [L8]	187	CD7_C8	CD7_B8		116	
E5 [L3.1]	187	E5_C3.1	E5_B3.1			
EF7 [L6]	187	EF7_C6	EF7_C6			
	16703					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 11		AB7-C7 R	07/09/15	1				20	1.72	7008	
		AB7-C7 R	07/09/15	1				23	1.64	7008	
		CD7-C7	07/09/15	1				23	1.62	7009	
	duplicate - engineer's request	CD7-C7	07/09/15	1				25	1.58	7009	
	Outside CQA remit – 1.2m achieved at layer 5	D6-C6 R	07/09/15	N/A				20	1.7	7009	
	Outside CQA remit – 1.2m achieved at layer 5	D6-C6 R	07/09/15	N/A				22	1.67	7009	
		E5-C1.1 R	07/09/15	1				23	1.62	7008	
		E5-C1.1 R2	07/09/15	1				21	1.69	7009	
		E6-C4	07/09/15	1				22	1.64	7008	
		F6-C4	07/09/15	1				24	1.6	7008	
		A4-C6	08/09/15	1				21	1.64	7013	
		A56-C8	08/09/15	1				23	1.59	7013	
	To be relaid / reworked - subsequent retest(s) passed	D4-C4	08/09/15		rejected			~~24~~	~~1.54~~	7013	23/09/15
		E7-C5	08/09/15	1				22	1.68	7013	
		F7-C5	08/09/15	1				23	1.62	7013	
	Outside CQA remit – 1.2m achieved at layer 5	BC4-C6	09/09/15		N/A			~~20~~	~~1.63~~	7014	
	Outside CQA remit – 1.2m achieved at layer 5	C6-C6	09/09/15	N/A				~~20~~	~~1.67~~	7014	
	duplicate - engineer's request	CD7-C7 R1	09/09/15	1				24	1.58	7014	
	duplicate - engineer's request	CD7-C7 R2	09/09/15	1				23	1.6	7014	
	2 no. retests Passed	E5-C2.2	09/09/15		1			22	1.59	7014	10/09/15
		AB7-C8	10/09/15	1				21	1.66	7020	
		E5-C2.2 R1	10/09/15	1				22	1.65	7020	
		E5-C2.2 R2	10/09/15	1				23	1.63	7020	
		G67-C1	10/09/15	1				20	1.71	7038	
		A56-C9	11/09/15	1				22	1.64	7038	
		CD7-C8	11/09/15	1				22	1.64	7038	
		E5-C3.1	11/09/15	1				22	1.64	7038	
		EF7-C6	11/09/15	1				23	1.63	7038	

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

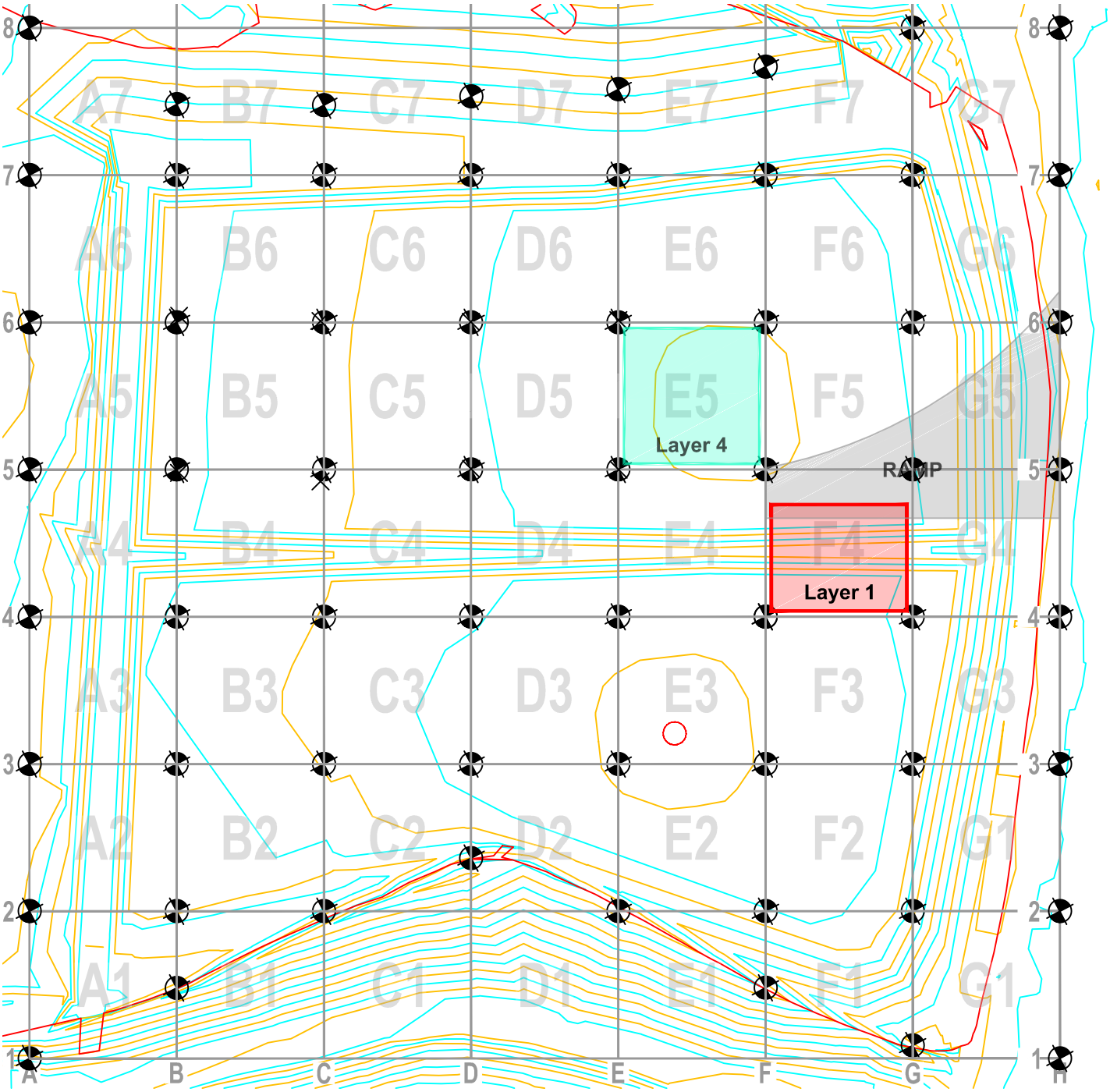
Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**12**
Date Commencing:	**14th September 2015**

1 Weekly Observations

1.1 Monday 14th, Tuesday 15th, Thursday 17th and Friday 18th lost to wet weather and fragile surfaces.

1.2 Contractor diverted efforts to areas of general fill outside of the cell footprint.



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary		CQA Engineer:	Meirion Humphreys		Weather Conditions:	
		Week : 12	Commencing: 14.09.2015			
Cell Ref	Volume Laid (m³)	Sample Taken				
	(BF) 16703	Core	Bulk	Core (perm)	Hand Shear Vane	Comments
E5 [L4]	187	E5_C4	E5_B4		119	
F4 [L1]	120	F4_C1	F4_B1			
	17010					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 12		E5-C4	16/09/15	1				20	1.7	7117	
		F4-C1	18/09/15	1				18	1.73	7118	

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**13**
Date Commencing:	**21st September 2015**

1 Weekly Observations

1.1 Area at bottom and to side of ramp (E4, G4, F4 and F5) cleared of slurry and repaired

1.2 Weather was favourable all week, and the surfaces were able to withstand trafficking without significant detriment.

1.3 Bottom of slope at G5, G6 and G7 benched out in readiness for the final layers of clay which will provide an under-lap to the clay laid on the slopes. Side slopes prepared for clay by clearing debris and vegetation.

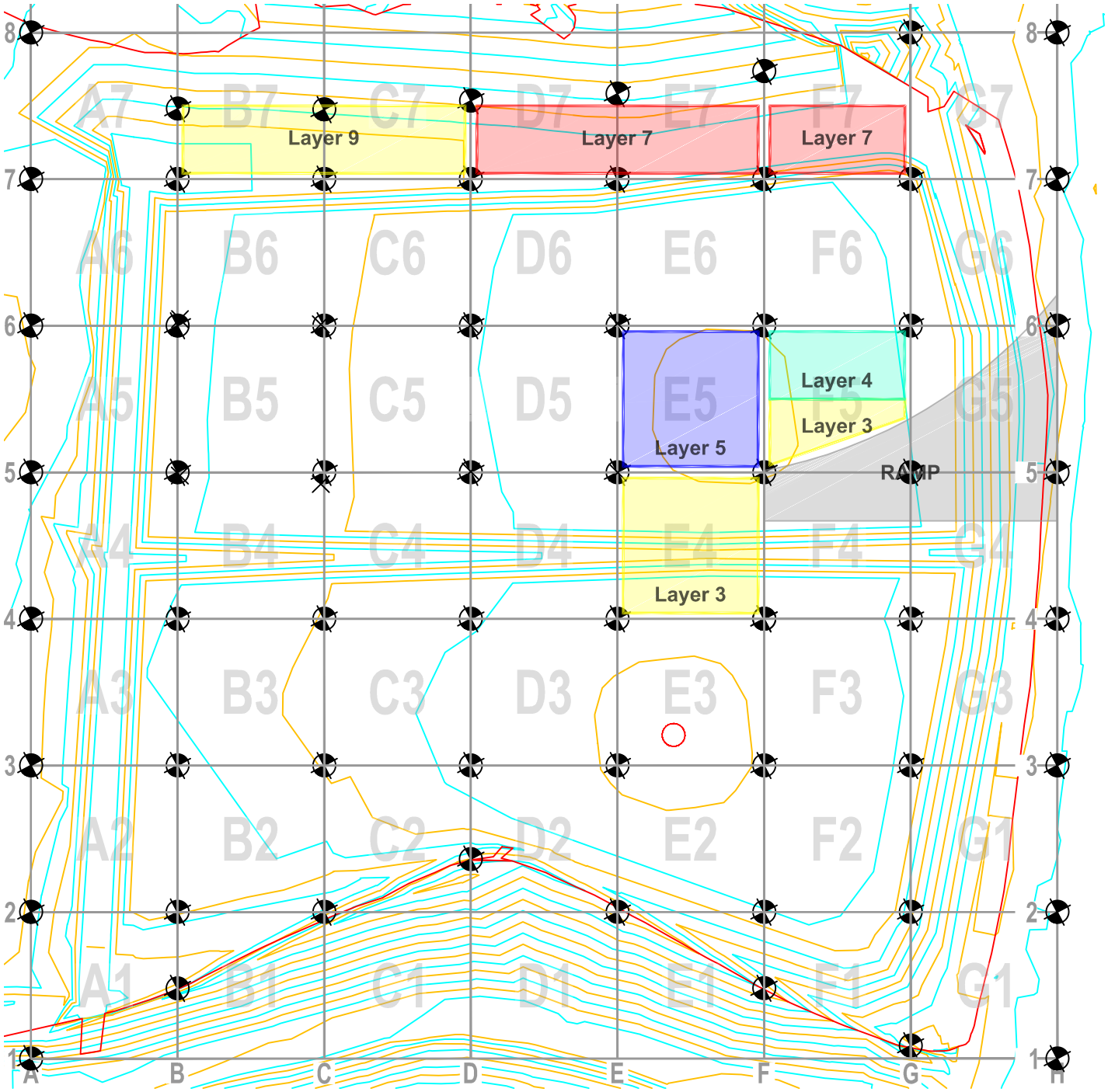
1.4 A567 layer 10 trimmed and re-wetted before re-compaction and re-testing following previous failures. The bund is no more than 8m in width, therefore 1 test will cover 3 cells on a pro rata basis.

E4, F4, G4 and F5 repairs to bottom of ramp

clearing debris from side slopes

benching at slope bottom, G5, G6

benching at slope bottom, G5, G6 , G7



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary		CQA Engineer:	Meirion Humphreys		Weather Conditions:	
		Week : 13	Commencing: 21.09.2015			
Cell Ref	Volume Laid (m³)	Sample Taken				
	(BF) 17077	Core	Bulk	Core (perm)	Hand Shear Vane	Comments
E4 [L3]	187	E4_C3	E4_B3		101	
F5 [L3]	187	F5_C3	F5_B3			
E5 [L5]	187	E5_C5	E5_B5			
F5 [L4]	187	F5_C4	F5_B4		113	
BC7 [L9]	180	BC7_C9	BC7_B9		105	
DE7 [L7]	180	DE7_C7	DE7_B7			
F7 [L7]	90	F7_C7	F7_B7			
	18275					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 13	To be relaid / reworked - subsequent retest(s) passed	**E4-C3**	21/09/15		**rejected**			~~20~~	~~1.66~~	7140	23/09/15
	To be relaid / reworked - subsequent retest(s) passed	**F4-C2**	21/09/15		**rejected**			~~19~~	~~1.67~~	7140	23/09/15
		F5-C3	21/09/15	**1**				20	1.69	7140	
		D4-C4 (RETEST 1)	23/09/15	**1**				22	1.64	7159	
		D4-C4 (RETEST 2)	23/09/15	**1**				23	1.62	7160	
		E4-C3 (RETEST 1)	23/09/15	**1**				21	1.67	7159	
		E4-C3 (RETEST 2)	23/09/15	**1**				19	1.7	7159	
		E5-C5	23/09/15	**1**				22	1.64	7160	
		F4-C2 (RETEST 2)	23/09/15	**1**				21	1.67	7159	
		F4-C2(RETEST 1)	23/09/15	**1**				21	1.64	7159	
		F5-C4	23/09/15	**1**				23	1.61	7160	
		BC7-C9	25/09/15	**1**				22	1.62	7190	
	Mislabeled - covers E7 only	**DE7-C7**	25/09/15	**1**				20	1.67	7190	
		F7-C7	26/09/15	**1**				19	1.7	7191	

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**14**
Date Commencing:	**28th September 2015**

1 Weekly summary

1.1 New stockpiles created within cell footprint (B5 & C5) to allow construction of central bund to separate proposed waste cell and asbestos cell.

1.2 Weather conditions favourable and stockpiled clay is in generally good condition.

1.3 Finishing levels at Northern bunds provided to contractor.

1.4 A5, A6 and A7 re-wetted and re-rolled to gain compaction in light of failures.

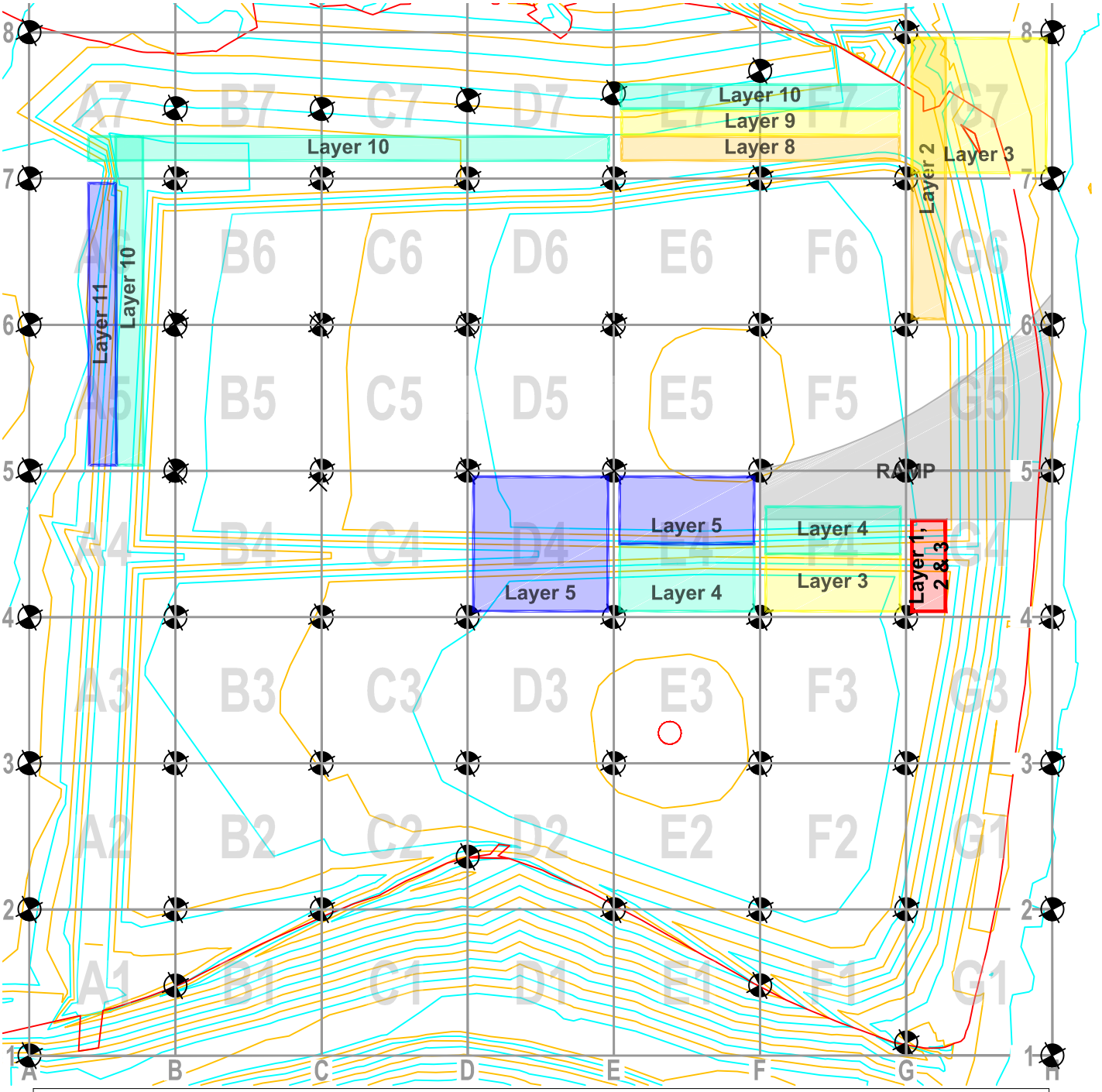
1.5 Lost sample at F3 retaken. Layer 4 locally excavated to provide access to underlying layer.

1.6 Overtime worked on Saturday 3rd. Contractor and client anxious that weather will turn for the worse.

1.7 Final layers at DEFG7 laid in the absence of confirmed lab results. Decision taken by contractor to maintain progress.

1.8 All cells within the site footprint have been constructed to their final thickness except for a small area at the foot of the access ramp and the final topping off layers at the perimeter bunds.

A5, A6, A7 layer 10 scarified, re-wetted and re-rolled



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary		CQA Engineer:	Meirion Humphreys		Weather Conditions:	
		Week : 14	Commencing: 28.09.2015			
Cell Ref	Volume Laid (m³) (BF) 18275	Sample Taken Core	Bulk	Core (perm)	Hand Shear Vane	Comments
A567 [L10]	70	A567_C10	A567_B10		99	
D4 [L5]	187	D4_C5	D4_B5			
E4 [L4]	187	E4_C4	E4_B4			
G4 [L1]	60	G4_C1	G4_B1		98	
G67 [L2]	50	G67_C2	G67_B2		109	
G4 [L3]	60	G4_C3	G4_B3		115	
E4 [L5]	187	E4_C5	E4_B5			
F4 [L4]	187	F4_C4	F4_B4			
ABCD7 [L10]	170	ABCD7_C10	ABCD7_B10			
EFG7 [L8]	170	EFG7_C8	EFG7_B8		120	
A56 [L11]	60	A56_C11	A56_B11			
F4 [L3]	187	F4_C3	F4_B3			
G7 [L3 BATTER]	90	G7_C3 [BAT]	G7_B3 [BAT]		117	
G4 [L2]	60	G4_C2	G4_B2			
DEFG7 [L9]	135	DEFG7_C9	DEFG7_B9			
F4 [L5]	187	F4_C5	F4_B5			
DEFG7 [L10]	190	DEFG7_C10	DEFG7_B10			
	20322					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 14	To be relaid / reworked - subsequent retest(s) passed	**A567-C10**	28/09/15		**rejected**			~~19~~	~~1.69~~	7192	30/09/15
		D4-C5	28/09/15	**1**				22	1.64	7195	
		E4-C4	28/09/15	**1**				23	1.6	7195	
		G4-C1	28/09/15	**1**				21	1.67	7195	
		G4-C3	29/09/15	**1**				23	1.62	7201	
		G67-C2	29/09/15	**1**				21	1.64	7196	
		A567-C10 (RETEST 1)	30/09/15	**1**				21	1.66	7201	
		A567-C10 (RETEST 2)	30/09/15	**1**				21	1.66	7201	
		E4-C5	30/09/15	**1**				23	1.62	7201	
		F4-C4	30/09/15	**1**				23	1.61	7201	
		A56-C11	01/10/15	**1**				24	1.59	7235	
		ABCD7-C10	01/10/15	**1**				23	1.66	7234	
	Refer to Cert 7364 (see cert 7364 for retest)	**EFG7-C8**	01/10/15		**1**			23	1.57	7234	
	Sample lost at lab – re-sampled retrospectively via excavation	**F4-C3**	01/10/15	**1**				22	1.64	7235	
		DEFG7-C9	02/10/15	**1**				21	1.68	7259	
		F4-C5	02/10/15	**1**				21	1.67	7259	
		G4-C2	02/10/15	**1**				23	1.63	7252	
		G7-C3-BATTER	02/10/15	**1**				23	1.64	7236	
		DEFG7-C10	03/10/15	**1**				23	1.61	7253	
		G6-C3	05/10/15	**1**				22	1.62	7254	

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor: Jim Davies Civil Engineering Ltd
CQA Engineer: Meirion Humphreys
Week No.: **15**
Date Commencing: **5th October 2015**

1 Weekly Summary

1.1 No CQA work Monday 5th or Tuesday 6th due to adverse weather.

1.2 First clay laid at side slopes. Compactor seems comfortable working on slope. Blade driver has a tendency to thicken layers. Instructed to maintain 300mm un-compacted thickness before compaction. Some areas have required a reduction in clay prior to compaction.

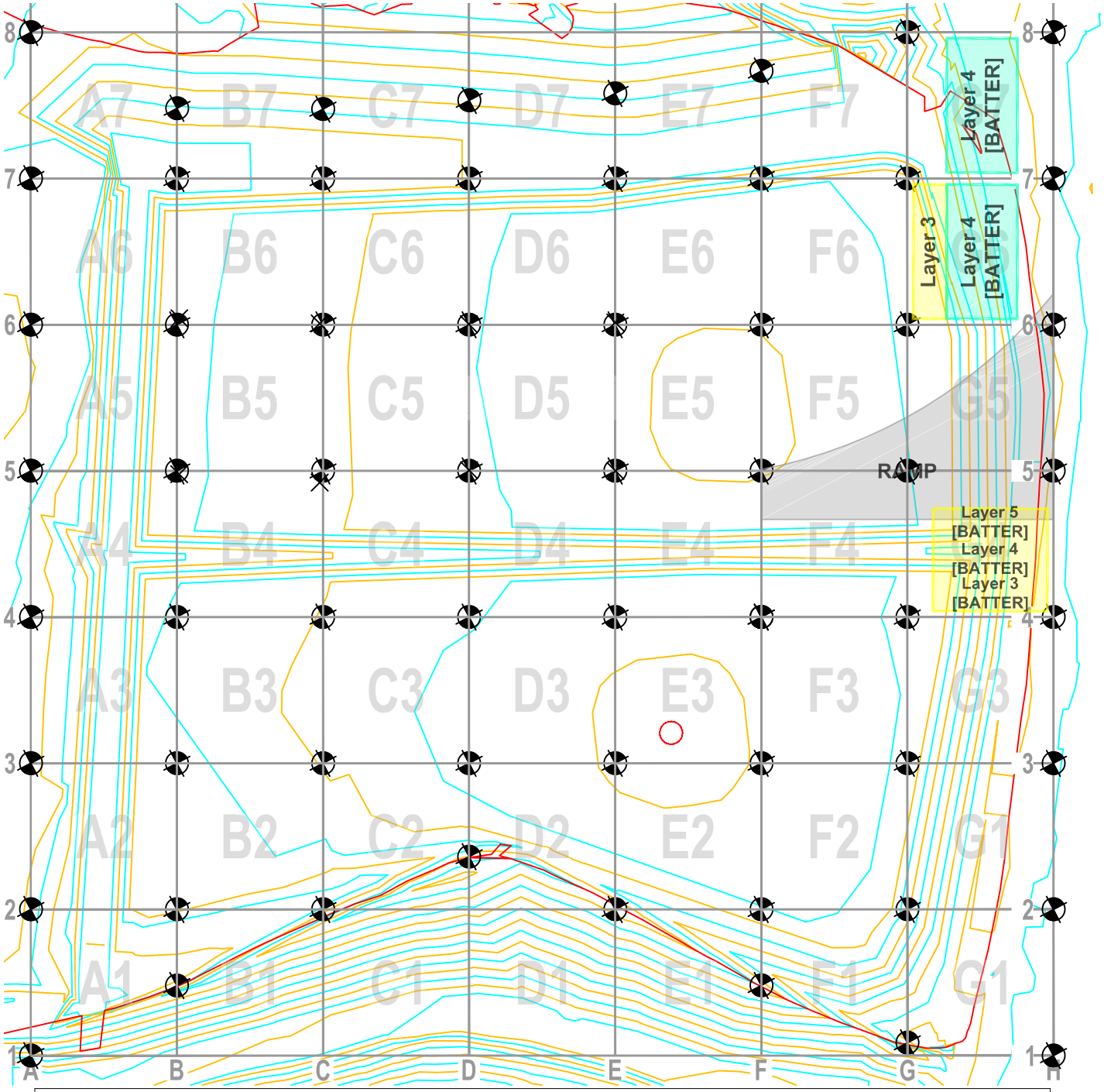
1.3 A fillet of clay has been placed at the toe of the slope to enable the compactor to rise onto the slope. This will be trimmed back and re-compacted after the final layers of clay have been placed on the side slopes.

1.4 The separating bund between the waste and asbestos cells at row 4 has been laid and compacted to specification, despite there being no design requirement.

side slope clay, G6 and G7

overburden to provide launch for compactor

compacting side slopes, G4 (separating bund at row 4 in background)



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary		CQA Engineer:	Meirion Humphreys		Weather Conditions:	
		Week : 15	Commencing: 05.10.2015			
Cell Ref	Volume Laid (m³) (BF) 20322	Sample Taken Core	Bulk	Core (perm)	Hand Shear Vane	Comments
G6 [L3]	50	G6_C3	G6_B3			
G4 [L3 BATTER]	150	G4_C3	G4_B4		118	
G4 [L4 BATTER]	150	G4_C4	G4_B4		115	
G6 [L4 BATTER]	150	G6_C4	G6_B4			
G7 [L4 BATTER]	150	G7_C4	G7_B4		104	
G4 [L5 BATTER]	150	G4_C5	G4_B5			
	21122					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 15		**G4-C3 (BATTER)**	07/10/15	**1**				20	1.69	7283	
		G4-C4 (BATTER)	08/10/15	**1**				22	1.65	7295	
		G6-C4 (BATTER)	08/10/15	**1**				22	1.65	7295	
		G7-C4 (BATTER)	08/10/15	**1**				22	1.62	7295	
	2 no. retests taken - engineer's request	**G4-C5 (BATTER)**	09/10/15	**1**				25	1.59	7296	12/10/15
		G4-C5 (BATTER) Retest 1	12/10/15	**1**				24	1.59	7313	
		G4-C5 (BATTER) Retest 2	12/10/15	**1**				23	1.61	7313	
	Includes G7	**G6-C5 (BATTER)**	12/10/15	**1**				23	1.59	7313	
	Refer to Cert 7234 (retested)	**EFG7-C8**	12/10/15	**1**				21	1.69	7364	

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**16**
Date Commencing:	**12th October 2015**

1 Weekly Progress

1.1 Work began on the drainage layer in areas where the clay works have been completed and confirmed acceptable.

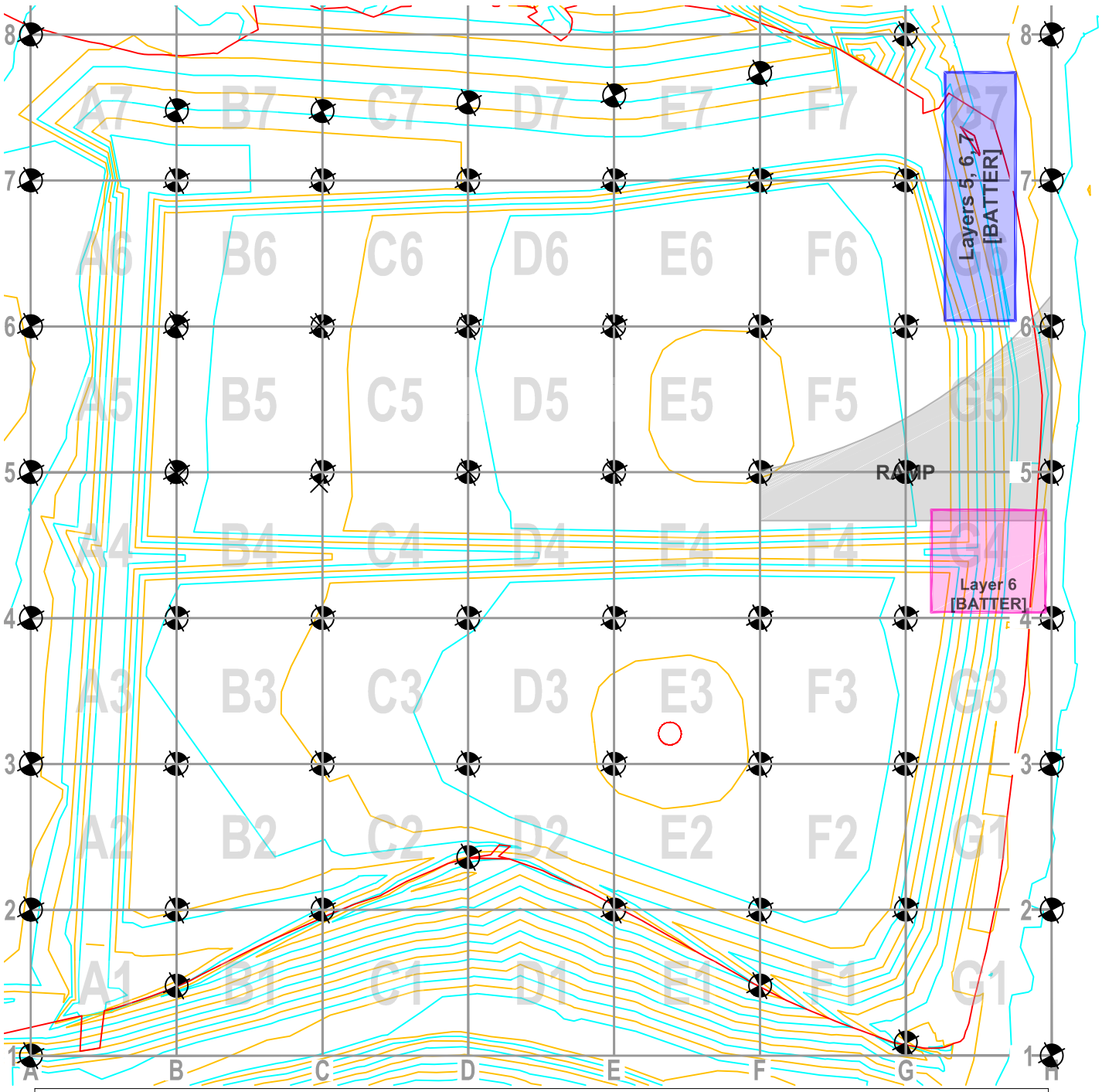
1.2 The geotextile separating layer was laid with 500mm laps to prevent the drainage stone punching through, as per the specification.

1.3 Clay works continued without issue at the side slopes at G6,G7 and G4. Layers were laid at risk before receipt of confirmed results at the contractor's will. All tests returned positive, and all areas have been confirmed acceptable with the exception of those obscured by the access ramp.

1.4 Clay layers at G6 and G4 have been subsequently stepped in to provide a tying in bench for the clay layers at G5 next week.

drainage stone & geotextile separating layer

final layers at sideslope (G4)



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary		CQA Engineer:	Meirion Humphreys		Weather Conditions:	
		Week : 16	Commencing: 12.10.2015			
Cell Ref	Volume Laid (m³)	Sample Taken				
	(BF) 21122	Core	Bulk	Core (perm)	Hand Shear Vane	Comments
EFG7 [L8]	150	EFG7_C8	EFG7_B8			
G6 [L5 BATTER]	150	G6_C5 [BAT]	G6_B5 [BAT]		108	
G4 [L6 BATTER]	150	G4_C6 [BAT]	G4_B6 [BAT]		108	
G67 [L6 BATTER]	190	G67_C6 [BAT]	G67_B6 [BAT]		113	
G67 [L7 BATTER]	190	G67_C7 [BAT]	G67_B7 [BAT]		111	
	21952					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 16		G4-C6 (BATTER)	14/10/15	1				20	1.68	7365	
		G67-C6 (BATTER)	14/10/15	1				22	1.65	7365	
		G67-C7	15/10/15	1				22	1.64	7408	
		G4-C7 (BATTER)	19/10/15	1				20	1.69	7409	
		G5-C1	19/10/15	1				22	1.63	7409	
		G5-C2	19/10/15	1				22	1.65	7409	
		G5-C3	20/10/15	1				21	1.65	7419	

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**17**
Date Commencing:	**19th October 2015**

1 Weekly Progress

1.1 Access ramp deconstructed, standing water vacuumed away and subgrade prepared for clay infill.

1.2 Cell F5 at the foot of the access ramp was wholly excavated to the whole width affected, and the repair extended into E5, which was graded off by a layer's thickness across the width of the ramp.

1.3 Final clay laid 19th through 22nd Oct to G5 and G6, tying into neighbouring cells layer by layer.

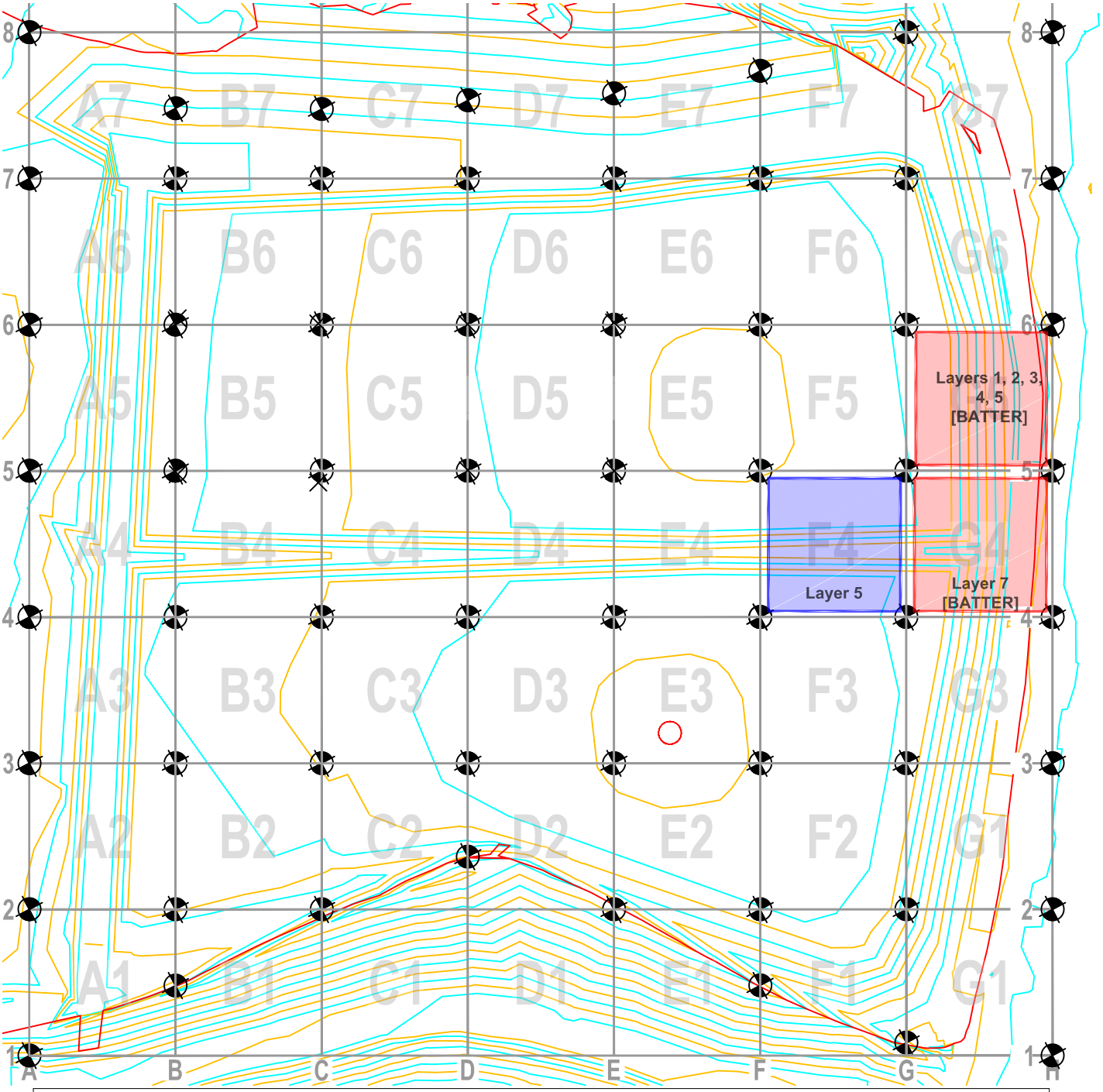
1.4 Concrete base laid for leachate stack construction, 3m x 3m x 0.3m poured onto clay surface (no clay excavated).

access ramp removed, E5 (foreground) regraded to accept ovelapping repair along previous travel way, and F5 / G5 (background) excavated to sugrade in readiness for clay

excavating access ramp (benching detail at neighbouring cell visible to left of photo)

final closing-in

leachate stack to background, final clay compaction to area at foot of access ramp.



Docksway - Cell 3 Clay Lining Works

CQA Weekly Summary		CQA Engineer:	Meirion Humphreys		Weather Conditions:	
		Week : 17	Commencing: 19.10.2015			
Cell Ref	Volume Laid (m³)	Sample Taken				
	(BF) 21952	Core	Bulk	Core (perm)	Hand Shear Vane	Comments
G4 [L7 BATTER]	187					
G5 [L1]	187	G5_C1	G5_B1		101	
G5 [L2]	187	G5_B2	G5_B2		115	
G5 [L3]	187	G5_C3	G5_B3		120	
F4 [L5]	187	F4_C5	F4_B5		122	
G5 [L4	187	G5_C4	G5_B4			
G5 [L5]	187	G5_C5	G5_B5			
	23261					

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 17	Additional - engineer's request	F4-C5	22/10/15	1				23	1.65	7444	
		G5-C4	22/10/15	1				23	1.62	7444	
		G5-C5	22/10/15	1				20	1.69	7445	
		A567_C12	22/07/16	1				19	1.76	10264	
		BC7_C11	22/07/16	1				19	1.73	10264	
		DE7/C11	22/07/16	1				23	1.66	10264	

Docksway Waste Disposal Site (Newport City Council)

Cell 3 (Sub-cell A) – Clay Lining Works 2015

Construction Quality Assurance – Weekly Summary

Contractor:	Jim Davies Civil Engineering Ltd
CQA Engineer:	Meirion Humphreys
Week No.:	**18**
Date Commencing:	**26th October 2015**

1 Weekly Progress

1.1 Final results received confirming conformance of final clay layers placed.

1.2 Final survey undertaken of remaining clay layers.

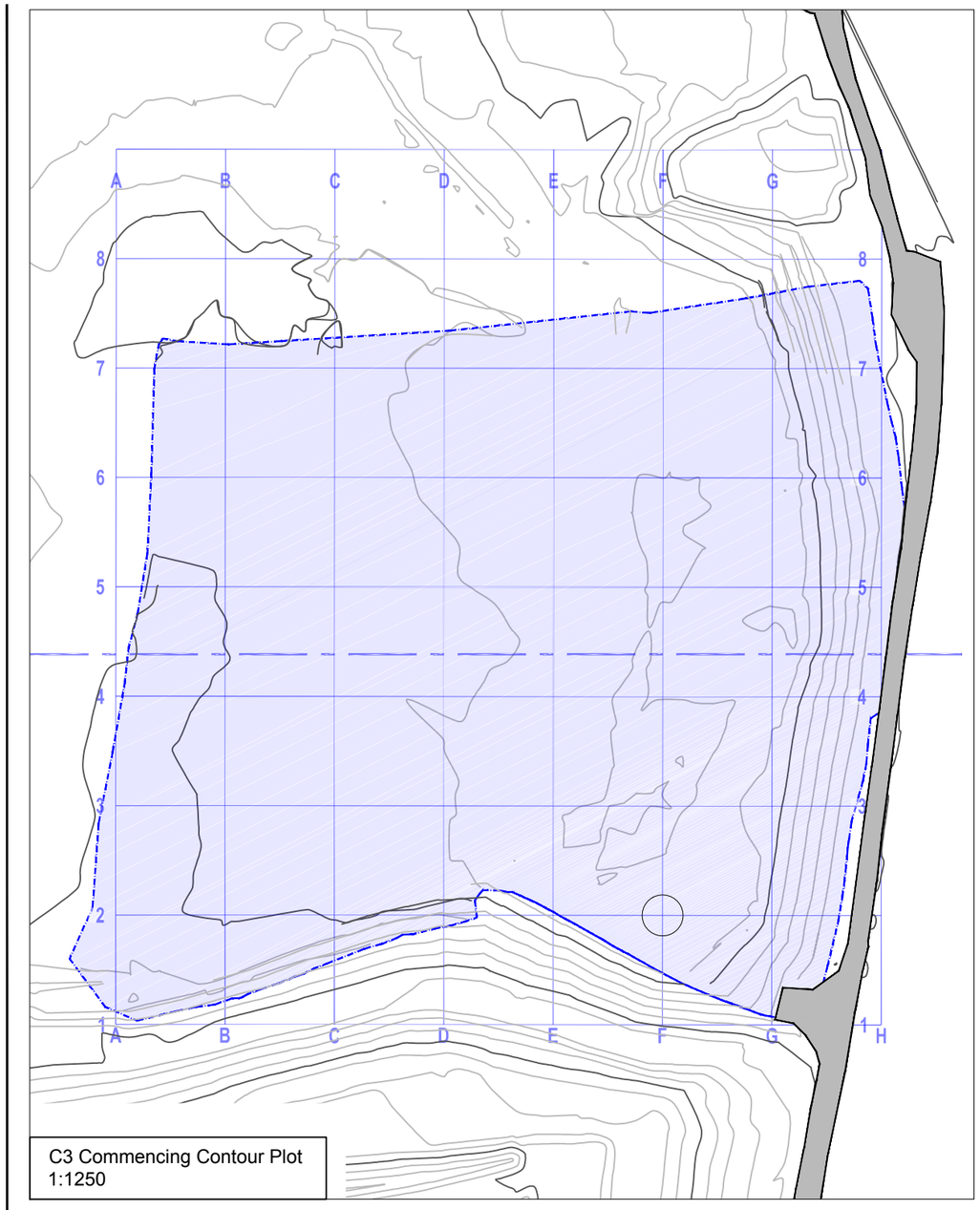
1.3 Contractor advised that he can proceed with completion of the drainage stone layer.

1.4 Locations for the placement of vibrating wire piezometers set out in readiness for drilling crew, booked in for mid November.

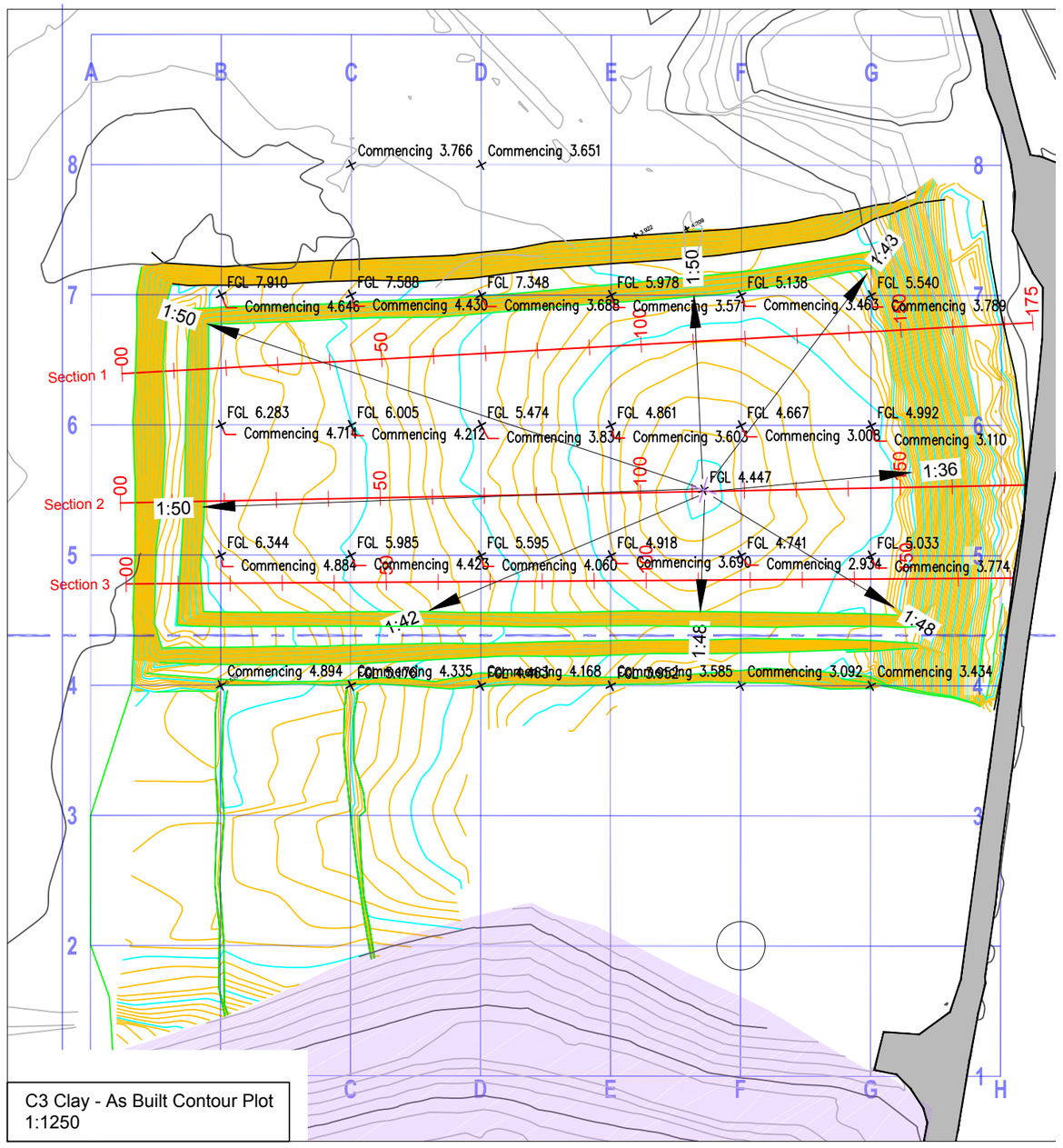
1.5 Contractor advised of access requirements of drilling crew; drainage pipe sections would need to be omitted until completion of the piezometer installation.

1.6 50mm flexible ductwork laid through drainage stone to enable retro-fitting and protection of piezometer cabling,

ANNEX D



C3 Commencing Contour Plot
1:1250



C3 Clay - As Built Contour Plot
1:1250

□J□H□S□U□K□G□X□F□H□G□□□□□U□R□P□□□W□K□H□□□2□U□G□Q□D□Q□F□H□□□6□X□U□Y□H□\□□□P□D□S□S□L□Q□J□□□Z□L□w□K□□□w□K□H□□□S□H□U□P□L□V□V□L□R□Q□□□R□I□□□W□K□H□□□&□R□Q□W□U□R□O□O□H□U□□□R□I□□□+□H□U□□□0□D□M□H□

A3	NOTES	Rev	Details	Dr	Ch	Ap	Date

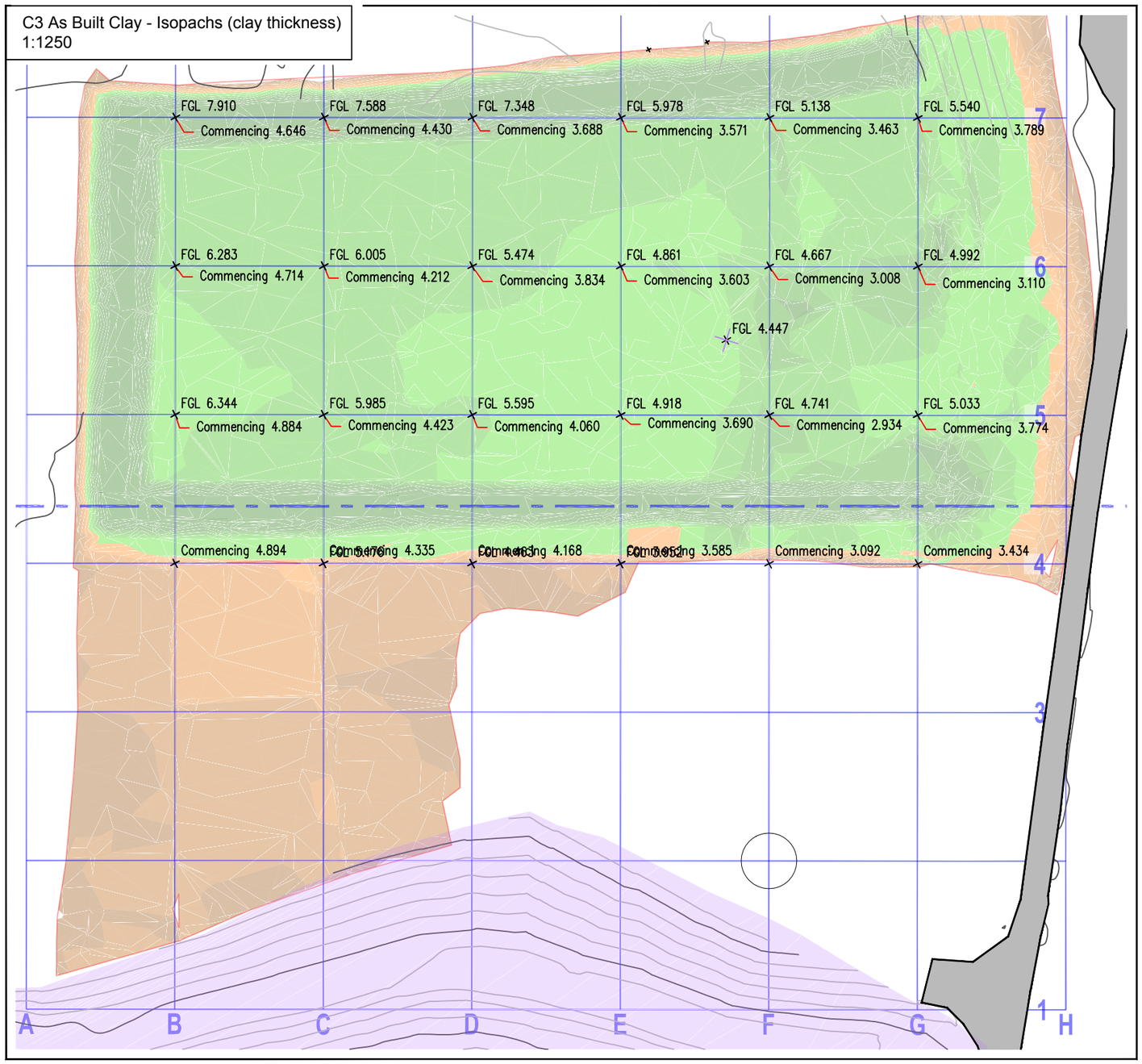
Streetscene
Paul Symonds
Head of Streetscene
Newport City Council
Civic Centre, Newport
South Wales, NP20 4UR.
Telephone: 01633 656656
Email: streetscene@newport.gov.uk

Project
Docksway Waste Disposal Site

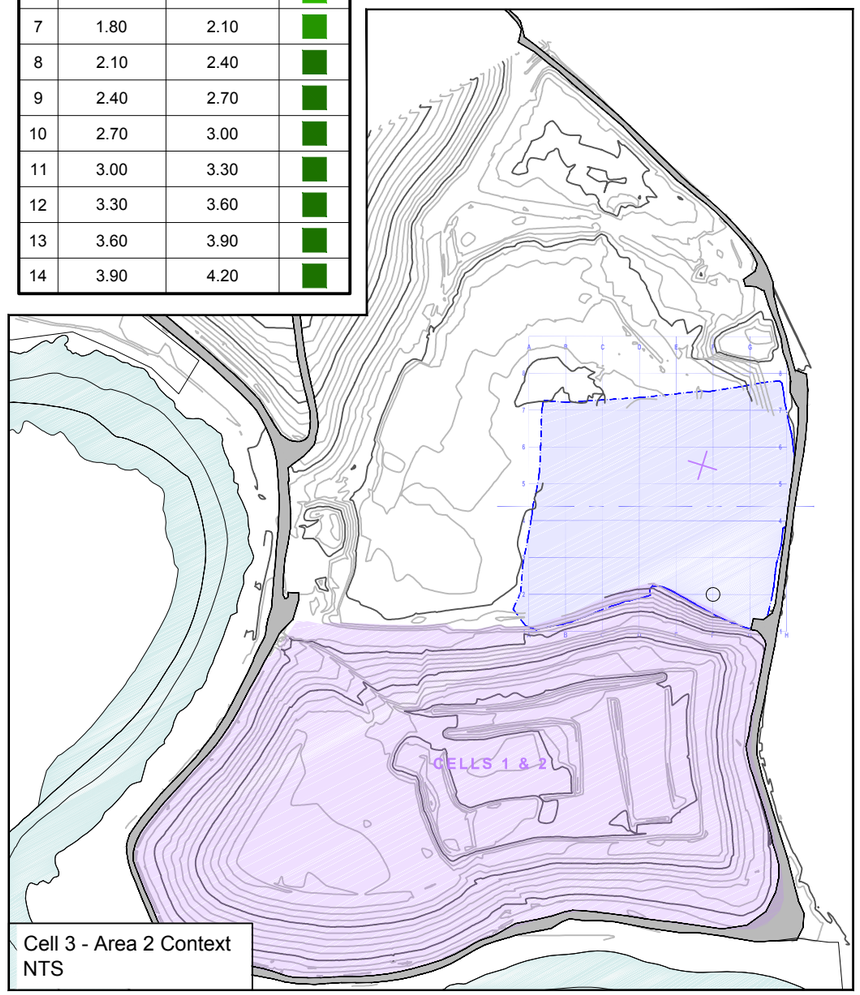
Cell 3 Clay As Built Details

File No. 2506		Status: As Built			
Drawn	MDH	Checked		Approved	
Date	Jun 2016	Date		Date	
Scales	see drawing panes				
Drawing No.	2506_AB_02				

C3 As Built Clay - Isopachs (clay thickness)
1:1250



Clay Thickness Data			
#	MIN LEVEL	MAX LEVEL	
1	0.00	0.30	
2	0.30	0.60	
3	0.60	0.90	
4	0.90	1.20	
5	1.20	1.50	
6	1.50	1.80	
7	1.80	2.10	
8	2.10	2.40	
9	2.40	2.70	
10	2.70	3.00	
11	3.00	3.30	
12	3.30	3.60	
13	3.60	3.90	
14	3.90	4.20	



Cell 3 - Area 2 Context
NTS

□5□H□S□U□R□G□X□F□H□G□□□I□U□R□P□□□W□K□H□□□2□U□G□Q□D□Q□F□H□□□6□X□U□Y□H□\□□□P□D□S□S□L□Q□J□□□Z□L□W□K□□□W□K□H□□□S□H□U□P□L□V□V□L□R□Q□□□R□I□□□W□K□H□□□&□R□Q□W□U□R□O□O□H□U□□□R□I□□□+□H□U□□□0□D□M□H□V□W

A3	NOTES	Rev	Details	Dr	Ch	Ap	Date

Streetscene
Paul Symonds
Head of Streetscene
Newport City Council
Civic Centre, Newport
South Wales, NP20 4UR.
Telephone: 01633 656656
Email: streetscene@newport.gov.uk

Project

Docksway Waste Disposal Site

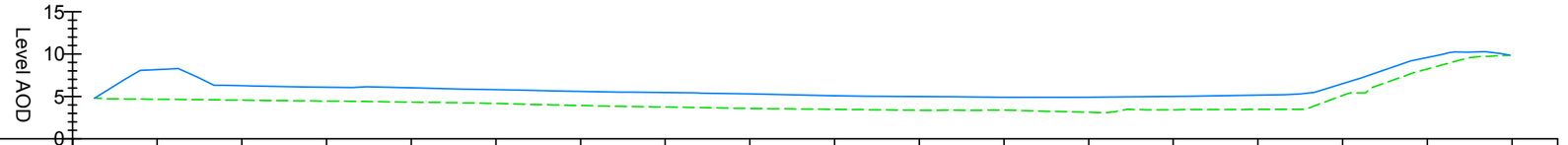
Cell 3 Clay Liner

As Built Details

File No. 2506		Status: As Built			
Drawn	MDH	Checked		Approved	
Date	Jun 2016	Date		Date	
Scales	see drawing panes				
Drawing No. 2506_AB_03					

SECTION 1

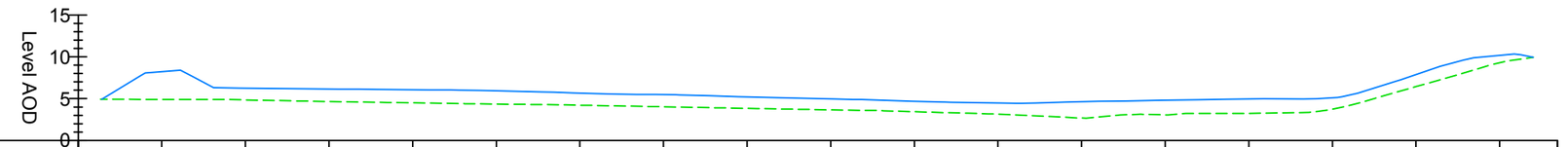
Scale: ~~H 1:500,V 1:500.~~ Datum: 0.000



Chainage	00	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	175
Existing Levels		4.663	4.557	4.454	4.325	4.167	3.928	3.747	3.579	3.475	3.375	3.382	3.138	3.433	3.476	5.117	8.238		
As-Built Clay		8.171	6.273	6.077	6.019	5.810	5.594	5.445	5.297	5.089	4.975	4.909	4.913	5.014	5.156	6.497	9.597		
Level Difference		3.508	1.716	1.623	1.694	1.642	1.666	1.698	1.718	1.614	1.600	1.527	1.774	1.581	1.680	1.380	1.359		

SECTION 2

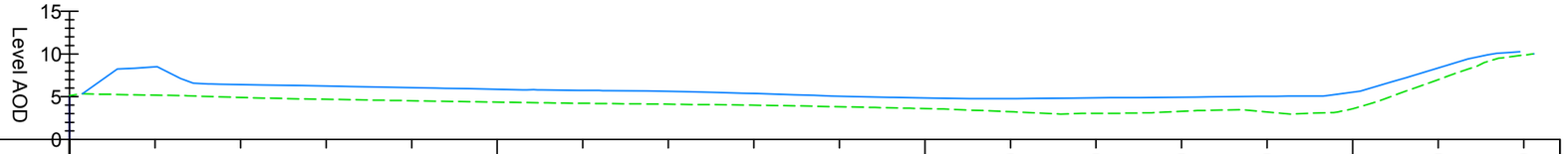
Scale: ~~H 1:500,V 1:500.~~ Datum: 0.000



Chainage	00	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	177
Existing Levels		4.894	4.841	4.651	4.489	4.348	4.214	4.024	3.831	3.655	3.437	3.140	2.674	3.060	3.222	3.727	6.444	9.290	
As-Built Clay		8.229	6.243	6.152	6.063	5.944	5.663	5.486	5.196	4.978	4.688	4.480	4.633	4.801	4.952	5.098	7.881	10.181	
Level Difference		3.335	1.402	1.501	1.574	1.597	1.449	1.461	1.364	1.324	1.251	1.340	1.959	1.742	1.730	1.371	1.437	0.891	

SECTION 3

Scale: ~~H 1:500,V 1:500.~~ Datum: 0.000



Chainage	00	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	174
Existing Levels	5.134	5.173	4.913	4.692	4.520	4.366	4.222	4.116	4.010	3.818	3.596	3.239	3.041	3.287	3.211	3.574	6.998	9.868	
As-Built Clay		8.492	6.415	6.243	6.054	5.866	5.737	5.613	5.364	5.052	4.855	4.767	4.860	4.938	5.034	5.529	8.360		
Level Difference		3.318	1.502	1.550	1.534	1.500	1.515	1.497	1.354	1.233	1.259	1.527	1.819	1.651	1.824	1.954	1.362		

NOTES A3

1. Not to be scaled
2. Refer to drawing number 2506_AB_02 for section key plan

Rev	Details	Dr	Ch	Ap	Date

Streetscene
Paul Symonds
Head of Streetscene
Newport City Council
Civic Centre, Newport
South Wales, NP20 4UR.
Telephone: 01633 656656
Email: streetscene@newport.gov.uk

Project

Docksway Waste Disposal Site

Cell 3 Clay Liner

As Built Details (Clay Liner Sections)

File No. 2506		Status: As Built / CQA			
Drawn	MDH	Checked		Approved	
Date	Jun 2015	Date		Date	
Scales	see drawing panes				
Drawing No.	2506_AB_04				

ANNEX E

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 1	To be relaid - see E5_C1.1 , 04.09.2015	**E5-C1**	29/06/15				**rejected**	~~15~~	~~1.6~~	27402	
	2 no. re-tests passed	**D5-C1**	30/06/15		**1**			18	1.63	27402	23/07/15
	2 no. re-tests passed	**C5-C1**	01/07/15		**1**			21	1.56	27402	23/07/15
	sampled retrospectively via excavation	**B6-C1**	02/07/15	**1**				18	1.77	6393	
	sampled retrospectively via excavation	**C6-C1**	02/07/15		**1**			18	1.70	27596	
		B5-C1	03/07/15	**1**				17	1.79	27402	
WEEK 2		**B4-C1**	06/07/15	**1**				20	1.68	27495	
		C4-C1	06/07/15	**1**				22	1.69	27495	
	Re-test passed	**D4-C1**	07/07/15			**1**		22	1.75	27495	28/07/15
		E4-C1	07/07/15	**1**				20	1.69	27495	
	2 no. retests passed	**B7-C1**	08/07/15		**1**			22	1.57	27495	28/07/15
		C7-C1	08/07/15	**1**				19	1.75	27495	
		D7-C1	09/07/15	**1**				19	1.73	27495	
	To be relaid	**B5-C2**	10/07/15			**rejected**		~~24~~	~~1.69~~	27596	28/07/15
	Duplicate – Engineer's request	**C5-C1**	10/07/15	**1**				24	1.60	27596	
WEEK 3		**D5-C2**	13/07/15	**1**				23	1.66	27596	
	Excavated to re-work layer 1	**E5-C2**	14/07/15	**Obsolete**				19	1.72	27596	
	1 re-test pass, 1 re-test fail	**B4-C2**	15/07/15		**1**			22	1.50	27668	03/08/15
	2 no. re-tests passed	**C4-C2**	15/07/15			**1**		22	1.75	27668	03/08/15
	Retest Passed - see cert 6645	**F5-C2**	15/07/15		**1**			21	1.61	27668	17/08/15
		C5-C2	16/07/15	**1**				21	1.65	27596	
	2 no. re-tests passed	**D4-C2**	16/07/15		**1**			19	1.66	27668	03/08/15
	2 no. re-tests passed	**E4-C2**	16/07/15			**1**		18	1.89	27668	03/08/15
		A4-C1	17/07/15		**1**			21	1.63	27668	
		A4-C2	17/07/15		**1**			21	1.62	27668	
		A5-C1	17/07/15	**1**				21	1.68	27668	
	No retest ordered	**A5-C2**	17/07/15		**1**			22	1.6	27668	
		A6-C1	17/07/15	**1**				18	1.82	27668	
		A6-C2	17/07/15	**1**				23	1.67	27668	
WEEK 4		**D6-C2**	20/07/15	**1**				21	1.71	27668	
	2 no. retests passed	**B7-C2**	21/07/15		**1**			24	1.5	27668	29/07/15
	Retest passed	**C7-C2**	21/07/15		**1**			22	1.59	27668	29/07/15
	2 no. retests passed	**D7-C2**	21/07/15		**1**			18	1.68	27668	03/08/15
	To be relaid	**E7-C1**	21/07/15		**rejected**			~~20~~	~~1.6~~	27668	03/08/15
		F6-C1	21/07/15	**1**				19	1.73	27668	
	To be reworked – subsequent retest passed	**F7-C1**	21/07/15			**rejected**		~~23~~	~~1.72~~	27668	29/07/15
		C5-C1 R1	23/07/15	**1**				18	1.75	6359	
		C5-C1 R2	23/07/15	**1**				20	1.72	6359	
		D5-C1 R1	23/07/15	**1**				22	1.65	6359	
		D5-C1R2	23/07/15	**1**				21	1.71	6359	
		B5-C2 R1	28/07/15	**1**				23	1.66	6393	

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
WEEK 5		B6-C2	28/07/15	1				21	1.68	6393	
		B7-C1 R1	28/07/15	1				21	1.68	6393	
		B7-C1 R2	28/07/15	1				20	1.72	6393	
	Result accepted - marginal failure	C6-C2	28/07/15		1			20	1.65	6394	
	Mis-labelled on certificate as D7-C1	D4-C1 R1	28/07/15	1				18	1.75	6395	
		D4-C1 R1	28/07/15	1				20	1.71	6394	
		B7-C2 R1	29/07/15	1				22	1.64	6432	
		B7-C2 R2	29/07/15	1				23	1.61	6432	
		C5-C2 R2	29/07/15	1				20	1.71	6432	
		C7-C2 R1	29/07/15	1				21	1.64	6432	
	sampled retrospectively via excavation	D6-C1	29/07/15	1				19	1.75	6395	
		E6-C1	29/07/15	1				20	1.7	6395	
		F5-C1	29/07/15	1				21	1.67	6395	
	Mis-labelled on certificate as F7-C2 – reworked and re-sampled	F7-C1	29/07/15	1				22	1.62	6395	
		A4-C3	31/07/15	1				20	1.7	6433	
	Result accepted - very marginal failure	A5-C3	31/07/15		1			19	1.69	6433	
		A6-C3	31/07/15	1				20	1.69	6433	
		B4-C3	31/07/15	1				22	1.64	6434	
		C4-C3	31/07/15	1				21	1.65	6434	
		C5-C3	31/07/15	1				23	1.64	6434	
		D5-C3	31/07/15	1				19	1.69	6433	
WEEK 6	Result accepted as anomaly on strength of second retest pass	B4-C2 R1	03/08/15			1		21	1.75	6448	
		B4-C2 R2	03/08/15	1				21	1.69	6448	
		B6-C3	03/08/15	1				20	1.72	6449	
		C4-C2 R1	03/08/15	1				20	1.71	6448	
		C4-C2 R2	03/08/15	1				21	1.71	6448	
		D4-C2 R1	03/08/15	1				19	1.78	6449	
		D4-C2 R2	03/08/15	1				21	1.7	6449	
		D7-C2 R1	03/08/15	1				18	1.75	6450	
		D7-C2 R2	03/08/15	1				20	1.69	6450	
		E4-C2 R1	03/08/15	1				18	1.78	6449	
		E4-C2 R2	03/08/15	1				18	1.8	6449	
	To be relaid / reworked - see 12.08.2015	E7-C1 R1	03/08/15			rejected		~~24~~	~~1.66~~	6450	
	To be relaid / reworked - see 12.08.2015	E7-C1 R2	03/08/15			rejected		~~23~~	~~1.7~~	6450	
	To be relaid / reworked - see 10.08.2015	A5-C4	05/08/15		rejected			~~20~~	~~1.65~~	6468	
	To be relaid / reworked - see 10.08.2015	A6-C4	05/08/15		rejected			~~19~~	~~1.68~~	6468	
		A7-C4	05/08/15	1				19	1.7	6468	
		B5-C4	05/08/15	1				21	1.66	6468	
		B7-C3	05/08/15	1				20	1.7	6468	
		C6-C3	05/08/15	1				20	1.71	6469	
		C7-C3	05/08/15	1				21	1.68	6469	

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities				MC	Density	Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC				
				◆	✧	◆					
		D6-C3	05/08/15	**1**				20	1.7	6469	
	2 no. retests passed	**D7-C3**	05/08/15		**1**			19	1.68	6469	05/08/15
		A4-C4	07/08/15	**1**				21	1.68	6507	
		B4-C4	07/08/15	**1**				21	1.67	6507	
		B6-C4	07/08/15	**1**				22	1.65	6507	
		C4-C4	07/08/15	**1**				22	1.64	6508	
		C5-C4	07/08/15	**1**				20	1.69	6507	
		C6-C4	07/08/15	**1**				20	1.71	6507	
	2 no. retests passed	**D5-C4**	07/08/15		**1**			19	1.69	6508	10/08/15
		D6-C4	07/08/15	**1**				21	1.68	6508	
	Reworked / relaid	**A5-C4 relaid**	10/08/15	**1**				22	1.64	6510	
	Reworked / relaid	**A6-C4 relaid**	10/08/15	**1**				21	1.66	6510	
		B5-C5	10/08/15	**1**				21	1.69	6510	
	To be relaid / reworked - subsequent retest(s) passed	**B7-C4**	10/08/15		**rejected**			~~16~~	~~1.75~~	6510	12/08/15
		C5-C5	10/08/15	**1**				22	1.64	6586	
		C7-C4	10/08/15	**1**				22	1.65	6510	
		D5-C4 R1	10/08/15	**1**				19	1.7	6511	
		D5-C4 R2	10/08/15	**1**				20	1.71	6511	
		D7-C3 R1	10/08/15	**1**				23	1.66	6511	
		D7-C3 R2	10/08/15	**1**				21	1.69	6511	
WEEK 7	To be relaid /reworked - subsequent retest(s) passed	**B6-C5**	11/08/15		**rejected**			~~20~~	~~1.64~~	6586	12/08/15
		C6-C5	11/08/15	**1**				20	1.67	6586	
		A5-C5	12/08/15	**1**				23	1.64	6608	
		A6-C5	12/08/15	**1**				23	1.64	6608	
		B6-C5 R1	12/08/15	**1**				21	1.68	6608	
	Labelled incorrectly on certificate	**B6-C5 R2**	12/08/15	**1**				21	1.69	6608	
		B7-C4.1	12/08/15	**1**				22	1.66	6608	
		E7-C1.1	12/08/15	**1**				23	1.63	6609	
		A4-C5	13/08/15	**1**				21	1.66	6625	
		C7-C5	13/08/15	**1**				24	1.58	6625	
		D6-C5	13/08/15	**1**				23	1.61	6625	
		D7-C5	13/08/15	**1**				21	1.67	6625	
	IN ABSENTIA – Relief CQA Engineer attending	**A5-C6**	17/08/15	**1**				20	1.74	6645	
	IN ABSENTIA – Result accepted by relief CQA Engineer	**A6-C6**	17/08/15			**1**		22	1.7	6645	
	IN ABSENTIA – Relief CQA Engineer attending - outside CQA remit	**B5-C6**	17/08/15	**N/A**				21	1.68	6645	
	IN ABSENTIA – Relief CQA Engineer attending - outside CQA remit	**B6-C6**	17/08/15	**N/A**				21	1.64	6645	
	IN ABSENTIA – Relief CQA Engineer attending	**B7-C5**	17/08/15	**1**				21	1.64	6646	
	IN ABSENTIA – Relief CQA Engineer attending	**C7-C6**	17/08/15	**1**				22	1.65	6660	
	IN ABSENTIA – Relief CQA Engineer attending	**D7-C6**	17/08/15	**1**				20	1.68	6660	
	IN ABSENTIA – Relief CQA Engineer attending	**F5-C2**	17/08/15	**1**				21	1.69	6645	
EK 8	IN ABSENTIA – Relief CQA Engineer attending	**E6-C2**	18/08/15	**1**				21	1.7	6689	

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities				MC	Density	Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC				
				◆	✧	◆					
WEE	IN ABSENTIA – Relief CQA Engineer attending	**E7-C2**	18/08/15	**1**				21	1.67	6689	
	IN ABSENTIA – Relief CQA Engineer attending	**F7-C2**	18/08/15	**1**				23	1.66	6689	
	IN ABSENTIA – Relief CQA Engineer attending	**E7-C3**	19/08/15	**1**				20	1.7	6690	
	IN ABSENTIA – Relief CQA Engineer attending	**F6-C2**	19/08/15	**1**				23	1.66	6690	
	IN ABSENTIA – Relief CQA Engineer attending - 2 no. retests passed	**F7-C3**	19/08/15		**1**			18	1.72	6690	
	IN ABSENTIA – Relief CQA Engineer attending	**B7-C6**	20/08/15	**1**				20	1.74	6740	
	IN ABSENTIA – Relief CQA Engineer attending - outside CQA remit	**C5-C6**	20/08/15	**N/A**				18	1.74	6693	
	IN ABSENTIA – Relief CQA Engineer attending	**F7-C3 R1**	20/08/15	**1**				21	1.7	6740	
	IN ABSENTIA – Relief CQA Engineer attending	**F7-C3 R2**	20/08/15	**1**				20	1.74	6740	
WEEK 9	IN ABSENTIA – Relief CQA Engineer attending	**E7-C4**	28/08/15	**1**				25	1.55	6865	
	IN ABSENTIA – Relief CQA Engineer attending	**F7-C4**	28/08/15	**1**				22	1.64	6865	
WEEK 10	Includes A6_C7	**A5-C7**	02/09/15	**1**				23	1.62	6898	
		B7-C7	02/09/15	**1**				25	1.58	6898	
	Outside CQA remit – 1.2m achieved at layer 5	**D6-C6**	02/09/15	**N/A**				25	1.58	6898	07/09/15
	Retested and passed as CD7_C7	**D7-C7**	02/09/15				**1**	26	1.57	6898	09/09/15
		E6-C3	02/09/15	**1**				23	1.64	6899	
		F6-C3	02/09/15	**1**				23	1.64	6898	
		D4-C3	03/09/15	**1**				20	1.71	7000	
		B4-C5	04/09/15	**1**				22	1.64	7001	
		C4-C5	04/09/15	**1**				21	1.64	7001	
	2 no. retests Passed	**E5-C1.1**	04/09/15		**1**			20	1.64	7001	07/09/15
WEEK 11		**AB7-C7 R**	07/09/15	**1**				20	1.72	7008	
		AB7-C7 R	07/09/15	**1**				23	1.64	7008	
		CD7-C7	07/09/15	**1**				23	1.62	7009	
	duplicate - engineer's request	**CD7-C7**	07/09/15	**1**				25	1.58	7009	
	Outside CQA remit – 1.2m achieved at layer 5	**D6-C6 R**	07/09/15	**N/A**				20	1.7	7009	
	Outside CQA remit – 1.2m achieved at layer 5	**D6-C6 R**	07/09/15	**N/A**				22	1.67	7009	
		E5-C1.1 R	07/09/15	**1**				23	1.62	7008	
		E5-C1.1 R2	07/09/15	**1**				21	1.69	7009	
		E6-C4	07/09/15	**1**				22	1.64	7008	
		F6-C4	07/09/15	**1**				24	1.6	7008	
		A4-C6	08/09/15	**1**				21	1.64	7013	
		A56-C8	08/09/15	**1**				23	1.59	7013	
	To be relaid / reworked - subsequent retest(s) passed	**D4-C4**	08/09/15		**rejected**			~~24~~	~~1.54~~	7013	23/09/15
		E7-C5	08/09/15	**1**				22	1.68	7013	
		F7-C5	08/09/15	**1**				23	1.62	7013	
	Outside CQA remit – 1.2m achieved at layer 5	**BC4-C6**	09/09/15		**N/A**			~~20~~	~~1.63~~	7014	
	Outside CQA remit – 1.2m achieved at layer 5	**C6-C6**	09/09/15	**N/A**				~~20~~	~~1.67~~	7014	
	duplicate - engineer's request	**CD7-C7 R1**	09/09/15	**1**				24	1.58	7014	
	duplicate - engineer's request	**CD7-C7 R2**	09/09/15	**1**				23	1.6	7014	
	2 no. retests Passed	**E5-C2.2**	09/09/15		**1**			22	1.59	7014	10/09/15

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities				MC	Density	Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC				
				◆	✧	◆					
		AB7-C8	10/09/15	**1**				21	1.66	7020	
		E5-C2.2 R1	10/09/15	**1**				22	1.65	7020	
		E5-C2.2 R2	10/09/15	**1**				23	1.63	7020	
		G67-C1	10/09/15	**1**				20	1.71	7038	
		A56-C9	11/09/15	**1**				22	1.64	7038	
		CD7-C8	11/09/15	**1**				22	1.64	7038	
		E5-C3.1	11/09/15	**1**				22	1.64	7038	
		EF7-C6	11/09/15	**1**				23	1.63	7038	
WEEK 12		**E5-C4**	16/09/15	**1**				20	1.7	7117	
		F4-C1	18/09/15	**1**				18	1.73	7118	
WEEK 13	To be relaid / reworked - subsequent retest(s) passed	**E4-C3**	21/09/15		**rejected**			~~20~~	~~1.66~~	7140	23/09/15
	To be relaid / reworked - subsequent retest(s) passed	**F4-C2**	21/09/15		**rejected**			~~19~~	~~1.67~~	7140	23/09/15
		F5-C3	21/09/15	**1**				20	1.69	7140	
		D4-C4 (RETEST 1)	23/09/15	**1**				22	1.64	7159	
		D4-C4 (RETEST 2)	23/09/15	**1**				23	1.62	7160	
		E4-C3 (RETEST 1)	23/09/15	**1**				21	1.67	7159	
		E4-C3 (RETEST 2)	23/09/15	**1**				19	1.7	7159	
		E5-C5	23/09/15	**1**				22	1.64	7160	
		F4-C2 (RETEST 2)	23/09/15	**1**				21	1.67	7159	
		F4-C2(RETEST 1)	23/09/15	**1**				21	1.64	7159	
		F5-C4	23/09/15	**1**				23	1.61	7160	
		BC7-C9	25/09/15	**1**				22	1.62	7190	
	Mislabeled - covers E7 only	**DE7-C7**	25/09/15	**1**				20	1.67	7190	
		F7-C7	26/09/15	**1**				19	1.7	7191	
WEEK 14	To be relaid / reworked - subsequent retest(s) passed	**A567-C10**	28/09/15		**rejected**			~~19~~	~~1.69~~	7192	30/09/15
		D4-C5	28/09/15	**1**				22	1.64	7195	
		E4-C4	28/09/15	**1**				23	1.6	7195	
		G4-C1	28/09/15	**1**				21	1.67	7195	
		G4-C3	29/09/15	**1**				23	1.62	7201	
		G67-C2	29/09/15	**1**				21	1.64	7196	
		A567-C10 (RETEST 1)	30/09/15	**1**				21	1.66	7201	
		A567-C10 (RETEST 2)	30/09/15	**1**				21	1.66	7201	
		E4-C5	30/09/15	**1**				23	1.62	7201	
		F4-C4	30/09/15	**1**				23	1.61	7201	
		A56-C11	01/10/15	**1**				24	1.59	7235	
		ABCD7-C10	01/10/15	**1**				23	1.66	7234	
	Refer to Cert 7364 (see cert 7364 for retest)	**EFG7-C8**	01/10/15		**1**			23	1.57	7234	
	Sample lost at lab – re-sampled retrospectively via excavation	**F4-C3**	01/10/15	**1**				22	1.64	7235	
		DEFG7-C9	02/10/15	**1**				21	1.68	7259	
		F4-C5	02/10/15	**1**				21	1.67	7259	
		G4-C2	02/10/15	**1**				23	1.63	7252	

Docksway waste Disposal Site, Newport

CQA, Cell C3 Clay Liner Lab Results

Contractor: Jim Davies Civil Engineering Ltd **CQA Engineer: Meirion Humphreys**

	Comment	Sample Ref	Date Sampled	Densities						Lab Certificate Reference	Re-test Taken
				Pass	Fail >5% Air Voids	Fail <0% Air Voids	Fail - % MC	MC	Density		
				◆	✧	◆					
		G7-C3-BATTER	02/10/15	1				23	1.64	7236	
		DEFG7-C10	03/10/15	1				23	1.61	7253	
		G6-C3	05/10/15	1				22	1.62	7254	
WEEK 15		G4-C3 (BATTER)	07/10/15	1				20	1.69	7283	
		G4-C4 (BATTER)	08/10/15	1				22	1.65	7295	
		G6-C4 (BATTER)	08/10/15	1				22	1.65	7295	
		G7-C4 (BATTER)	08/10/15	1				22	1.62	7295	
	2 no. retests taken - engineer's request	G4-C5 (BATTER)	09/10/15	1				25	1.59	7296	12/10/15
		G4-C5 (BATTER) Retest 1	12/10/15	1				24	1.59	7313	
		G4-C5 (BATTER) Retest 2	12/10/15	1				23	1.61	7313	
	Includes G7	G6-C5 (BATTER)	12/10/15	1				23	1.59	7313	
	Refer to Cert 7234 (retested)	EFG7-C8	12/10/15	1				21	1.69	7364	
WEEK 16		G4-C6 (BATTER)	14/10/15	1				20	1.68	7365	
		G67-C6 (BATTER)	14/10/15	1				22	1.65	7365	
		G67-C7	15/10/15	1				22	1.64	7408	
		G4-C7 (BATTER)	19/10/15	1				20	1.69	7409	
		G5-C1	19/10/15	1				22	1.63	7409	
		G5-C2	19/10/15	1				22	1.65	7409	
		G5-C3	20/10/15	1				21	1.65	7419	
WEEK 17	Additional - engineer's request	F4-C5	22/10/15	1				23	1.65	7444	
		G5-C4	22/10/15	1				23	1.62	7444	
		G5-C5	22/10/15	1				20	1.69	7445	
		A567_C12	22/07/16	1				19	1.76	10264	
		BC7_C11	22/07/16	1				19	1.73	10264	
		DE7/C11	22/07/16	1				23	1.66	10264	

Laboratory Report

GEO Site & Testing Services Ltd

Contract Number: 27495

Client's Reference: **NCC_2506**

Report Date: **27-07-2015**

Client **Jim Davies Civil Engineering Ltd**
Ty Gwyn,
Banalog Terrace,
Hollybush,
Blackwood
NP12 0SG

Contract Title: **Docksway Landfill - Newport**

For the attention of: **Meirion Humphreys**

Date Received: **10-07-2015**

Date Commenced: **10-07-2015**

Date Completed: **27-07-2015**

Test Description	Qty
Moisture Content 1377 : 1990 Part 2 : 3.2 - * UKAS	7
4 Point Liquid & Plastic Limit (LL/PL) 1377 : 1990 Part 2 : 4.3 & 5.3 - * UKAS	7
Dry Den/MC (2.5kg Rammer Method 1 Litre Mould) 1377 : 1990 Part 4 : 3.3 - * UKAS	2
Bulk/Dry Density 1377 : 1990 Part 4 : 4.3/4.4 - * UKAS	7
Determination of Permeability in a triaxial cell BS1377 Part 6 :1990 Clause 6 - * UKAS	2
Extra Over Item (4 Days Over)	10
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

Test Report: **Method of the Determination of the plastic limit and plasticity index**
BS 1377 : Part 2 : 1990 Method 5

Client ref:

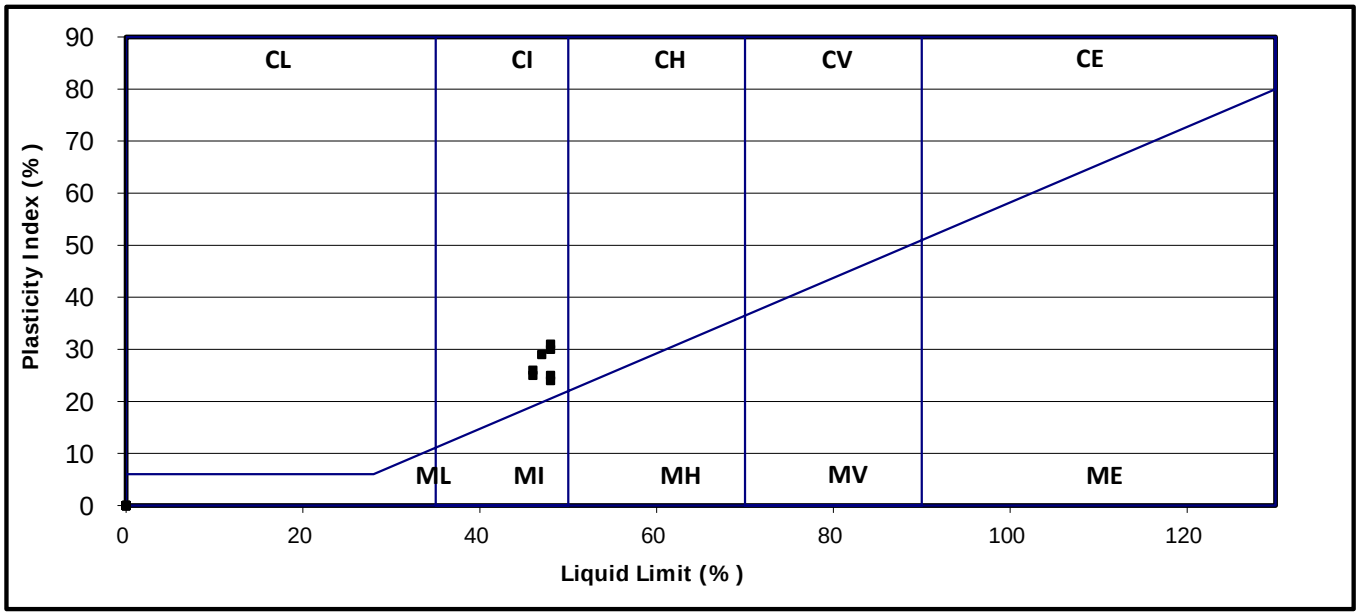
Location: **Docksway Landfill, Newport**

Contract Number: **27495-100715**

Hole/ Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3/ 4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
2506_B4_B1	B		24	48	18	30	95	CI Intermediate Plasticity
2506_C4_B1	B		18	48	17	31	96	CI Intermediate Plasticity
2506_D4_B1	B		20	46	21	25	99	CI Intermediate Plasticity
2506_E4_B1	B		20	48	24	24	95	CI Intermediate Plasticity
2506_B7_B1	B		21	47	18	29	97	CI Intermediate Plasticity
2506_C7_B1	B		24	46	20	26	94	CI Intermediate Plasticity
2506_D7_B1	B		23	48	23	25	95	CI Intermediate Plasticity

Symbols: **NP : Non Plastic** **# : Liquid Limit and Plastic Limit Wet Sieved**

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.
BS 5930:1999+A2:2010



For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/ Quality Assistant)
Date: 26.7.15

UKAS TESTING 2788

SUMMARY OF SOIL DENSITY TESTS.

(B.S. 1377 : PART 2 : 7.2 & 8.2: 1990)

Client ref:
Location: Docksway Landfill, Newport
Contract Number: 27495-100715
Hole Number: As Stated
Sample Number: As Stated
Depth (m) : As Stated
Sample Type: As Stated

Location Number	Sample Number	Sample Type	Depth m from	Depth m to	Moisture Content %	Bulk Density Mg/ m3	Dry Density Mg/ m3	Method of Laboratory compaction (kg Rammer)	Particle Density Mg/ m3	Remarks
2506_B4_C1		C			20	2.00	1.68			
2506_C4_C1		C			22	2.06	1.69			
2506_D4_C1		C			22	2.12	1.75			
2506_E4_C1		C			20	2.03	1.69			
2506_B7_C1		C			22	1.90	1.57			
2506_C7_C1		C			19	2.08	1.75			
2506_D7_C1		C			19	2.07	1.73			

GSTL
GEO Site & Testing Services Limited

Checked by:
Jonathan Tatam
(Admin/ Quality Assistant)

Approved by:
Paul Evans
(Quality Manager)

UKAS TESTING 2788

Date of approval: 26/07/15

Dry Density/ Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Docksway Landfill, Newport**

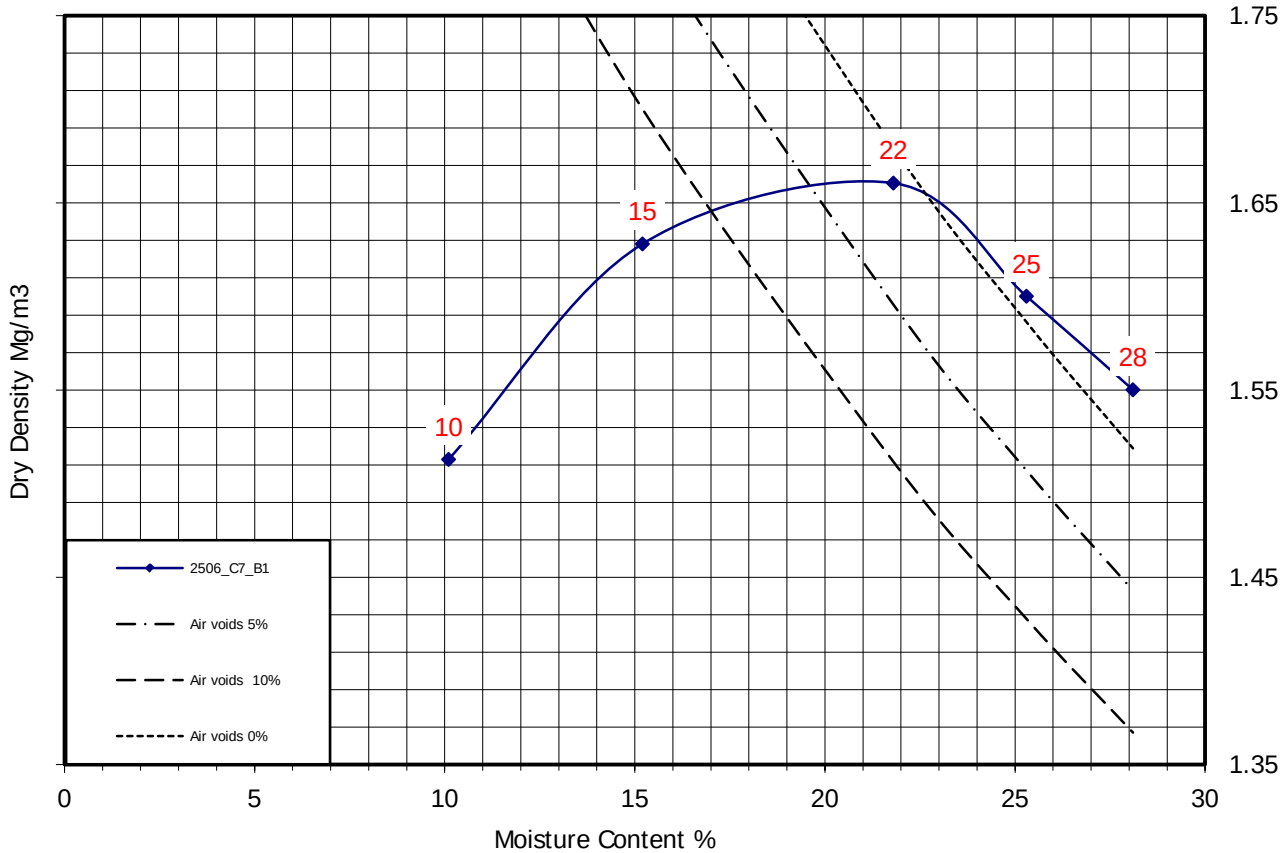
Contract Number: **27495-100715**

Hole Number: **2506_C7_B1**

Sample Number:

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	10	15	22	25	28
Bulk Density (Mg/m^3):	1.67	1.88	2.02	2.00	1.99
Dry Density (Mg/m^3):	1.51	1.63	1.66	1.60	1.55

Initial Moisture Content:	**22**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**1**
Maximum Dry Density (mg/m^3):	**1.66**	Material Retained on 20.0 mm Test Sieve (%):	**5**
Optimum Moisture Content (%):	**22**	Sample Preparation Clause:	**3.2.4.2**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: 26.7.15

UKAS TESTING
2788

Dry Density/ Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:

Location: **Docksway Landfill, Newport**

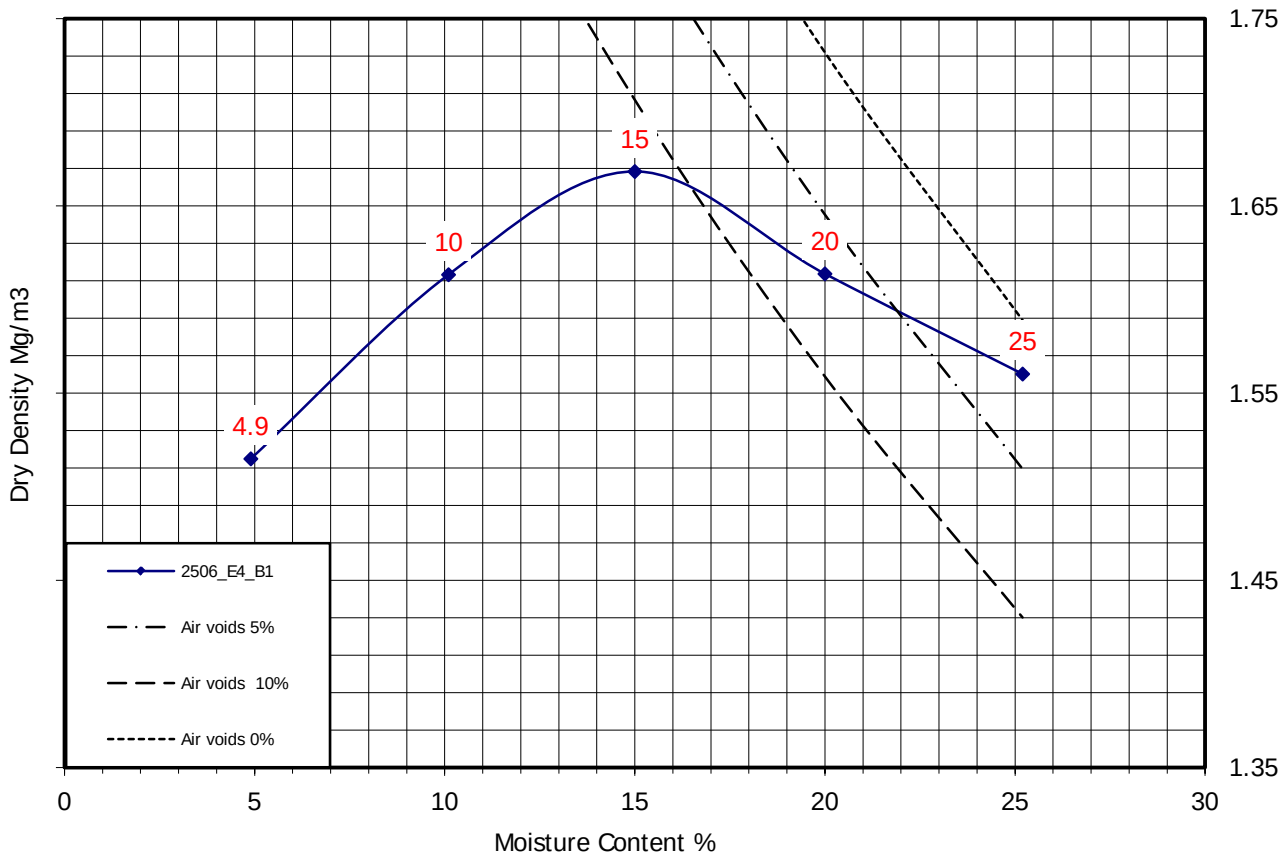
Contract Number: **27495-100715**

Hole Number: **2506_E4_B1**

Sample Number:

Depth (m):

Sample Type: **B**



Compaction Point:	1	2	3	4	5
Moisture Content:	4.9	10	15	20	25
Bulk Density (Mg/m^3):	1.59	1.78	1.92	1.94	1.95
Dry Density (Mg/m^3):	1.51	1.61	1.67	1.61	1.56

Initial Moisture Content:	**20**	Method of Compaction:	**2.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**0**
Maximum Dry Density (mg/m^3):	**1.67**	Material Retained on 20.0 mm Test Sieve (%):	**5**
Optimum Moisture Content (%):	**15**	Sample Preparation Clause:	**3.2.4.2**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Jonathan Tatam

Approved By:
Paul Evans

Date Approved: 26.7.15

UKAS TESTING
2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		2506 C7 C1P
Sample No.		
Depth	m	
Date		27/07/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark grey fine silty CLAY

Initial Specimen Conditions

Height	mm	130.00
Diameter	mm	101.00
Area	mm^2	8011.85
Volume	cm^3	1041.54
Mass	g	2170.10
Dry Mass	g	1816.70
Density	Mg/m^3	2.08
Dry Density	Mg/m^3	1.74
Moisture Content	%	19.5
Voids Ratio		0.519
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	20.66
Density	Mg/m^3	2.15
Dry Density	Mg/m^3	1.78

Test Setup

Date started	15/07/2015
Date Finished	24/07/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 10
Cell Number	CPerm 10

DP Gans

Checked and Approved By

27/ 07/ 15
Date

GSTL
GEO Site & Testing Services Limited

Docksway Landfill

Client Ref

NCC 2506

Contract No

27495

UKAS TESTING
2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		2506 C7 C1P
Sample No.		
Depth	m	
Date		27/07/2015

Saturation

Cell Pressure Incr.	kPa	60.00
Back Pressure Incr.	kPa	57.50
Differential Pressure	kPa	2.50
Final Cell Pressure	kPa	270.00
Final Pore Pressure	kPa	265.00
Final B Value		0.96

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	270.00
Back Pressure	kPa	170.00
Excess Pore Pressure	kPa	95.00
Pore Pressure at End	kPa	170.00
Consolidated Volume	cm^3	1020.14
Consolidated Height	mm	129.11
Consolidated Area	mm^2	7902.10
Vol. Compressibility	m^2/MN	31.6270
Consolidation Coef.	$m^2/yr.$	0.2163
Final Voids Ratio		0.488

Permeability

Cell Pressure	kPa	270.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00340
Average Temperature	'C	20

Vertical Permeability I m/ s	**4.52 x 10-10**

Checked and Approved By

27/ 07/ 15
Date

Client Ref

NCC 2506

Contract No

27495

Docksway Landfill

GSTL
GEO Site & Testing Services Limited

UKAS TESTING
2788

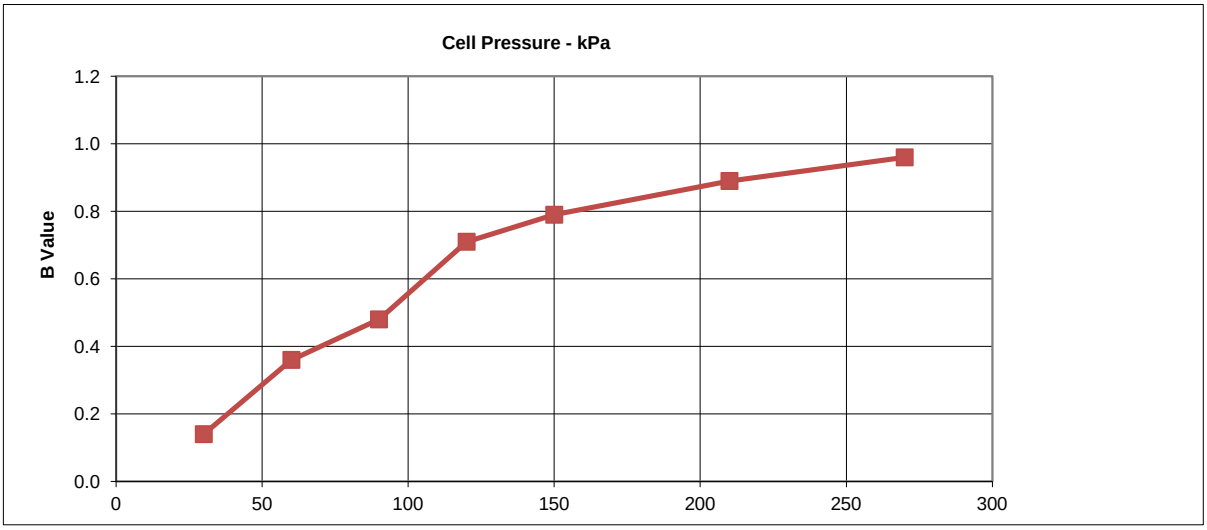
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

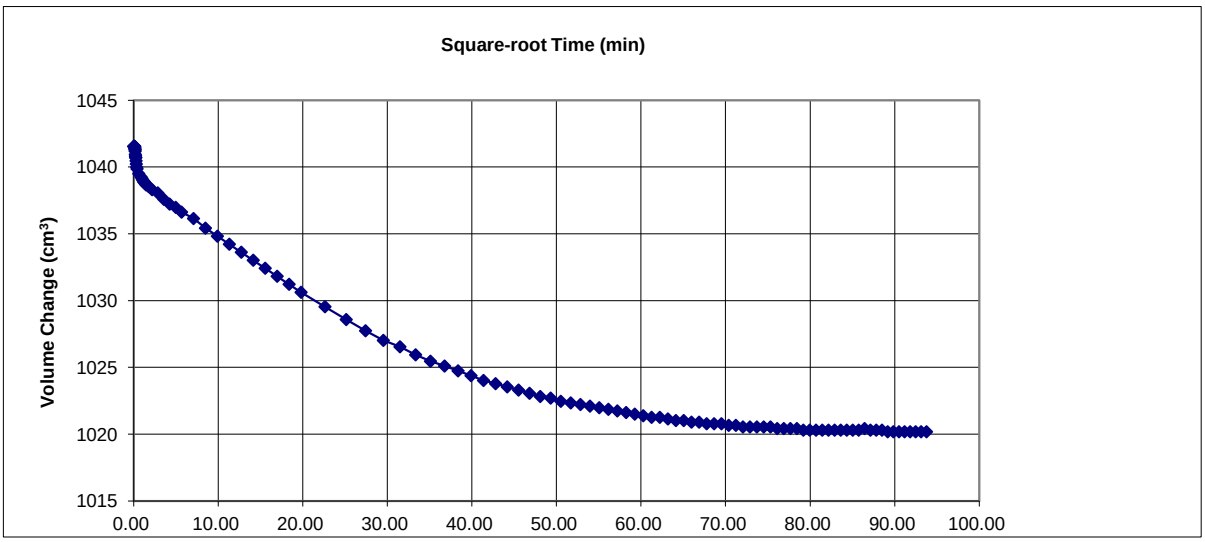
Specimen Details

Borehole		2506 C7 C1P
Sample No.		
Depth	m	
Date		27/07/2015

Saturation Stage



Consolidation Stage



D P Rands

Checked and Approved By

27/ 07/ 15
Date

Client Ref

NCC 2506

Contract No

27495

Docksway Landfill

GSTL
GEO Site & Testing Services Limited

UKAS TESTING
2788

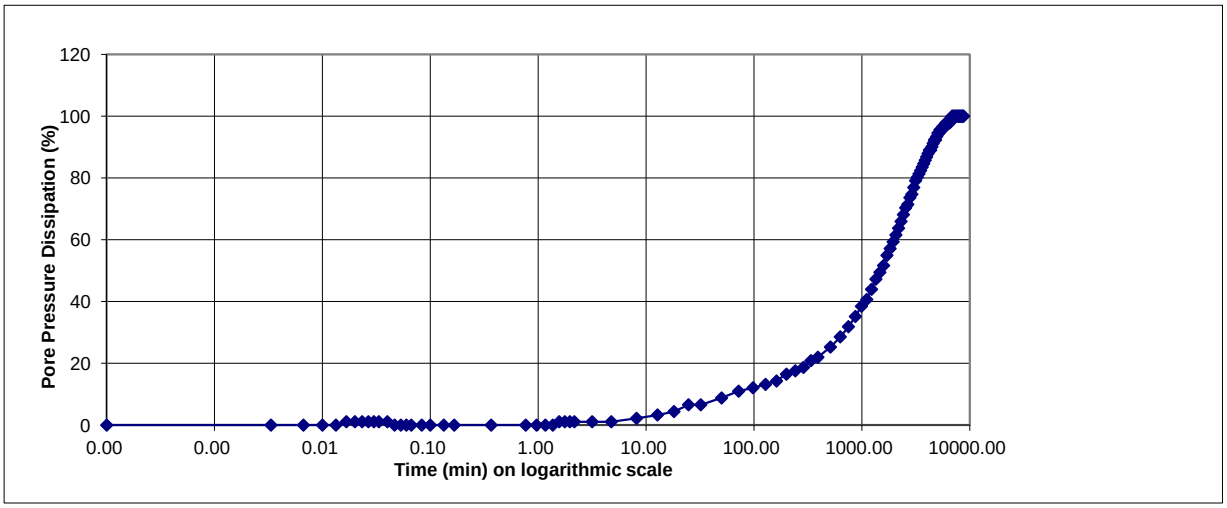
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

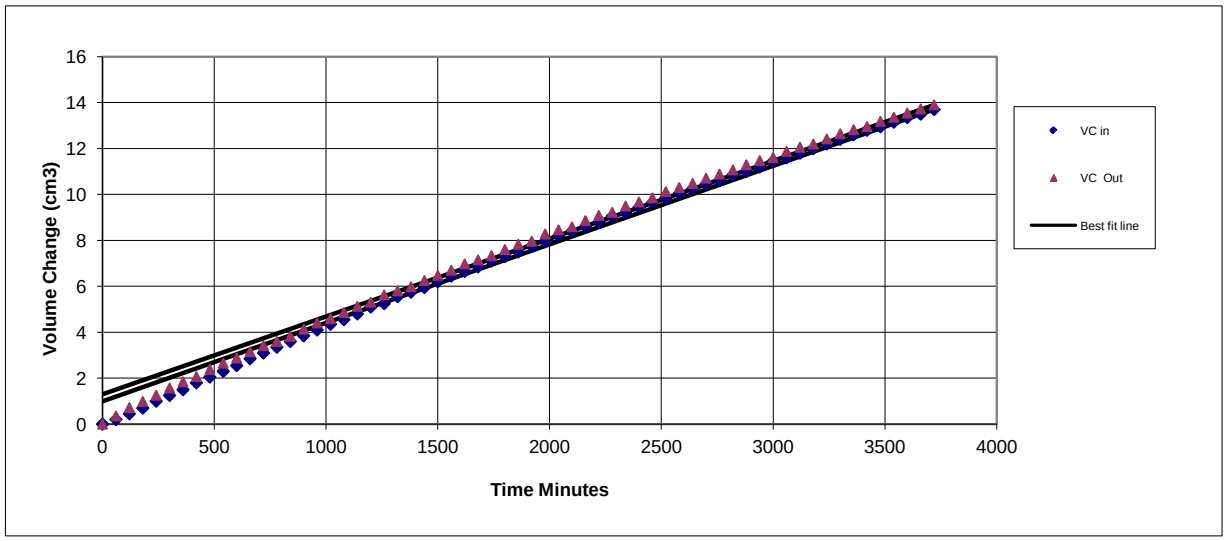
Specimen Details

Borehole		2506 C7 C1P
Sample No.		
Depth	m	
Date		27/07/2015

Consolidation Stage



Permeability Stage



DP Rands

Checked and Approved By

27/ 07/ 15
Date

Client Ref

NCC 2506

Docksway Landfill

Contract No

27495

GSTL
GEO Site & Testing Services Limited

UKAS TESTING
2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		2506 E4 C1P
Sample No.		
Depth	m	
Date		27/07/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark grey fine silty firm CLAY

Initial Specimen Conditions

Height	mm	130.00
Diameter	mm	101.00
Area	mm^2	8011.85
Volume	cm^3	1041.54
Mass	g	2156.30
Dry Mass	g	1789.90
Density	Mg/m^3	2.07
Dry Density	Mg/m^3	1.72
Moisture Content	%	20.5
Voids Ratio		0.542
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	21.17
Density	Mg/m^3	2.09
Dry Density	Mg/m^3	1.73

Test Setup

Date started	15/07/2015
Date Finished	24/07/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPERM 2
Cell Number	CPERM 2

D P Evans

Checked and Approved By

27/ 07/ 15
Date

Client Ref

NCC 2506

Docksway Landfill

Contract No

27495

GSTL
GEO Site & Testing Services Limited

UKAS TESTING 2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		2506 E4 C1P
Sample No.		
Depth	m	
Date		27/07/2015

Saturation

Cell Pressure Incr.	kPa	100.00
Back Pressure Incr.	kPa	97.00
Differential Pressure	kPa	3.00
Final Cell Pressure	kPa	500.00
Final Pore Pressure	kPa	491.00
Final B Value		0.97

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	500.00
Back Pressure	kPa	400.00
Excess Pore Pressure	kPa	91.00
Pore Pressure at End	kPa	400.00
Consolidated Volume	cm^3	1036.04
Consolidated Height	mm	129.77
Consolidated Area	mm^2	7983.64
Vol. Compressibility	m^2/MN	2135.4766
Consolidation Coef.	$m^2/yr.$	0.0580
Final Voids Ratio		0.534

Permeability

Cell Pressure	kPa	500.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00239
Average Temperature	'C	20

Vertical Permeability Kv	**m/ s**	**3.16 x 10-10**

D P Gras

Checked and Approved By

27/ 07/ 15
Date

Client Ref

NCC 2506

Docksway Landfill

Contract No

27495

GSTL
GEO Site & Testing Services Limited

UKAS TESTING 2788

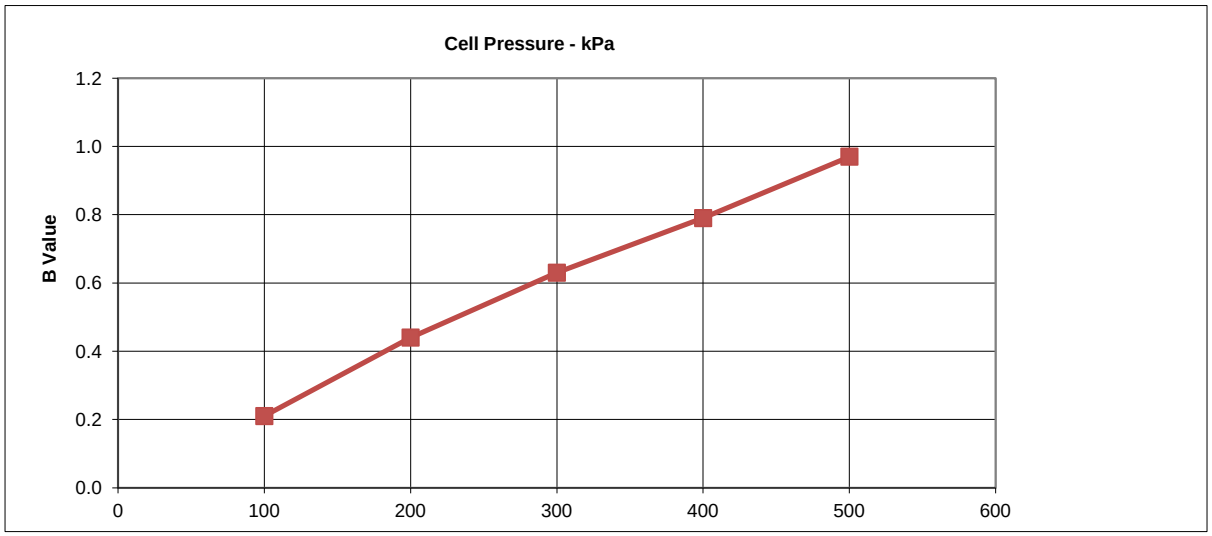
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

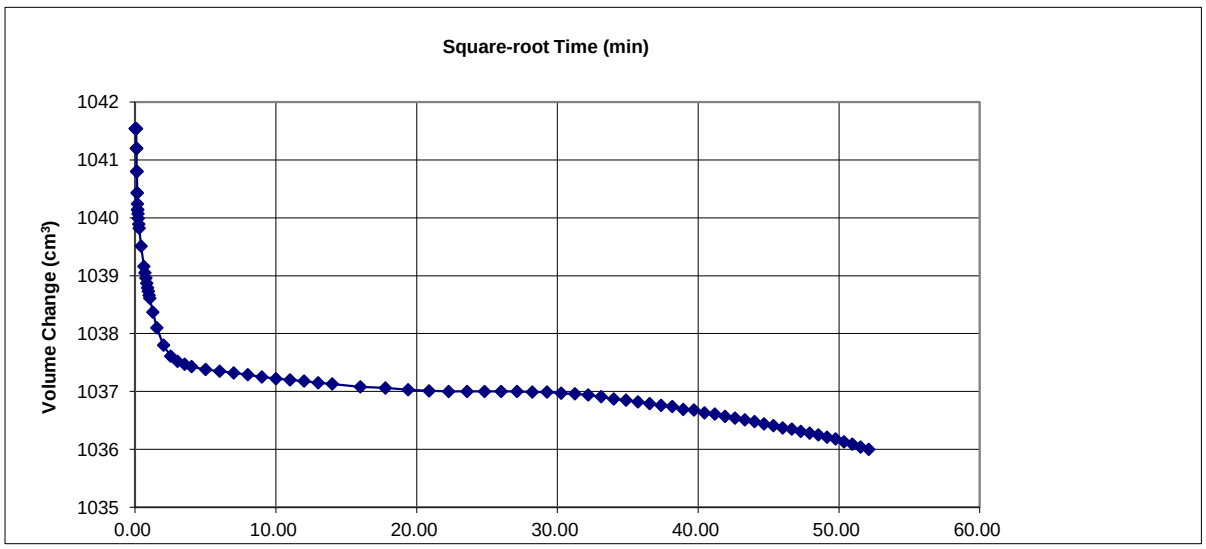
Specimen Details

Borehole		2506 E4 C1P
Sample No.		
Depth	m	
Date		27/07/2015

Saturation Stage



Consolidation Stage



DP Ward

Checked and Approved By

27/ 07/ 15
Date

Client Ref

NCC 2506

Docksway Landfill

Contract No

27495

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UKAS TESTING 2788

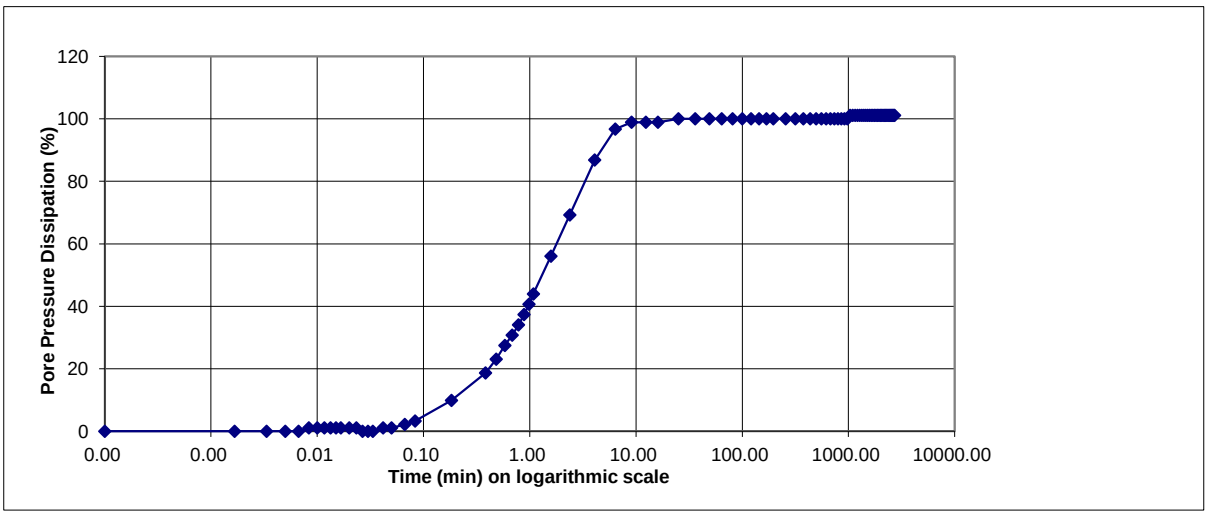
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

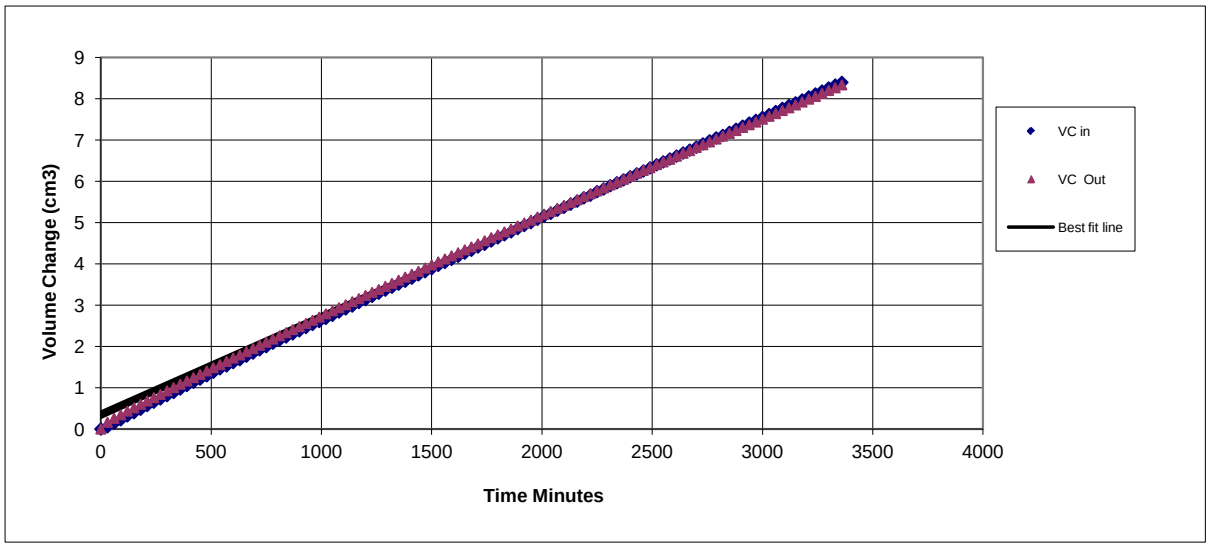
Specimen Details

Borehole		2506 E4 C1P
Sample No.		
Depth	m	
Date		27/07/2015

Consolidation Stage



Permeability Stage



D P Evans

Checked and Approved By

27/ 07/ 15
Date

Client Ref

NCC 2506

Contract No

27495

Docksway Landfill

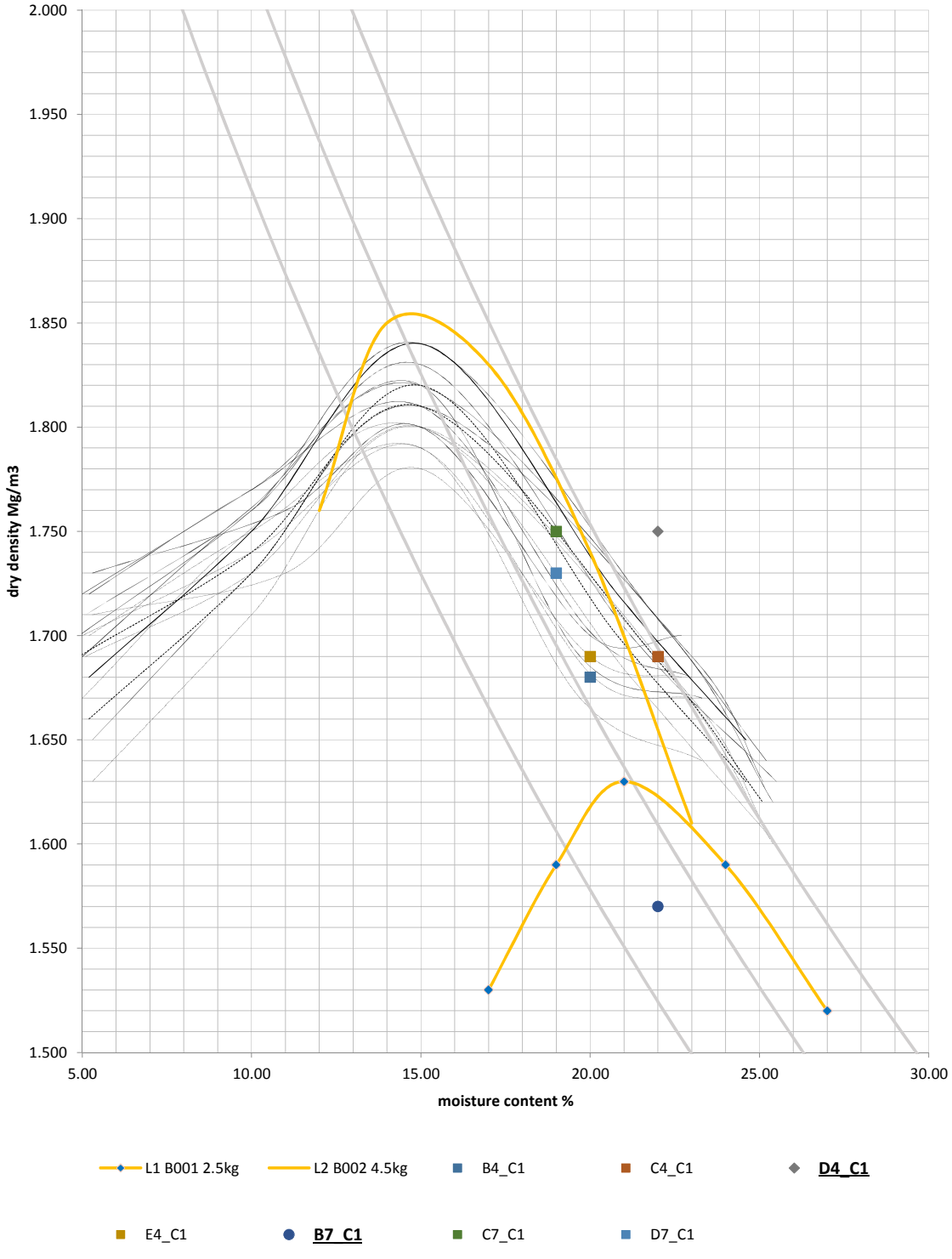
GSTL
GEO Site & Testing Services Limited

UKAS TESTING
2788

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 27.07.2015

GSTL Certifacte(s) 27495



Laboratory Report

GEO Site & Testing Services Ltd

Contract Number: 27596

Client's Reference: **NCC_2506**

Report Date: **31-07-2015**

Client **Jim Davies Civil Engineering Ltd**
Ty Gwyn,
Banalog Terrace,
Hollybush,
Blackwood
NP12 0SG

Contract Title: **Docksway Landfill - Newport**

For the attention of: **Meirion Humphreys**

Date Received: **16-07-2015**

Date Commenced: **16-07-2015**

Date Completed: **31-07-2015**

Test Description	Qty
Moisture Content 1377 : 1990 Part 2 : 3.2 - * UKAS	6
4 Point Liquid & Plastic Limit (LL/PL) 1377 : 1990 Part 2 : 4.3 & 5.3 - * UKAS	6
Bulk/Dry Density 1377 : 1990 Part 4 : 4.3/4.4 - * UKAS	6
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

Test Report: **Method of the Determination of the plastic limit and plasticity index**
BS 1377 : Part 2 : 1990 Method 5

Client ref:

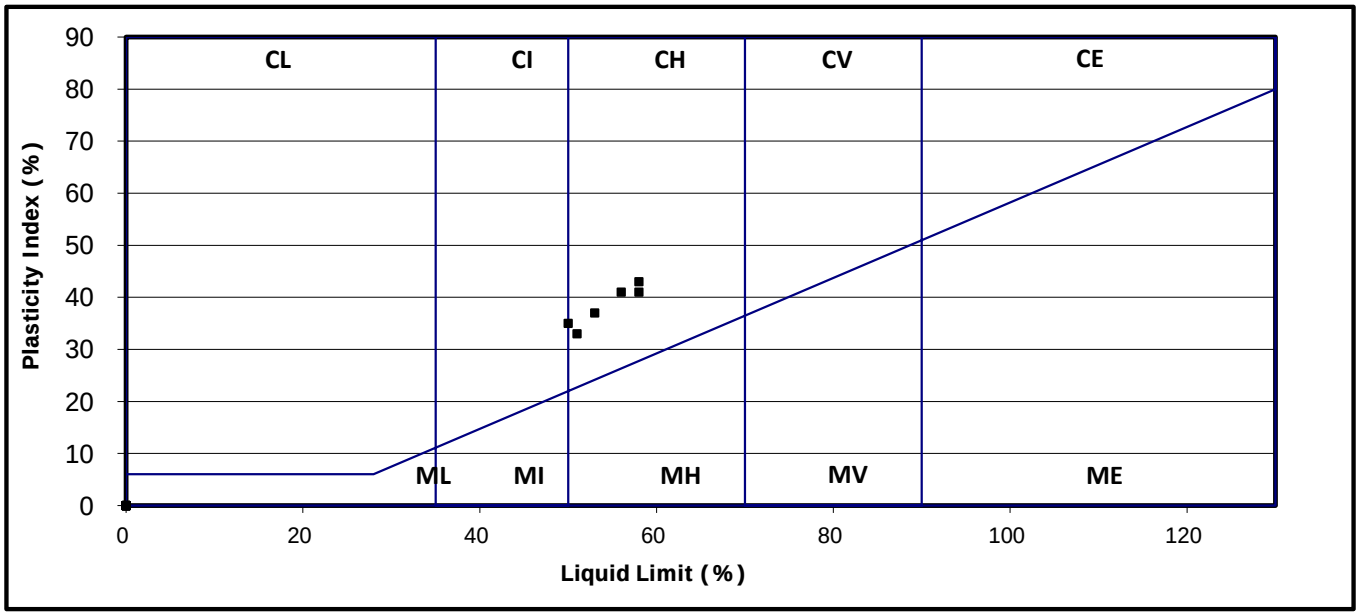
Location: **Docksway Landfill, Newport**

Contract Number: **27596-160715**

Hole/ Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3/4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
2506_B5_B2	B		26	51	18	33	98	CH High Plasticity
2506_C5_B2	B		34	53	16	37	99	CH High Plasticity
2506_D5_B2	B		22	50	15	35	98	CI/H Inter/High Plasticity
2506_E5_B2	B		18	56	15	41	96	CH High Plasticity
2506_D7_B1	B		25	58	17	41	95	CH High Plasticity
2506_C6_B1	B		23	58	15	43	99	CH High Plasticity

Symbols: **NP : Non Plastic** **# : Liquid Limit and Plastic Limit Wet Sieved**

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.
BS 5930:1999+A2:2010



For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Jonathan Tatam (Admin/Quality Assistant)
Date: 31.7.15

UKAS TESTING 2788

SUMMARY OF SOIL DENSITY TESTS.

(B.S. 1377 : PART 2 : 7.2 & 8.2: 1990)

Client ref:
Location: Docksway Landfill, Newport
Contract Number: 27596-160715
Hole Number: As Stated
Sample Number: As Stated
Depth (m) : As Stated
Sample Type: As Stated

Location Number	Sample Number	Sample Type	Depth m from	Depth m to	Moisture Content %	Bulk Density Mg/m3	Dry Density Mg/m3	Method of Laboratory compaction (kg Rammer)	Particle Density Mg/m3	Remarks
2506_B5_C2		C			24	2.10	1.69			
2506_C5_C2		C			24	1.98	1.60			
2506_D5_C2		C			23	2.03	1.66			
2506_E5_C2		C			19	2.05	1.72			
2506_D7_C1		C			23	2.13	1.88			
2506_C6_C1		C			18	1.99	1.70			

GSTL
GEO Site & Testing Services Limited

Checked by:
Jonathan Tatam
(Admin/Quality Assistant)

Approved by:
Paul Evans
(Quality Manager)

UKAS TESTING 2788

Date of approval: 27/07/15

Laboratory Report

GEO Site & Testing Services Ltd

Contract Number: 27668

Client's Reference:

Report Date: **06-08-2015**

Client **Jim Davies Civil Engineering Ltd**
Ty Gwyn,
Banalog Terrace,
Hollybush,
Blackwood
NP12 0SG

Contract Title: **Docksway Landfill - Newport**

For the attention of: **Meirion Humphreys**

Date Received: **22-07-2015**

Date Commenced: **22-07-2015**

Date Completed: **06-08-2015**

Test Description	Qty
Moisture Content 1377 : 1990 Part 2 : 3.2 - * UKAS	22
4 Point Liquid & Plastic Limit (LL/PL) 1377 : 1990 Part 2 : 4.3 & 5.3 - * UKAS	22
Dry Den/MC (4.5kg Rammer Method 1 Litre Mould) 1377 : 1990 Part 4 : 3.5 - * UKAS	1
Bulk/Dry Density 1377 : 1990 Part 4 : 4.3/4.4 - * UKAS	22
Determination of Permeability in a triaxial cell BS1377 Part 6 :1990 Clause 6 - * UKAS	1
Extra Over Item (4 Days Over)	5
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

Client ref: N/A

Location: Docksway Landfill

Contract Number: 27668-220715

Hole Number	Sample Number	Type	Depth (m)	Description of Sample*
2506	B4	B2		Greyish brown gravelly silty CLAY.
2506	C4	B2		Greyish brown silty CLAY.
2506	B5	B2		Greyish brown gravelly silty CLAY.
2506	C5	B2		Greyish brown gravelly silty CLAY.
2506	E4	B2		Greyish brown gravelly silty CLAY.
2506	F4	B2		Greyish brown gravelly silty CLAY.
2506	A4	B1		Greyish brown silty CLAY.
2506	A5	B1		Greyish brown gravelly silty CLAY.
2506	A6	B1		Greyish brown gravelly silty CLAY.
2506	A4	B2		Greyish brown gravelly silty CLAY.
2506	A5	B2		Greyish brown gravelly silty CLAY.
2506	A6	B2		Greyish brown gravelly silty CLAY.
2506	E6	B2		Greyish brown gravelly silty CLAY.
2506	D6	B2		Greyish brown silty CLAY.
2506	F5	B2		Greyish brown gravelly silty CLAY.
2506	F6	B1		Greyish brown gravelly silty CLAY.
2506	F7	B1		Greyish brown gravelly silty CLAY.

Note: Results on this table are in summary format and may not meet the requirements of the relevant standards, additional information is held by the laboratory

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GEO SITE & TESTING SERVICES LTD

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)
Date: 6.8.15

UKAS TESTING
2788

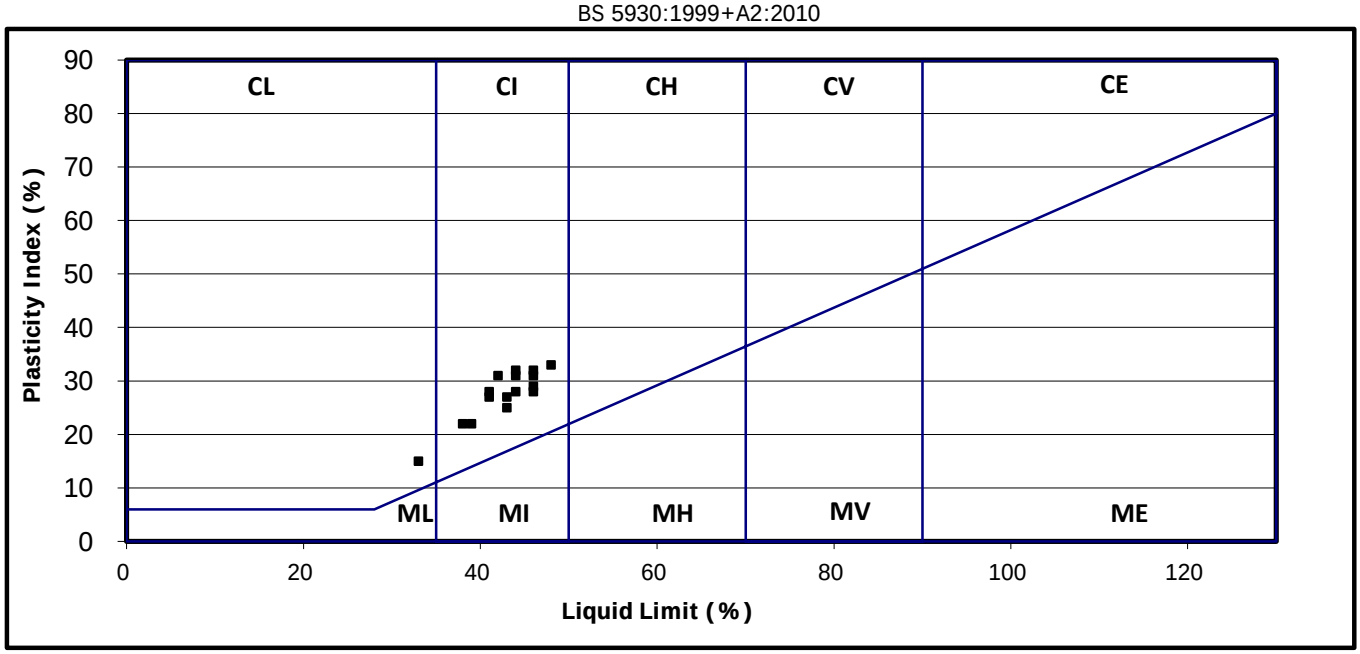
Test Report: **Method of the Determination of the plastic limit and plasticity index**
BS 1377 : Part 2 : 1990 Method 5

Client ref: N/A
Location: Docksway Landfill
Contract Number: 27668-220715

Hole / Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3/4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
2506/B4	B2		22	48	15	33	90	CI Intermediate Plasticity
2506/C4	B2		21	33	18	15	90	CL Low Plasticity
2506/B5	B2		23	41	14	27	90	CI Intermediate Plasticity
2506/C5	B2		23	46	18	28	90	CI Intermediate Plasticity
2506/E4	B2		23	44	12	32	90	CI Intermediate Plasticity
2506/F4	B2		26	43	16	27	90	CI Intermediate Plasticity
2506/A4	B1		25	46	17	29	90	CI Intermediate Plasticity
2506/A5	B1		23	41	13	28	90	CI Intermediate Plasticity
2506/A6	B1		21	39	17	22	90	CI Intermediate Plasticity
2506/A4	B2		24	44	16	28	90	CI Intermediate Plasticity
2506/A5	B2		22	42	11	31	90	CI Intermediate Plasticity
2506/A6	B2		23	44	13	31	90	CI Intermediate Plasticity
2506/E6	B2		24	46	14	32	90	CI Intermediate Plasticity
2506/D6	B2		20	43	18	25	90	CI Intermediate Plasticity
2506/F5	B2		19	46	15	31	90	CI Intermediate Plasticity
2506/F6	B1		20	38	16	22	90	CI Intermediate Plasticity
2506/F7	B1		22	45	17	28	90	CI Intermediate Plasticity

Symbols: **NP : Non Plastic** **# : Liquid Limit and Plastic Limit Wet Sieved**

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.
BS 5930:1999+A2:2010



For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)

Date: 6.8.15

GSTL
GEO SITE & TESTING SERVICES LTD

UKAS TESTING 2788

Client ref: N/A

Location: Docksway Landfill

Contract Number: 27668-220715

Hole Number	Sample Number	Type	Depth (m)	Description of Sample*
2506	E7	B1		Greyish brown silty CLAY.
2506	C7	B2		Greyish brown silty CLAY.
2506	B7	B2		Greyish brown gravelly fine to medium silty CLAY.
2506	A3	B1		Greyish brown gravelly fine to medium silty CLAY.
2506	D7	B2		Greyish brown gravelly fine to medium silty CLAY.

Note: Results on this table are in summary format and may not meet the requirements of the relevant standards, additional information is held by the laboratory

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GEO SITE & TESTING SERVICES LTD

For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)
Date: 6.8.15

UKAS TESTING
2788

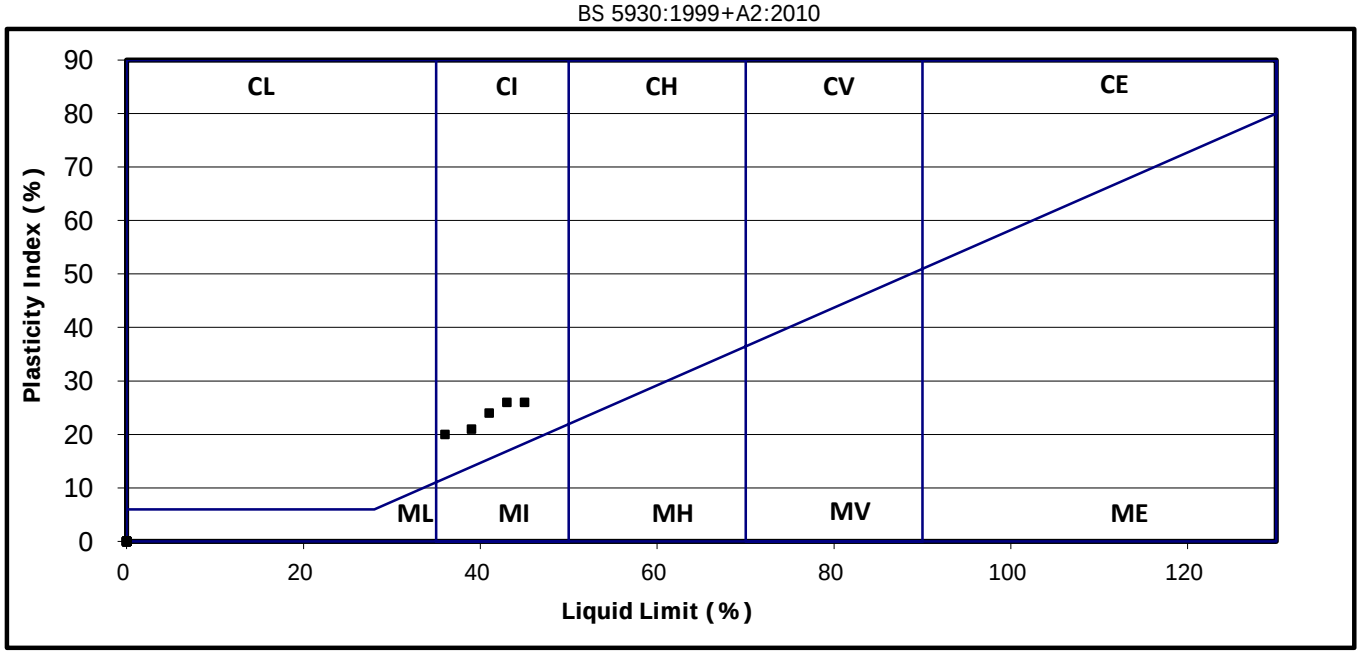
Test Report: **Method of the Determination of the plastic limit and plasticity index**
BS 1377 : Part 2 : 1990 Method 5

Client ref: N/A
Location: Docksway Landfill
Contract Number: 27668-220715

Hole / Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3/4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
2506/E7	B1		19	43	17	26	90	CI Intermediate Plasticity
2506/C7	B2		22	41	17	24	91	CI Intermediate Plasticity
2506/B7	B2		21	45	19	26	90	CI Intermediate Plasticity
2506/A3	B1		18	39	18	21	90	CI Intermediate Plasticity
2506/D7	B2		22	36	16	20	90	CI Intermediate Plasticity

Symbols: **NP : Non Plastic** **# : Liquid Limit and Plastic Limit Wet Sieved**

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.
BS 5930:1999+A2:2010



For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)

Date: 6.8.15

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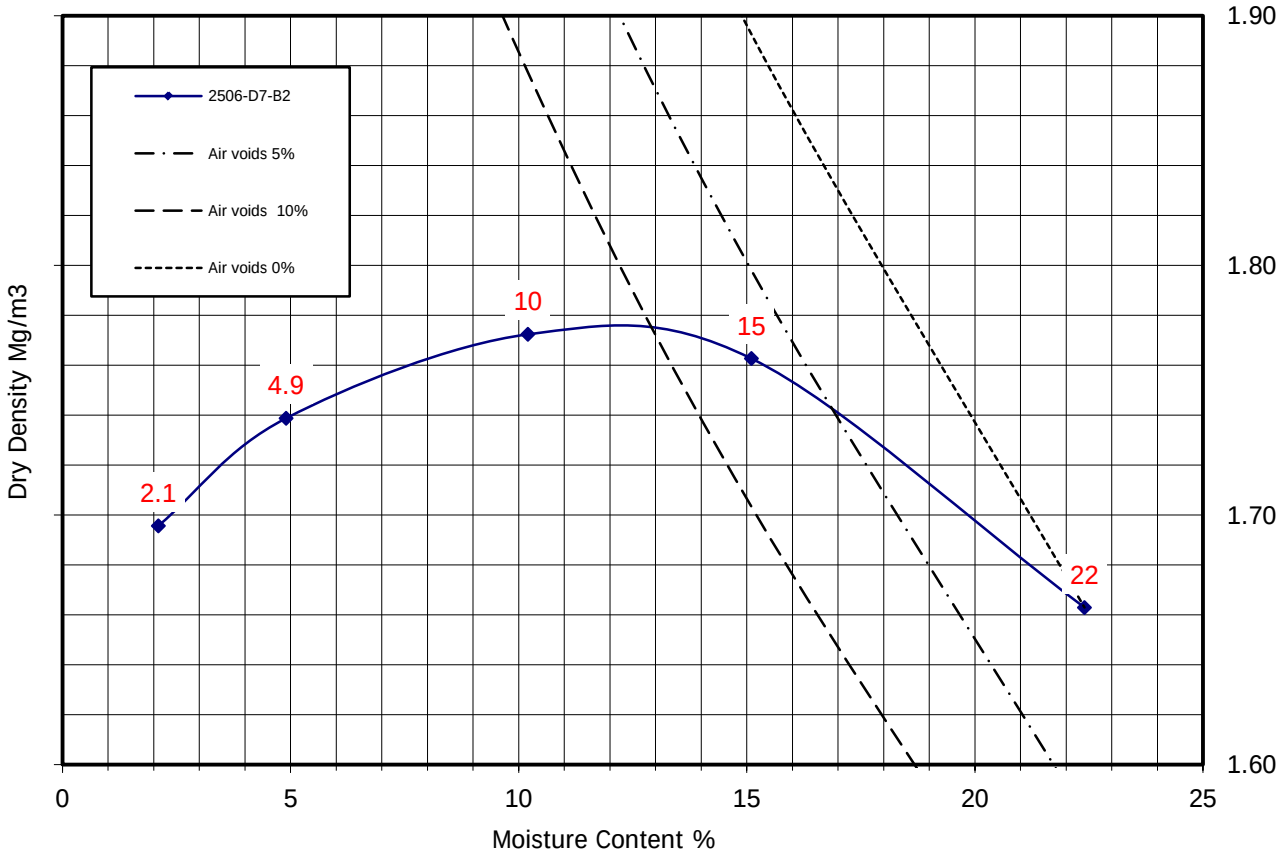
Dry Density / Moisture Content Relationship

BS 1377:Part 4:1990

Client ref:	**N/A**		
Location:	**Docksway Landfill**		
Contract Number:	**27668-**		
Hole Number:	**2506-D7-B2**		
Sample Number:	**N/A**		
Depth (m):	**N/A**	**-**	**N/A**
Sample Type:	**B**		



Compaction Point:	1	2	3	4	5
Moisture Content:	2.1	4.9	10	15.1	22.4
Bulk Density (Mg/m^3):	1.73	1.82	1.95	2.03	2.04
Dry Density (Mg/m^3):	1.70	1.74	1.77	1.76	1.66

Initial Moisture Content:	**22**	Method of Compaction:	**4.5kg Rammer**
Particle Density (Mg/m^3):	**2.65 Assumed**	Material Retained on 37.5 mm Test Sieve (%):	**3.2**
Maximum Dry Density (mg/m^3):	**1.77**	Material Retained on 20.0 mm Test Sieve (%):	**9.6**
Optimum Moisture Content (%):	**10**	Sample Preparation Clause:	**3.2.4.1**

Remarks:

GSTL
GEO Site & Testing Services Limited

Checked By:
Emma Sharp

Approved By:
Paul Evans

Date Approved: 6.8.15

UKAS TESTING
2788

SUMMARY OF SOIL DENSITY TESTS.

(B.S. 1377 : PART 2 : 7.2 & 8.2: 1990)

Client ref:
Location: Docksway Landfill, Newport
Contract Number: 27668-220715
Hole Number: As Stated
Sample Number: As Stated
Depth (m) : As Stated
Sample Type: As Stated

Location Number	Sample Number	Sample Type	Depth m from	Depth m to	Moisture Content %	Bulk Density Mg/m3	Dry Density Mg/m3	Method of Laboratory compaction (kg Rammer)	Particle Density Mg/m3	Remarks
2506_B4_C2		C			22	1.83	1.50			
2506_C4_C2		C			22	2.13	1.75			
2506_B5_C2		C			17	1.95	1.66			
2506_C5_C2		C			21	2.00	1.65			
2506_D4_C2		C			19	1.97	1.66			
2506_E4_C2		C			18	2.24	1.89			
2506_A4_C1		C			21	1.98	1.63			
2506_A5_C1		C			21	2.03	1.68			
2506_A6_C1		C			18	2.15	1.82			
2506_A4_C2		C			21	1.97	1.62			
2506_A5_C2		C			22	1.94	1.60			
2506_A6_C2		C			23	2.07	1.67			
2506_E6_C2		C			25	2.00	1.60			
2506_D6_C2		C			21	2.07	1.71			
2506_F5_C2		C			21	1.96	1.61			
2506_F6_C1		C			19	2.05	1.73			
2506_F7_C1		C			23	2.11	1.72			
2506_E7_C1		C			20	1.93	1.60			
2506_D7_C2		C			18	1.98	1.68			
2506_C7_C2		C			22	1.93	1.59			
2506_B7_C2		C			24	1.87	1.50			
2506_A3_C1		C			19	2.12	1.78			

GSTL
GEO Site & Testing Services Limited

Checked by:
Jonathan Tatam
(Admin/Quality Assistant)

Approved by:
Paul Evans
(Quality Manager)

UKAS TESTING 2788

Date of approval: 29/07/15

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		2506 D7 C2P
Sample No.		
Depth	m	
Date		04/08/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark grey sl silty CLAY

Initial Specimen Conditions

Height	mm	135.00
Diameter	mm	98.00
Area	mm^2	7542.96
Volume	cm^3	1018.30
Mass	g	1994.10
Dry Mass	g	1648.50
Density	Mg/m^3	1.96
Dry Density	Mg/m^3	1.62
Moisture Content	%	21.0
Voids Ratio		0.637
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	22.50
Density	Mg/m^3	2.01
Dry Density	Mg/m^3	1.64

Test Setup

Date started	25/07/2015
Date Finished	03/08/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 01
Cell Number	CPerm 01

DP Gans

Checked and Approved By

04/08/15
Date

Client Ref

GSTL
GEO Site & Testing Services Limited

Docksway Landfill - Newport

Contract No

27668

UKAS TESTING
2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		2506 D7 C2P
Sample No.		
Depth	m	
Date		04/08/2015

Saturation

Cell Pressure Incr.	kPa	25.00
Back Pressure Incr.	kPa	24.00
Differential Pressure	kPa	1.00
Final Cell Pressure	kPa	200.00
Final Pore Pressure	kPa	191.40
Final B Value		0.96

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	200.00
Back Pressure	kPa	100.00
Excess Pore Pressure	kPa	92.60
Pore Pressure at End	kPa	100.00
Consolidated Volume	cm^3	1007.10
Consolidated Height	mm	134.51
Consolidated Area	mm^2	7487.66
Vol. Compressibility	m^2/MN	21.4789
Consolidation Coef.	$m^2/yr.$	0.1188
Final Voids Ratio		0.619

Permeability

Cell Pressure	kPa	200.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00229
Average Temperature	'C	20

Vertical Permeability I m/s	**3.35 x 10-10**

DP Rees

Checked and Approved By

04/08/15
Date

Client Ref

GSTL
GEO Site & Testing Services Limited

Docksway Landfill - Newport

Contract No

27668

UKAS TESTING
2788

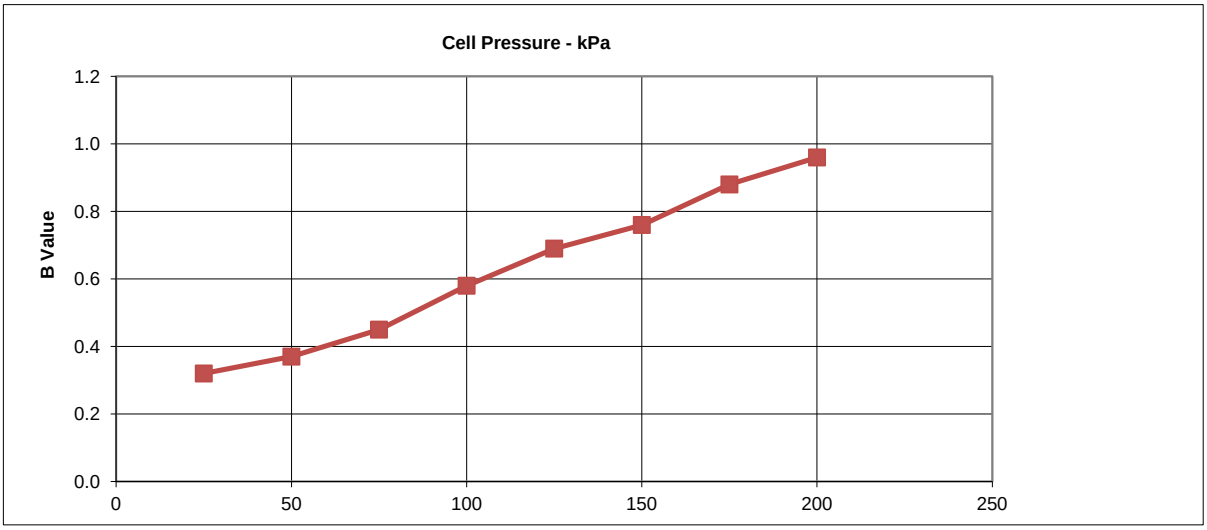
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

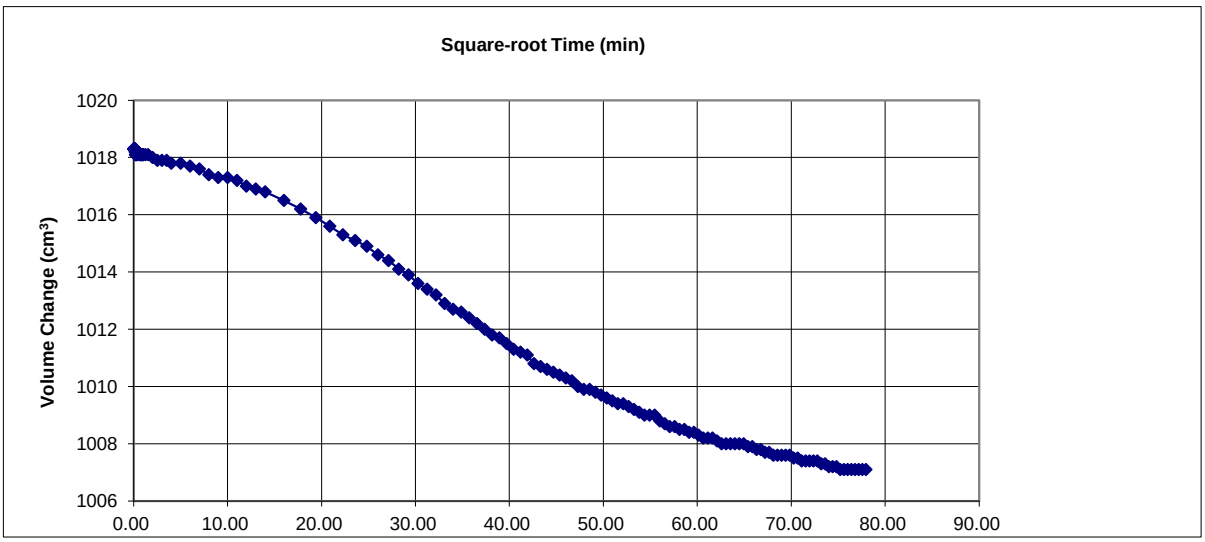
Specimen Details

Borehole		2506 D7 C2P
Sample No.		
Depth	m	
Date		04/08/2015

Saturation Stage



Consolidation Stage



DP Evans

Checked and Approved By

04/08/15
Date

Client Ref

Docksway Landfill - Newport

Contract No

27668

GSTL
GEO Site & Testing Services Limited

UKAS TESTING
2788

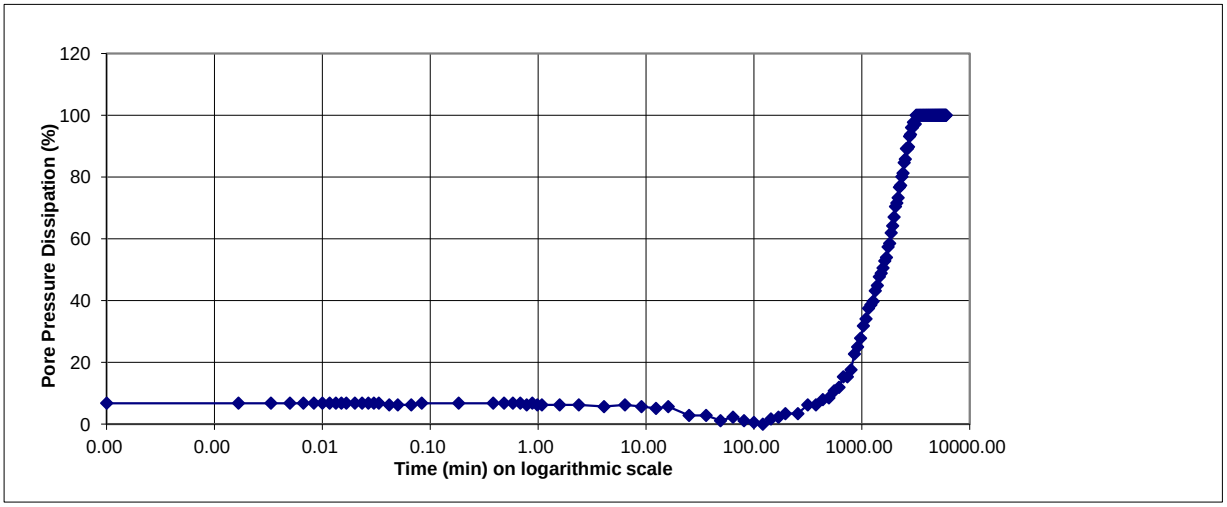
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

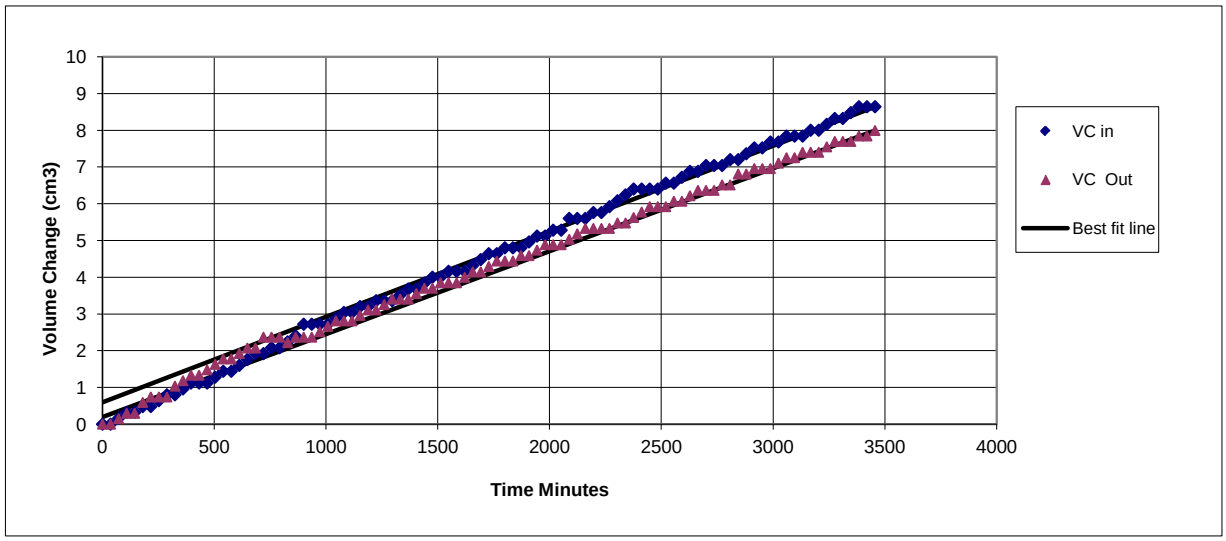
Specimen Details

Borehole		2506 D7 C2P
Sample No.		
Depth	m	
Date		04/08/2015

Consolidation Stage



Permeability Stage



D P Evans

Checked and Approved By

04/08/15
Date

Client Ref

GSTL
GEO Site & Testing Services Limited

Docksway Landfill - Newport

Contract No

27668

UKAS TESTING
2788

Laboratory Report

2788

GEO Site & Testing Services Ltd

Contract Number: 27718

Client's Reference:

Report Date: **18-08-2015**

Client **Jim Davies Civil Engineering Ltd**
Ty Gwyn,
Banalog Terrace,
Hollybush,
Blackwood
NP12 0SG

Contract Title: **Docksway Landfill - Newport**

For the attention of: **Meirion Humphreys**

Date Received: **27-07-2015**

Date Commenced: **27-07-2015**

Date Completed: **18-08-2015**

Test Description	Qty
Moisture Content 1377 : 1990 Part 2 : 3.2 - * UKAS	4
4 Point Liquid & Plastic Limit (LL/PL) 1377 : 1990 Part 2 : 4.3 & 5.3 - * UKAS	4
Bulk/Dry Density 1377 : 1990 Part 4 : 4.3/4.4 - * UKAS	4
Determination of Permeability in a triaxial cell BS1377 Part 6 :1990 Clause 6 - * UKAS	3
Extra Over Item (4 Days Over)	21
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

Client ref: N/ A

Location: Docksway Landfill

Contract Number: 27718-270715

Hole Number	Sample Number	Type	Depth (m)	Description of Sample*
2506	C3	B1		Greyish brown silty CLAY.
2506	A2	B1		Greyish brown silty CLAY.
2506	B2	B1		Greyish brown silty CLAY.
2506	B3	B1		Greyish brown silty CLAY.

Note: Results on this table are in summary format and may not meet the requirements of the relevant standards, additional information is held by the laboratory

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For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)
Date: 10.8.15

UKAS TESTING
2788

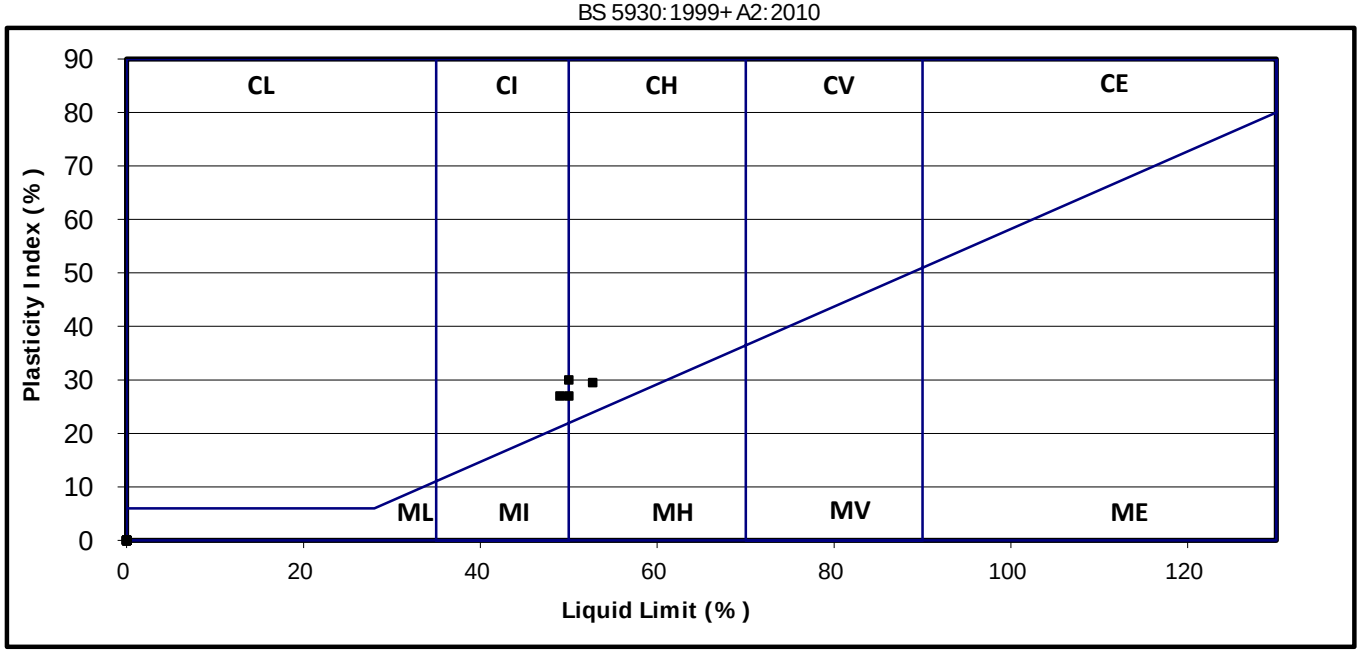
Test Report: **Method of the Determination of the plastic limit and plasticity index**
BS 1377 : Part 2 : 1990 Method 5

Client ref: N/ A
Location: Docksway Landfill
Contract Number: 27718-270715

Hole/ Sample Number	Sample Type	Depth m	Moisture Content % Cl. 3.2	Liquid Limit % Cl. 4.3/ 4.4	Plastic Limit % Cl. 5.	Plasticity Index % Cl. 6.	% Passing .425mm	Remarks
2506/ C3	B1		23	49	22	27	100	CI Intermediate Plasticity
2506/ A2	B1		24	50	23	27	100	CI / H Inter/ High Plasticity
2506/ B2	B1		25	50	20	30	100	CI / H Inter/ High Plasticity
2506/ B3	B1		24	53	23	30	100	CH High Plasticity

Symbols: **NP : Non Plastic** **# : Liquid Limit and Plastic Limit Wet Sieved**

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.
BS 5930:1999+A2:2010



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For and behalf of GEO Site & Testing Services Ltd

Authorised By:
Emma Sharp (Office Manager)

Date: 10.8.15

UKAS TESTING 2788

SUMMARY OF SOIL DENSITY TESTS.

(B.S. 1377 : PART 2 : 7.2 & 8.2: 1990)

Client ref: N/ A
Location: Docksway Landfill
Contract Number: 27718-270715

Location Number	Sample Type	Sample Number	Depth m from	Depth m to	Moisture Content %	Bulk Density Mg/m3	Dry Density Mg/m3	Sample condition Undisturbed/ Remoulded & (kg Rammer)	Particle Density Mg/m3	Mg/m3	Remarks
2506-A2	C1				21	1.98	1.63				
2506-A3	C1.2				20	1.93	1.60				
2506-B2	C1				24	1.87	1.50				
2506-B3	C1				22	1.83	1.50				

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GEO Site & Testing Services Limited

Checked by
Paul Evans
Quality Manager

Approved by
Ben Sharp
Contracts Manager

Date of approval: 10/08/15

UKAS TESTING 2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		C3 C1P
Sample No.		
Depth	m	
Date		15/08/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark greyish brown silty stiff CLAY

Initial Specimen Conditions

Height	mm	132.00
Diameter	mm	101.00
Area	mm^2	8011.85
Volume	cm^3	1057.56
Mass	g	2055.90
Dry Mass	g	1721.00
Density	Mg/m^3	1.94
Dry Density	Mg/m^3	1.63
Moisture Content	%	19.5
Voids Ratio		0.628
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	19.67
Density	Mg/m^3	1.96
Dry Density	Mg/m^3	1.63

Test Setup

Date started	31/07/2015
Date Finished	14/08/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 6
Cell Number	CPerm 6

D P Rands

Checked and Approved By

15/ 08/ 15
Date

GSTL
GEO Site & Testing Services Limited

Newport Docksway Landfill

Client Ref

Contract No

27718

UKAS TESTING
2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		C3 C1P
Sample No.		
Depth	m	
Date		15/08/2015

Saturation

Cell Pressure Incr.	kPa	25.00
Back Pressure Incr.	kPa	24.00
Differential Pressure	kPa	1.00
Final Cell Pressure	kPa	175.00
Final Pore Pressure	kPa	170.00
Final B Value		0.96

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	175.00
Back Pressure	kPa	75.00
Excess Pore Pressure	kPa	95.00
Pore Pressure at End	kPa	75.00
Consolidated Volume	cm^3	1053.06
Consolidated Height	mm	131.81
Consolidated Area	mm^2	7989.12
Vol. Compressibility	m^2/MN	54.3049
Consolidation Coef.	$m^2/yr.$	0.0448
Final Voids Ratio		0.622

Permeability

Cell Pressure	kPa	175.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00135
Average Temperature	'C	20

Vertical Permeability I m/ s	**1.81 x 10-10**

D P Evans

Checked and Approved By

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GEO Site & Testing Services Limited

Newport Docksway Landfill

Contract No

27718

UKAS TESTING 2788

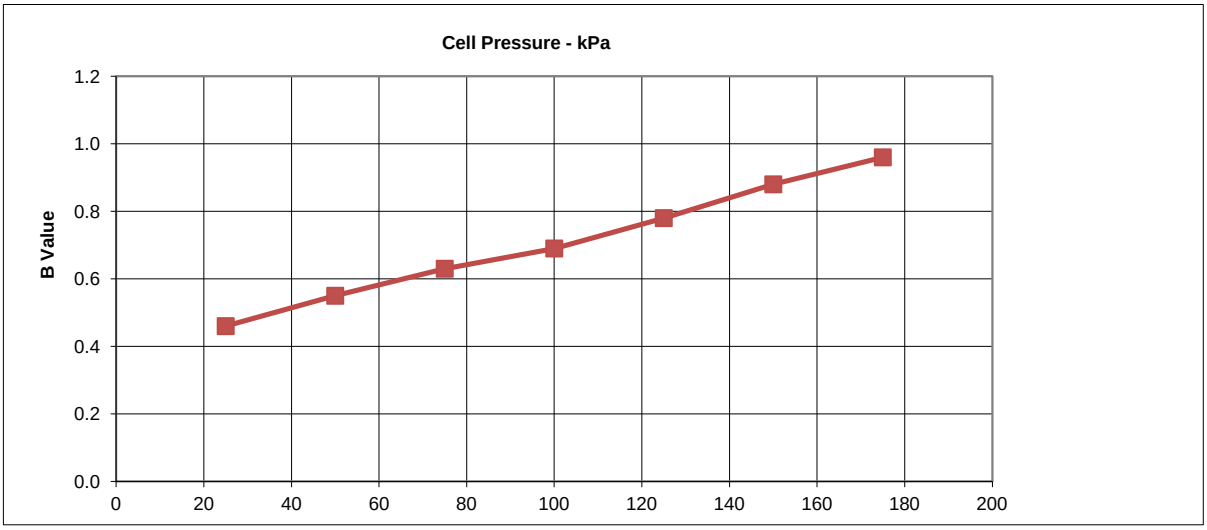
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

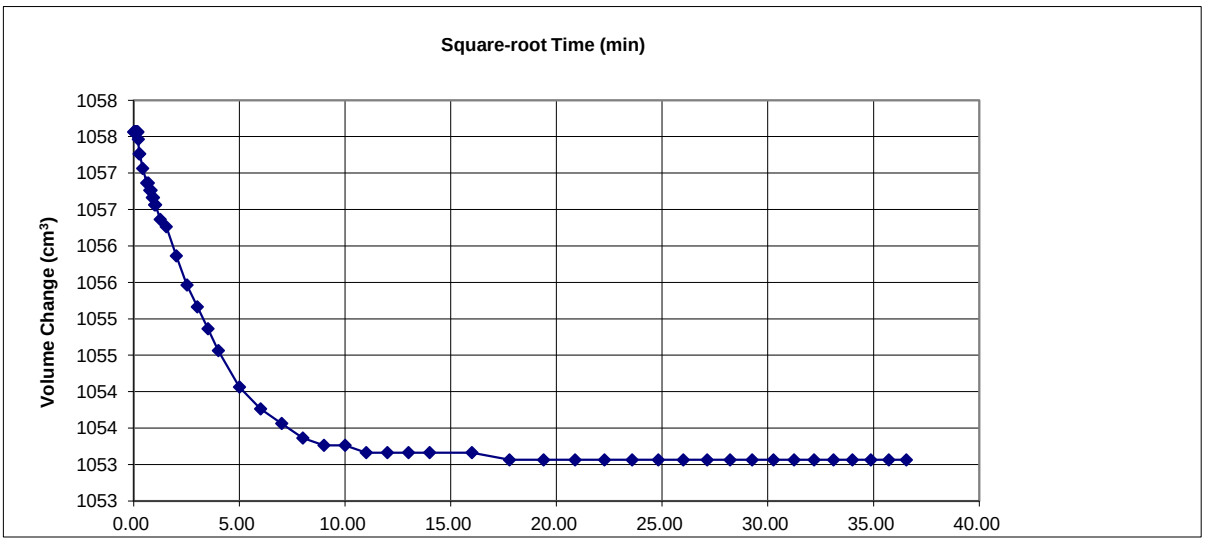
Specimen Details

Borehole		C3 C1P
Sample No.		
Depth	m	
Date		15/08/2015

Saturation Stage



Consolidation Stage



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Contract No

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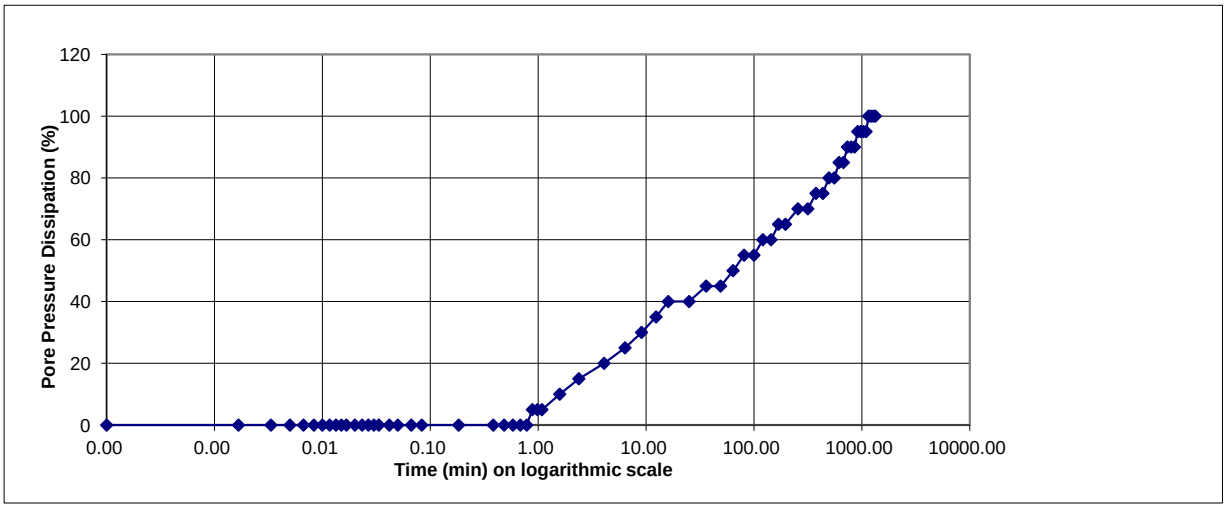
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

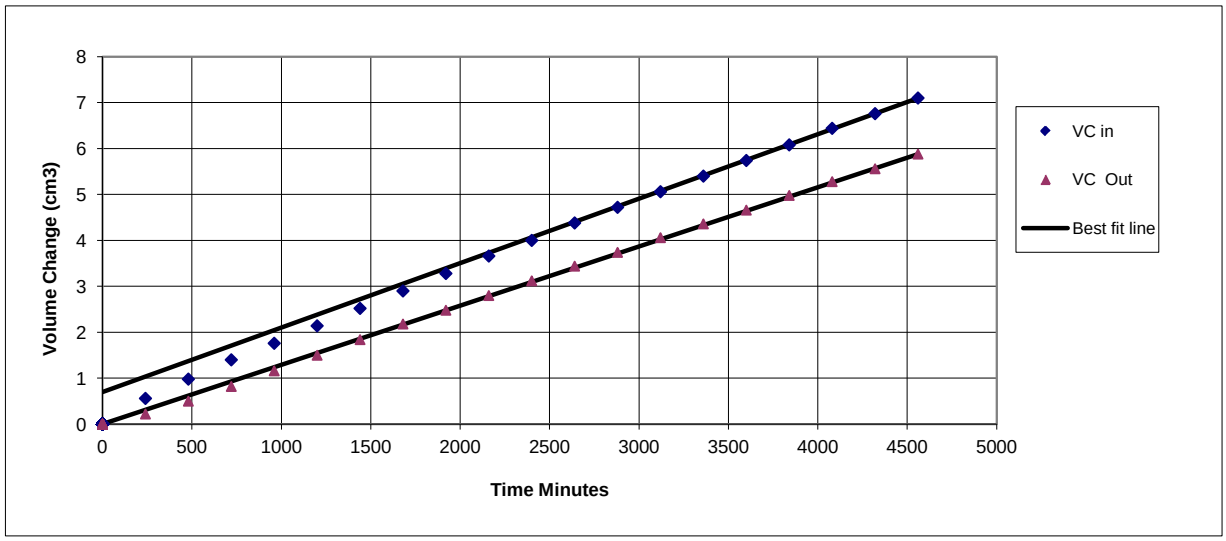
Specimen Details

Borehole		C3 C1P
Sample No.		
Depth	m	
Date		15/08/2015

Consolidation Stage



Permeability Stage



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Newport Docksway Landfill

Contract No

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		C5 C1P
Sample No.		
Depth	m	
Date		15/08/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark greyish brown silty stiff CLAY

Initial Specimen Conditions

Height	mm	125.00
Diameter	mm	98.00
Area	mm^2	7542.96
Volume	cm^3	942.87
Mass	g	1957.10
Dry Mass	g	1631.20
Density	Mg/m^3	2.08
Dry Density	Mg/m^3	1.73
Moisture Content	%	20.0
Voids Ratio		0.532
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	20.54
Density	Mg/m^3	2.09
Dry Density	Mg/m^3	1.74

Test Setup

Date started	31/07/2015
Date Finished	14/08/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 3
Cell Number	CPerm 3

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Newport Docksway Landfill

Contract No

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		C5 C1P
Sample No.		
Depth	m	
Date		15/08/2015

Saturation

Cell Pressure Incr.	kPa	25.00
Back Pressure Incr.	kPa	23.50
Differential Pressure	kPa	1.50
Final Cell Pressure	kPa	175.00
Final Pore Pressure	kPa	170.00
Final B Value		0.94

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	175.00
Back Pressure	kPa	75.00
Excess Pore Pressure	kPa	95.00
Pore Pressure at End	kPa	75.00
Consolidated Volume	cm^3	939.97
Consolidated Height	mm	124.87
Consolidated Area	mm^2	7527.50
Vol. Compressibility	m^2/MN	86.5243
Consolidation Coef.	$m^2/yr.$	0.0324
Final Voids Ratio		0.527

Permeability

Cell Pressure	kPa	175.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00188
Average Temperature	'C	20

Vertical Permeability Im/ s	**2.53 x 10-10**

D P Evans

Checked and Approved By

15/ 08/ 15
Date

Client Ref

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Newport Docksway Landfill

Contract No

27718

UKAS TESTING
2788

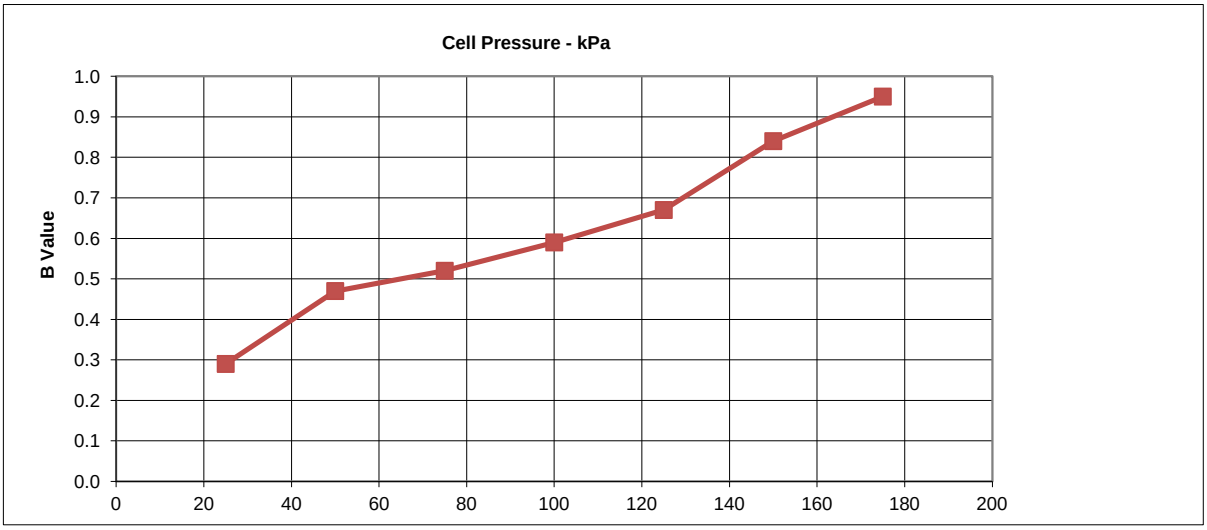
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

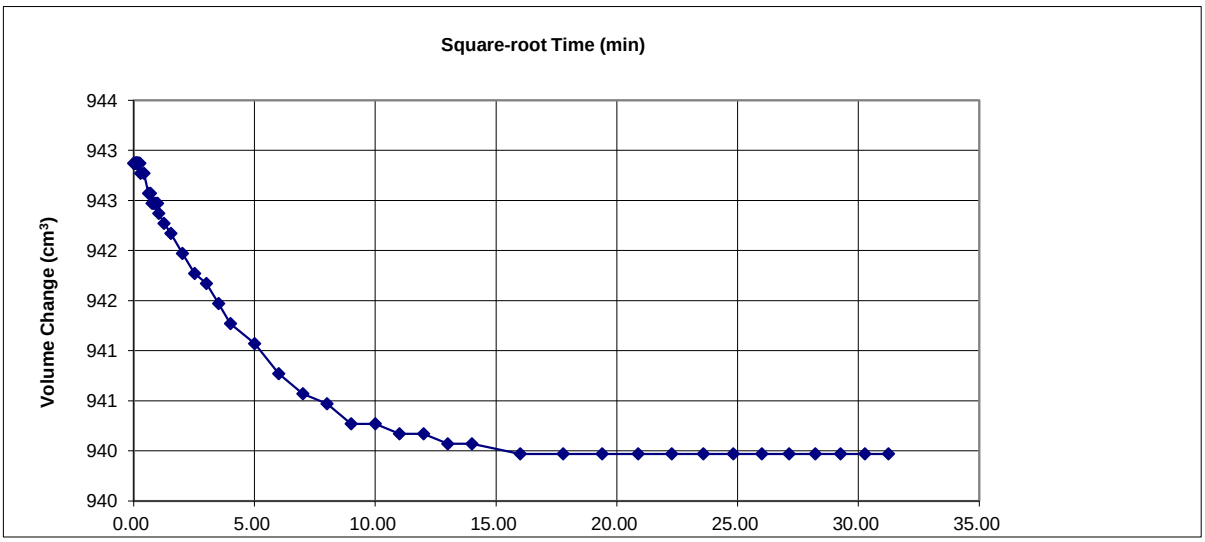
Specimen Details

Borehole		C5 C1P
Sample No.		
Depth	m	
Date		15/08/2015

Saturation Stage



Consolidation Stage



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Newport Docksway Landfill

Contract No

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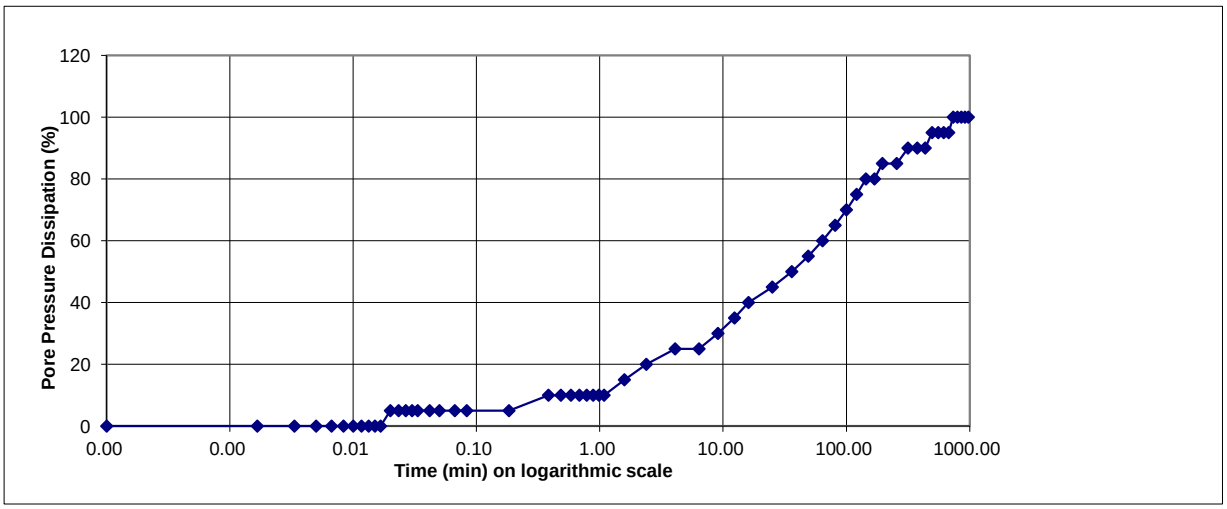
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

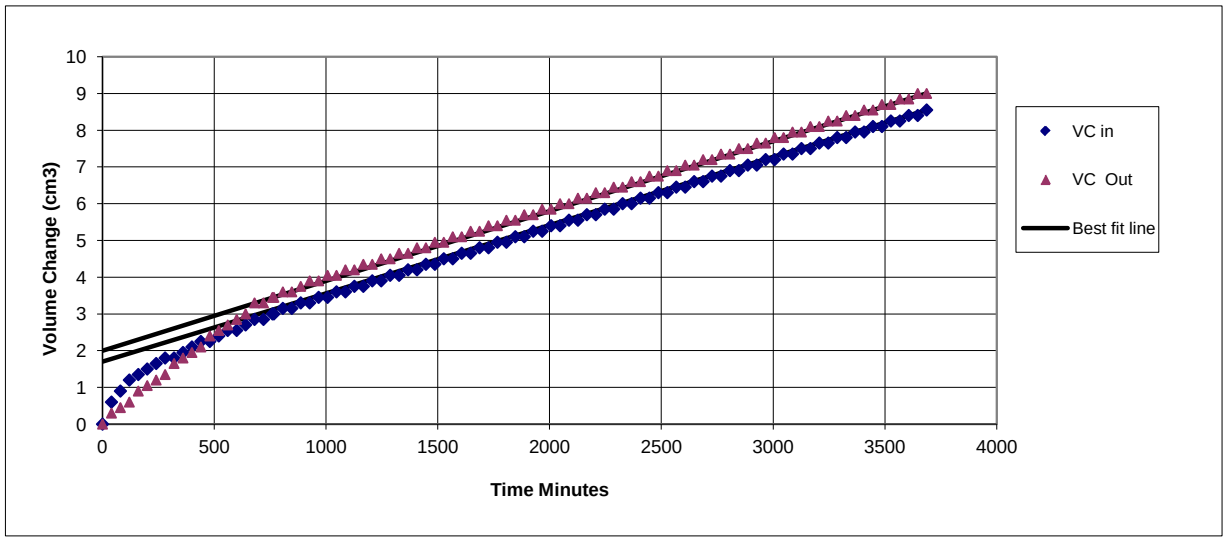
Specimen Details

Borehole		C5 C1P
Sample No.		
Depth	m	
Date		15/08/2015

Consolidation Stage



Permeability Stage



D P Nash

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Newport Docksway Landfill

Contract No

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UKAS TESTING 2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		D5-C1P
Sample No.		
Depth	m	0
Date		17/08/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark greyish brown silty stiff CLAY

Initial Specimen Conditions

Height	mm	132.00
Diameter	mm	103.00
Area	mm^2	8332.29
Volume	cm^3	1099.86
Mass	g	2274.10
Dry Mass	g	1919.80
Density	Mg/m^3	2.07
Dry Density	Mg/m^3	1.75
Moisture Content	%	18.5
Voids Ratio		0.518
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	20.54
Density	Mg/m^3	2.19
Dry Density	Mg/m^3	1.82

Test Setup

Date started	31/07/2015
Date Finished	14/08/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 1
Cell Number	CPerm 1

D P Evans

Checked and Approved By

17/ 08/ 15
Date

Client Ref

Newport Docksway Landfill

Contract No

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		D5-C1P
Sample No.		
Depth	m	0
Date		17/08/2015

Saturation

Cell Pressure Incr.	kPa	50.00
Back Pressure Incr.	kPa	48.00
Differential Pressure	kPa	2.00
Final Cell Pressure	kPa	250.00
Final Pore Pressure	kPa	244.00
Final B Value		0.96

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	250.00
Back Pressure	kPa	150.00
Excess Pore Pressure	kPa	94.00
Pore Pressure at End	kPa	150.00
Consolidated Volume	cm^3	1055.46
Consolidated Height	mm	130.22
Consolidated Area	mm^2	8108.05
Vol. Compressibility	m^2/MN	1.8326
Consolidation Coef.	$m^2/yr.$	0.4295
Final Voids Ratio		0.457

Permeability

Cell Pressure	kPa	250.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00214
Average Temperature	'C	20

Vertical Permeability Kv	**m/ s**	**2.79 x 10-10**

Checked and Approved By

17/ 08/ 15
Date

Client Ref

Newport Docksway Landfill

Contract No

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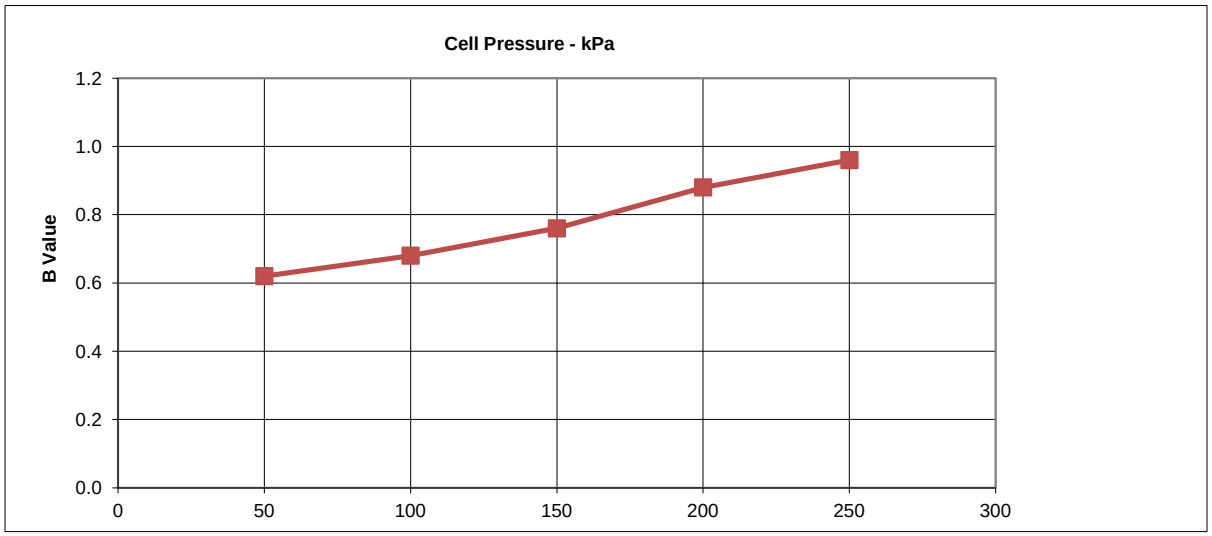
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

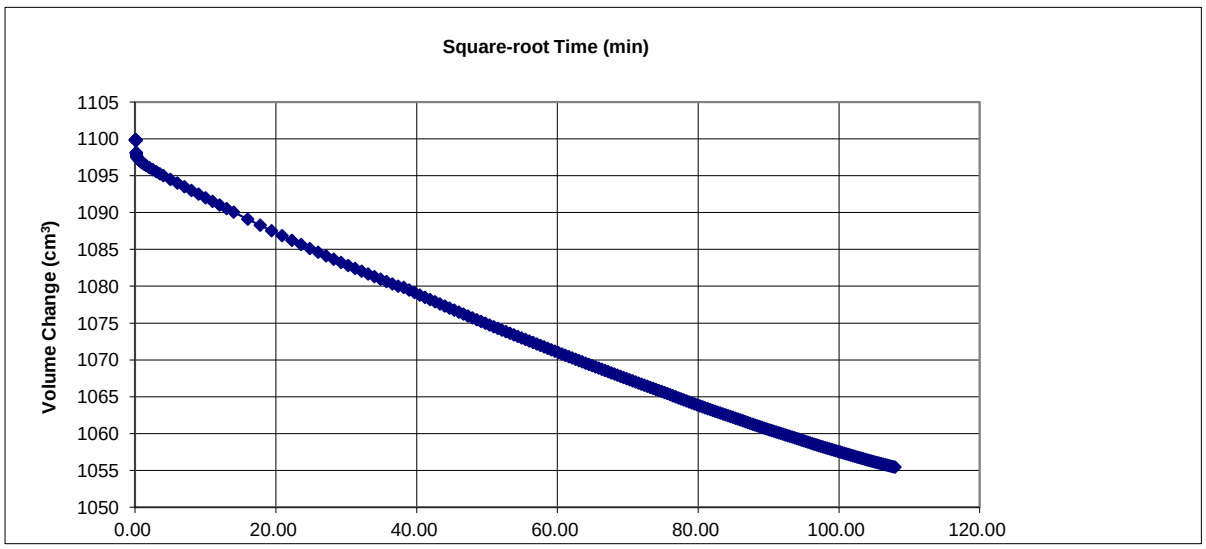
Specimen Details

Borehole		D5-C1P
Sample No.		
Depth	m	0
Date		17/08/2015

Saturation Stage



Consolidation Stage



DP Evans

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17/ 08/ 15
Date

Client Ref

Newport Docksway Landfill

Contract No

27718

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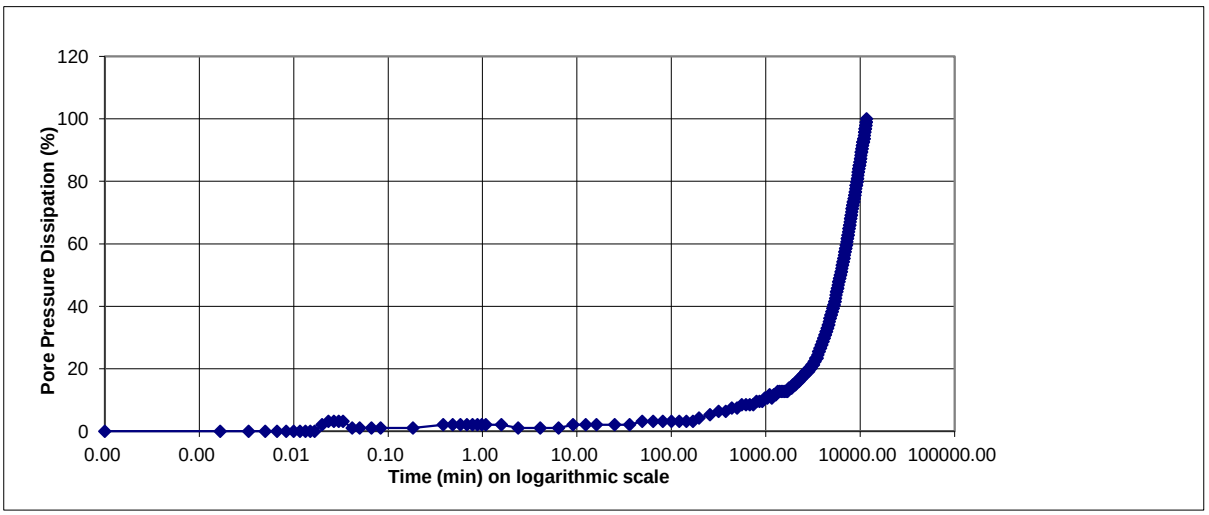
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

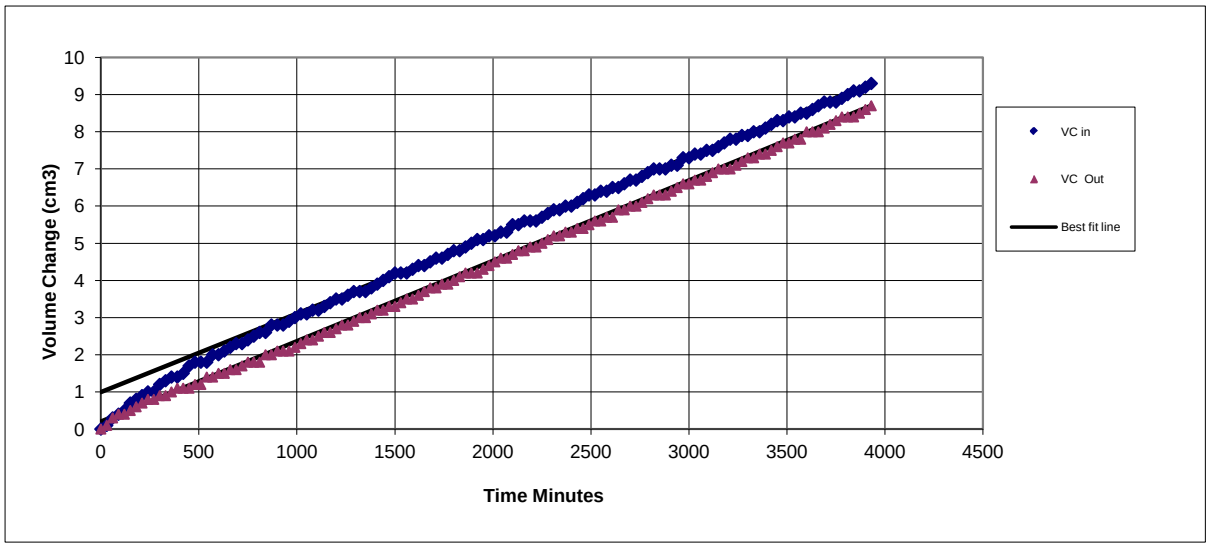
Specimen Details

Borehole		D5-C1P
Sample No.		
Depth	m	0
Date		17/08/2015

Consolidation Stage



Permeability Stage



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17/ 08/ 15
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Client Ref

Contract No

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Newport Docksway Landfill

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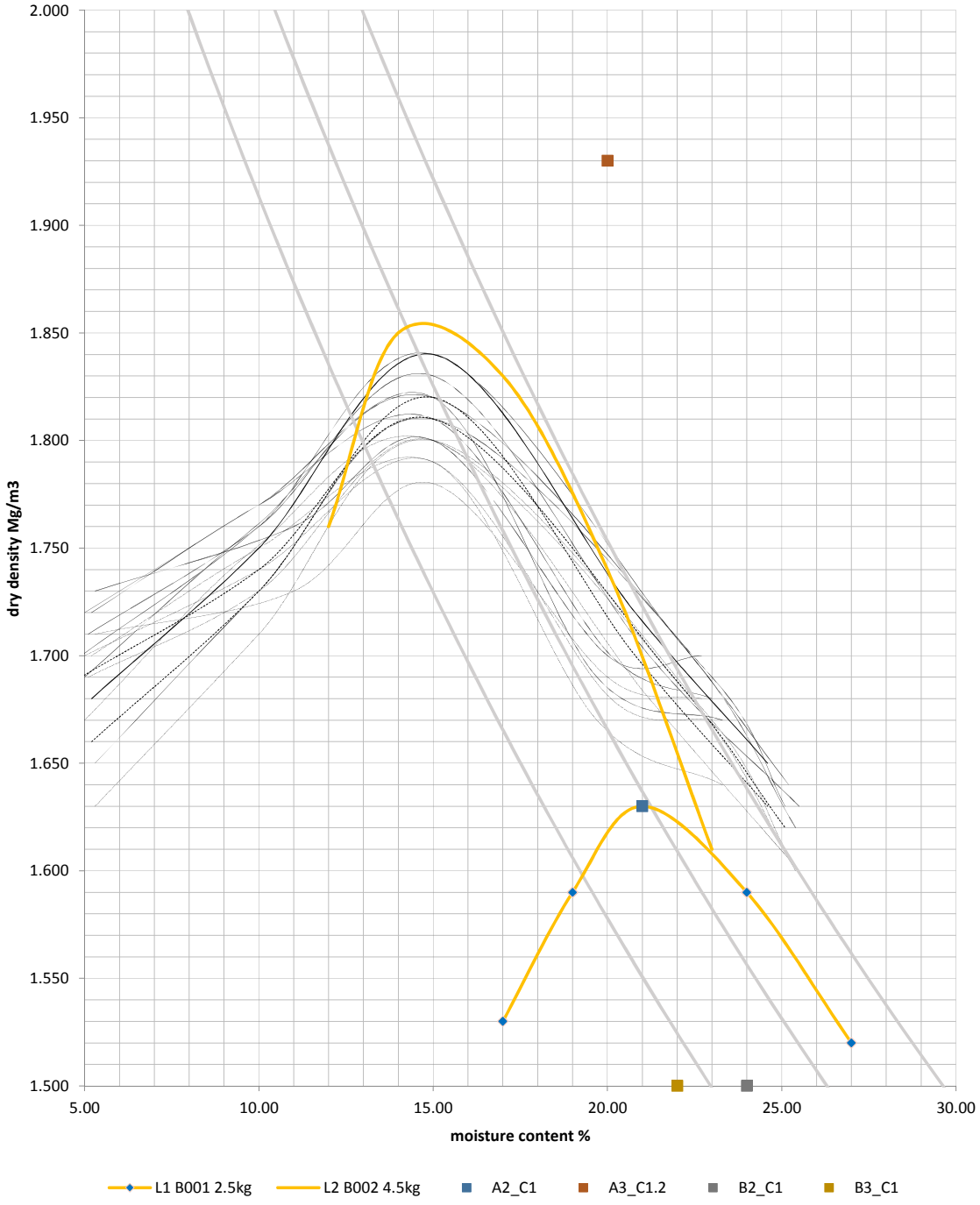
Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 31.07.2015

GSTL Certifacte(s) 27596



Laboratory Report

GEO Site & Testing Services Ltd

Contract Number: 27871

Client's Reference:

Report Date: **21-08-2015**

Client **Jim Davies Civil Engineering Ltd**
Ty Gwyn,
Banalog Terrace,
Hollybush,
Blackwood
NP12 0SG

Contract Title: **Docksway Landfill - Newport**

For the attention of: **Meirion Humphreys**

Date Received: **10-08-2015**

Date Commenced: **10-08-2015**

Date Completed: **21-08-2015**

Test Description	Qty
Determination of Permeability in a triaxial cell BS1377 Part 6 :1990 Clause 6 - * UKAS	1
Extra Over Item (4 Days Over)	4
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		D6_C3 [P]
Sample No.		
Depth	m	N/A
Date		21/08/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark greyish brown sl fine gravelly sl silty stff CLAY

Initial Specimen Conditions

Height	mm	133.00
Diameter	mm	98.00
Area	mm^2	7542.96
Volume	cm^3	1003.21
Mass	g	2090.70
Dry Mass	g	1766.90
Density	Mg/m^3	2.08
Dry Density	Mg/m^3	1.76
Moisture Content	%	18.3
Voids Ratio		0.505
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	19.02
Density	Mg/m^3	2.12
Dry Density	Mg/m^3	1.78

Test Setup

Date started	12/08/2015
Date Finished	20/08/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 4
Cell Number	CPerm 4

Checked and Approved By

21/08/15
Date

Client Ref

GSTL
GEO Site & Testing Services Limited

Docksway Landfill-Newport

Contract No

27871

UKAS TESTING
2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		D6_C3 [P]
Sample No.		
Depth	m	N/A
Date		21/08/2015

Saturation

Cell Pressure Incr.	kPa	35.00
Back Pressure Incr.	kPa	35.00
Differential Pressure	kPa	0.00
Final Cell Pressure	kPa	180.00
Final Pore Pressure	kPa	174.80
Final B Value		1.00

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	180.00
Back Pressure	kPa	80.00
Excess Pore Pressure	kPa	94.80
Pore Pressure at End	kPa	80.00
Consolidated Volume	cm^3	992.21
Consolidated Height	mm	132.51
Consolidated Area	mm^2	7487.83
Vol. Compressibility	m^2/MN	2.9923
Consolidation Coef.	$m^2/yr.$	0.1157
Final Voids Ratio		0.488

Permeability

Cell Pressure	kPa	180.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00061
Average Temperature	'C	20

Vertical Permeability | m/s	**8.78 x 10-11**

Checked and Approved By

21/08/15
Date

Client Ref

GSTL
GEO Site & Testing Services Limited

Docksway Landfill-Newport

Contract No

27871

UKAS TESTING
2788

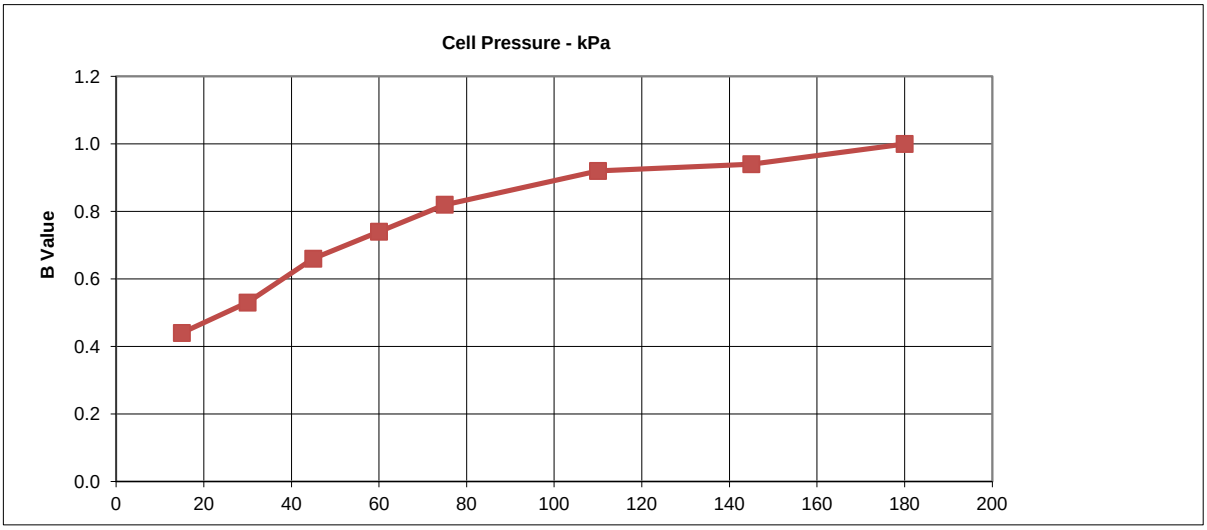
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

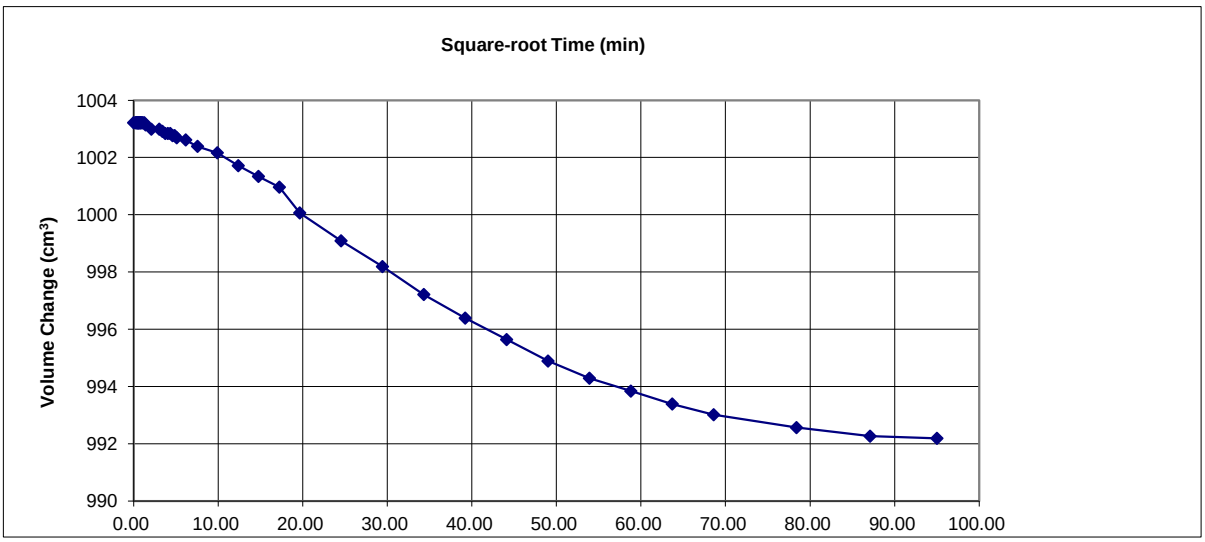
Specimen Details

Borehole		D6_C3 [P]
Sample No.		
Depth	m	N/A
Date		21/08/2015

Saturation Stage



Consolidation Stage



Checked and Approved By

Date 21/08/15

Client Ref

Docksway Landfill-Newport

Contract No 27871

GSTL GEO Site & Testing Services Limited

UKAS TESTING 2788

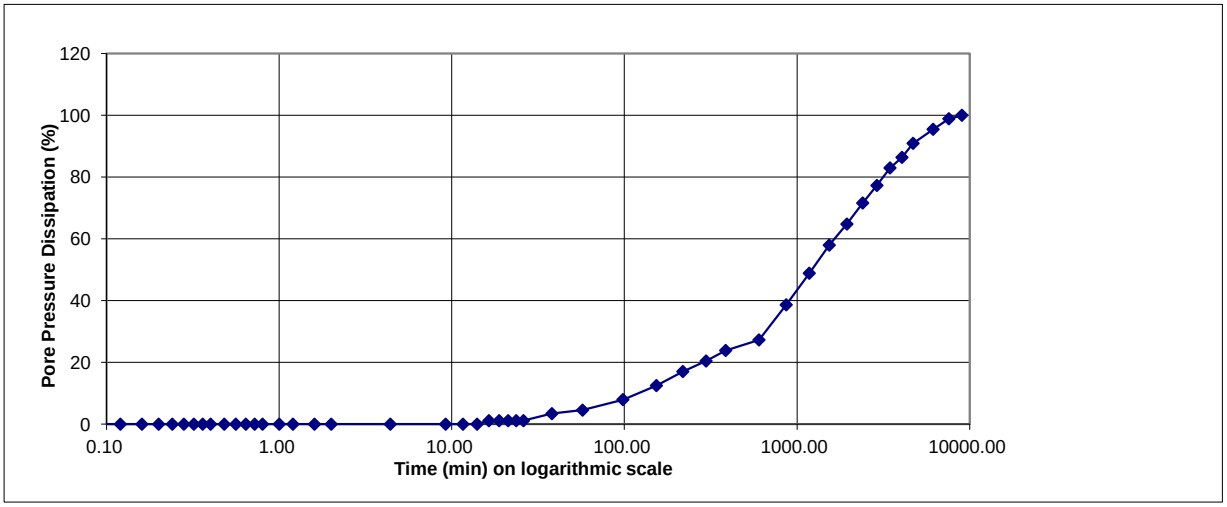
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

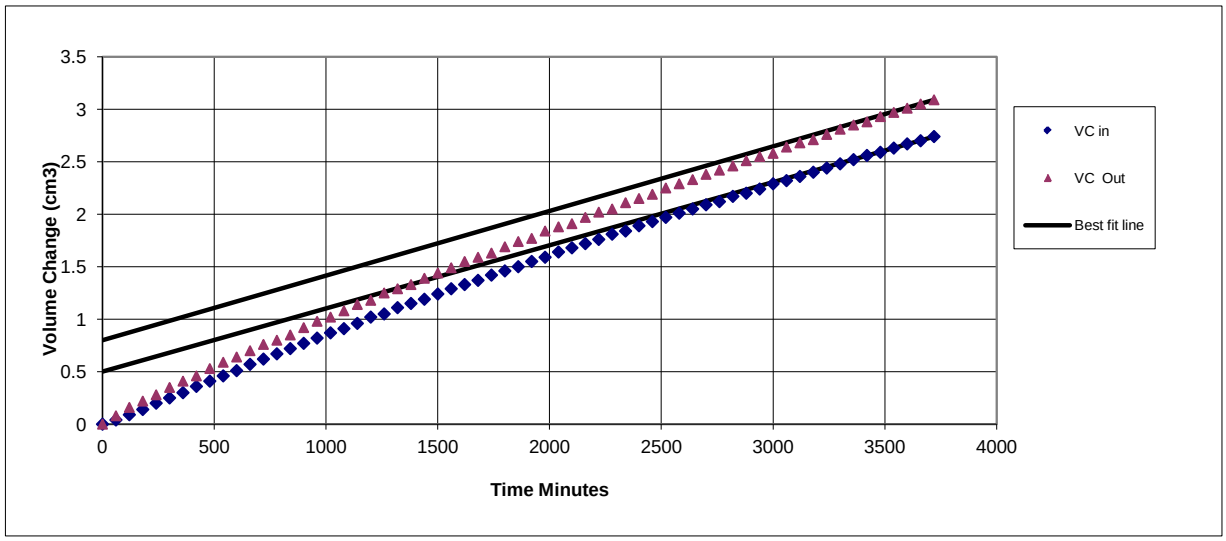
Specimen Details

Borehole		D6_C3 [P]
Sample No.		
Depth	m	N/A
Date		21/08/2015

Consolidation Stage



Permeability Stage



Checked and Approved By

21/08/15
Date

Client Ref

Docksway Landfill-Newport

Contract No

27871

GSTL
GEO Site & Testing Services Limited

UKAS TESTING
2788

Laboratory Report

GEO Site & Testing Services Ltd

Contract Number: 27912

Client's Reference:

Report Date: **01-09-2015**

Client **Jim Davies Civil Engineering Ltd**
Ty Gwyn,
Banalog Terrace,
Hollybush,
Blackwood
NP12 0SG

Contract Title: **Docksway Landfill - Newport**

For the attention of: **Ian Fisher**

Date Received: **13-08-2015**

Date Commenced: **13-08-2015**

Date Completed: **01-09-2015**

Test Description	Qty
Determination of Permeability in a triaxial cell BS1377 Part 6 :1990 Clause 6 - * UKAS	2
Extra Over Item (4 Days Over)	18
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		A4-C5P
Sample No.		
Depth	m	
Date		01/09/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark greyish brown sl fine gravelly silty CLAY

Initial Specimen Conditions

Height	mm	131.00
Diameter	mm	98.00
Area	mm^2	7542.96
Volume	cm^3	988.13
Mass	g	2013.80
Dry Mass	g	1654.70
Density	Mg/m^3	2.04
Dry Density	Mg/m^3	1.67
Moisture Content	%	21.7
Voids Ratio		0.582
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	22.51
Density	Mg/m^3	2.19
Dry Density	Mg/m^3	1.78

Test Setup

Date started	15/08/2015
Date Finished	28/08/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	P5
Cell Number	C5

DP Evans

Checked and Approved By

01/09/15
Date

Client Ref

Docksway Landfill-Newport

Contract No

27912

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		A4-C5P
Sample No.		
Depth	m	
Date		01/09/2015

Saturation

Cell Pressure Incr.	kPa	100.00
Back Pressure Incr.	kPa	95.00
Differential Pressure	kPa	5.00
Final Cell Pressure	kPa	500.00
Final Pore Pressure	kPa	503.00
Final B Value		1.07

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	500.00
Back Pressure	kPa	400.00
Excess Pore Pressure	kPa	103.00
Pore Pressure at End	kPa	400.00
Consolidated Volume	cm^3	927.33
Consolidated Height	mm	128.31
Consolidated Area	mm^2	7233.55
Vol. Compressibility	m^2/MN	1.0520
Consolidation Coef.	$m^2/yr.$	0.5974
Final Voids Ratio		0.485

Permeability

Cell Pressure	kPa	500.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00053
Average Temperature	'C	20

Vertical Permeability Kv	**m/s**	**7.68 x 10-11**

D P Evans

Checked and Approved By

01/09/15
Date

Client Ref

Docksway Landfill-Newport

Contract No

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UKAS TESTING
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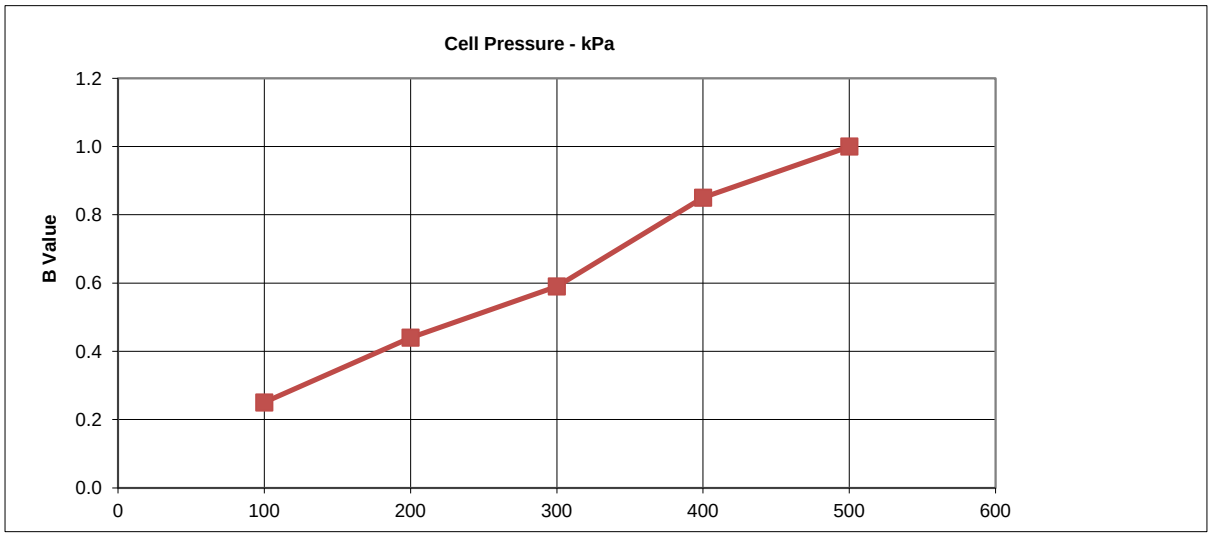
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

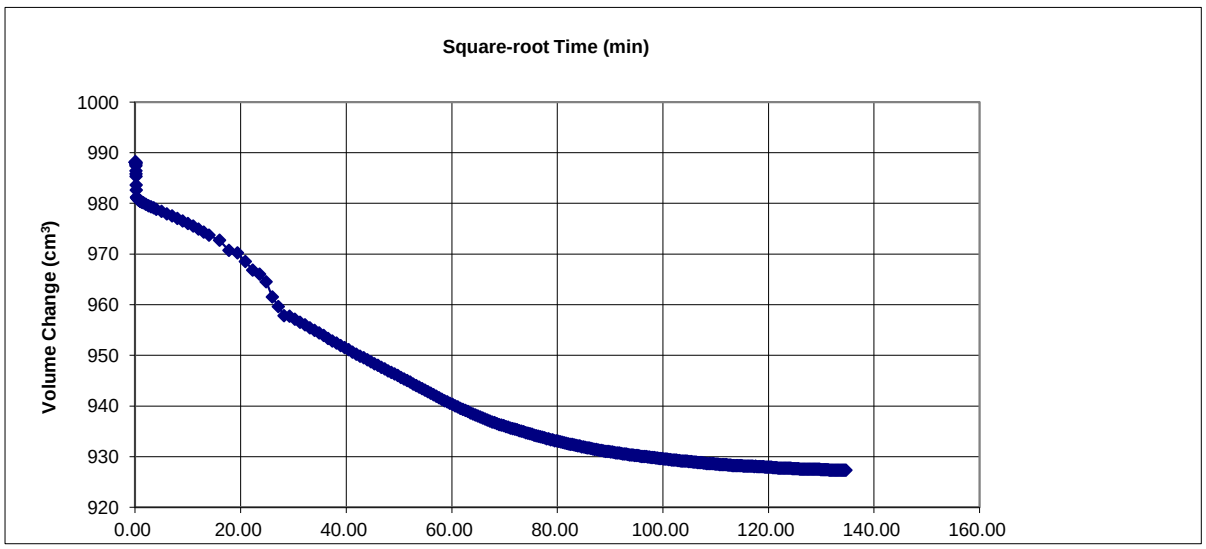
Specimen Details

Borehole		A4-C5P
Sample No.		
Depth	m	
Date		01/09/2015

Saturation Stage



Consolidation Stage



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01/09/15
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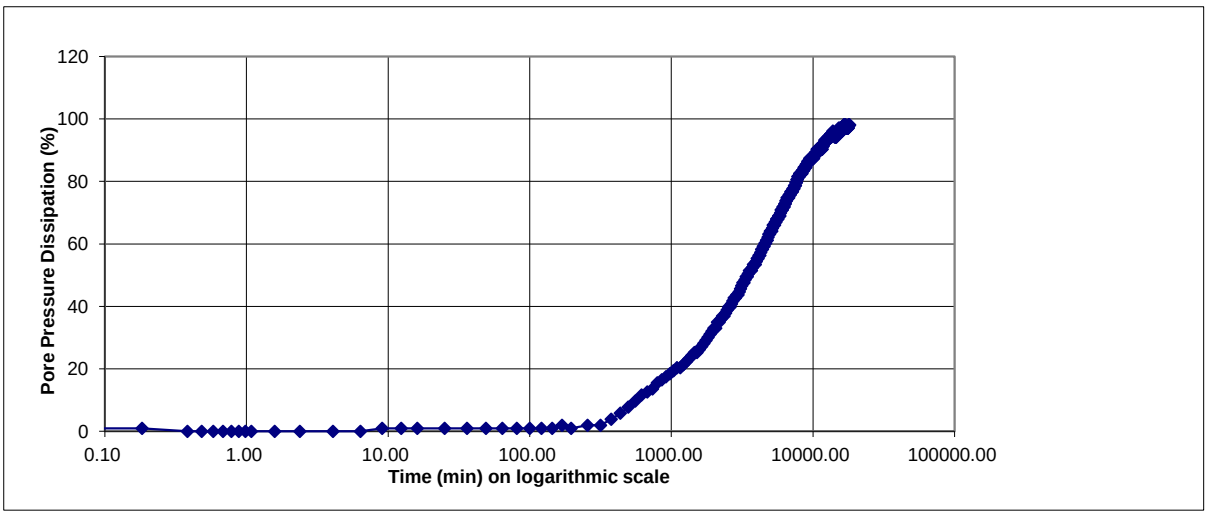
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

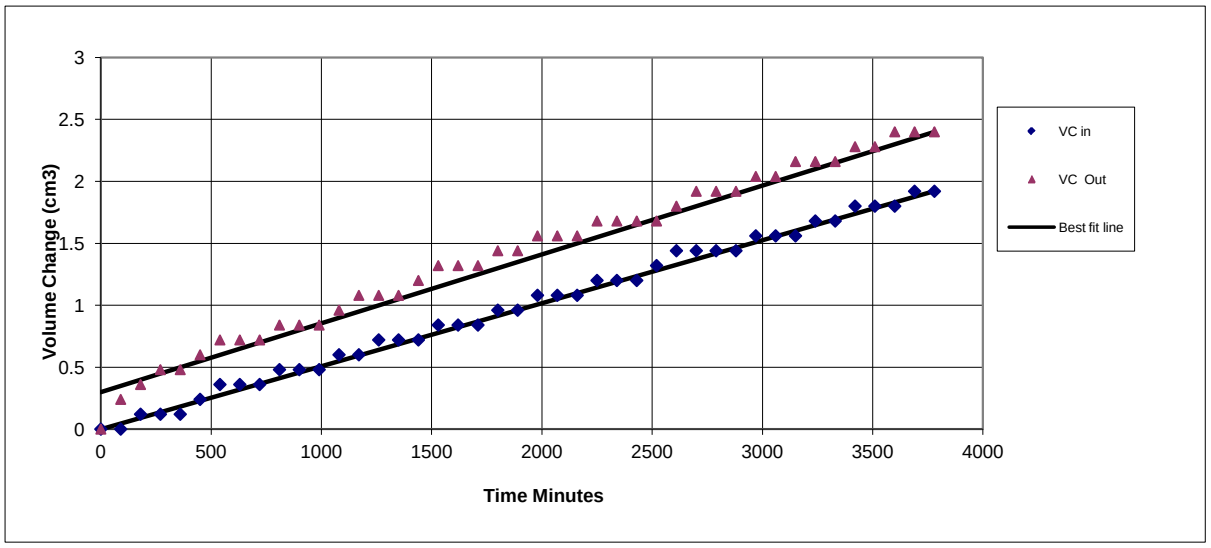
Specimen Details

Borehole		A4-C5P
Sample No.		
Depth	m	
Date		01/09/2015

Consolidation Stage



Permeability Stage



D P Evans

Checked and Approved By

Date 01/09/15

Client Ref

Contract No 27912

GSTL GEO Site & Testing Services Limited

Docksway Landfill-Newport

UKAS TESTING 2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		B6-C5P
Sample No.		
Depth	m	
Date		01/09/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark greyish brown sl fine gravelly silty CLAY

Initial Specimen Conditions

Height	mm	124.00
Diameter	mm	100.00
Area	mm^2	7853.98
Volume	cm^3	973.89
Mass	g	1922.20
Dry Mass	g	1576.60
Density	Mg/m^3	1.97
Dry Density	Mg/m^3	1.62
Moisture Content	%	21.9
Voids Ratio		0.637
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	22.80
Density	Mg/m^3	2.11
Dry Density	Mg/m^3	1.72

Test Setup

Date started	15/08/2015
Date Finished	28/08/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	P6
Cell Number	C6

D P Evans

Checked and Approved By

01/09/15
Date

Client Ref

Docksway Landfill-Newport

Contract No

27912

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Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		B6-C5P
Sample No.		
Depth	m	
Date		01/09/2015

Saturation

Cell Pressure Incr.	kPa	100.00
Back Pressure Incr.	kPa	104.00
Differential Pressure	kPa	-4.00
Final Cell Pressure	kPa	500.00
Final Pore Pressure	kPa	499.00
Final B Value		1.04

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	500.00
Back Pressure	kPa	400.00
Excess Pore Pressure	kPa	103.00
Pore Pressure at End	kPa	400.00
Consolidated Volume	cm^3	917.79
Consolidated Height	mm	121.62
Consolidated Area	mm^2	7552.37
Vol. Compressibility	m^2/MN	1.7177
Consolidation Coef.	$m^2/yr.$	0.5593
Final Voids Ratio		0.543

Permeability

Cell Pressure	kPa	500.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00041
Average Temperature	'C	20

Vertical Permeability Kv	**m/s**	**5.42 x 10-11**

D P Evans

Checked and Approved By

01/09/15
Date

Client Ref

Docksway Landfill-Newport

Contract No

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GEO Site & Testing Services Limited

UKAS TESTING
2788

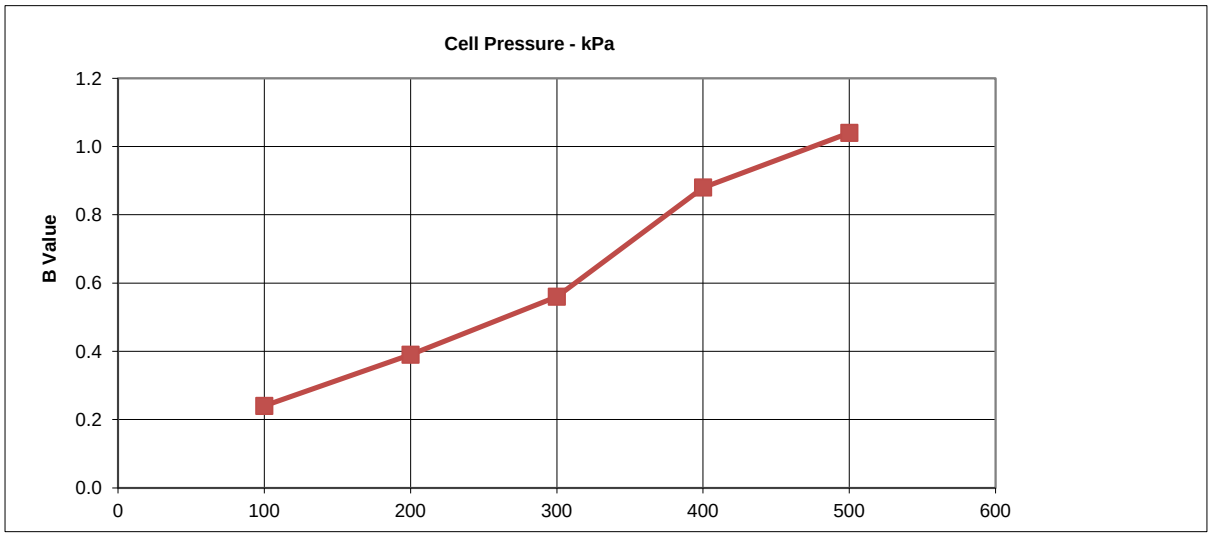
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

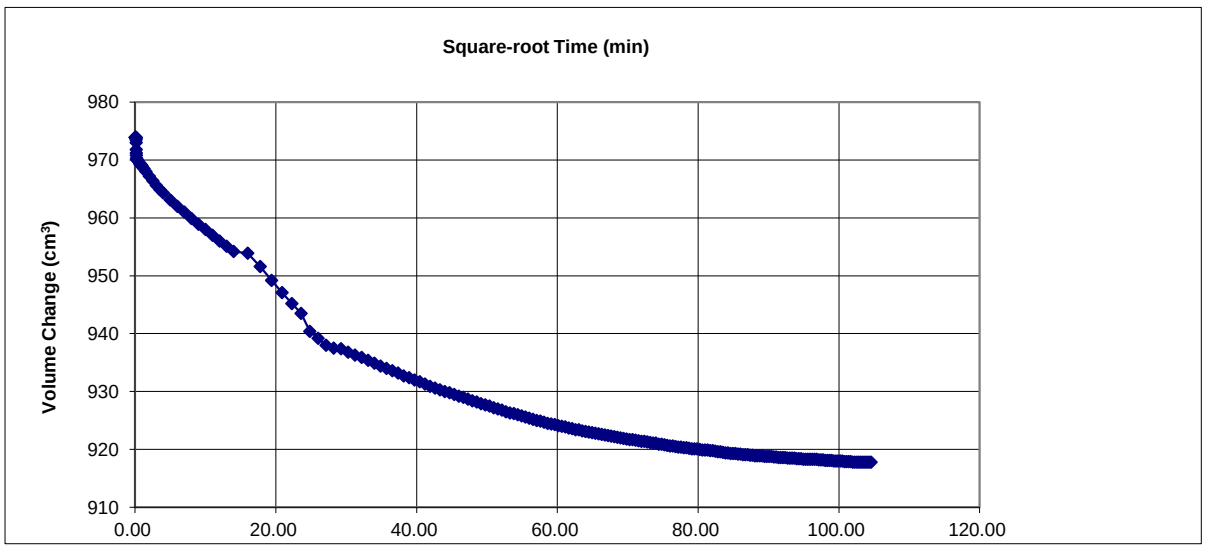
Specimen Details

Borehole		B6-C5P
Sample No.		
Depth	m	
Date		01/09/2015

Saturation Stage



Consolidation Stage



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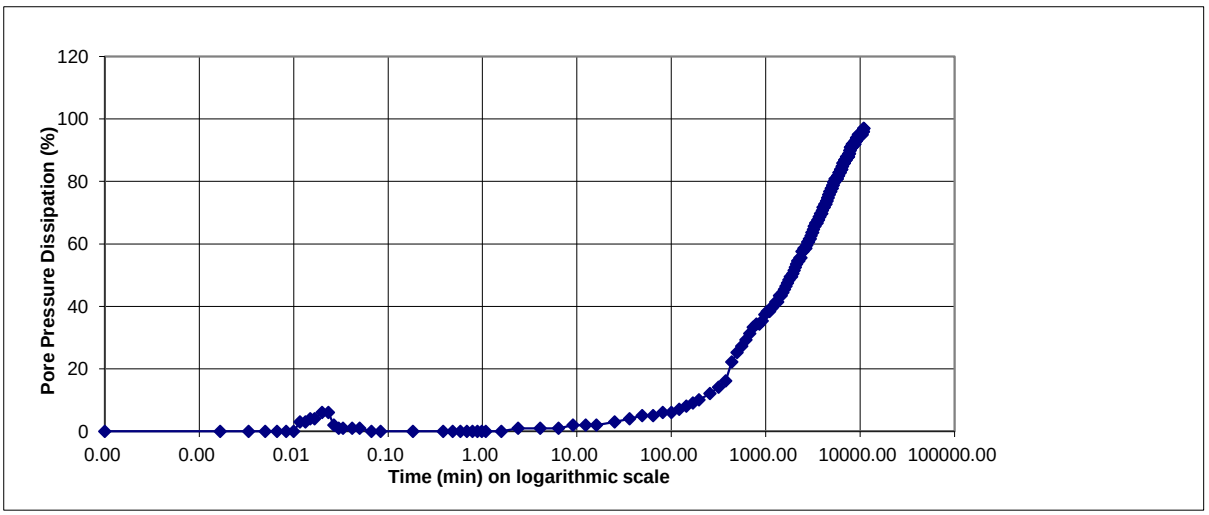
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

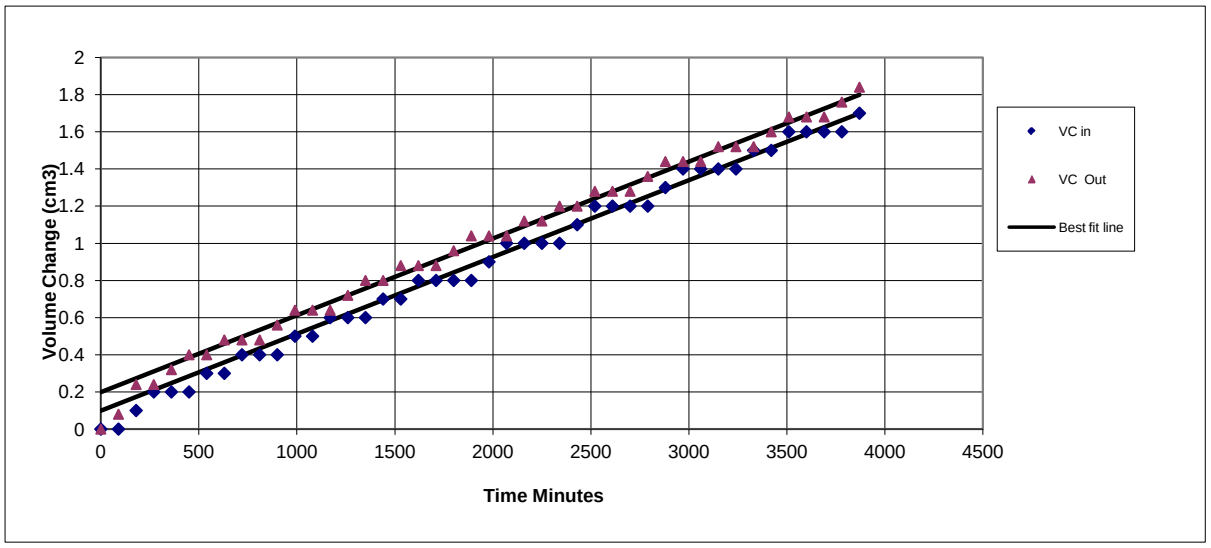
Specimen Details

Borehole		B6-C5P
Sample No.		
Depth	m	
Date		01/09/2015

Consolidation Stage



Permeability Stage



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Checked and Approved By

01/09/15
Date

Client Ref

Contract No

27912

Docksway Landfill-Newport

GSTL
GEO Site & Testing Services Limited

UKAS TESTING
2788

Laboratory Report

2788

GEO Site & Testing Services Ltd

Contract Number: 28019

Client's Reference:

Report Date: **04-09-2015**

Client **Jim Davies Civil Engineering Ltd**
Ty Gwyn,
Banalog Terrace,
Hollybush,
Blackwood
NP12 0SG

Contract Title: **Docksway Landfill - Newport**

For the attention of: **Ian Fisher**

Date Received: **20-08-2015**

Date Commenced: **20-08-2015**

Date Completed: **04-09-2015**

Test Description	Qty
Determination of Permeability in a triaxial cell BS1377 Part 6 :1990 Clause 6 - * UKAS	2
Extra Over Item (4 Days Over)	14
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
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Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		C5:P6
Sample No.		
Depth	m	N/A
Date		04/09/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark greyish brown silty CLAY

Initial Specimen Conditions

Height	mm	131.00
Diameter	mm	100.00
Area	mm^2	7853.98
Volume	cm^3	1028.87
Mass	g	2138.80
Dry Mass	g	1258.30
Density	Mg/m^3	2.08
Dry Density	Mg/m^3	1.22
Moisture Content	%	70.0
Voids Ratio		1.167
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	19.47
Density	Mg/m^3	2.10
Dry Density	Mg/m^3	1.76

Test Setup

Date started	22/08/2015
Date Finished	03/09/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	P3
Cell Number	C3

D P Nash

Checked and Approved By

04/09/15
Date

Client Ref

GSTL
GEO Site & Testing Services Limited

Docksway Landfill-Newport

Contract No

28019

UKAS TESTING 2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		C5:P6
Sample No.		
Depth	m	N/A
Date		04/09/2015

Saturation

Cell Pressure Incr.	kPa	35.00
Back Pressure Incr.	kPa	33.50
Differential Pressure	kPa	1.50
Final Cell Pressure	kPa	180.00
Final Pore Pressure	kPa	174.80
Final B Value		0.96

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	180.00
Back Pressure	kPa	80.00
Excess Pore Pressure	kPa	94.80
Pore Pressure at End	kPa	80.00
Consolidated Volume	cm^3	1018.07
Consolidated Height	mm	130.54
Consolidated Area	mm^2	7799.02
Vol. Compressibility	m^2/MN	10.2684
Consolidation Coef.	$m^2/yr.$	0.1107
Final Voids Ratio		1.144

Permeability

Cell Pressure	kPa	180.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00101
Average Temperature	'C	20

Vertical Permeability | m/s	**1.38 x 10-10**

DP Rans

Checked and Approved By

04/09/15
Date

Client Ref

Docksway Landfill-Newport

Contract No

28019

GSTL
GEO Site & Testing Services Limited

UKAS TESTING
2788

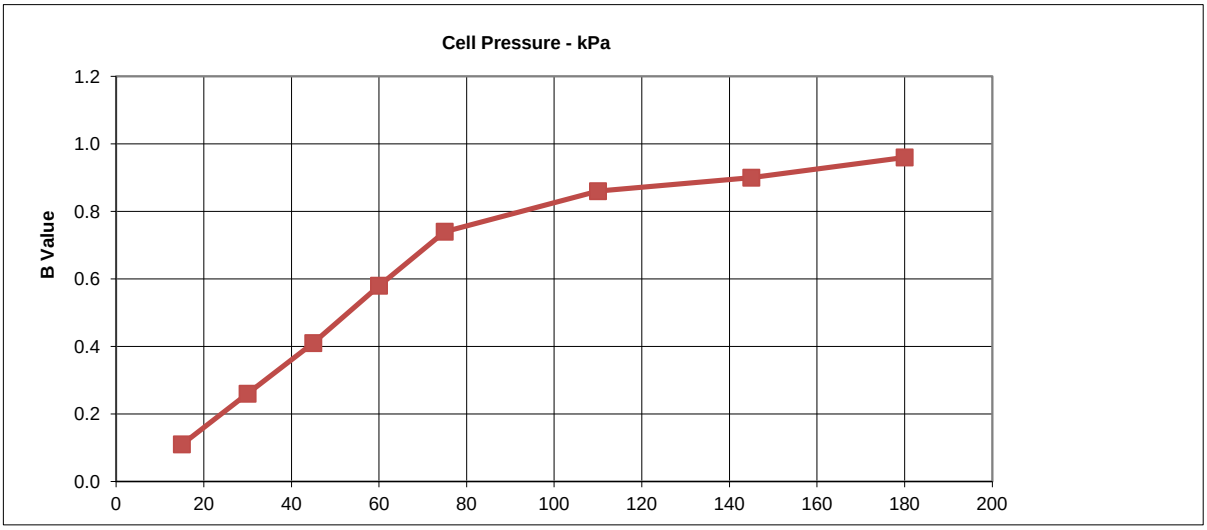
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

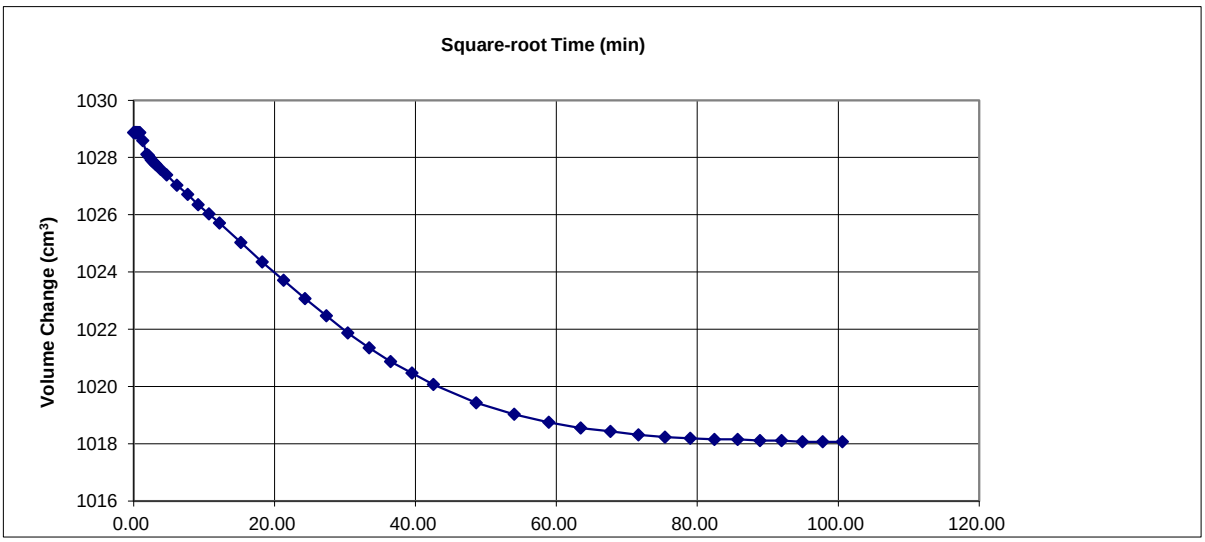
Specimen Details

Borehole		C5:P6
Sample No.		
Depth	m	N/A
Date		04/09/2015

Saturation Stage



Consolidation Stage



D P Ward

Checked and Approved By

04/09/15
Date

Client Ref

GSTL
GEO Site & Testing Services Limited

Docksway Landfill-Newport

Contract No

28019

UKAS TESTING
2788

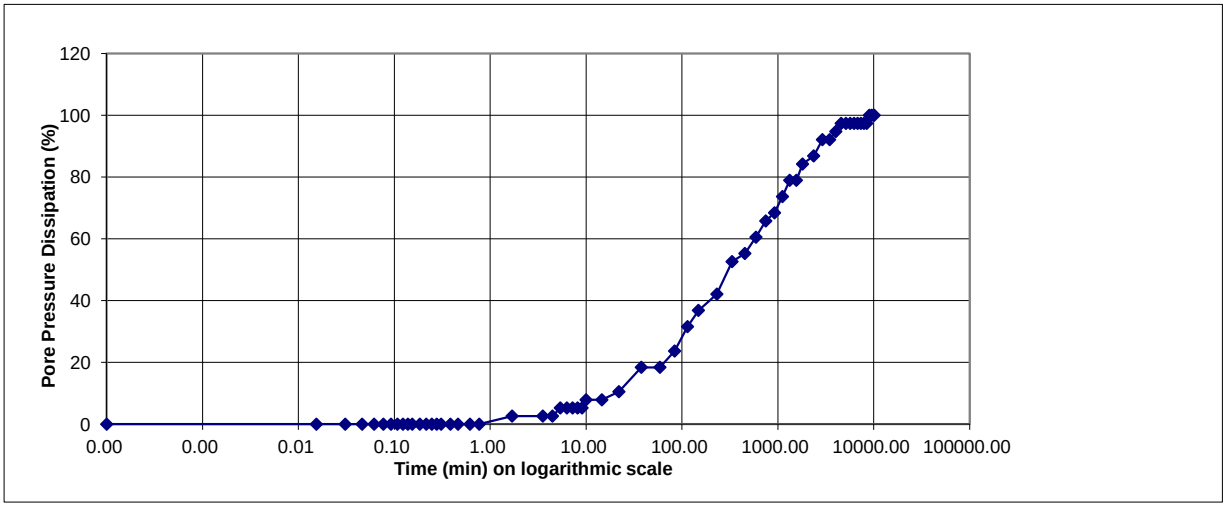
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

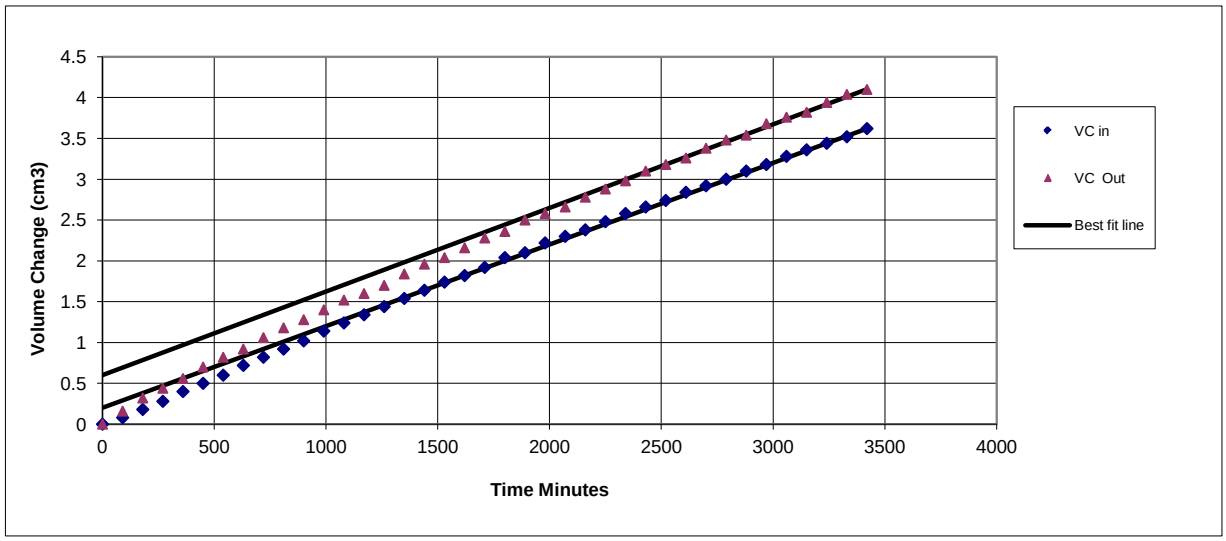
Specimen Details

Borehole		C5:P6
Sample No.		
Depth	m	N/A
Date		04/09/2015

Consolidation Stage



Permeability Stage



D P Ward

Checked and Approved By

04/09/15
Date

Client Ref

GSTL
GEO Site & Testing Services Limited

Docksway Landfill-Newport

Contract No

28019

UKAS TESTING
2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		E7:P3
Sample No.		
Depth	m	N/A
Date		04/08/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark greyish brown silty CLAY

Initial Specimen Conditions

Height	mm	118.00
Diameter	mm	100.00
Area	mm^2	7853.98
Volume	cm^3	926.77
Mass	g	1855.90
Dry Mass	g	1626.40
Density	Mg/m^3	2.00
Dry Density	Mg/m^3	1.75
Moisture Content	%	14.1
Voids Ratio		0.510
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	21.49
Density	Mg/m^3	2.12
Dry Density	Mg/m^3	1.75

Test Setup

Date started	22/08/2015
Date Finished	03/08/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	P4
Cell Number	C4

Checked and Approved By

Date 04/08/15

Client Ref

Docksway Landfill-Newport

Contract No

28019

GSTL GEO Site & Testing Services Limited

UKAS TESTING 2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		E7:P3
Sample No.		
Depth	m	N/A
Date		04/08/2015

Saturation

Cell Pressure Incr.	kPa	50.00
Back Pressure Incr.	kPa	50.00
Differential Pressure	kPa	0.00
Final Cell Pressure	kPa	200.00
Final Pore Pressure	kPa	199.40
Final B Value		1.00

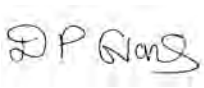
Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	200.00
Back Pressure	kPa	100.00
Excess Pore Pressure	kPa	99.40
Pore Pressure at End	kPa	100.00
Consolidated Volume	cm^3	874.27
Consolidated Height	mm	115.77
Consolidated Area	mm^2	7557.37
Vol. Compressibility	m^2/MN	4.4352
Consolidation Coef.	$m^2/yr.$	0.5699
Final Voids Ratio		0.425

Permeability

Cell Pressure	kPa	200.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00262
Average Temperature	'C	20

Vertical Permeability | m/s	**3.27 x 10-10**



Checked and Approved By

04/08/15
Date

Client Ref

GSTL
GEO Site & Testing Services Limited

Docksway Landfill-Newport

Contract No

28019

UKAS TESTING
2788

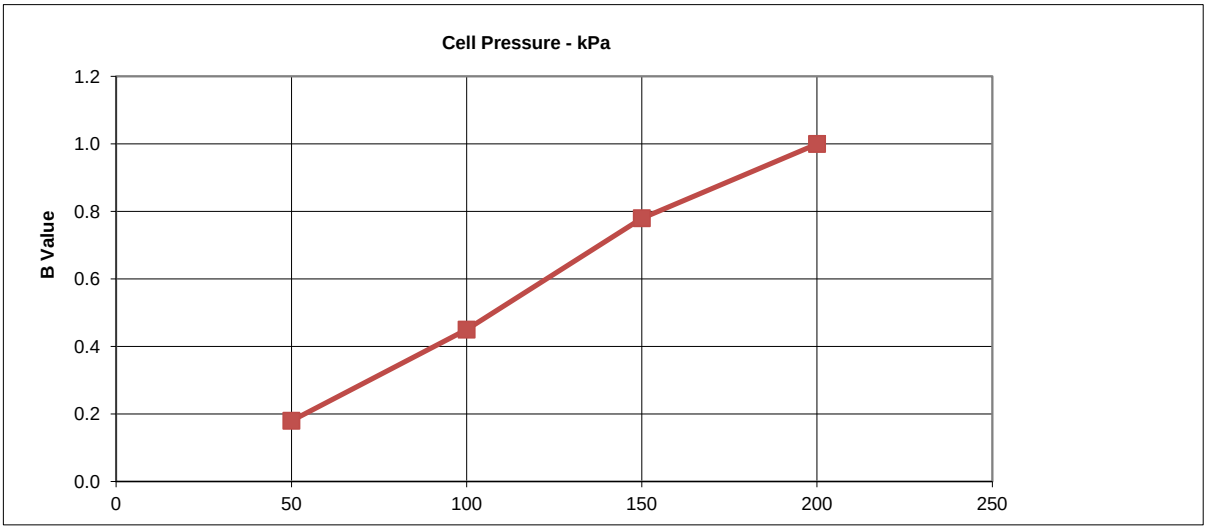
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

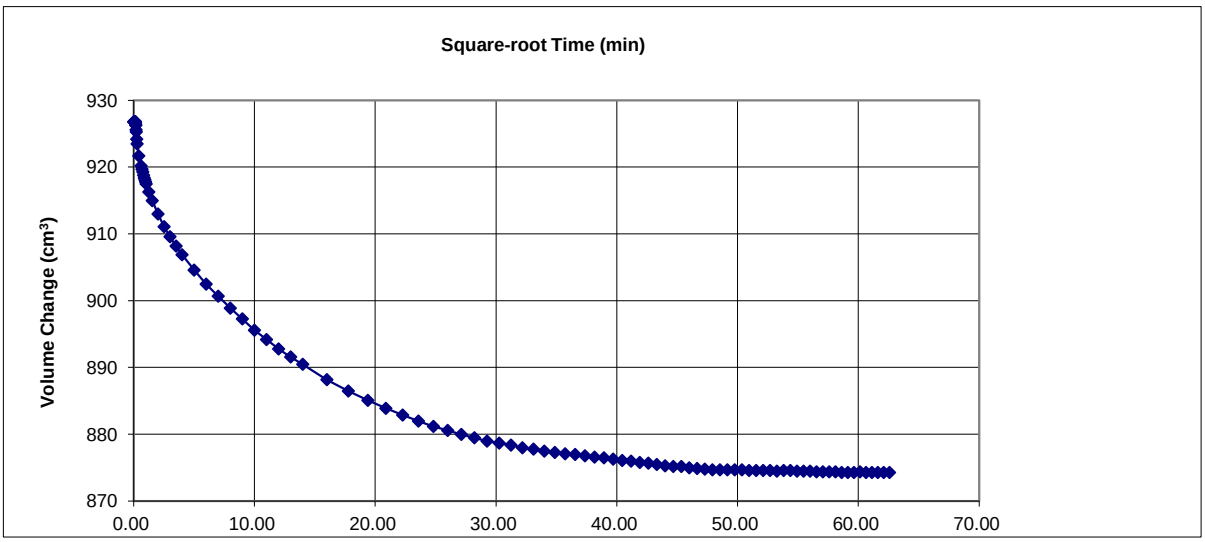
Specimen Details

Borehole		E7:P3
Sample No.		
Depth	m	N/A
Date		04/08/2015

Saturation Stage



Consolidation Stage



D P Evans

Checked and Approved By

04/08/15
Date

Client Ref

GSTL
GEO Site & Testing Services Limited

Docksway Landfill-Newport

Contract No

28019

UKAS TESTING
2788

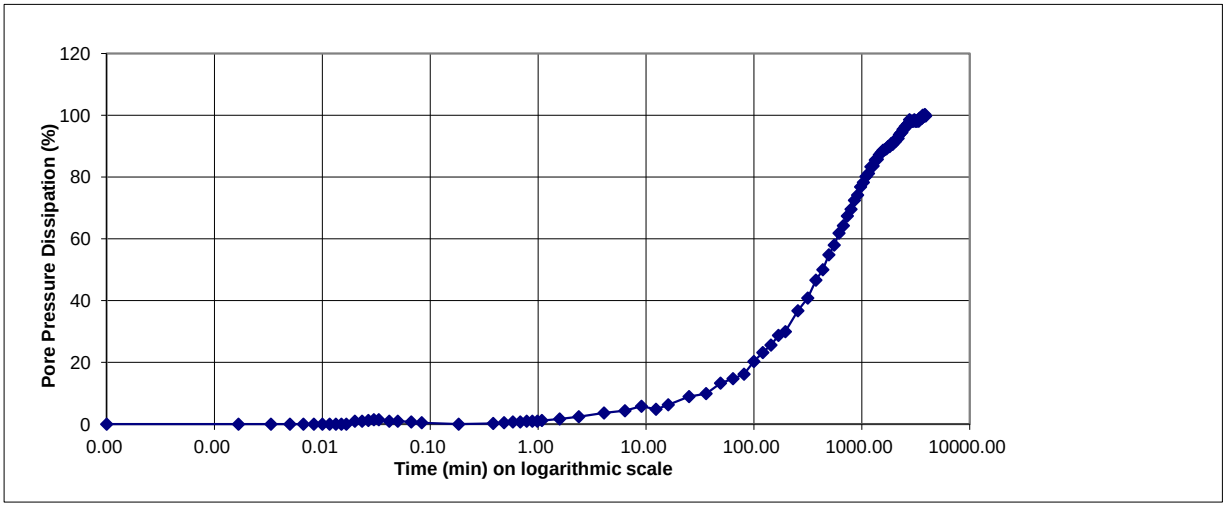
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

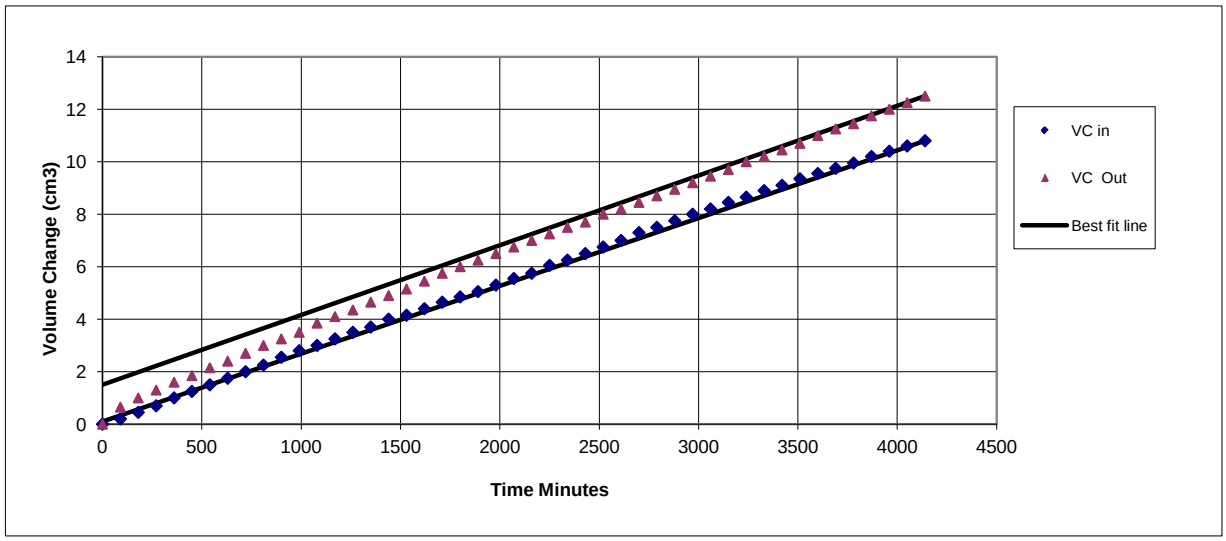
Specimen Details

Borehole		E7:P3
Sample No.		
Depth	m	N/A
Date		04/08/2015

Consolidation Stage



Permeability Stage



DP Evans

Checked and Approved By

04/08/15
Date

Client Ref

GSTL
GEO Site & Testing Services Limited

Docksway Landfill-Newport

Contract No

28019

UKAS TESTING
2788

Laboratory Report

GEO Site & Testing Services Ltd

Contract Number: 28390

Client's Reference:

Report Date: **06-10-2015**

Client **Jim Davies Civil Engineering Ltd**
Ty Gwyn,
Banalog Terrace,
Hollybush,
Blackwood
NP12 0SG

Contract Title: **Docksway Landfill - Newport**

For the attention of: **Meirion Humphreys**

Date Received: **22-09-2015**

Date Commenced: **22-09-2015**

Date Completed: **06-10-2015**

Test Description	Qty
Determination of Permeability in a triaxial cell BS1377 Part 6 :1990 Clause 6 - * UKAS	1
Extra Over Item (4 Days Over)	5
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
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Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		E5_2.2P
Sample No.		
Depth	m	
Date		06/10/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark grey silty stiff CLAY

Initial Specimen Conditions

Height	mm	130.00
Diameter	mm	101.00
Area	mm^2	8011.85
Volume	cm^3	1041.54
Mass	g	2121.60
Dry Mass	g	1806.30
Density	Mg/m^3	2.04
Dry Density	Mg/m^3	1.73
Moisture Content	%	17.5
Voids Ratio		0.528
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	17.44
Density	Mg/m^3	2.08
Dry Density	Mg/m^3	1.77

Test Setup

Date started	24/09/2015
Date Finished	05/10/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 6
Cell Number	CPerm 6

DP Rigg

Checked and Approved By

06/10/15
Date

Client Ref

GSTL
GEO Site & Testing Services Limited

Docksway Landfill, Newport

Contract No

28390

UKAS TESTING
2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		E5_2.2P
Sample No.		
Depth	m	
Date		06/10/2015

Saturation

Cell Pressure Incr.	kPa	50.00
Back Pressure Incr.	kPa	48.00
Differential Pressure	kPa	2.00
Final Cell Pressure	kPa	400.00
Final Pore Pressure	kPa	386.90
Final B Value		0.96

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	400.00
Back Pressure	kPa	300.00
Excess Pore Pressure	kPa	100.00
Pore Pressure at End	kPa	300.00
Consolidated Volume	cm^3	1019.74
Consolidated Height	mm	129.09
Consolidated Area	mm^2	7900.05
Vol. Compressibility	m^2/MN	51.0877
Consolidation Coef.	$m^2/yr.$	0.2093
Final Voids Ratio		0.496

Permeability

Cell Pressure	kPa	400.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00438
Average Temperature	'C	20

Vertical Permeability | m/s	**5.83 x 10-10**

D P Evans

Checked and Approved By

06/10/15
Date

Client Ref

Docksway Landfill, Newport

Contract No

28390

GSTL
GEO Site & Testing Services Limited

UKAS TESTING
2788

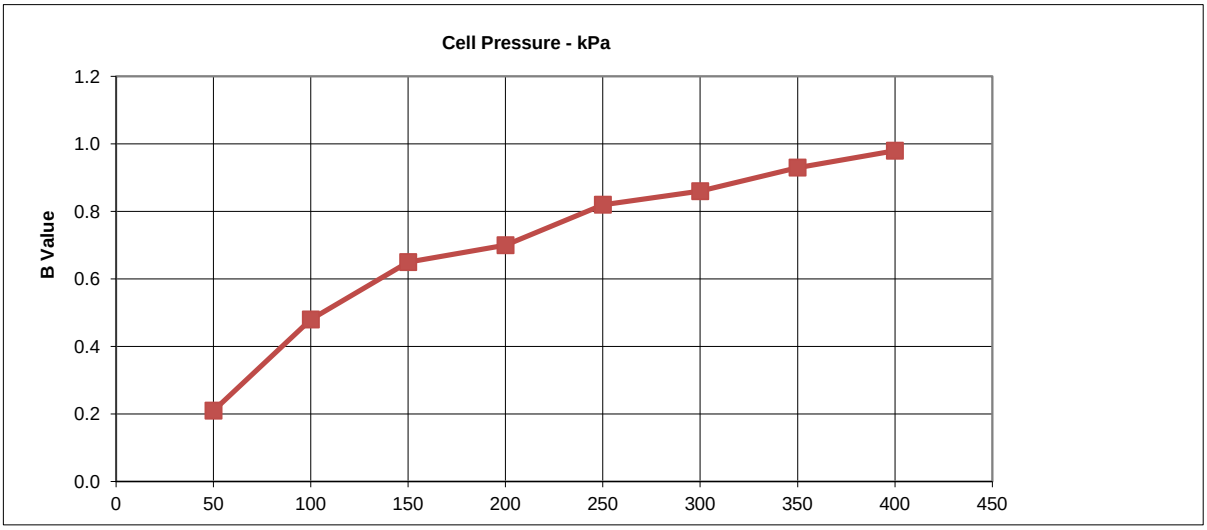
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

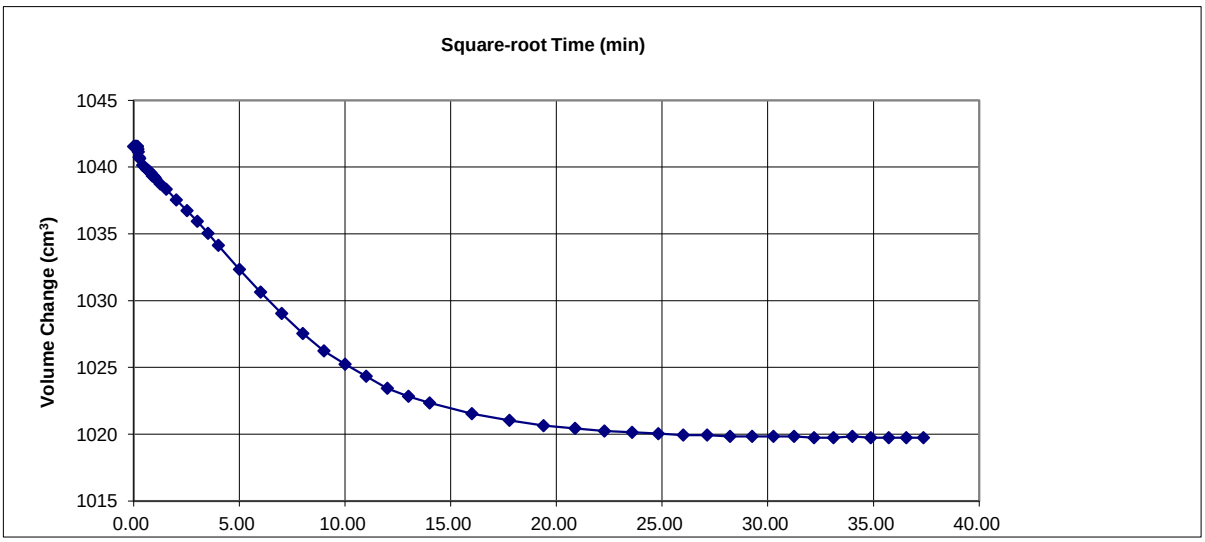
Specimen Details

Borehole		E5_2.2P
Sample No.		
Depth	m	
Date		06/10/2015

Saturation Stage



Consolidation Stage



D P Evans

Checked and Approved By

06/10/15
Date

Client Ref

Docksway Landfill, Newport

Contract No

28390

GSTL
GEO Site & Testing Services Limited

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2788

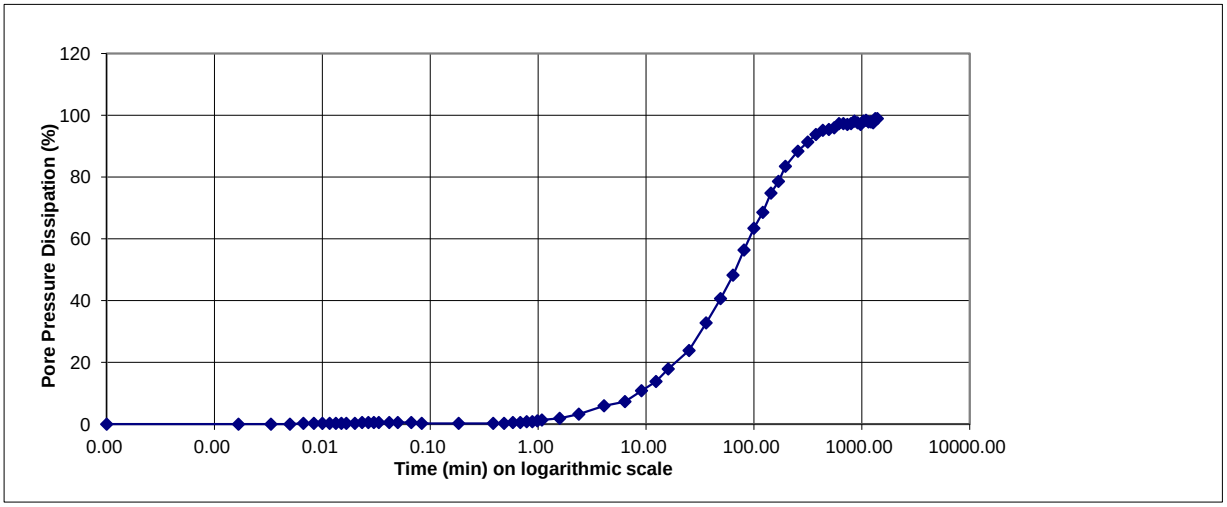
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		E5_2.2P
Sample No.		
Depth	m	
Date		06/10/2015

Consolidation Stage



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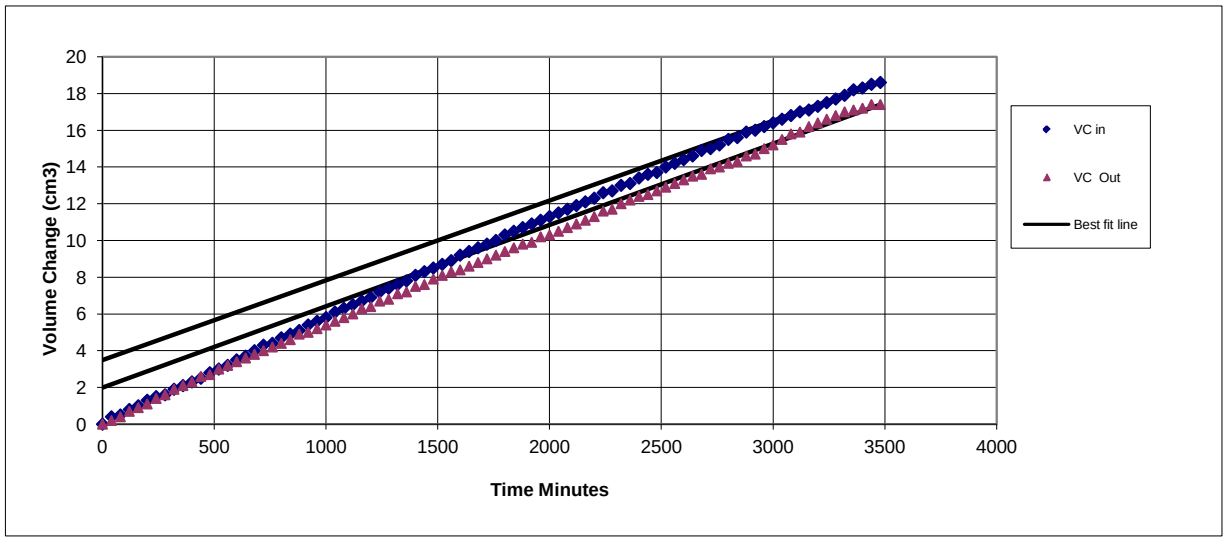


D P Rands

Checked and Approved By

06/10/15
Date

Client Ref

GSTL
GEO Site & Testing Services Limited

Docksway Landfill, Newport

Contract No

28390

UKAS TESTING
2788

Laboratory Report

UKAS TESTING 2788

GSTL

GEO Site & Testing Services Ltd

Contract Number: 28603

Client's Reference: **A56_C11(P)**

Report Date: **21-10-2015**

Client **Jim Davies Civil Engineering Ltd**
Ty Gwyn,
Banalog Terrace,
Hollybush,
Blackwood
NP12 0SG

Contract Title: **Docksway Landfill - Newport**

For the attention of: **Meirion Humphreys**

Date Received: **09-10-2015**

Date Commenced: **09-10-2015**

Date Completed: **21-10-2015**

Test Description	Qty
Determination of Permeability in a triaxial cell BS1377 Part 6 :1990 Clause 6 - * UKAS	1
Extra Over Item (4 Days Over)	4
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

Approved Signatories:
Alex Wynn (Associate Director) - Benjamin Sharp (Contracts Manager) - D V Edwards (Managing Director)
Emma Sharp (Office Manager) - Paul Evans (Quality/Technical Manager)

GEO Site & Testing Services Ltd
Unit 4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@geo.uk.com geo.uk.com

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		A56_C11(P)
Sample No.		
Depth	m	
Date		21/10/2015
Disturbed / Undisturbed		Undisturbed

Description of Specimen

Dark grey firm silty CLAY

Initial Specimen Conditions

Height	mm	127.00
Diameter	mm	102.00
Area	mm^2	8171.28
Volume	cm^3	1037.75
Mass	g	2010.60
Dry Mass	g	1630.90
Density	Mg/m^3	1.94
Dry Density	Mg/m^3	1.57
Moisture Content	%	23.3
Voids Ratio		0.686
Specific Gravity	kN/m^3	2.65
(assumed/measured)		assumed

Final Specimen Conditions

Moisture Content	%	23.84
Density	Mg/m^3	1.99
Dry Density	Mg/m^3	1.60

Test Setup

Date started	10/10/2015
Date Finished	20/10/2015
Top Drain Used	y
Base Drain Used	y
Pressure System Number	PPerm 1
Cell Number	CPerm 1

D P Evans

Checked and Approved By

21/10/15
Date

Client Ref

A56_C11(P)

Docksway Landfill-Newport

Contract No

28603

GSTL
GEO Site & Testing Services Limited

UKAS TESTING 2788

Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		A56_C11(P)
Sample No.		
Depth	m	0
Date		21/10/2015

Saturation

Cell Pressure Incr.	kPa	50.00
Back Pressure Incr.	kPa	52.00
Differential Pressure	kPa	-2.00
Final Cell Pressure	kPa	200.00
Final Pore Pressure	kPa	197.00
Final B Value		1.04

Consolidation

Effective Pressure	kPa	100.00
Cell Pressure	kPa	200.00
Back Pressure	kPa	100.00
Excess Pore Pressure	kPa	97.00
Pore Pressure at End	kPa	100.00
Consolidated Volume	cm^3	1016.75
Consolidated Height	mm	126.14
Consolidated Area	mm^2	8061.05
Vol. Compressibility	m^2/MN	4.3529
Consolidation Coef.	$m^2/yr.$	0.2086
Final Voids Ratio		0.652

Permeability

Cell Pressure	kPa	200.00
Effective Cell Pressure	kPa	100.00
Back Pressure Diff.	kPa	20.00
Mean Rate of Flow	ml/min	0.00136
Average Temperature	'C	20

Vertical Permeability Kv	**m/s**	**1.73 x 10-10**

DP Rowe

Checked and Approved By

21/10/15
Date

Client Ref

A56_C11(P)

Docksway Landfill-Newport

Contract No

28603

GSTL
GEO Site & Testing Services Limited

UKAS TESTING
2788

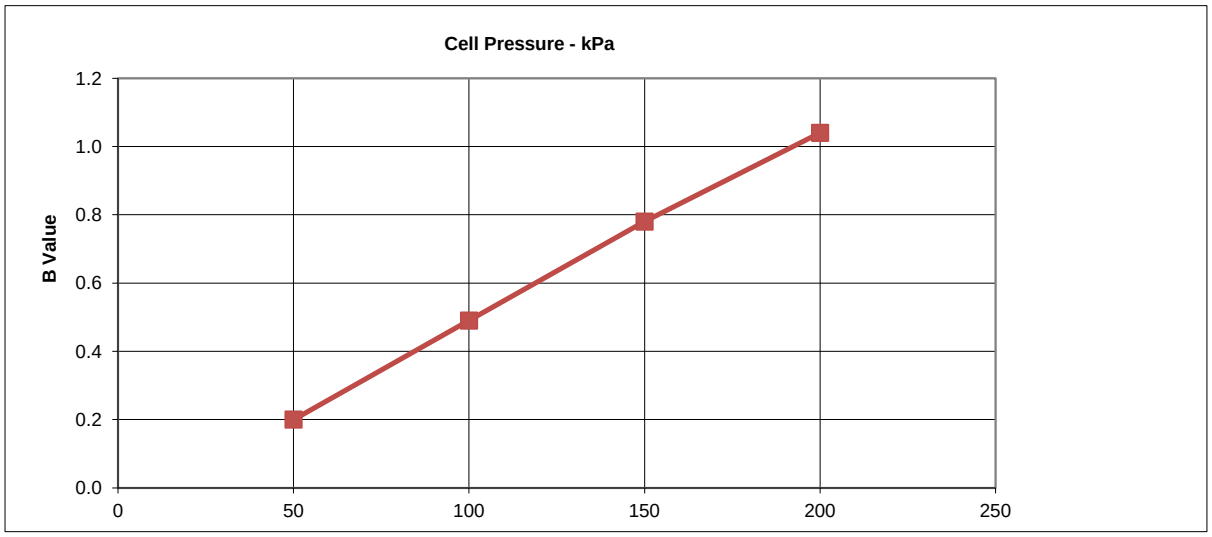
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details

Borehole		A56_C11(P)
Sample No.		
Depth	m	0
Date		21/10/2015

Saturation Stage



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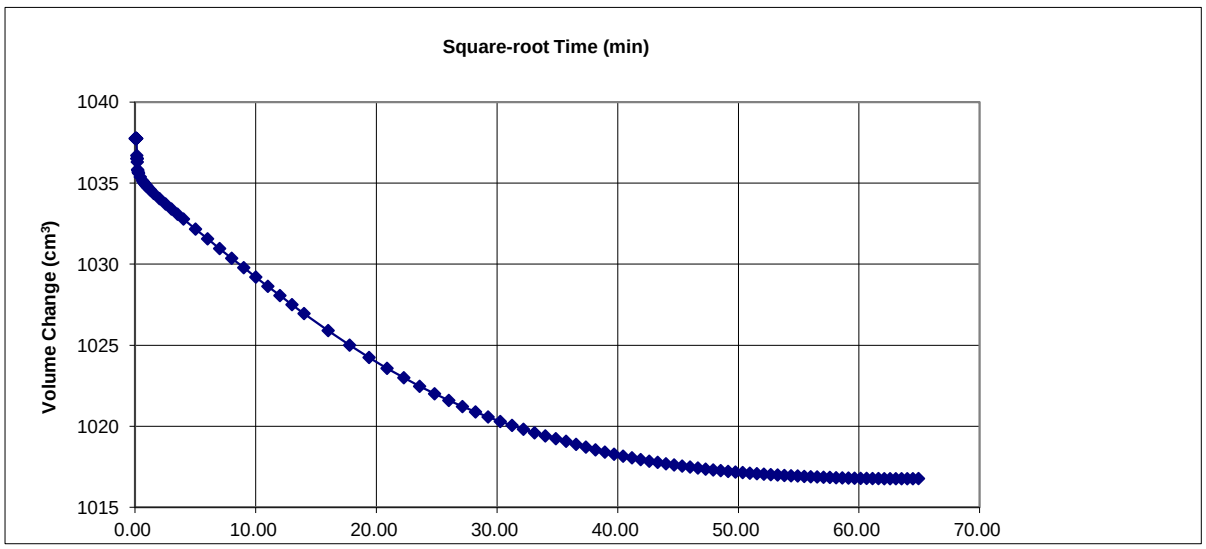


D P Evans

Checked and Approved By

21/10/15
Date

Client Ref

A56_C11(P)

Docksway Landfill-Newport

Contract No

28603

GSTL
GEO Site & Testing Services Limited

UKAS TESTING
2788

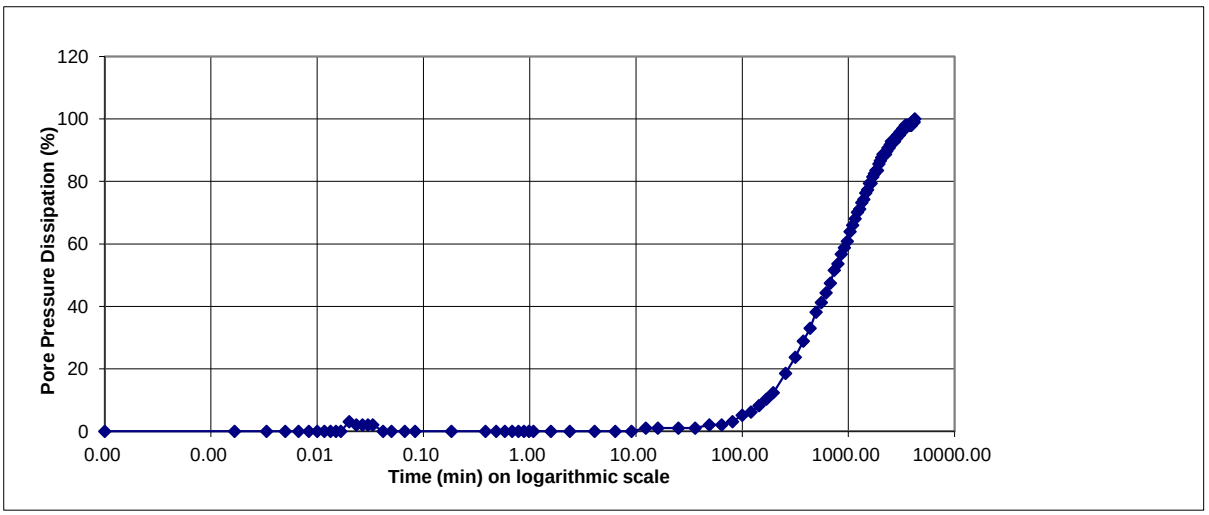
Permeability in a Triaxial Cell

BS 1377 : Part 6 : 1990 Clause 6

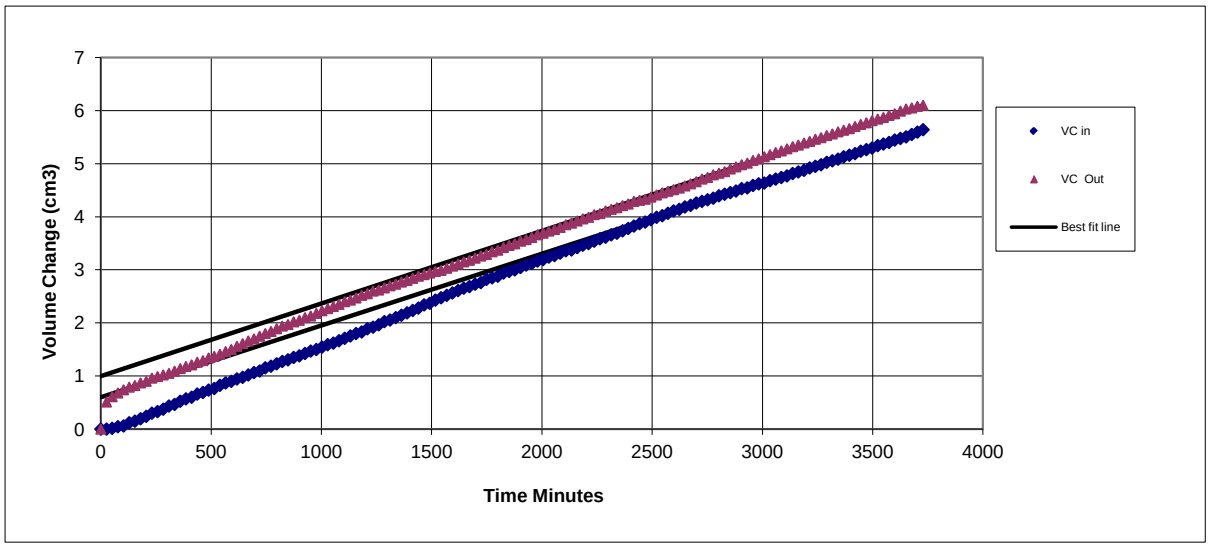
Specimen Details

Borehole		A56_C11(P)
Sample No.		
Depth	m	0
Date		21/10/2015

Consolidation Stage



Permeability Stage



D P Evans

Checked and Approved By

21/10/15
Date

GSTL
GEO Site & Testing Services Limited

Docksway Landfill-Newport

Client Ref
A56_C11(P)

Contract No
28603

UKAS TESTING
2788

TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6358**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**23/07/2015**	Material Source:	**Unknown**
Tested By:	**R Anstee**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 B1-C1	Core 2 B2-C1	Core 3 B3-C1	Core 4 A1-C1	Core 5 C3-C1
Bulk Density	2.00	2.02	1.99	1.98	2.04
Moisture Content	19	23	20	24	20
Dry Density	1.68	1.64	1.65	1.60	1.70

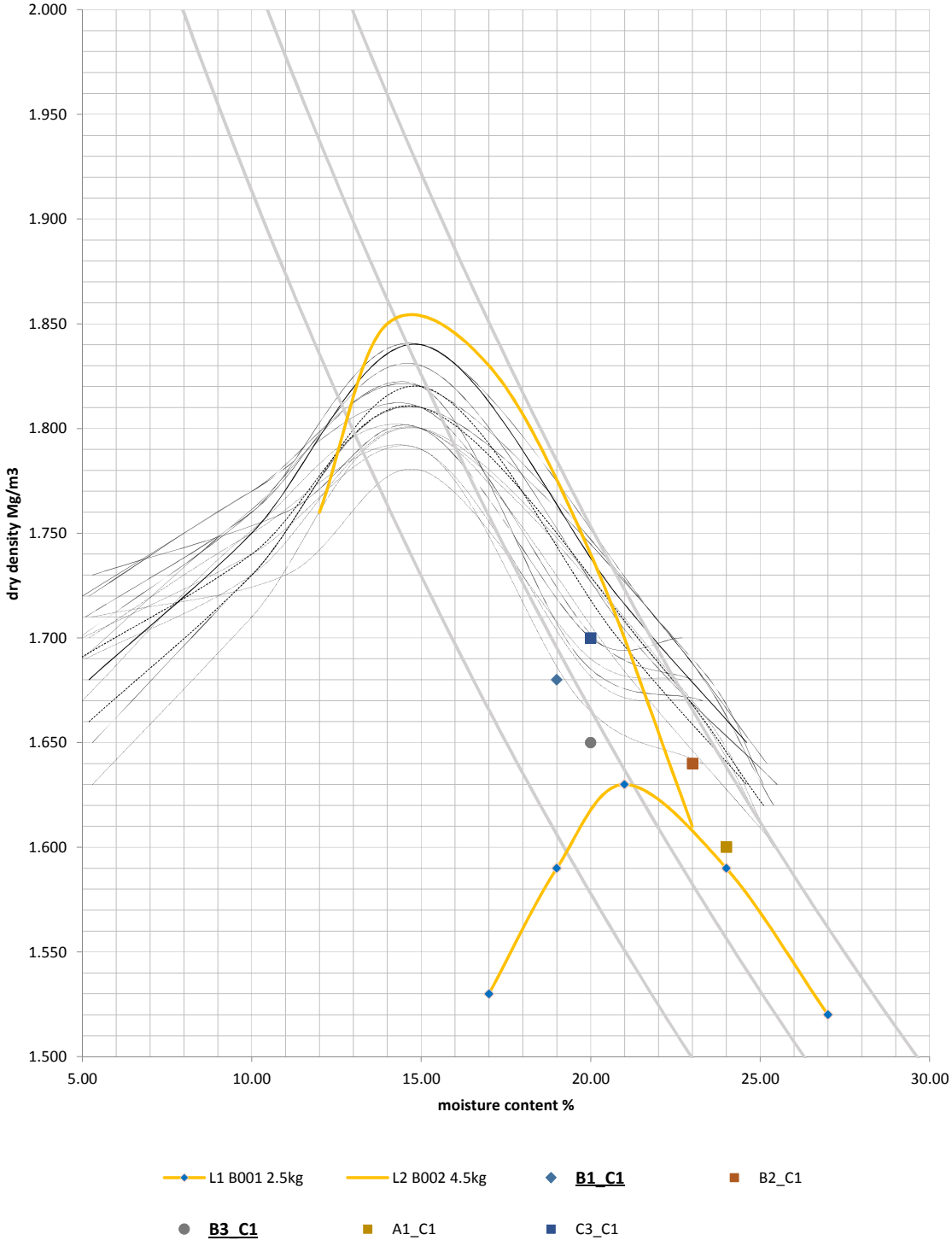
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 04.08.2015

APEX Testing Solutions Certifactes 6358



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6359**		

Site Reference:	**Core 6 - 9**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**23/07/2015**	Material Source:	**Unknown**
Tested By:	**R Anstee**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 6 C5-C1 Retest 1	Core 7 C5-C1 Retest 2	Core 8 D5-C1 Retest 1	Core 9 D5-C1 Retest 2	
Bulk Density	2.06	2.06	2.02	2.06	
Moisture Content	18	20	22	21	
Dry Density	1.75	1.72	1.65	1.71	

Relative Compaction	N/A	N/A	N/A	N/A	

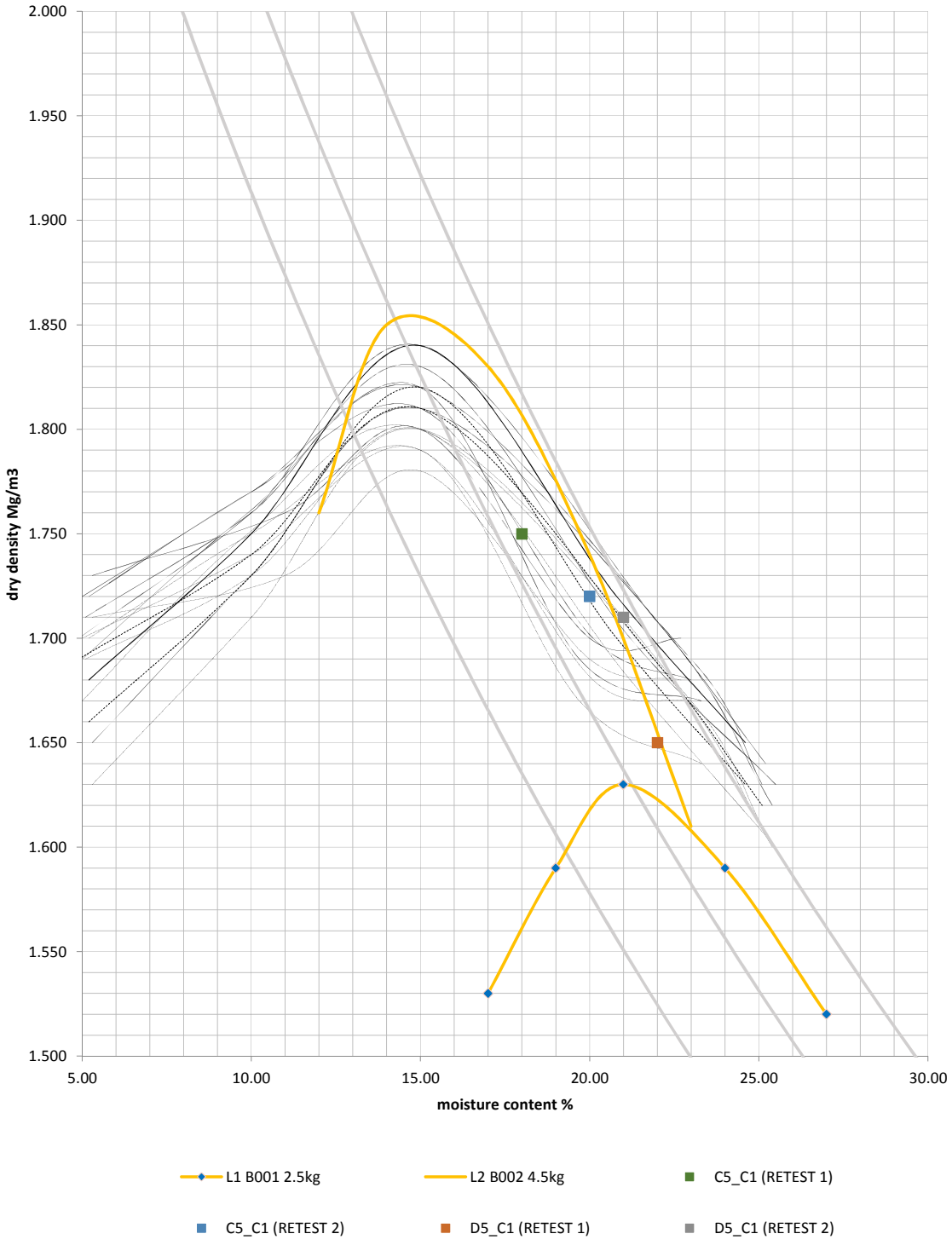
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver R. Anstee	Date 27/07/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 04.08.2015

(APEX Testing Solutions Certifactes 6358, 6359, 6360)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6360**		

Site Reference:	**Core 10**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**23/07/2015**	Material Source:	**Unknown**
Tested By:	**R Anstee**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 10 B1-C1 Spare				
Bulk Density	2.01				
Moisture Content	19				
Dry Density	1.68				

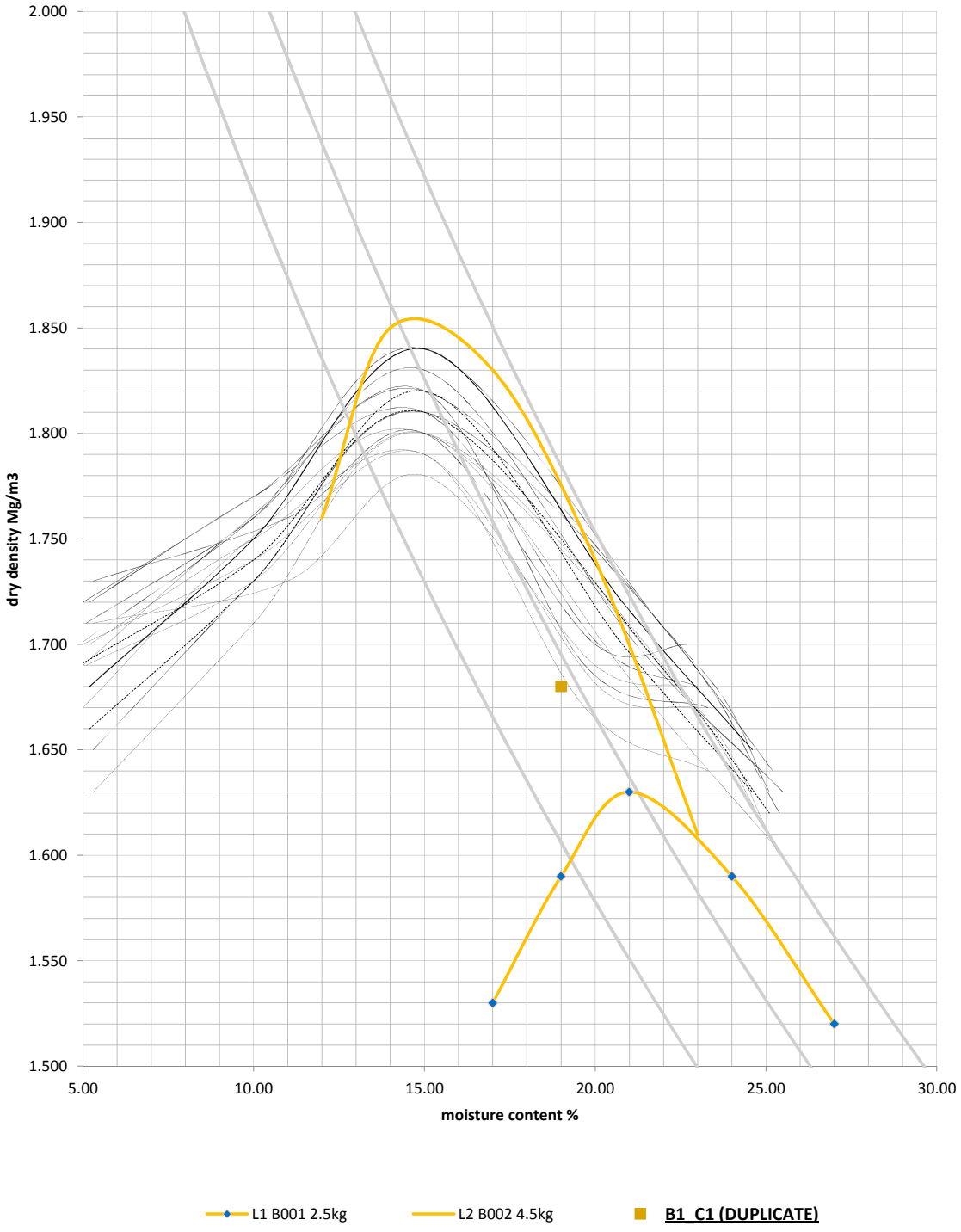
Relative Compaction	N/A				

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 04.08.2015

(APEX Testing Solutions Certifactes 6358, 6359, 6360)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6393**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**28/07/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 B6-C1	Core 2 B6-C2	Core 3 B7-C1 Retest 1	Core 4 B7-C1 Retest 2	Core 5 B5-C2 Retest
Bulk Density	2.08	2.04	2.04	2.06	2.03
Moisture Content	18	21	21	20	23
Dry Density	1.77	1.68	1.68	1.72	1.66

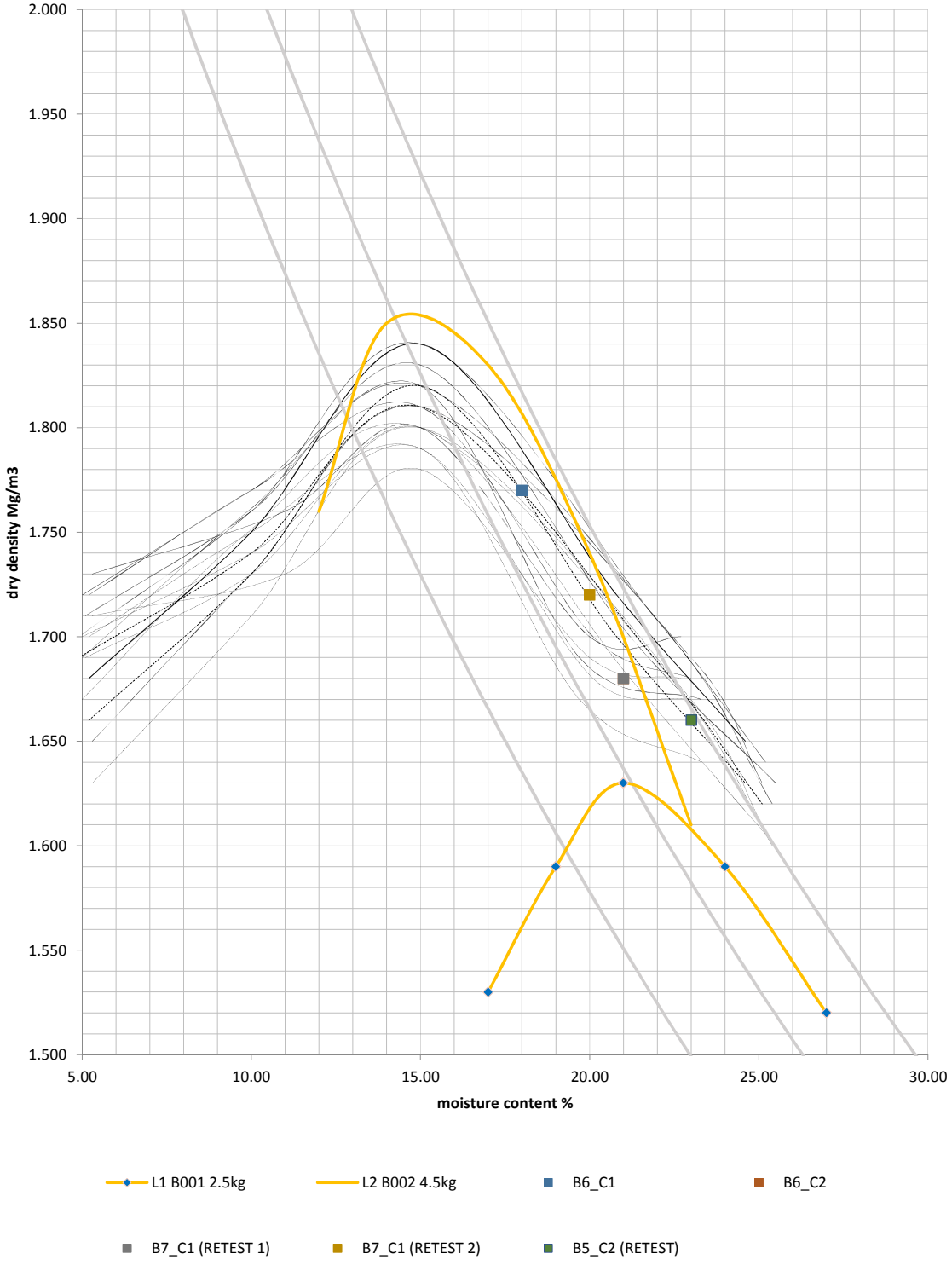
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 28.07.2015

(APEX Testing Solutions Certifactes 6393)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6394**		

Site Reference:	**Core 6 - 7**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**28/07/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 6 C6-C2	Core 7 D4-C1 Retest			
Bulk Density	1.98	2.06			
Moisture Content	20	20			
Dry Density	1.65	1.71			

Relative Compaction	N/A	N/A			

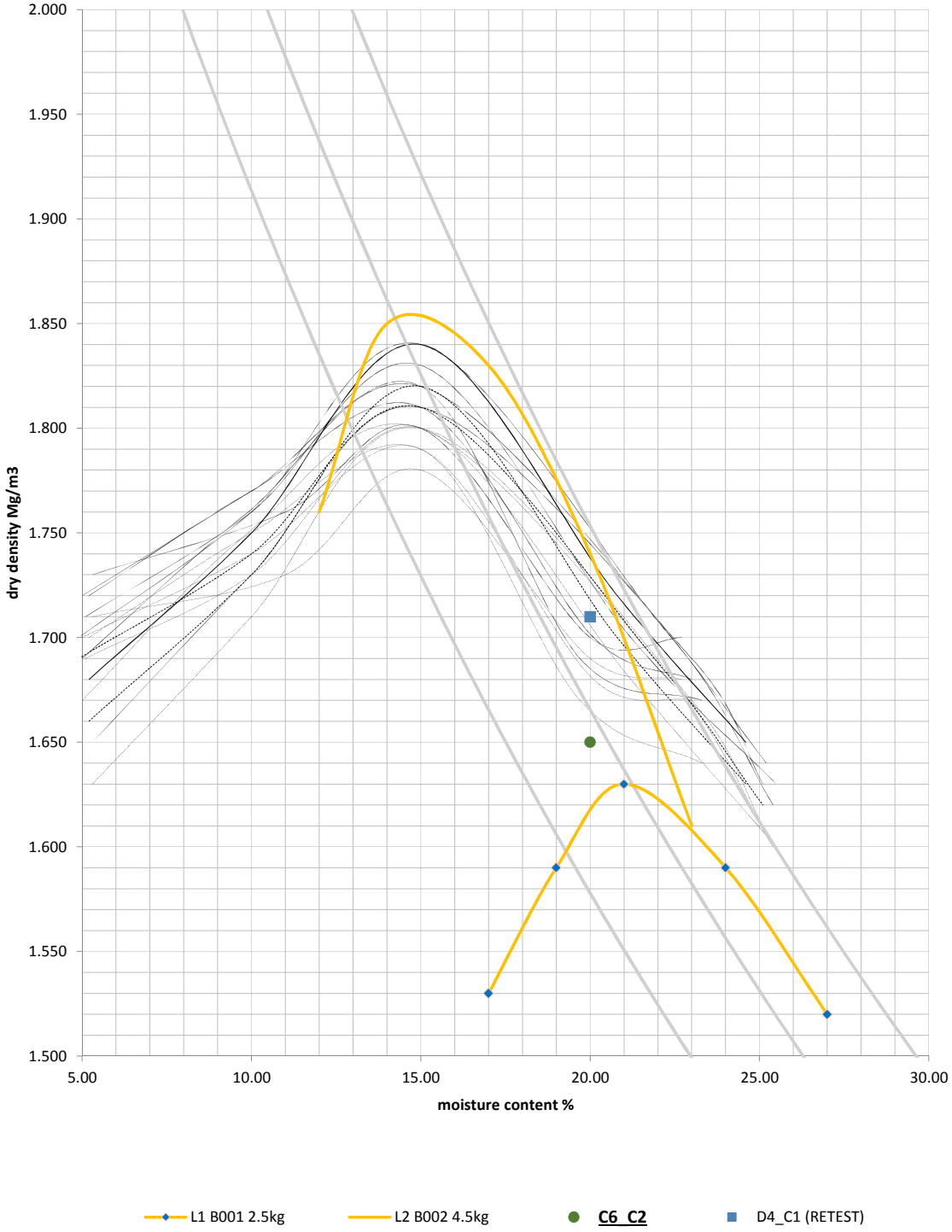
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver R. Anstee	Date 30/07/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 28.07.2015

(APEX Testing Solutions Certifactes 6394)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6395**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**29/07/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 D6-C1	Core 2 D7-C1 Retest	Core 3 E6-C1	Core 4 F5-C1	Core 5 F7-C2
Bulk Density	2.08	2.07	2.04	2.02	1.98
Moisture Content	19	18	20	21	22
Dry Density	1.75	1.75	1.70	1.67	1.62

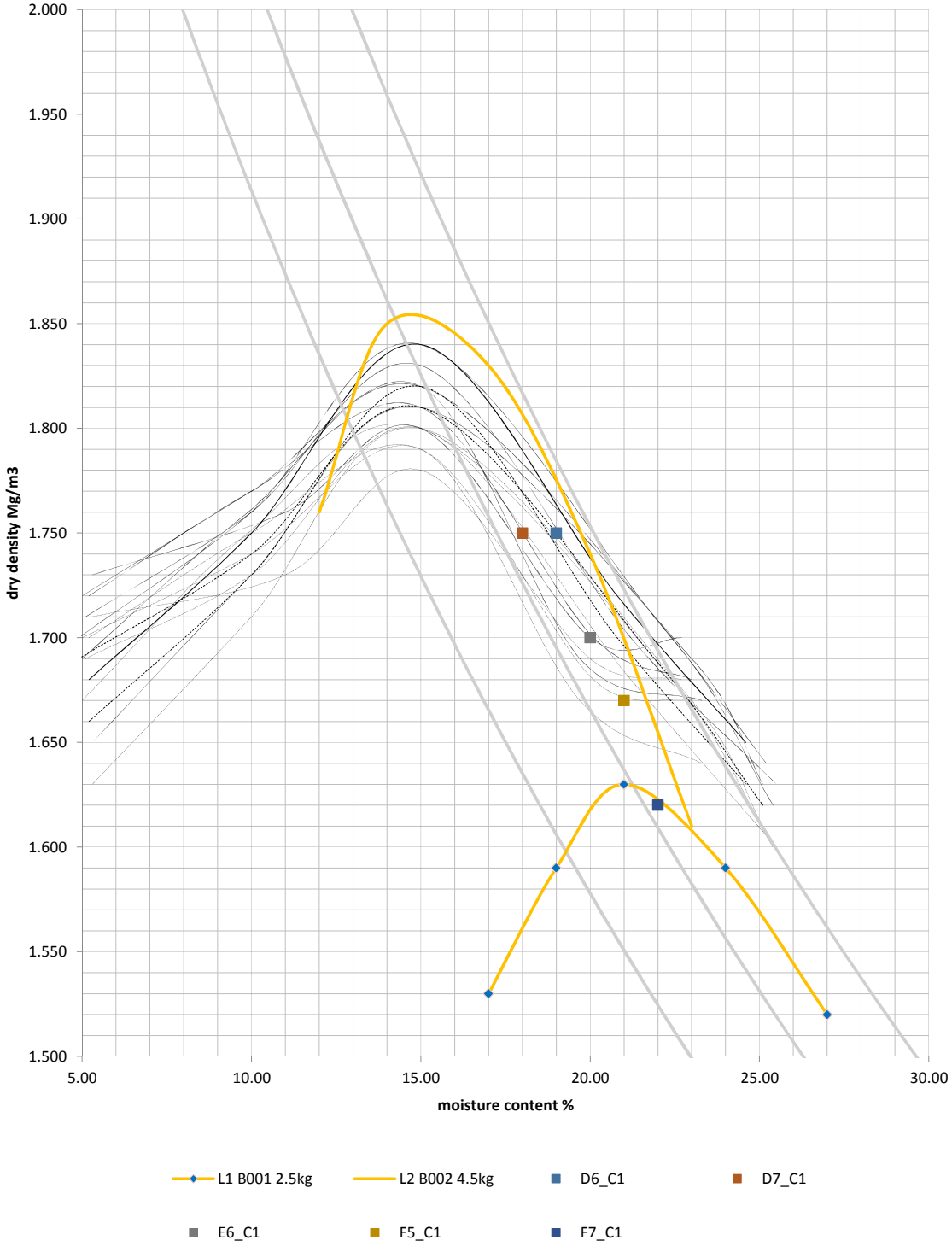
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 29.07.2015

(APEX Testing Solutions Certifactes 6395)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6432**		

Site Reference:	**Core 1 - 4**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**29/07/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 B7-C2 Retest 2	Core 2 C5-C2 Retest 2	Core 3 B7-C2 Retest	Core 4 C7-C2 Retest	
Bulk Density	1.98	2.06	2.00	1.99	
Moisture Content	23	20	22	21	
Dry Density	1.61	1.71	1.64	1.64	

Relative Compaction	N/A	N/A	N/A	N/A	

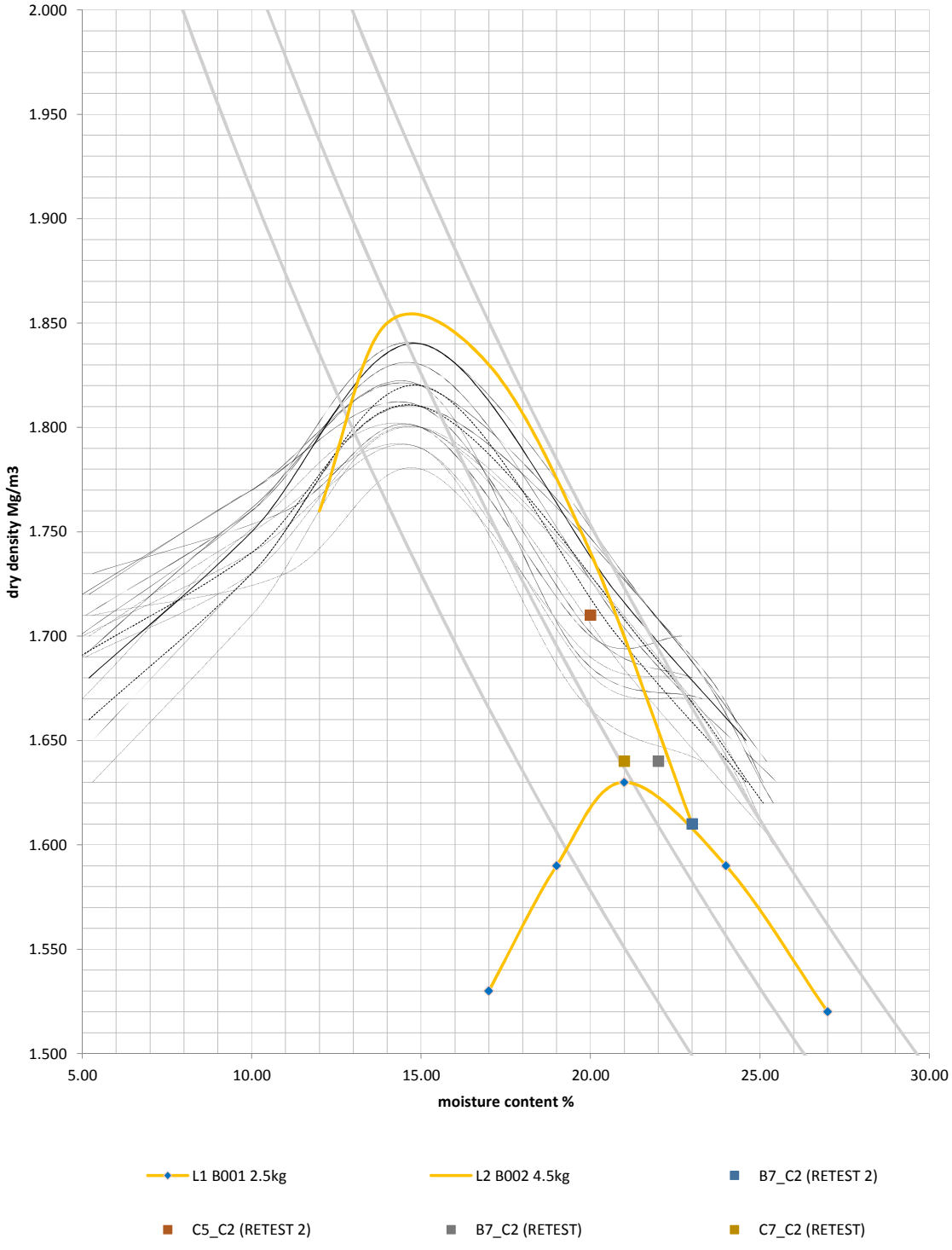
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver R. Anstee	Date 01/08/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 29.07.2015

(APEX Testing Solutions Certifactes 6432)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6433**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**31/08/2015**	Material Source:	**Unknown**
Tested By:	**R Anstee**	Material Supplier:	**Unknown**
Environmental Conditions:	**Bright and sunny**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 A6-C3	Core 2 A5-C3	Core 3 A3-C2	Core 4 A4-C3	Core 5 D5-C3
Bulk Density	2.02	2.02	2.02	2.04	2.01
Moisture Content	20	19	20	20	19
Dry Density	1.69	1.69	1.68	1.70	1.69

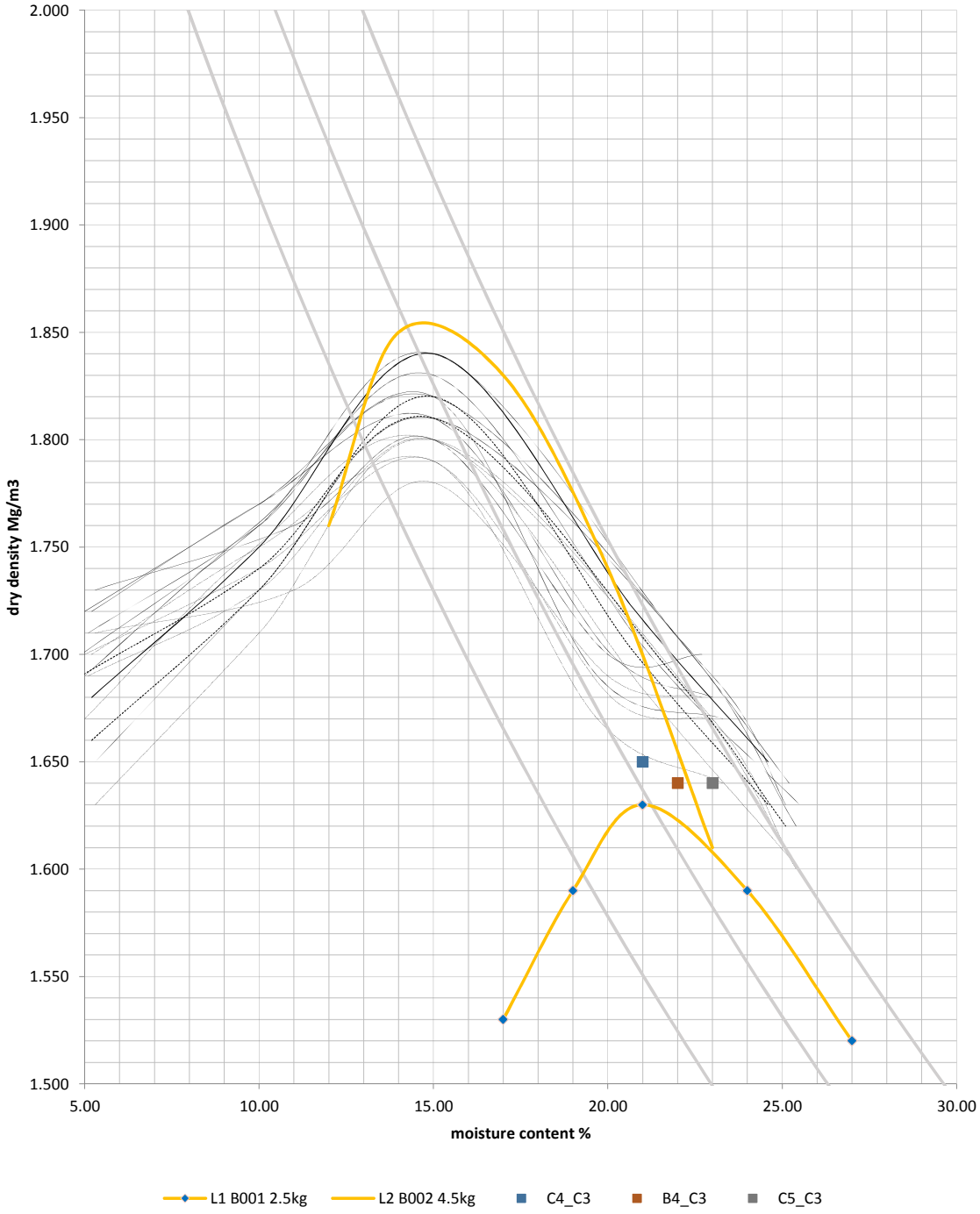
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 31.07.2015

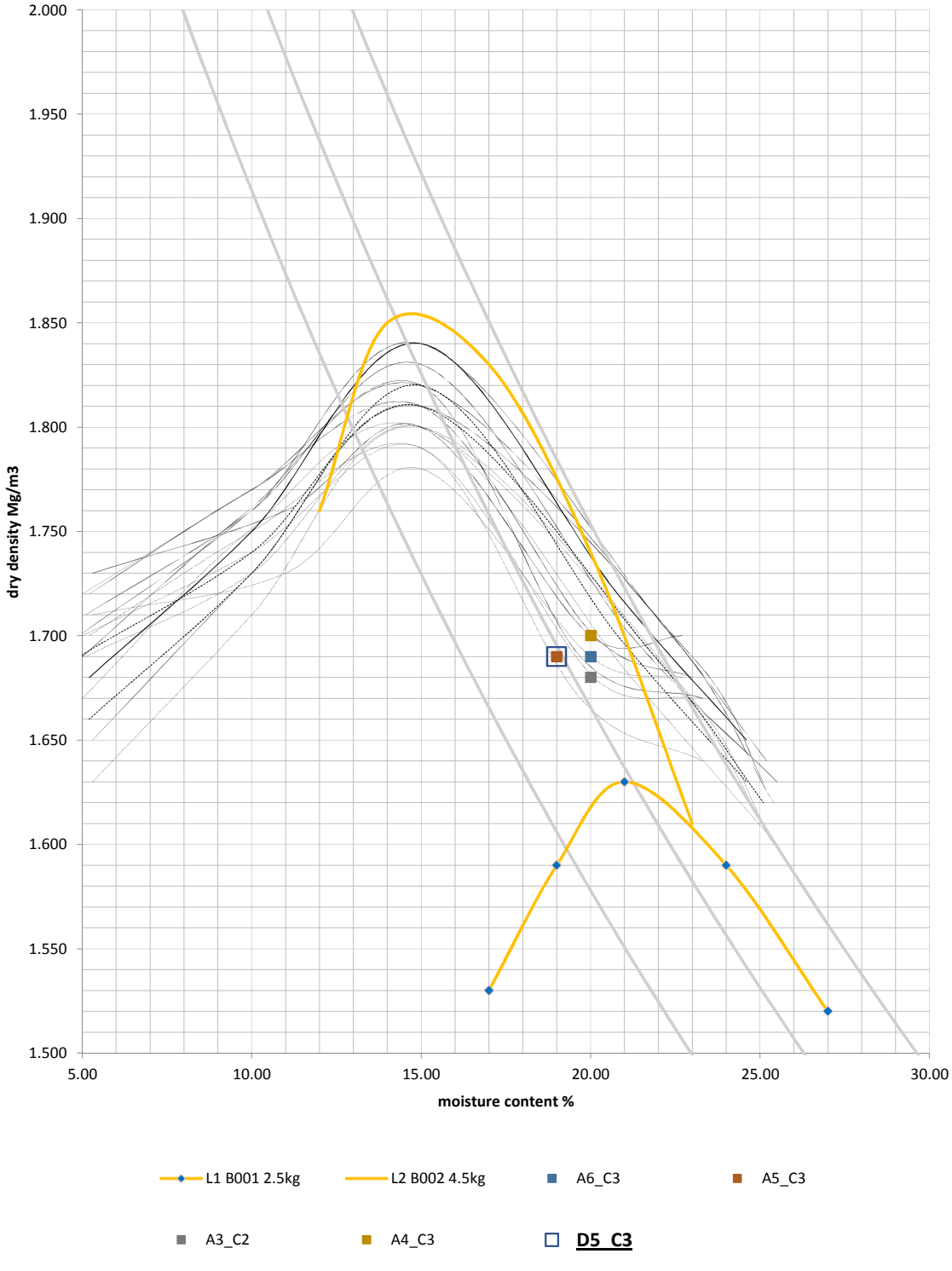
(APEX Testing Solutions Certifactes 6434)



Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 31.07.2015

(APEX Testing Solutions Certifactes 6433)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6434**		

Site Reference:	**Core 6 - 8**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**31/08/2015**	Material Source:	**Unknown**
Tested By:	**R Anstee**	Material Supplier:	**Unknown**
Environmental Conditions:	**Bright and sunny**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 6 C5-C3	Core 7 C4-C3	Core 8 B4-C3		
Bulk Density	2.01	2.00	1.99		
Moisture Content	23	21	22		
Dry Density	1.64	1.65	1.64		

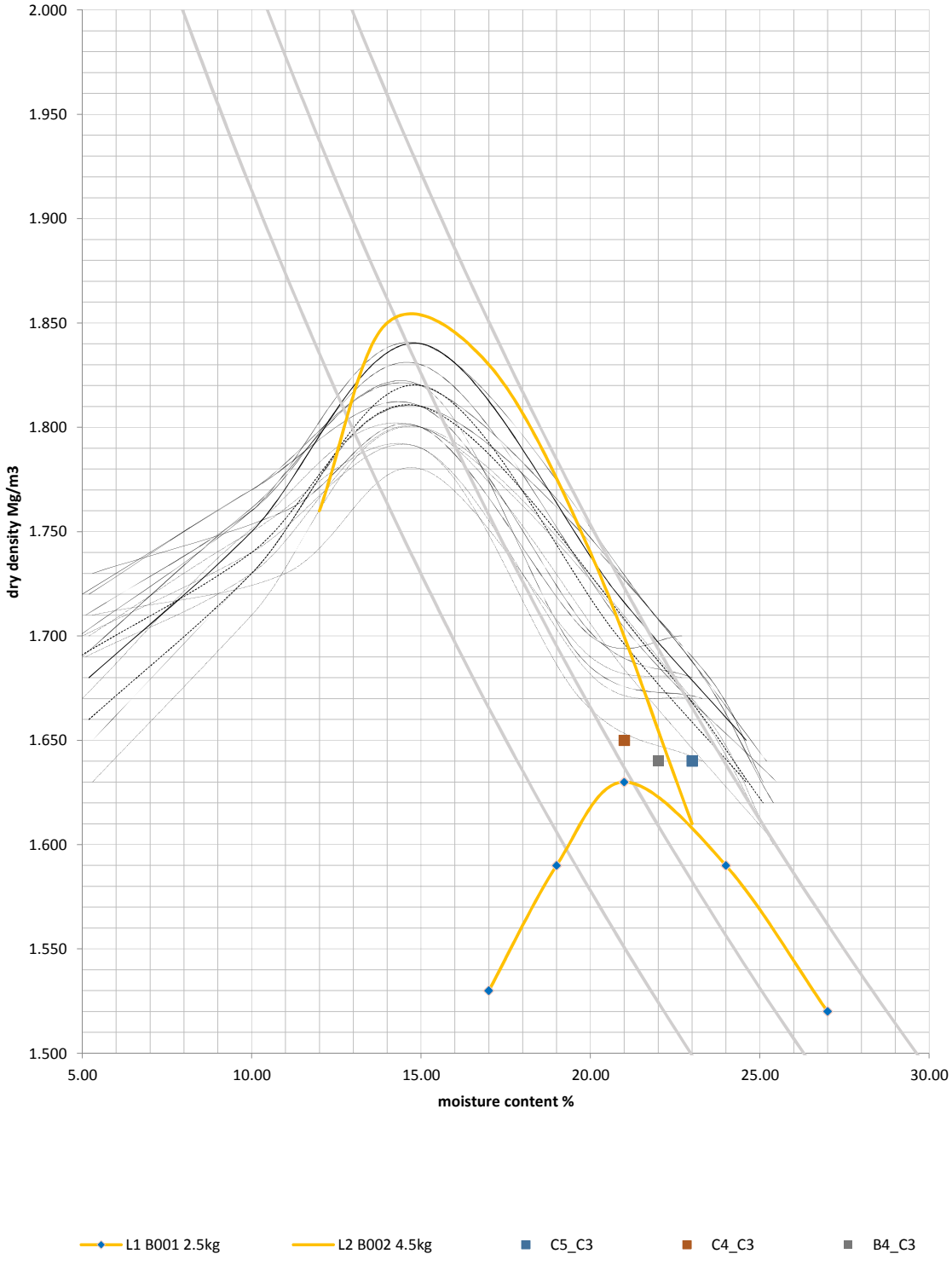
Relative Compaction	N/A	N/A	N/A		

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 31.07.2015

(APEX Testing Solutions Certifactes 6434)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6448**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**03/08/2015**	Material Source:	**Unknown**
Tested By:	**T Thomas**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 B1-C1	Core 2 B4-C2 Retest 1	Core 3 B4-C2 Retest 2	Core 4 C4-C2 Retest 1	Core 5 C4-C2 Retest 2
Bulk Density	2.05	2.12	2.04	2.06	2.06
Moisture Content	21	21	21	20	21
Dry Density	1.69	1.75	1.69	1.71	1.71

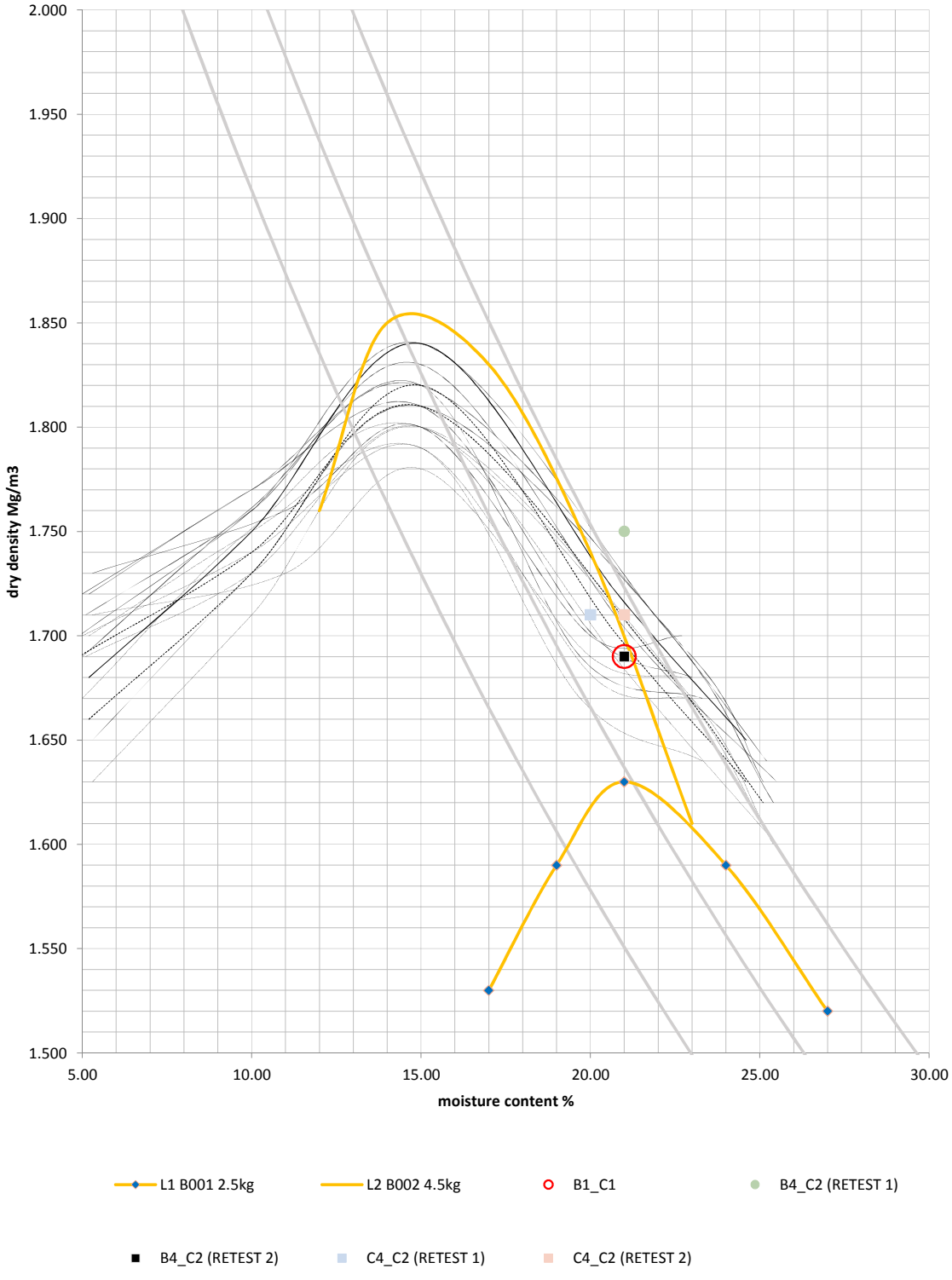
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 03.08.2015

(APEX Testing Solutions Certifacte 6448)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6449**		

Site Reference:	**Core 6 - 10**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**03/08/2015**	Material Source:	**Unknown**
Tested By:	**T Thomas**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 6 D4-C2 Retest 1	Core 7 D4-C2 Retest 2	Core 8 E4-C2 Retest 1	Core 9 E4-C2 Retest 2	Core 10 B6-C3
Bulk Density	2.11	2.06	2.11	2.13	2.07
Moisture Content	19	21	18	18	20
Dry Density	1.78	1.70	1.78	1.80	1.72

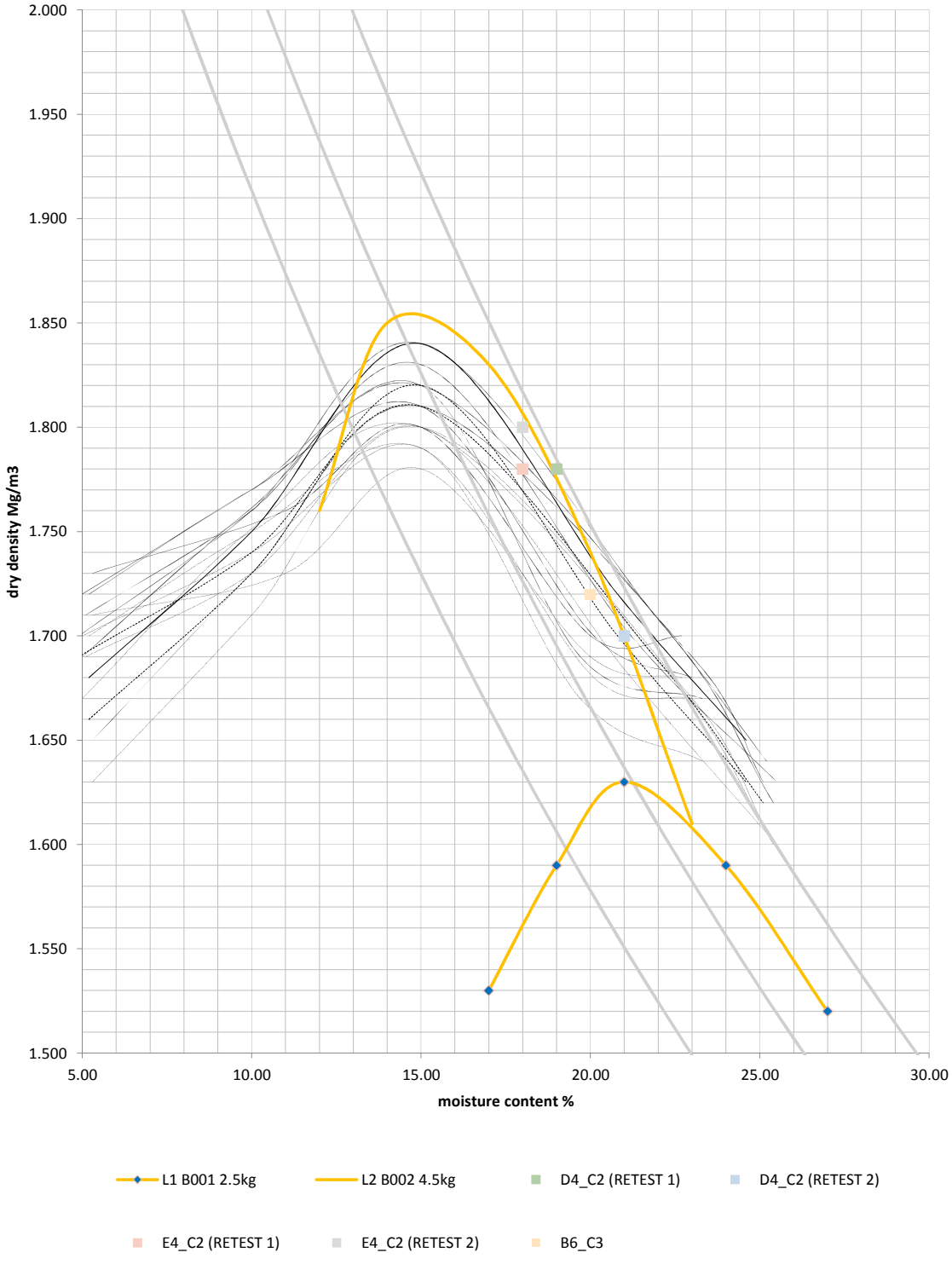
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 03.08.2015

(APEX Testing Solutions Certifactes 6449)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6450**		

Site Reference:	**Core 11 - 15**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**03/08/2015**	Material Source:	**Unknown**
Tested By:	**T Thomas**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 11 D7-C2 Retest 1	Core 12 D7-C2 Retest 2	Core 13 E7-C1 Retest 1	Core 14 E7-C1 Retest 2	Core 15 B2-C2
Bulk Density	2.06	2.03	2.06	2.08	2.10
Moisture Content	18	20	24	23	20
Dry Density	1.75	1.69	1.66	1.70	1.75

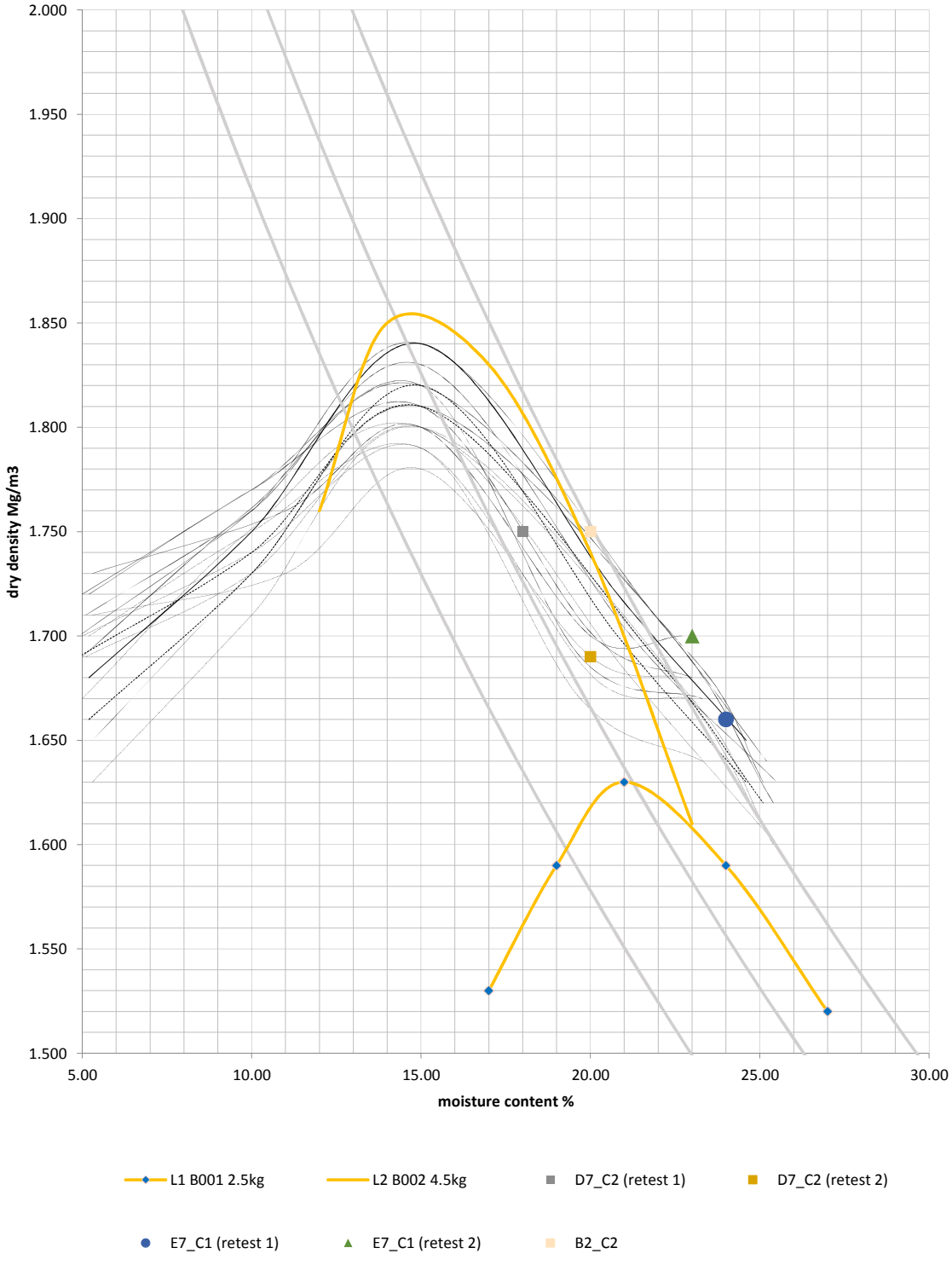
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 04.08.2015

(APEX Testing Solutions Certifactes 6450)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6451**		

Site Reference:	**Core 16**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**03/08/2015**	Material Source:	**Unknown**
Tested By:	**T Thomas**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 16 B1-C2				
Bulk Density	2.09				
Moisture Content	21				
Dry Density	1.73				

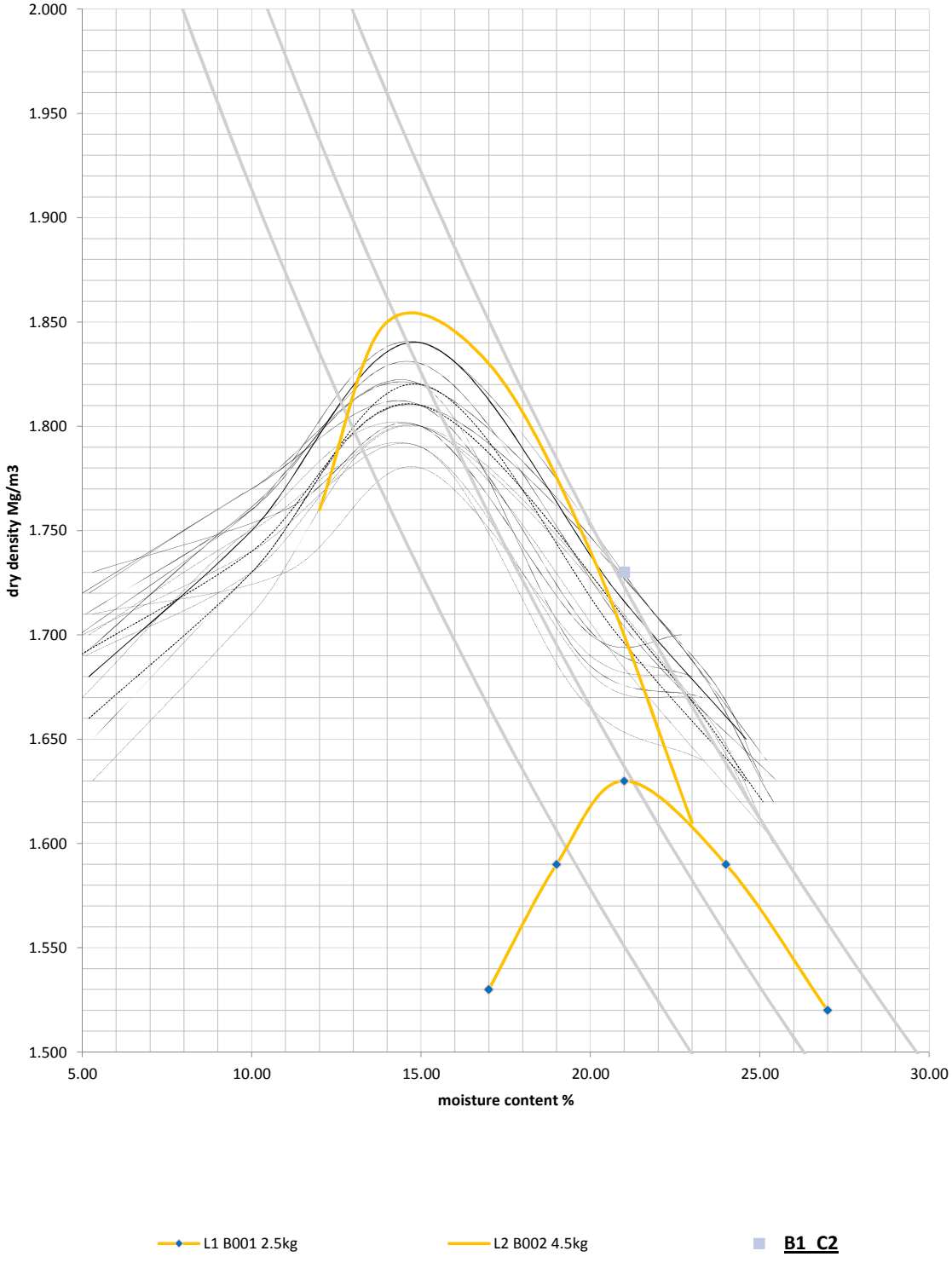
Relative Compaction	N/A				

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 03.08.2015

(APEX Testing Solutions Certifactes 6451)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6468**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**05/08/2015**	Material Source:	**Unknown**
Tested By:	**T Thomas**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 A6-C4	Core 2 A7-C4	Core 3 A5-C4	Core 4 B5-C4	Core 5 B7-C3
Bulk Density	2.00	2.02	1.99	2.01	2.05
Moisture Content	19	19	20	21	20
Dry Density	1.68	1.70	1.65	1.66	1.70

Relative Compaction	N/A	N/A	N/A	N/A	N/A

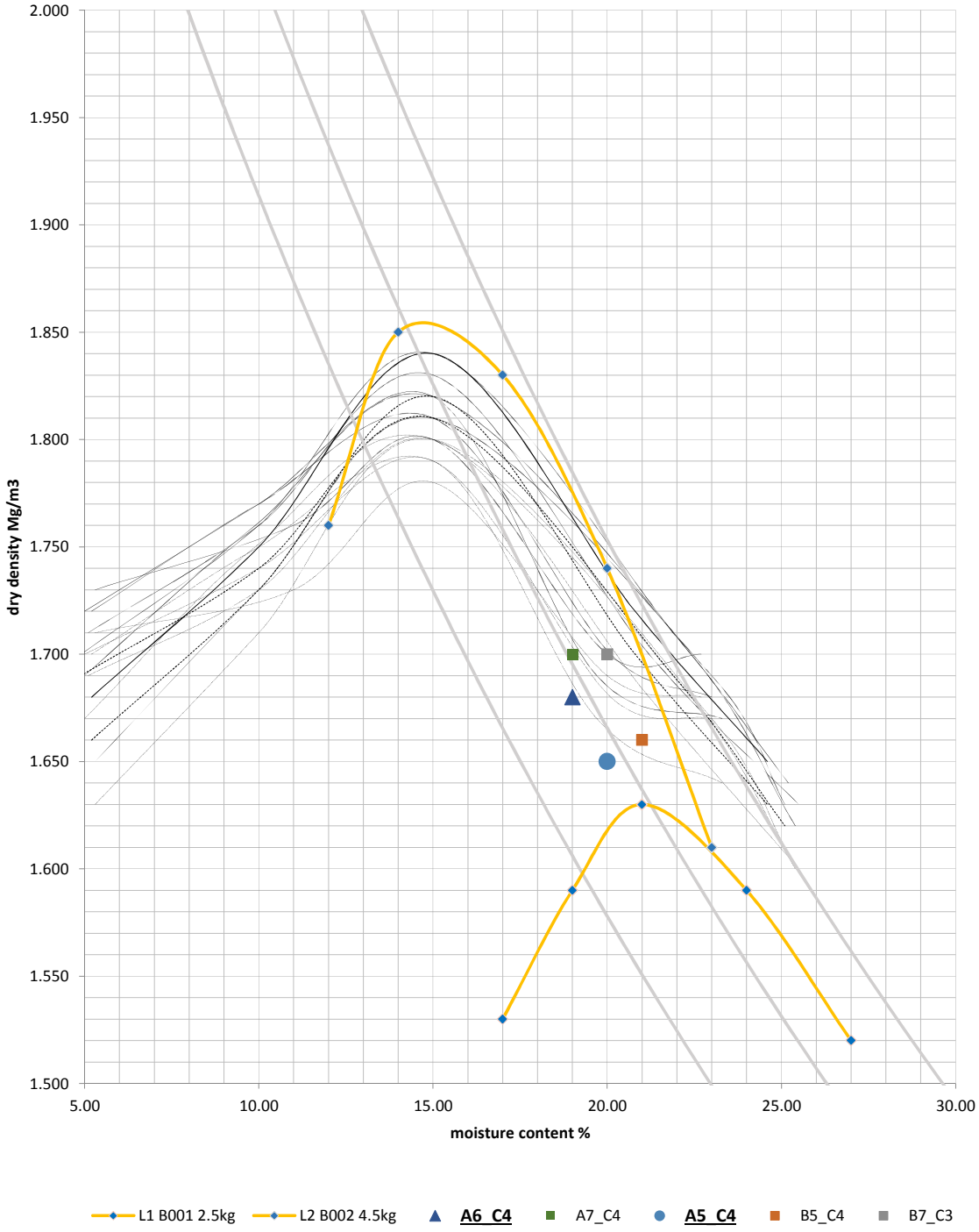
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver R. Anstee	Date 06/08/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 05.08.2015

(APEX Testing Solutions Certifacte 6468)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6469**		

Site Reference:	**Core 6 - 9**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**05/08/2015**	Material Source:	**Unknown**
Tested By:	**T Thomas**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 6 C7-C3	Core 7 D7-C3	Core 8 D6-C3	Core 9 C6-C3	
Bulk Density	2.04	2.00	2.04	2.04	
Moisture Content	21	19	20	20	
Dry Density	1.68	1.68	1.70	1.71	

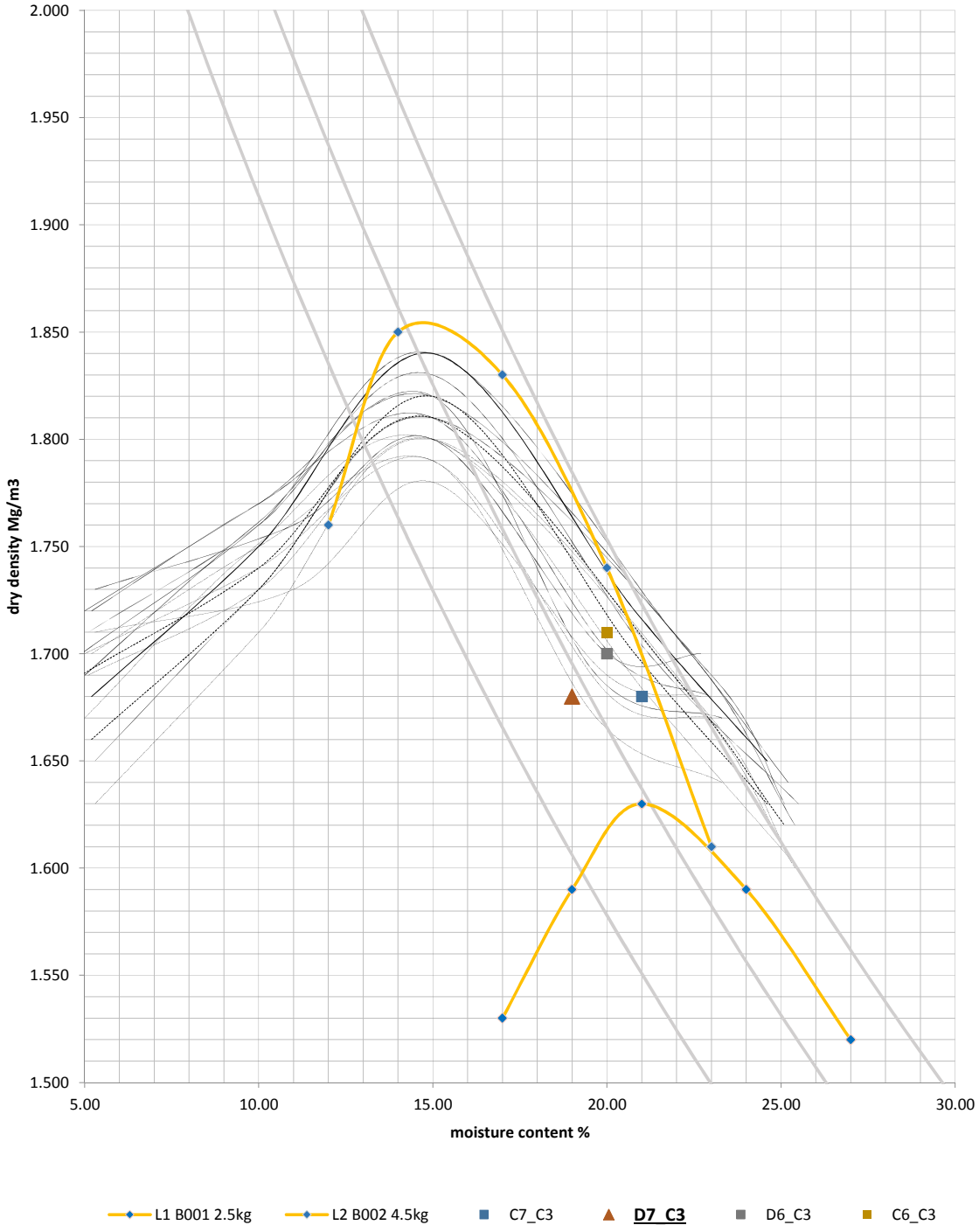
Relative Compaction	N/A	N/A	N/A	N/A	

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 05.08.2015

(APEX Testing Solutions Certifactes 6469)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6507**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**07/08/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Bright and sunny**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 B4-C4	Core 2 B6-C4	Core 3 C6-C4	Core 4 A4-C4	Core 5 C5-C4
Bulk Density	2.03	2.02	2.05	2.03	2.03
Moisture Content	21	22	20	21	20
Dry Density	1.67	1.65	1.71	1.68	1.69

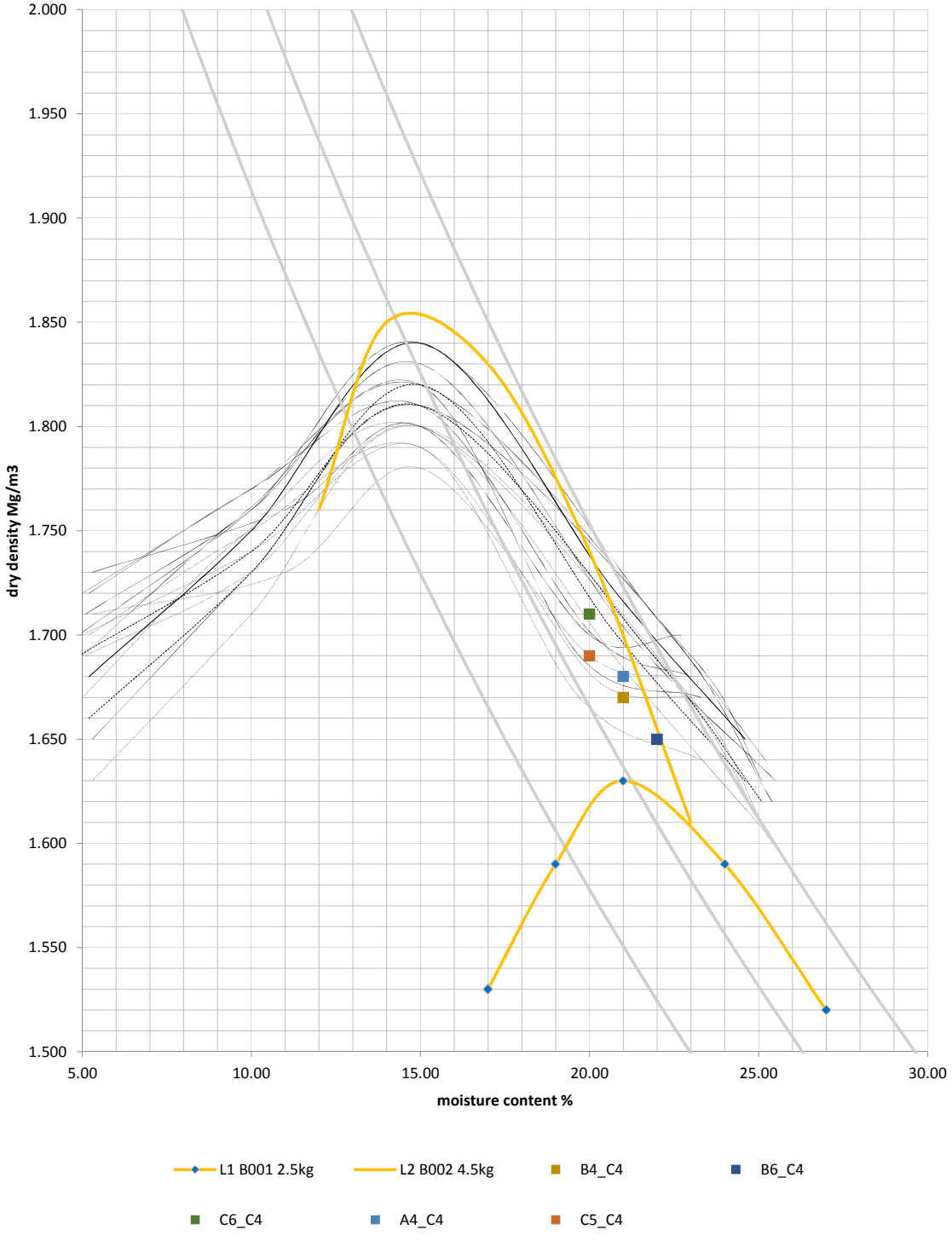
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 07.08.2015

(APEX Testing Solutions Certifactes 6507)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6508**		

Site Reference:	**Core 6 - 8**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**07/08/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Bright and sunny**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 6 C4-C4	Core 7 D6-C4	Core 8 D5-C4		
Bulk Density	1.99	2.02	2.02		
Moisture Content	22	21	19		
Dry Density	1.64	1.68	1.69		

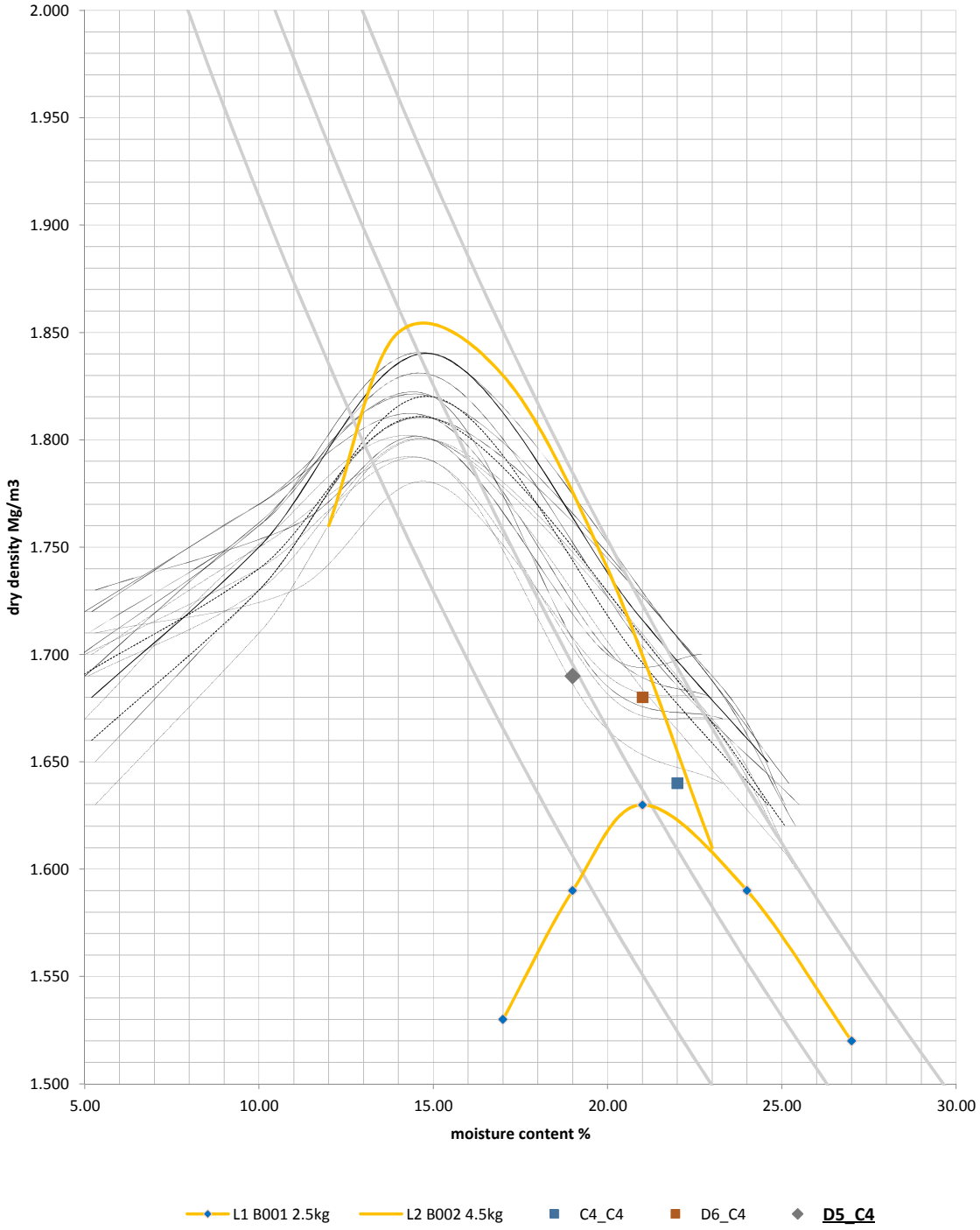
Relative Compaction	N/A	N/A	N/A		

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 07.08.2015

(APEX Testing Solutions Certifactes 6508)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6510**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**10/08/2015**	Material Source:	**Unknown**
Tested By:	**T Thomas**	Material Supplier:	**Unknown**
Environmental Conditions:	**Bright and sunny**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 C7-C4	Core 2 A5-C4	Core 3 A6-C4 Relaid New Layer	Core 4 B5-C5	Core 5 B7-C4
Bulk Density	2.01	2.01	2.01	2.05	2.04
Moisture Content	22	22	21	21	16
Dry Density	1.65	1.64	1.66	1.69	1.75

Relative Compaction	N/A	N/A	N/A	N/A	N/A

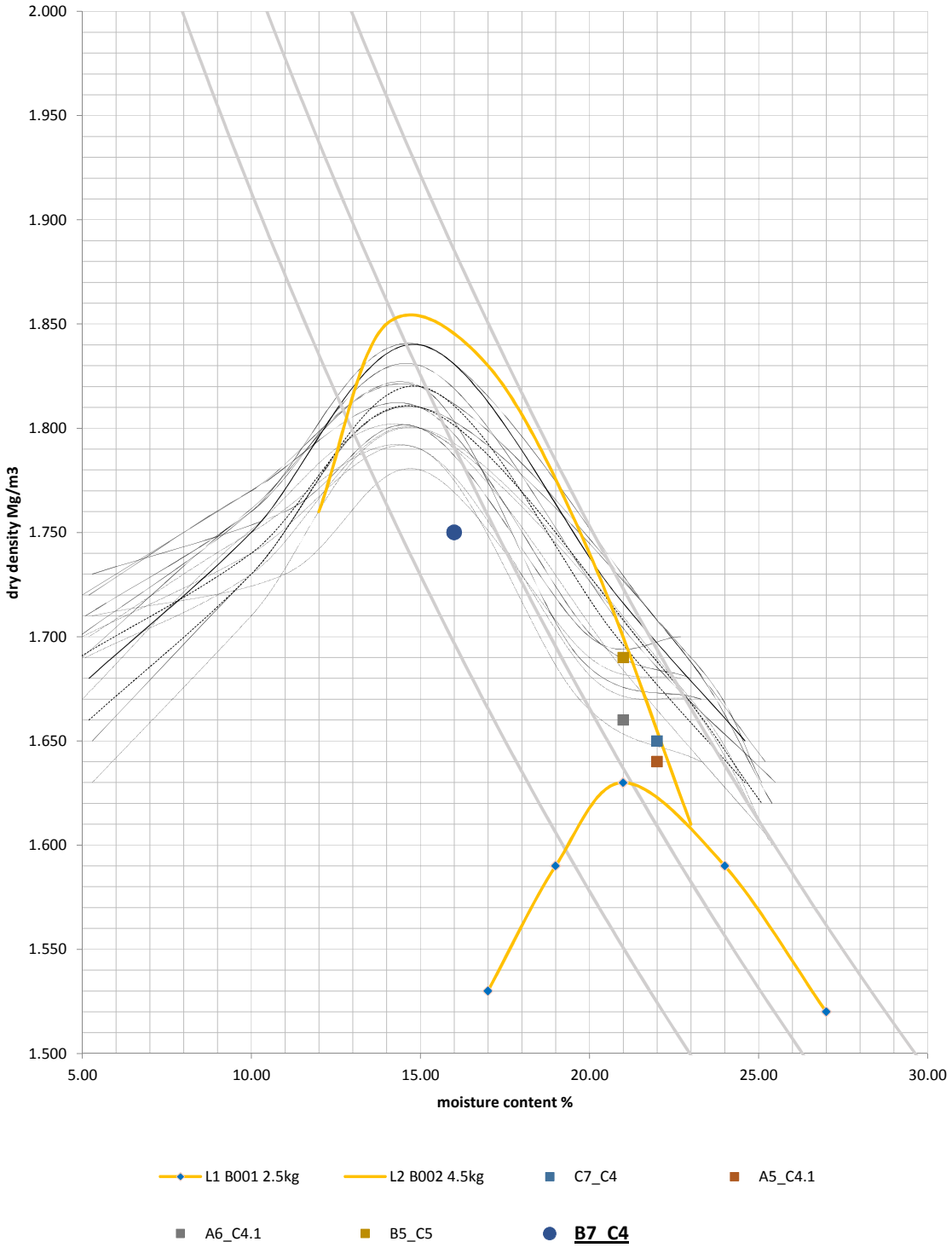
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver R. Anstee	Date 11/08/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 10.08.2015

(APEX Testing Solutions Certifactes 6510,



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6511**		

Site Reference:	**Core 6 - 9**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**10/08/2015**	Material Source:	**Unknown**
Tested By:	**T Thomas**	Material Supplier:	**Unknown**
Environmental Conditions:	**Bright and sunny**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 6 D5-C4 Retest 1	Core 7 D5-C4 Retest 2	Core 8 D7-C3 Retest 1	Core 9 D7-C3 Retest 2	
Bulk Density	2.03	2.06	2.04	2.04	
Moisture Content	19	20	23	21	
Dry Density	1.70	1.71	1.66	1.69	

Relative Compaction	N/A	N/A	N/A	N/A	

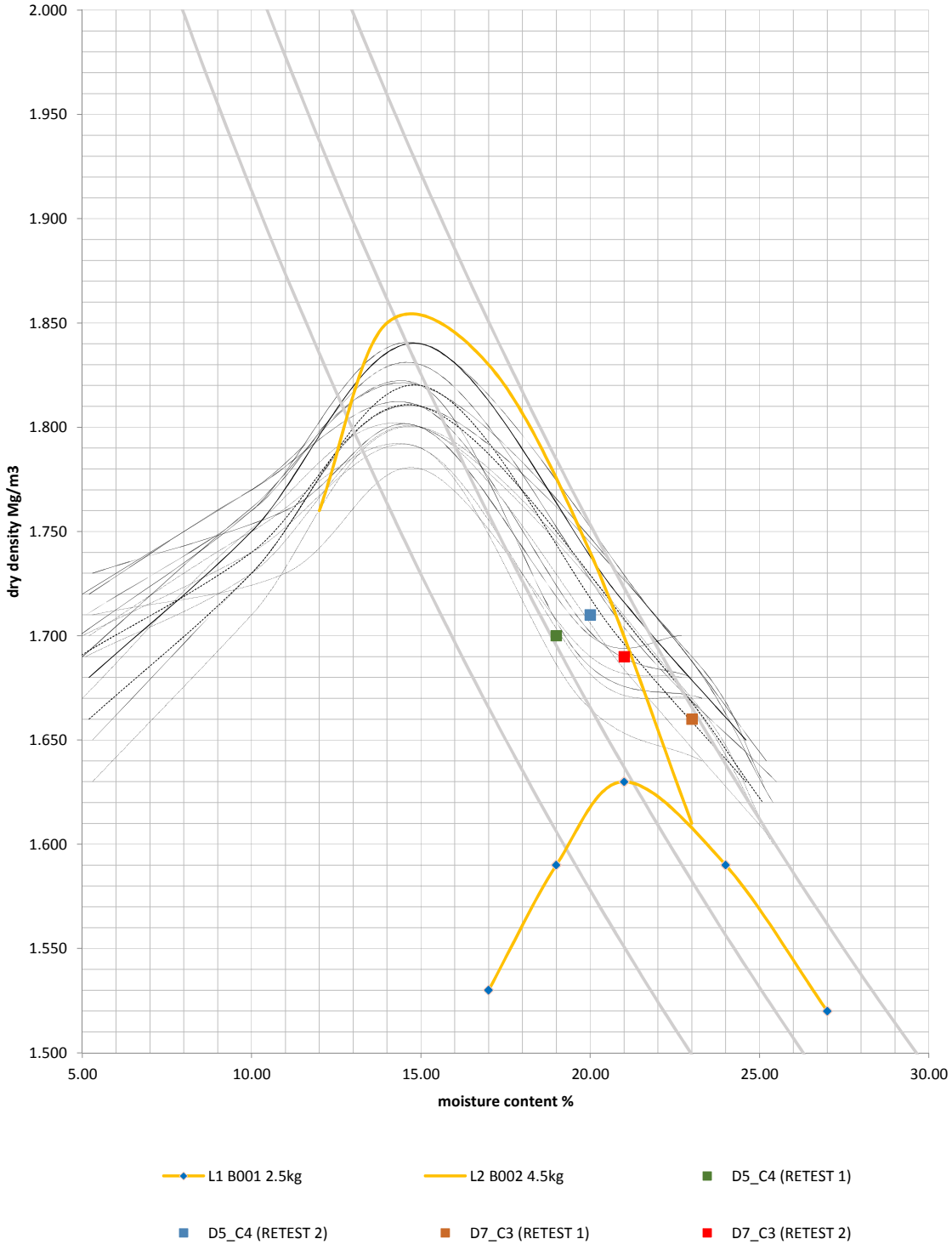
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver R. Anstee	Date 11/08/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 10.08.2015

(APEX Testing Solutions Certifactes 6511)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6586**		

Site Reference:	**Core 1 - 4**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**11/08/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Bright and sunny**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 C6-C5	Core 2 C5-C5	Core 3 B3-C3	Core 4 B6-C5	
Bulk Density	2.01	2.00	2.02	1.98	
Moisture Content	20	22	22	20	
Dry Density	1.67	1.64	1.65	1.64	

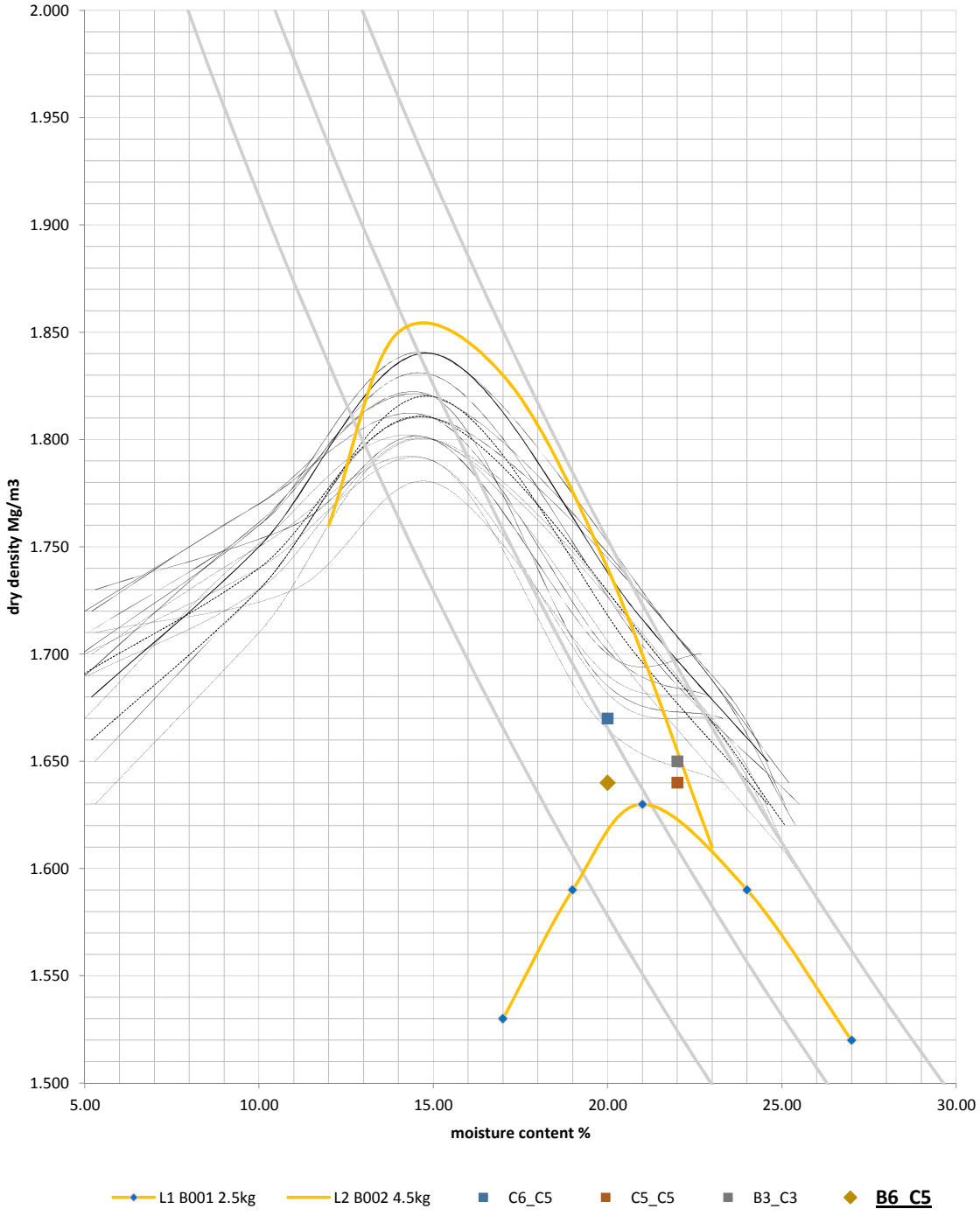
Relative Compaction	N/A	N/A	N/A	N/A	

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 11.08.2015

(APEX Testing Solutions Certifactes 6586)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6608**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**12/08/2015**	Material Source:	**Unknown**
Tested By:	**R Anstee**	Material Supplier:	**Unknown**
Environmental Conditions:	**Bright and sunny**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 B6-C5 Retest 1	Core 2 C6-C5 Retest 2	Core 3 A5-C5	Core 4 A6-C5	Core 5 B7-C4.1
Bulk Density	2.04	2.04	2.01	2.01	2.03
Moisture Content	21	21	23	23	22
Dry Density	1.68	1.69	1.64	1.64	1.66

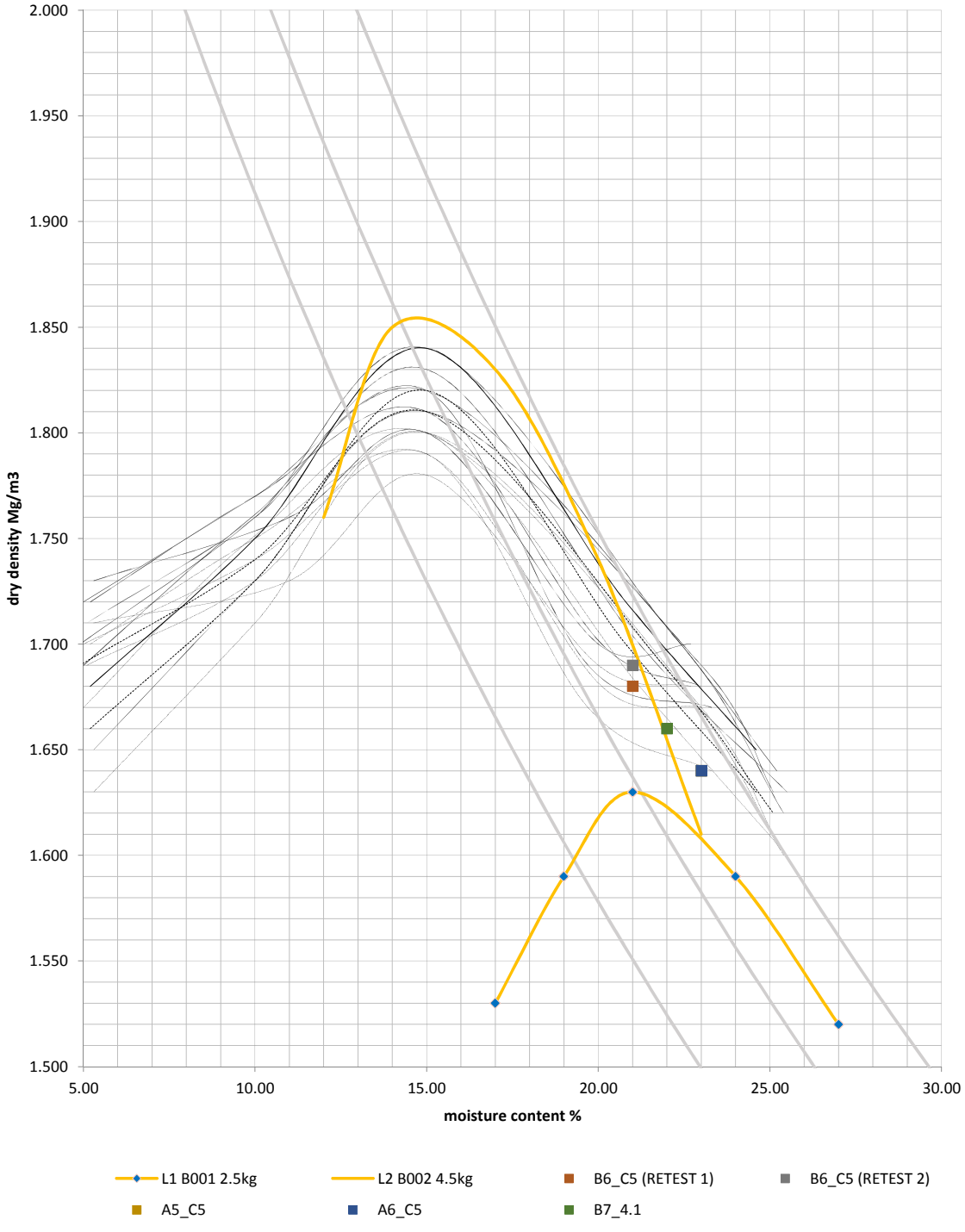
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 12.08.2015

(APEX Testing Solutions Certifactes : 6608)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6609**		

Site Reference:	**Core 6**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**12/08/2015**	Material Source:	**Unknown**
Tested By:	**R Anstee**	Material Supplier:	**Unknown**
Environmental Conditions:	**Bright and sunny**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 6 E7-C1.1				
Bulk Density	2.01				
Moisture Content	23				
Dry Density	1.63				

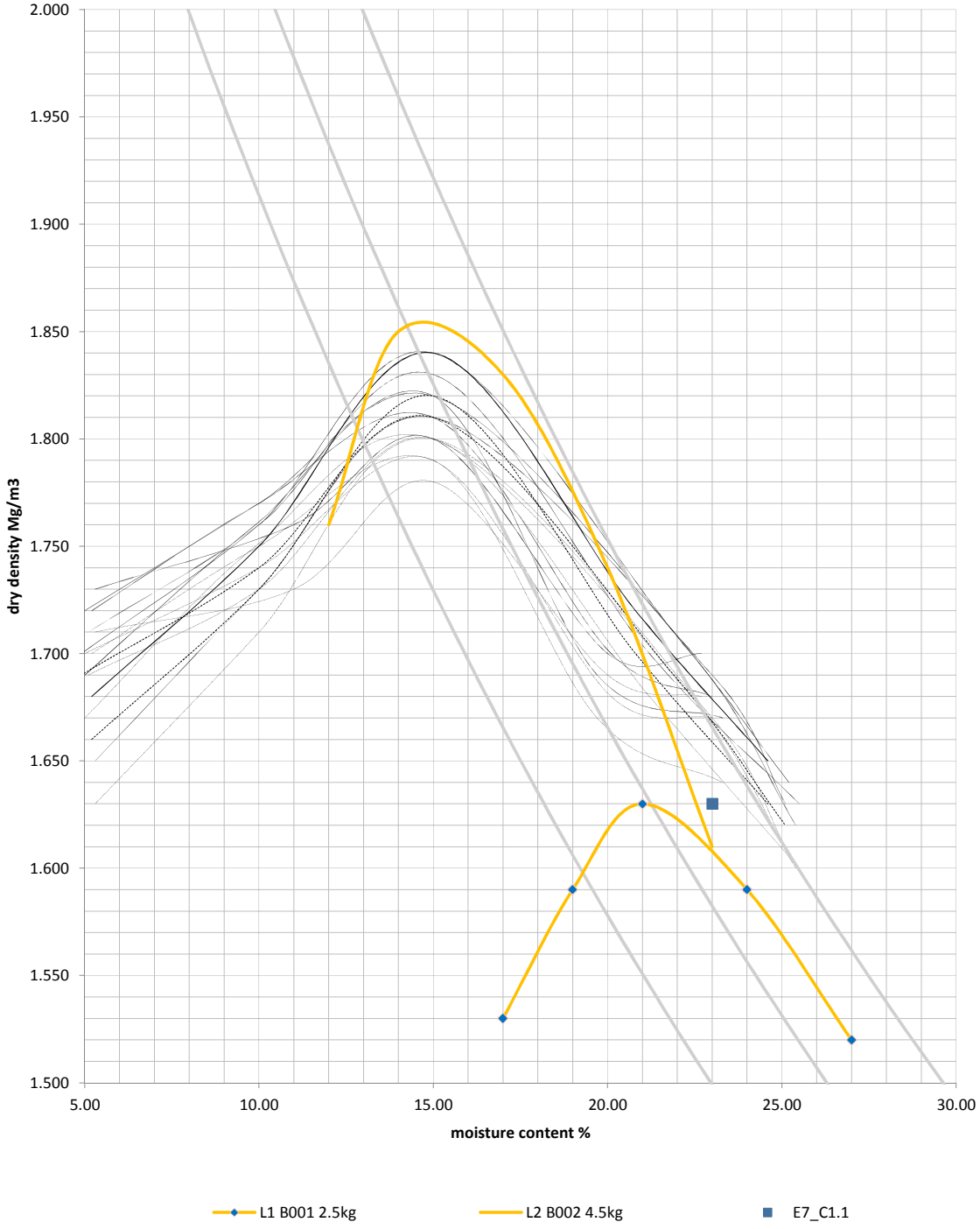
Relative Compaction	N/A				

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 12.08.2015

(APEX Testing Solutions Certifactes : 6609)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6625**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**13/08/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 C7-C5	Core 2 D7-C5	Core 3 D6-C5	Core 4 A4-C5	
Bulk Density	1.97	2.02	1.98	2.00	
Moisture Content	24	21	23	21	
Dry Density	1.58	1.67	1.61	1.66	

Relative Compaction	N/A	N/A	N/A	N/A	

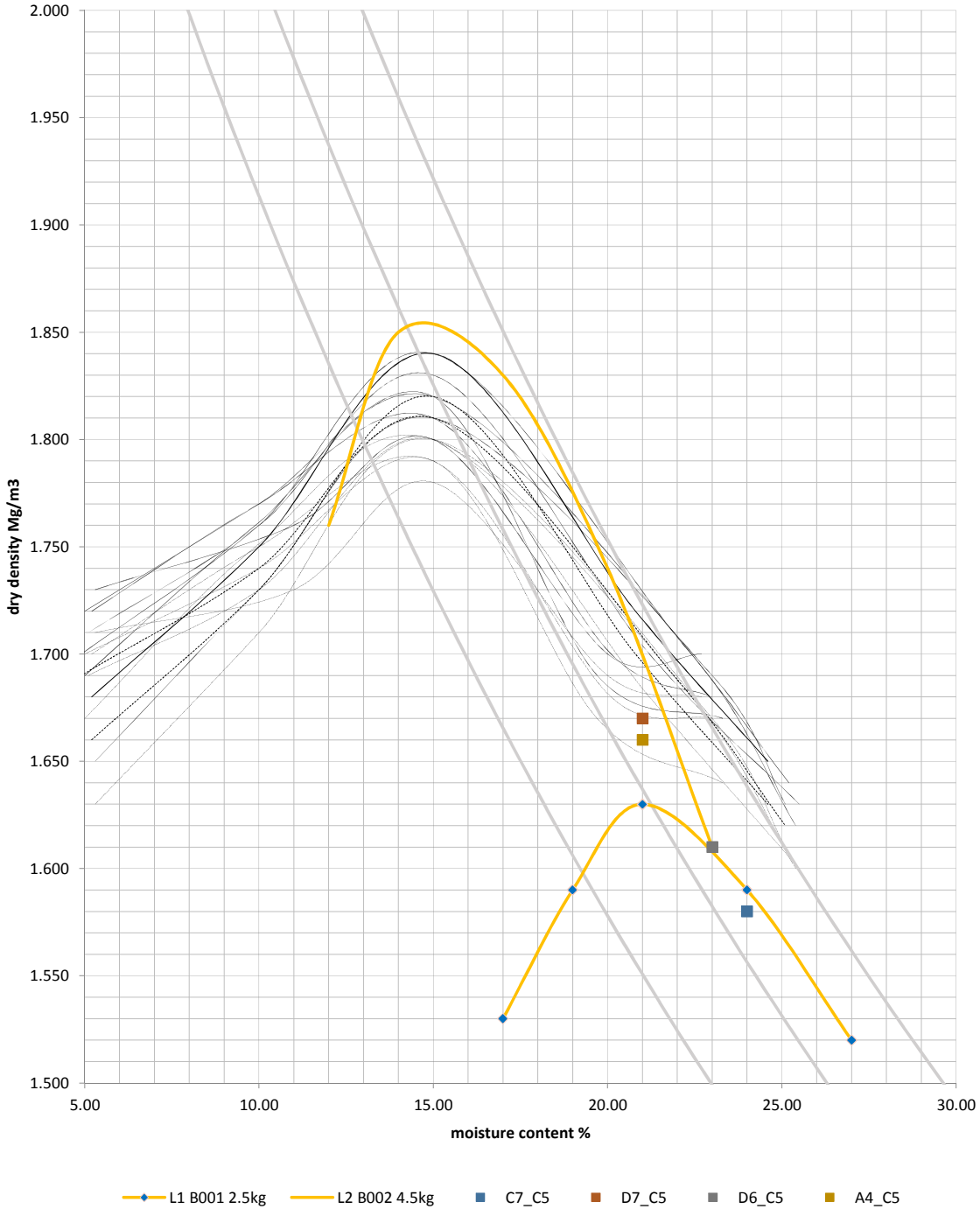
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver R. Anstee	Date 15/08/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 13.08.2015

(APEX Testing Solutions Certifactes : 6625)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6645**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**17/08/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 B6-C6	Core 2 A5-C6	Core 3 A6-C6	Core 4 F5-C2	Core 5 B5-C6
Bulk Density	1.99	2.08	2.06	2.04	2.04
Moisture Content	21	20	22	21	21
Dry Density	1.64	1.74	1.70	1.69	1.68

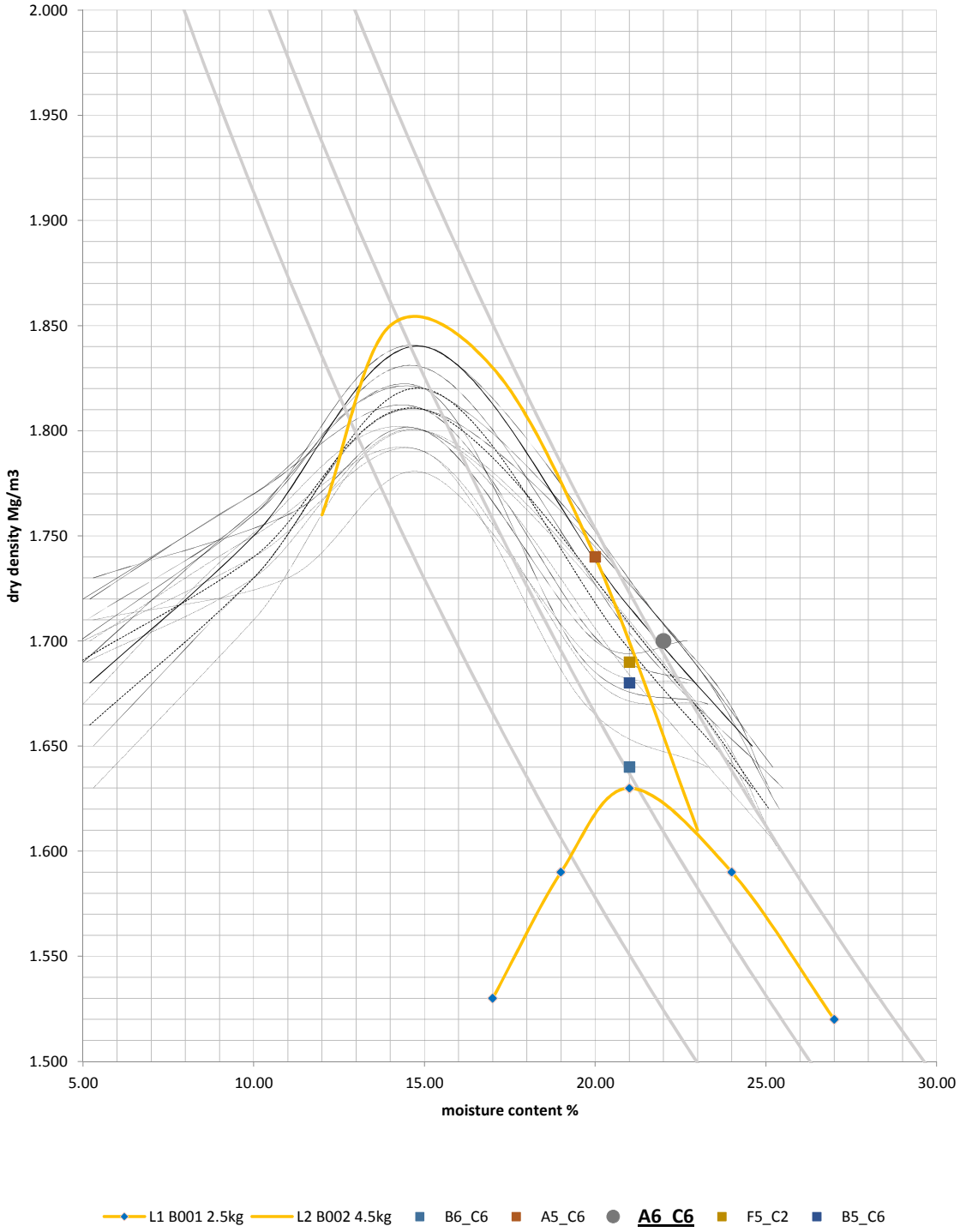
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 17.08.2015

(APEX Testing Solutions Certifactes : 6645)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6646**		

Site Reference:	**Core 6**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**17/08/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 6 B7-C5				
Bulk Density	1.99				
Moisture Content	21				
Dry Density	1.64				

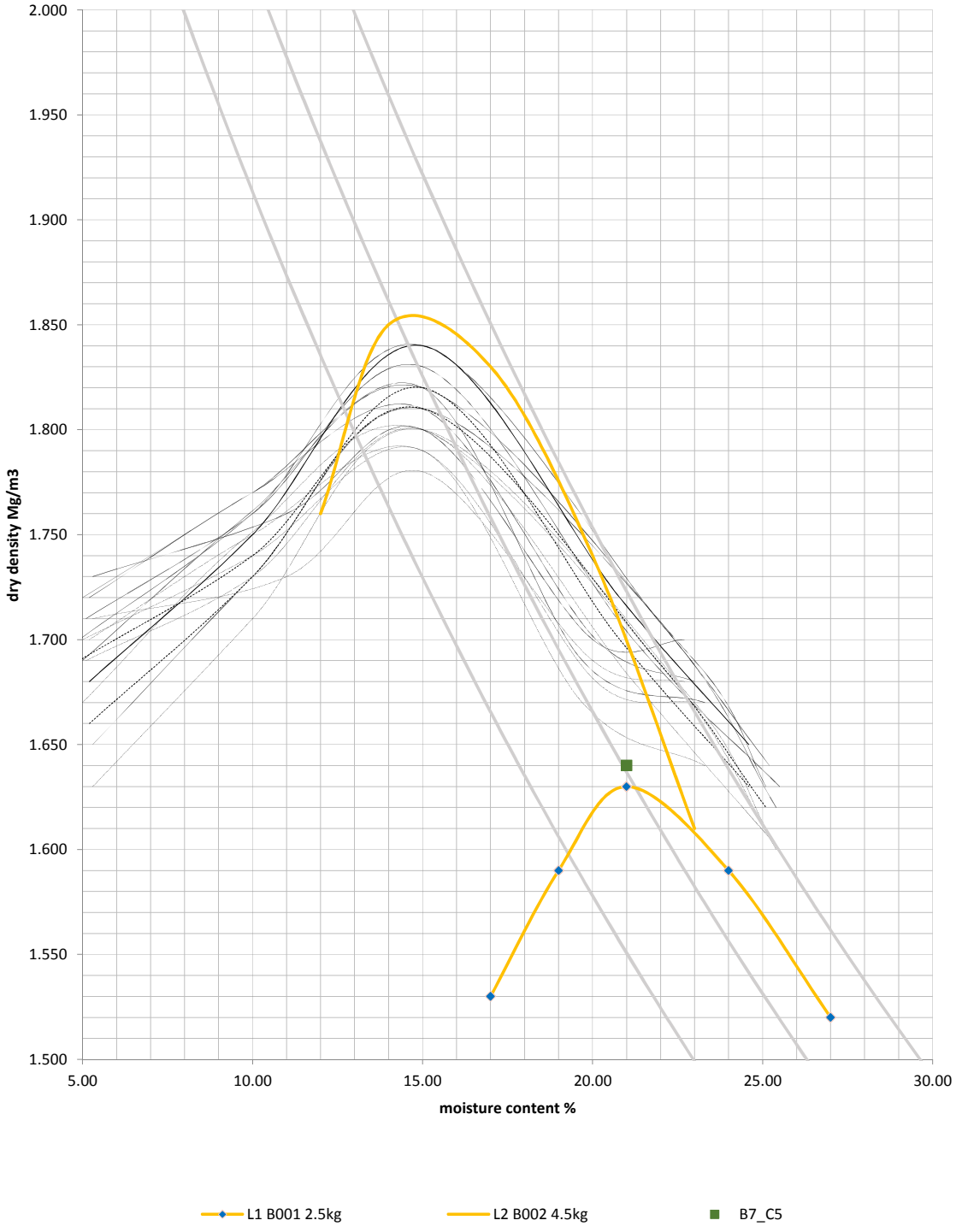
Relative Compaction	N/A				

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 17.08.2015

(APEX Testing Solutions Certifactes : 6646)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6660**		

Site Reference:	**Core 1 - 2**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**17/08/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 D7-C6	Core 2 C7-C6			
Bulk Density	2.03	2.02			
Moisture Content	20	22			
Dry Density	1.68	1.65			

Relative Compaction	N/A	N/A			

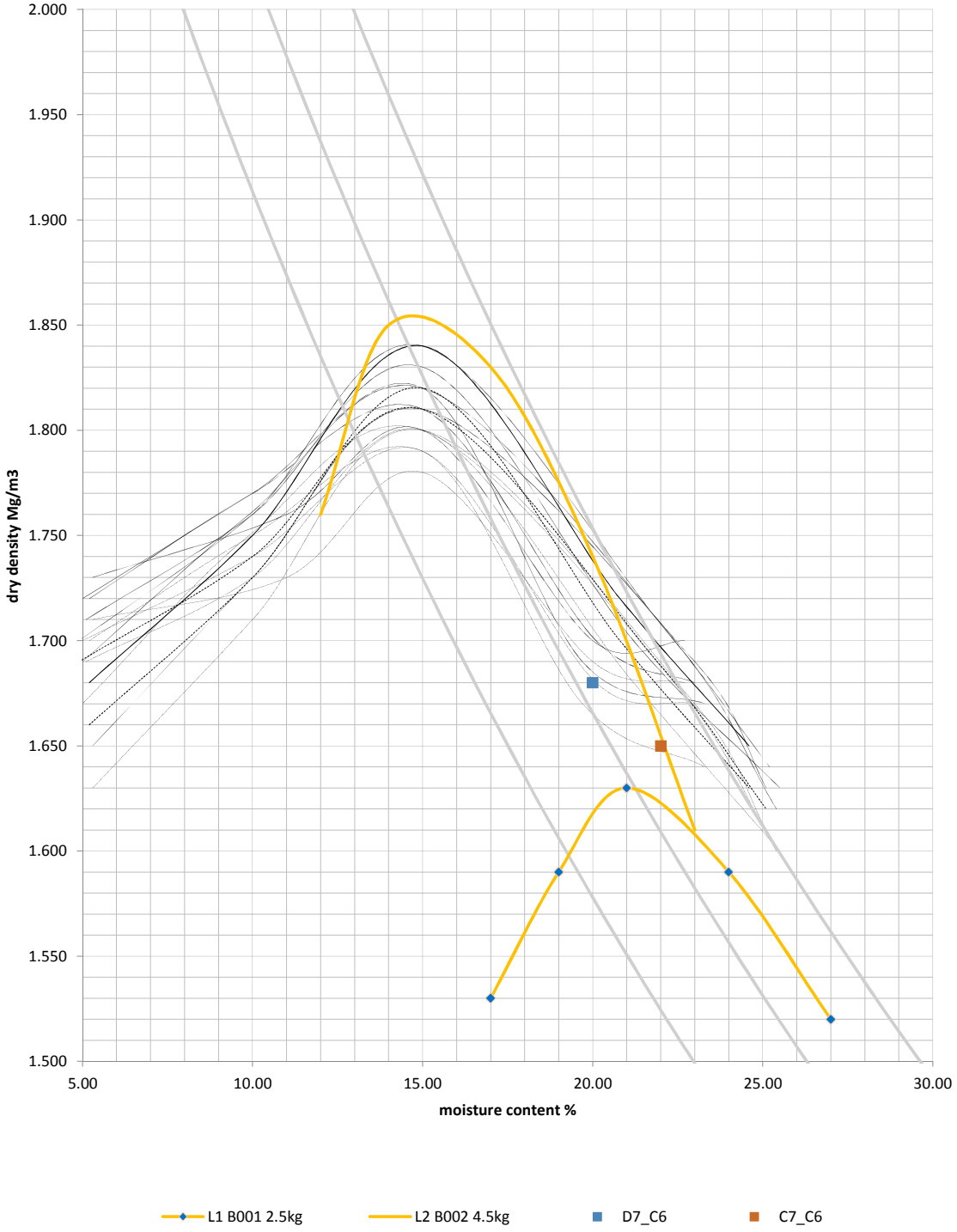
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver R. Anstee	Date 19/08/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 17.08.2015

(APEX Testing Solutions Certifactes : 6660)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6689**		

Site Reference:	**Core 1 - 3**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**18/08/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 F7-C2	Core 2 E7-C2	Core 3 E6-C2		
Bulk Density	2.03	2.03	2.07		
Moisture Content	23	21	21		
Dry Density	1.66	1.67	1.70		

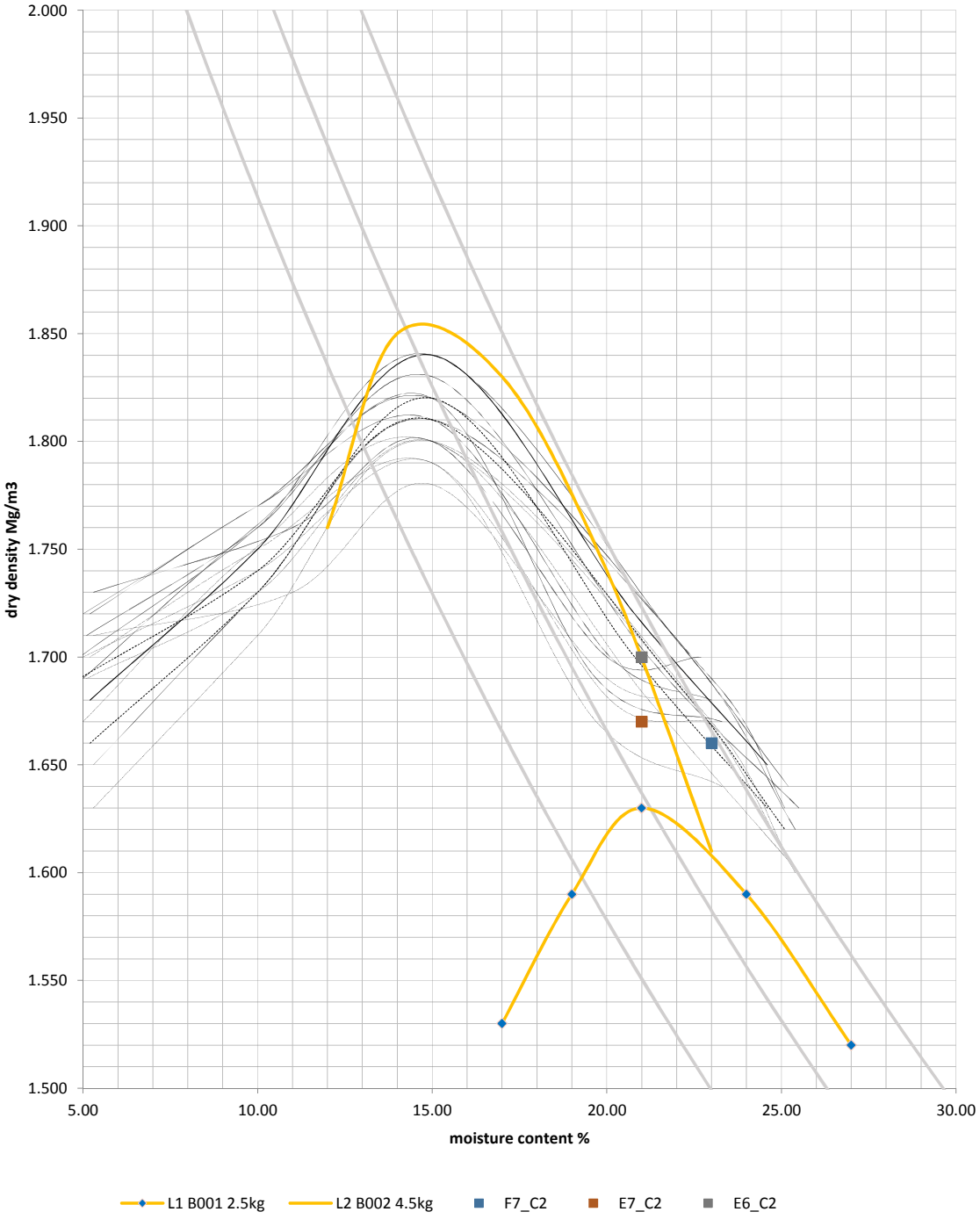
Relative Compaction	N/A	N/A	N/A		

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 18.08.2015

(APEX Testing Solutions Certifactes : 6689)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6690**		

Site Reference:	**Core 1 - 3**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**19/08/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 E7-C3	Core 2 F6-C2	Core 3 F7-C3		
Bulk Density	2.05	2.03	2.03		
Moisture Content	20	23	18		
Dry Density	1.70	1.66	1.72		

Relative Compaction	N/A	N/A	N/A		

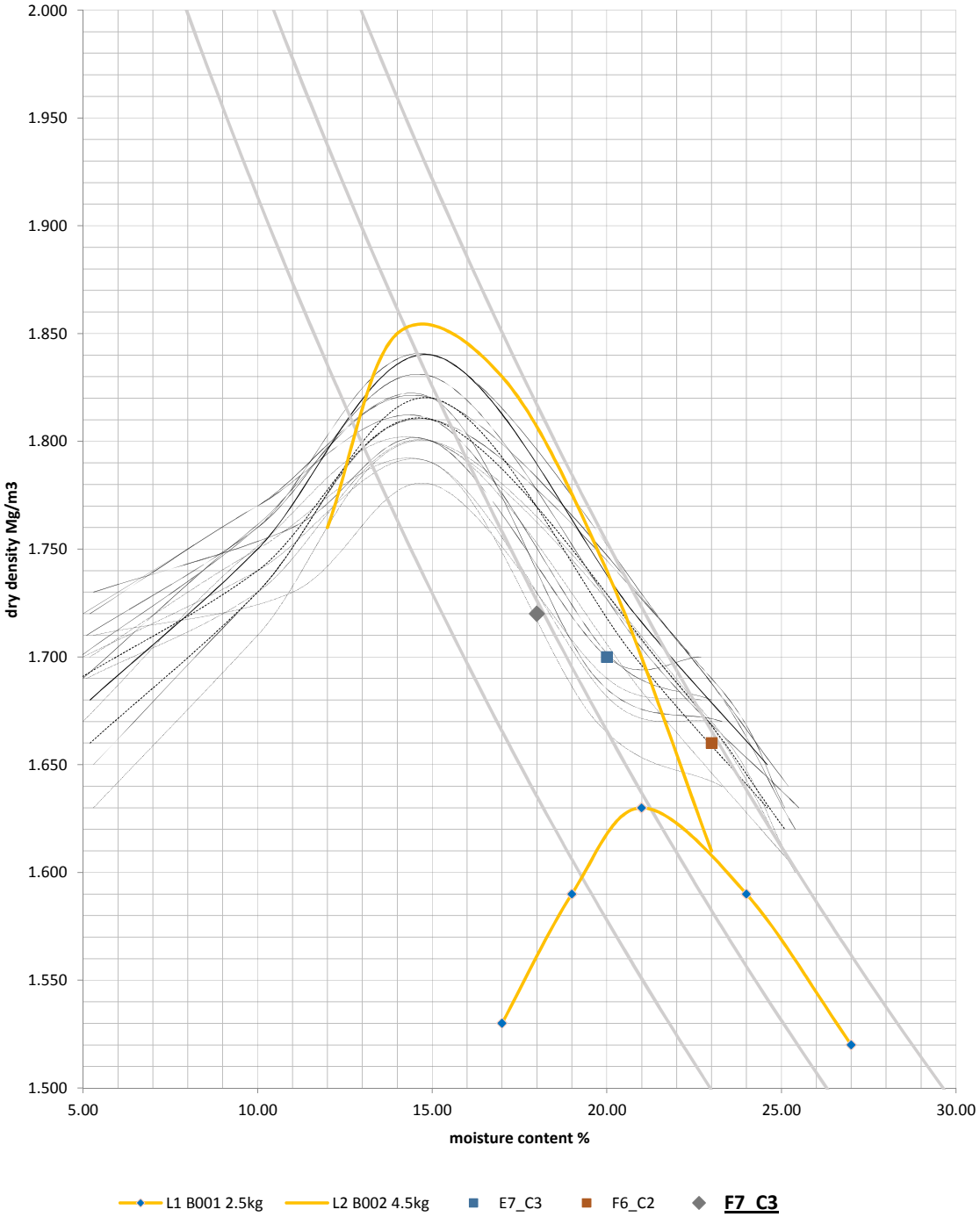
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver R. Anstee	Date 20/08/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 19.08.2015

(APEX Testing Solutions Certifactes : 6690)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6693**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**20/08/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 C5-C6				
Bulk Density	2.04				
Moisture Content	18				
Dry Density	1.74				

Relative Compaction	N/A				

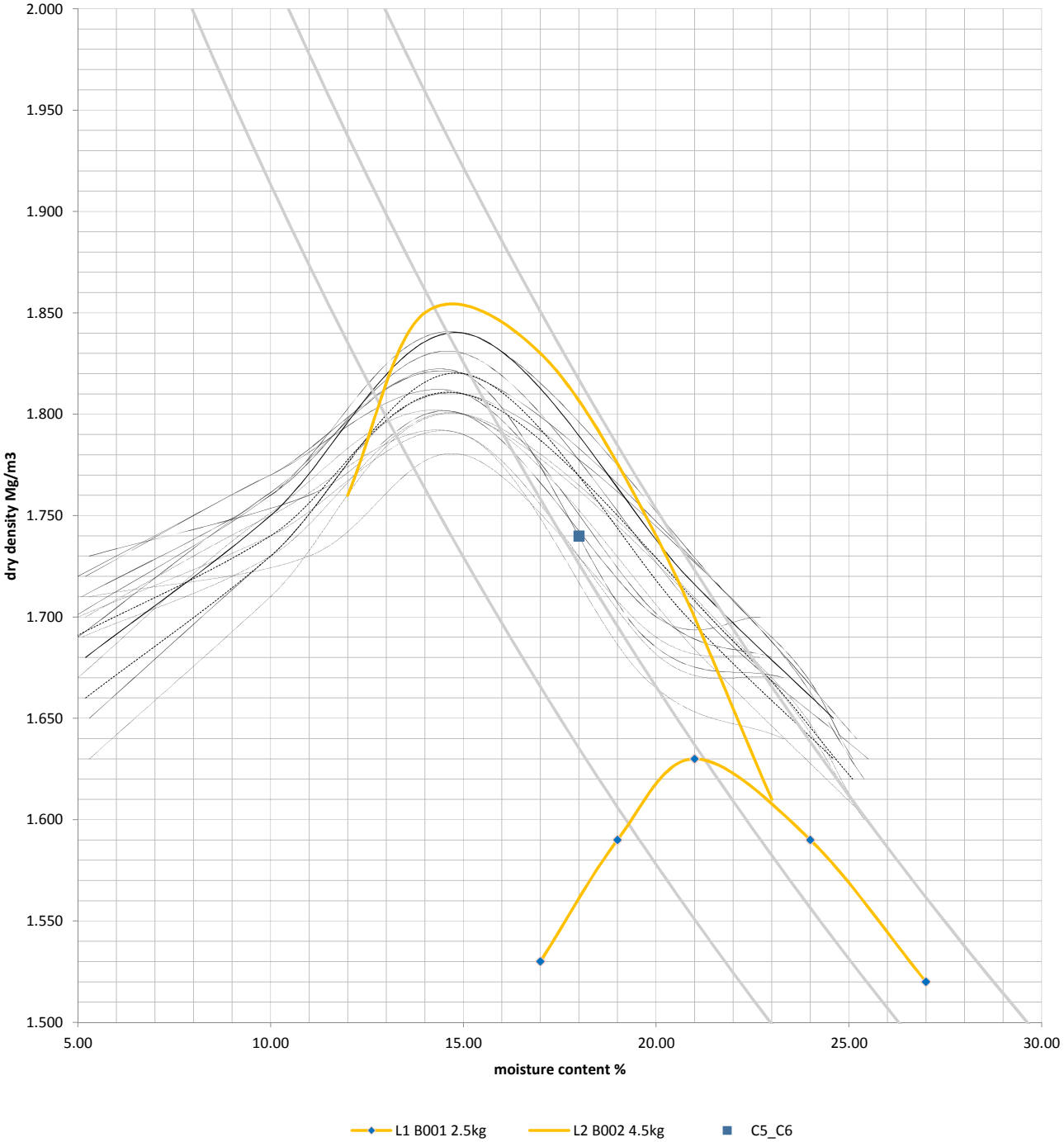
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver R. Anstee	Date 21/08/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 20.08.2015

(APEX Testing Solutions Certifactes : 6693)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6740**		

Site Reference:	**Core 1 - 3**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**20/08/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 B7-C6	Core 2 F7-C3 Retest 1	Core 3 F7-C3 Retest 2		
Bulk Density	2.09	2.07	2.10		
Moisture Content	20	21	20		
Dry Density	1.74	1.70	1.74		

Relative Compaction	N/A	N/A	N/A		

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver R. Anstee	Date 25/08/2015
			R Anstee, Laboratory Manager	Fig

TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6865**		

Site Reference:	**Core 1 - 2**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**28/08/2015**	Material Source:	**Unknown**
Tested By:	**R Anstee**	Material Supplier:	**Unknown**
Environmental Conditions:	**Overcast**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 F7-C4	Core 2 E7-C4			
Bulk Density	2.00	1.93			
Moisture Content	22	25			
Dry Density	1.64	1.55			

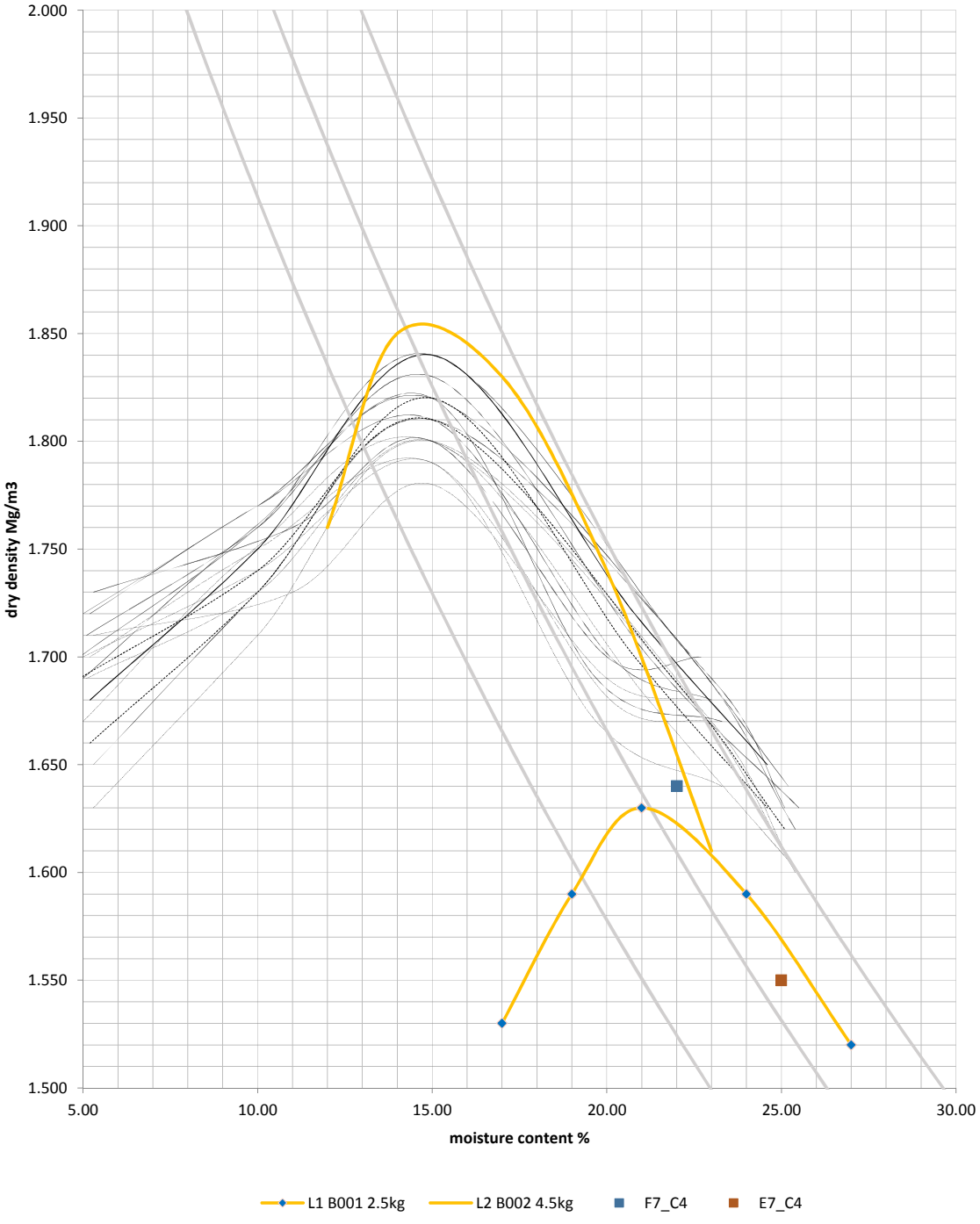
Relative Compaction	N/A	N/A			

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 28.08.2015

(APEX Testing Solutions Certifactes : 6865)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6898**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**02/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 D6-C6	Core 2 D7-C7	Core 3 B7-C7	Core 4 F6-C3	Core 5 A5-C7
Bulk Density	1.97	1.98	1.98	2.02	2.00
Moisture Content	25	26	25	23	23
Dry Density	1.58	1.57	1.58	1.64	1.62

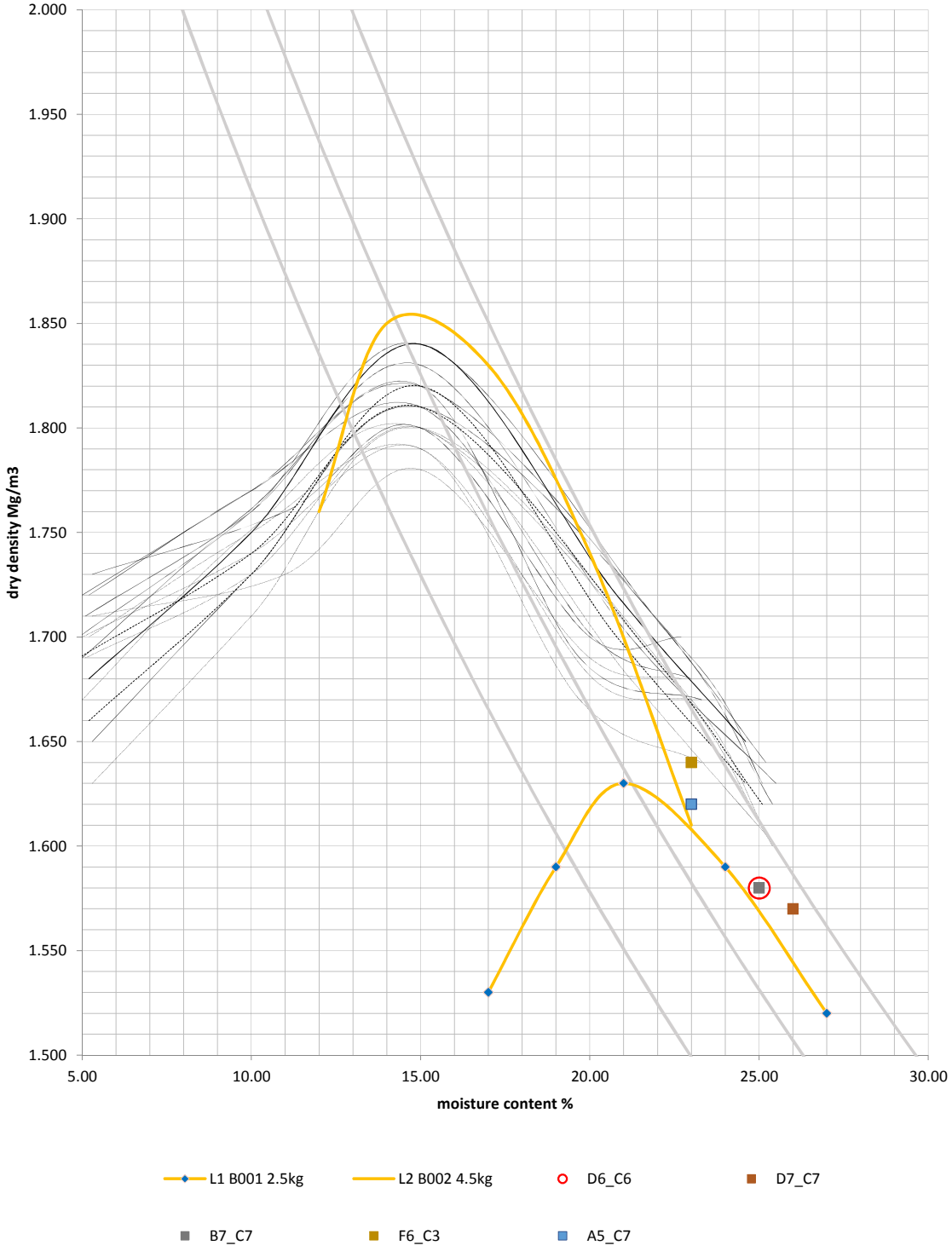
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 02.09.2015

(APEX Testing Solutions Certifactes : 6898)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**6899**		

Site Reference:	**Core 6**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**02/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 6 E6-C3				
Bulk Density	2.02				
Moisture Content	23				
Dry Density	1.64				

Relative Compaction	N/A				

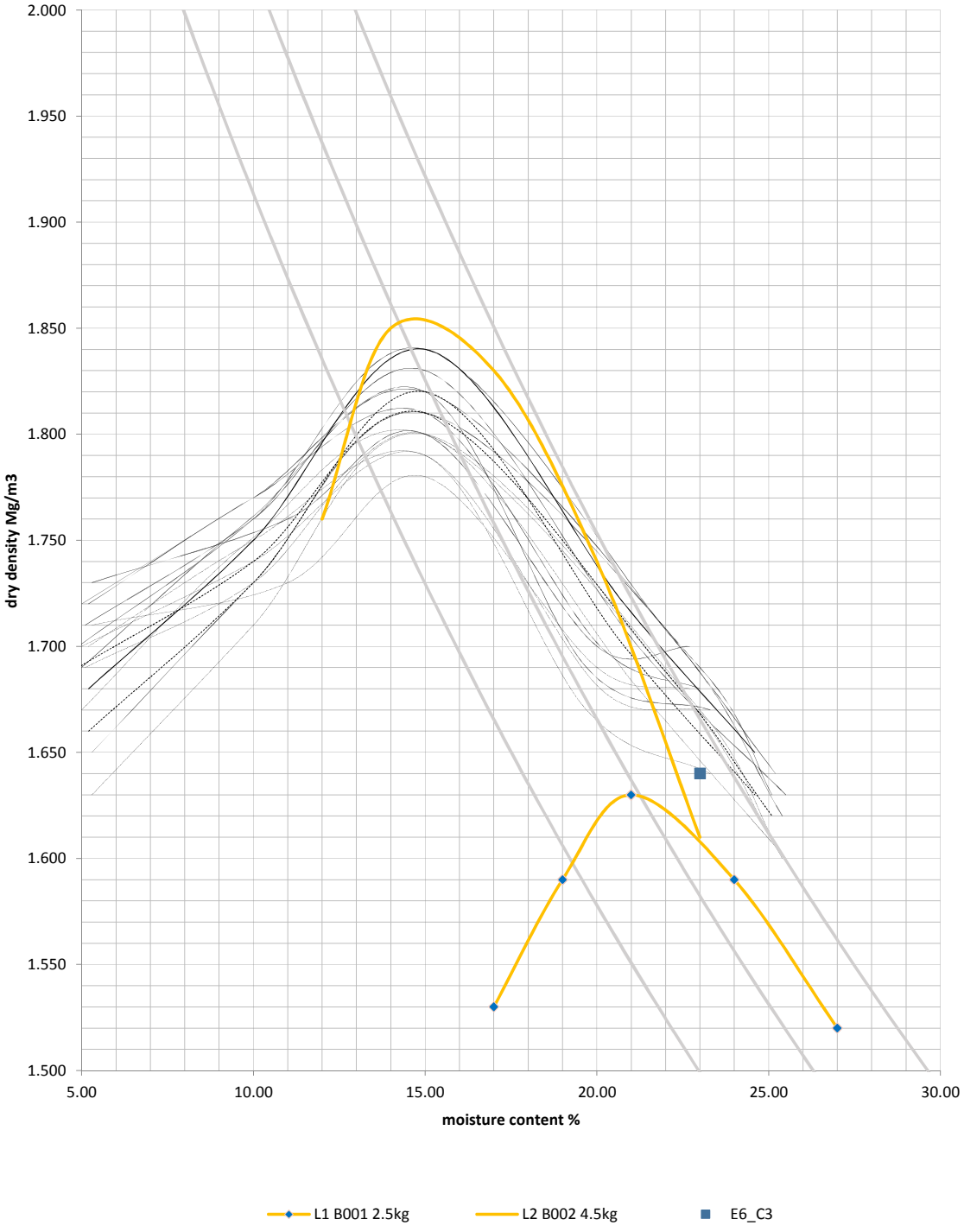
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 03/09/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 02.09.2015

(APEX Testing Solutions Certifactes : 6899)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7000**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**03/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 D4-C3				
Bulk Density	2.04				
Moisture Content	20				
Dry Density	1.71				

Relative Compaction	N/A				

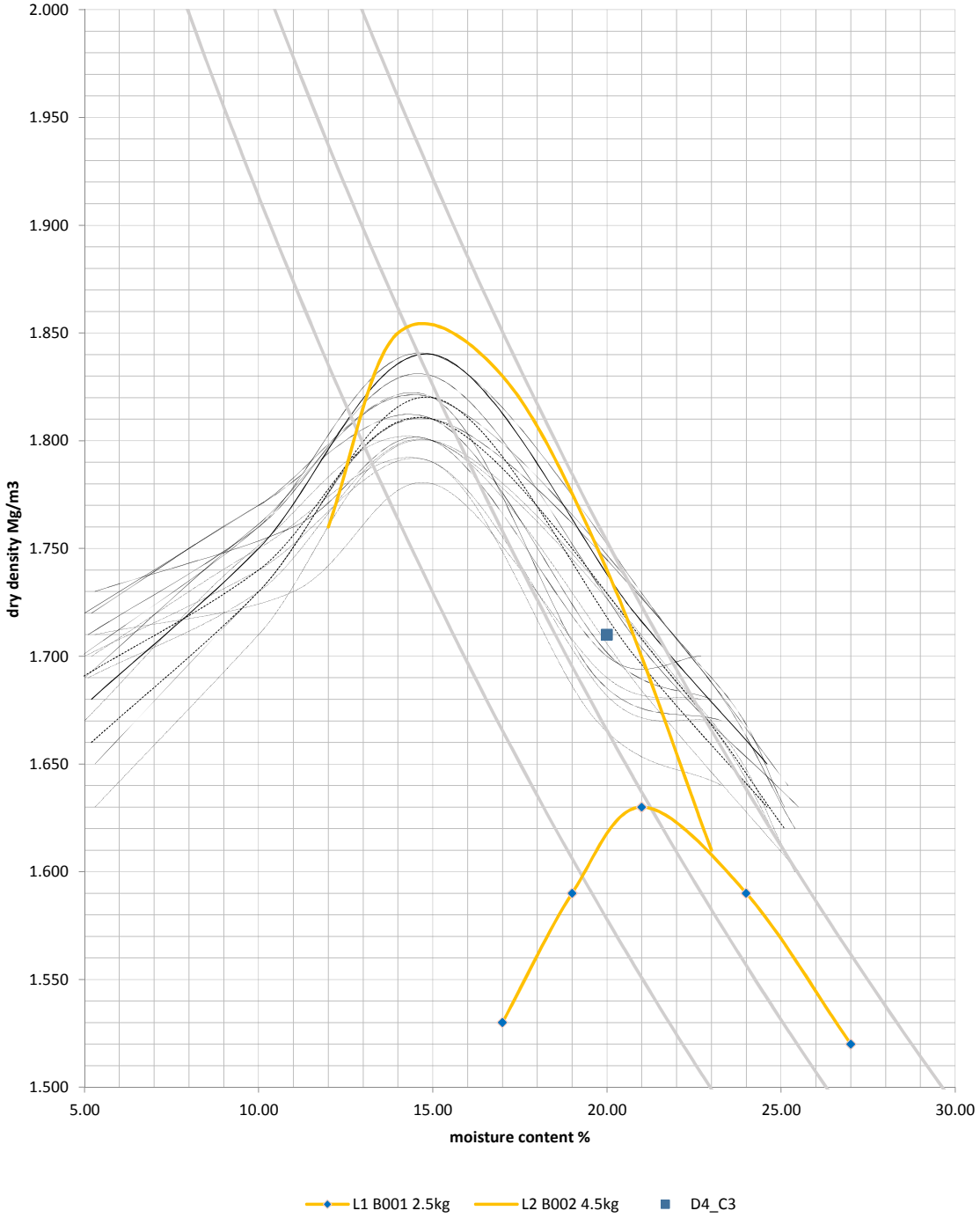
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver R. Anstee	Date 05/09/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 03.09.2015

(APEX Testing Solutions Certifactes : 7000)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7001**		

Site Reference:	**Core 1 - 3**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**04/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 B4-C5	Core 2 C4-C5	Core 3 E5-C1.1		
Bulk Density	1.99	1.97	1.98		
Moisture Content	22	21	20		
Dry Density	1.64	1.64	1.64		

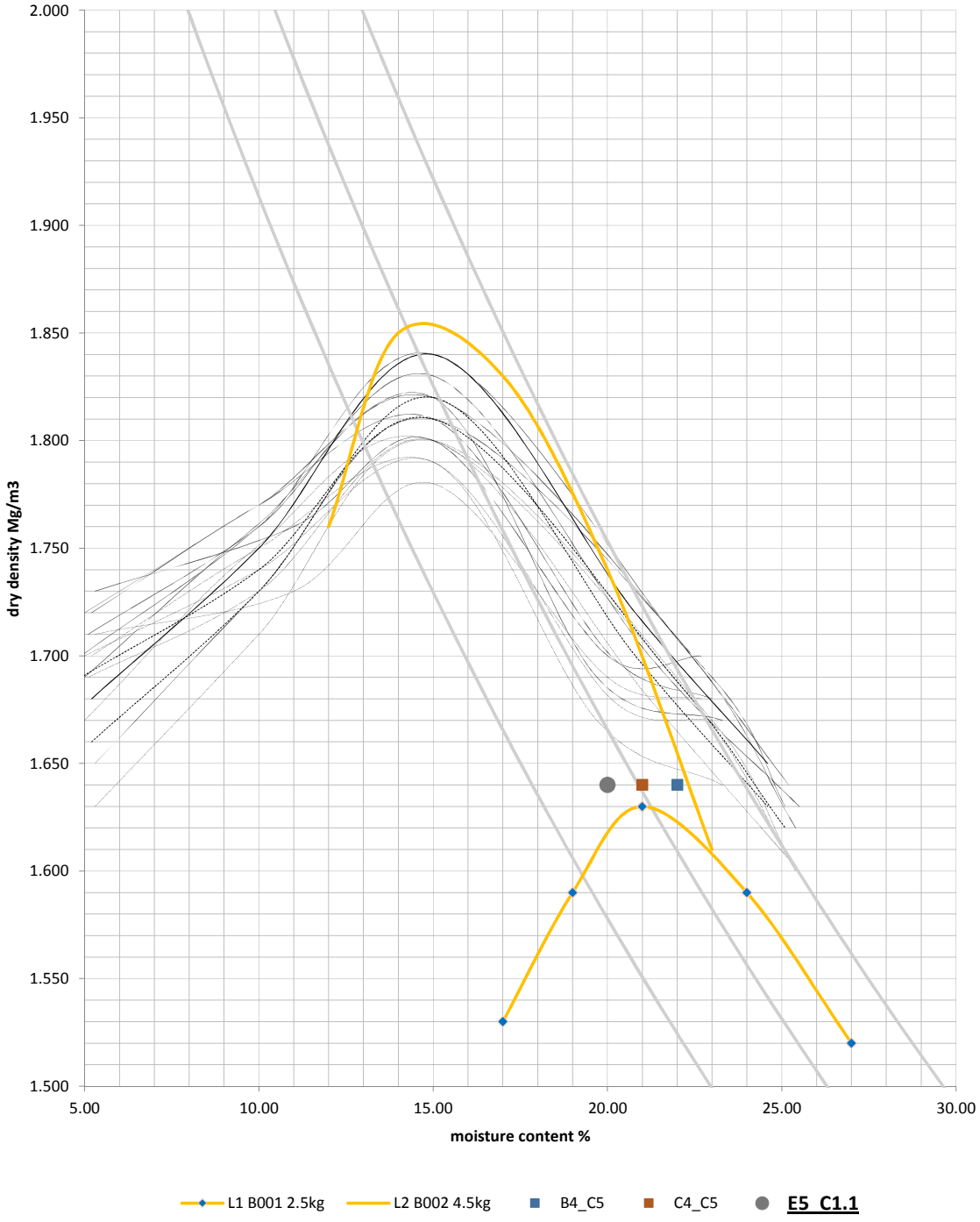
Relative Compaction	N/A	N/A	N/A		

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 04.09.2015

(APEX Testing Solutions Certifactes : 7001)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7008**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**07/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 F6-C4 Retest	Core 2 E5-C1.1 Retest	Core 3 E6-C4	Core 4 A-B7-C7 Retest	Core 5 A-B7-C7 Retest
Bulk Density	1.99	2.00	2.01	2.06	2.01
Moisture Content	24	23	22	20	23
Dry Density	1.60	1.62	1.64	1.72	1.64

Relative Compaction	N/A	N/A	N/A	N/A	N/A

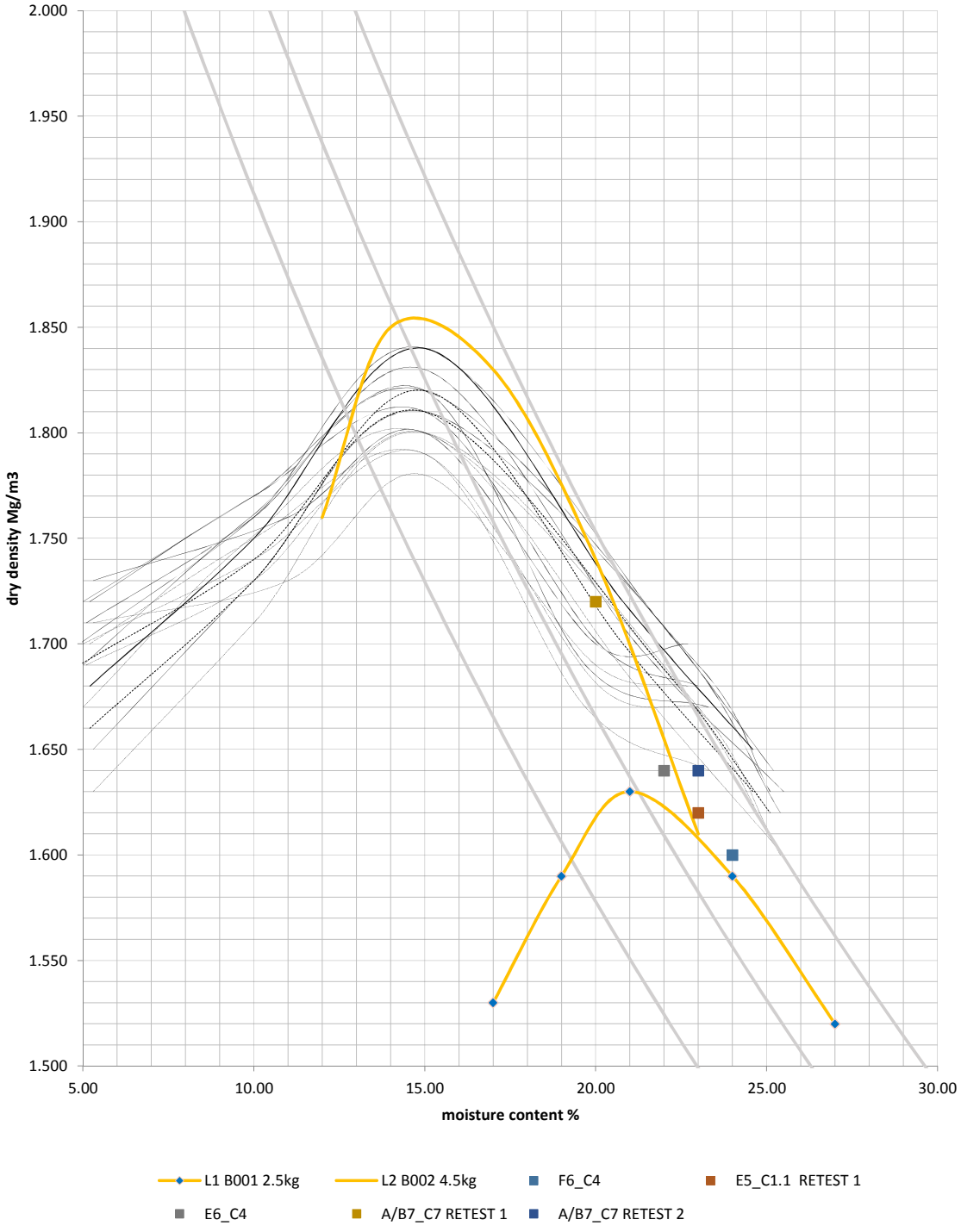
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver R. Anstee	Date 08/09/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 07.09.2015

(APEX Testing Solutions Certifactes : 7008)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7009**		

Site Reference:	**Core 6 - 10**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**07/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 6 E5-C1.1 Retest 2	Core 7 D6-C6 Retest	Core 8 D6-C6 Retest	Core 9 CD7-C7	Core 10 CD7-C7
Bulk Density	2.04	2.02	2.04	2.00	1.97
Moisture Content	21	22	20	23	25
Dry Density	1.69	1.67	1.70	1.62	1.58

Relative Compaction	N/A	N/A	N/A	N/A	N/A

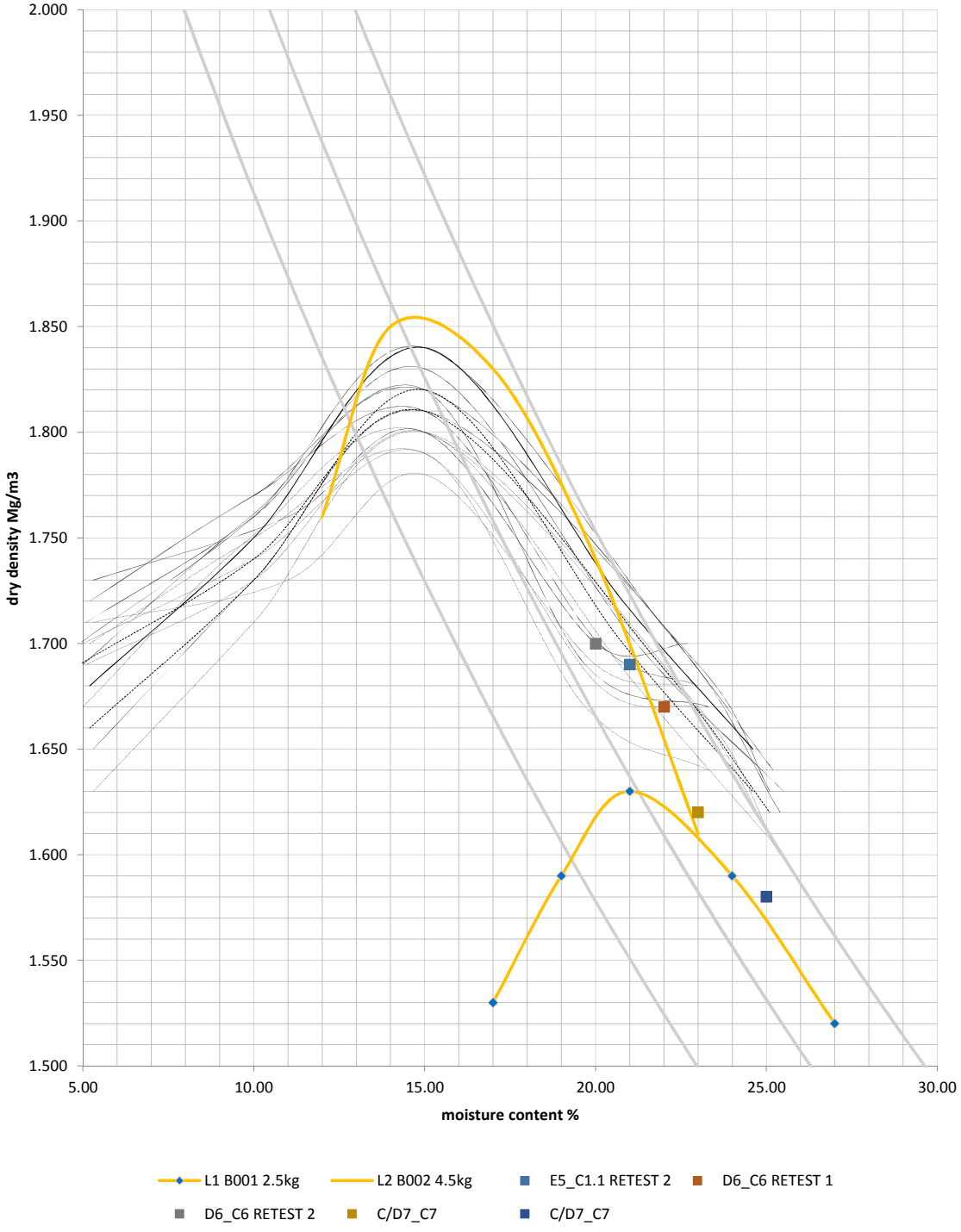
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver R. Anstee	Date 08/09/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 07.09.2015

(APEX Testing Solutions Certifactes : 7009)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7013**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**08/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 E7-C5	Core 2 A4-C6	Core 3 F7-C5	Core 4 A5/6-C8	Core 5 D4-C4
Bulk Density	2.04	1.98	1.99	1.96	1.92
Moisture Content	22	21	23	23	24
Dry Density	1.68	1.64	1.62	1.59	1.54

Relative Compaction	N/A	N/A	N/A	N/A	N/A

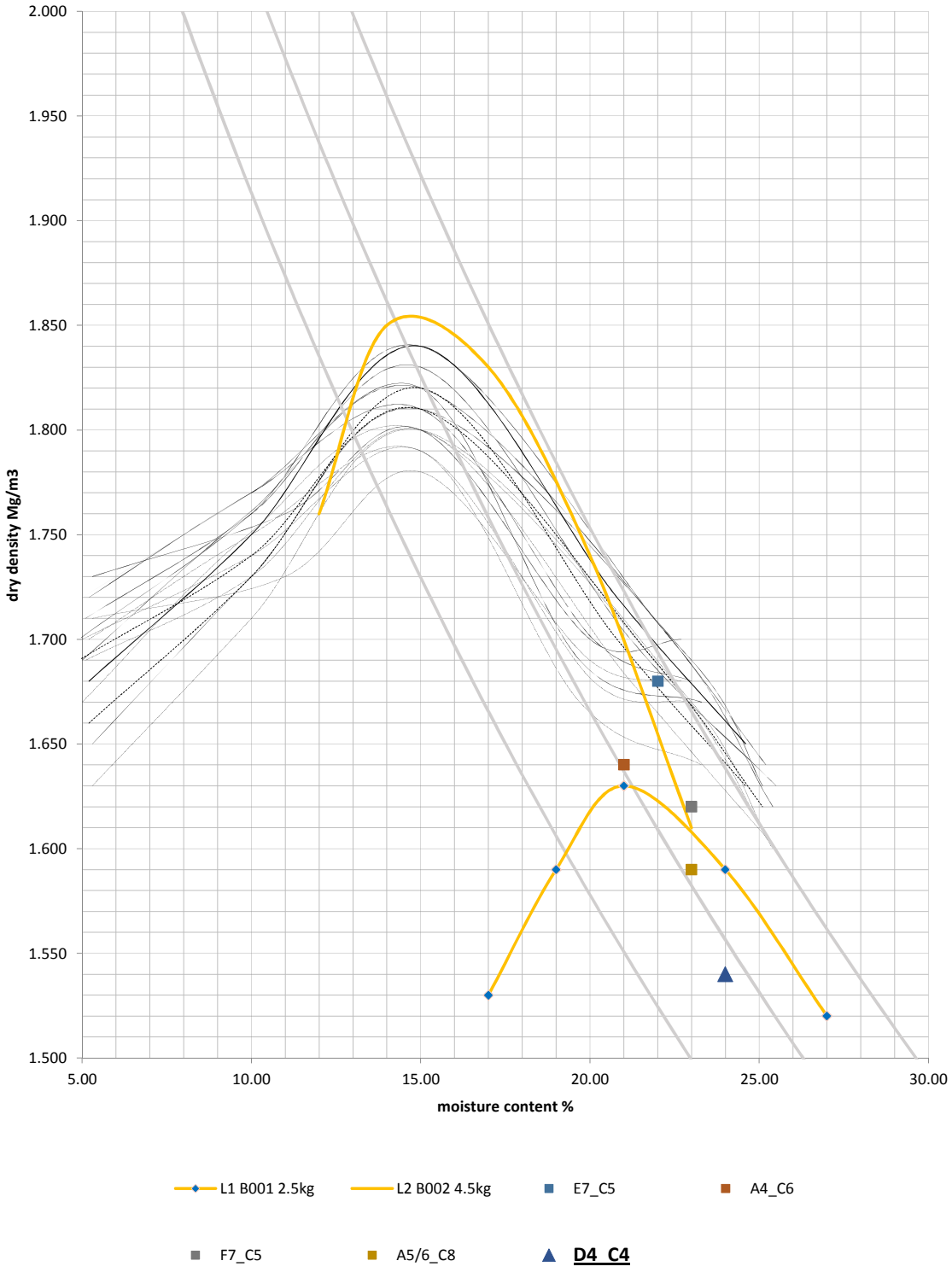
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver R. Anstee	Date 10/09/2015
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 08.09.2015

(APEX Testing Solutions Certifactes : 7013)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7014**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**09/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 C6-C6	Core 2 B/C4-C6	Core 3 E5-C2.2	Core 4 C/D7-C7 Retest 1	Core 5 C/D7-C7 Retest 2
Bulk Density	2.00	1.95	1.95	1.97	1.97
Moisture Content	20	20	22	24	23
Dry Density	1.67	1.63	1.59	1.58	1.60

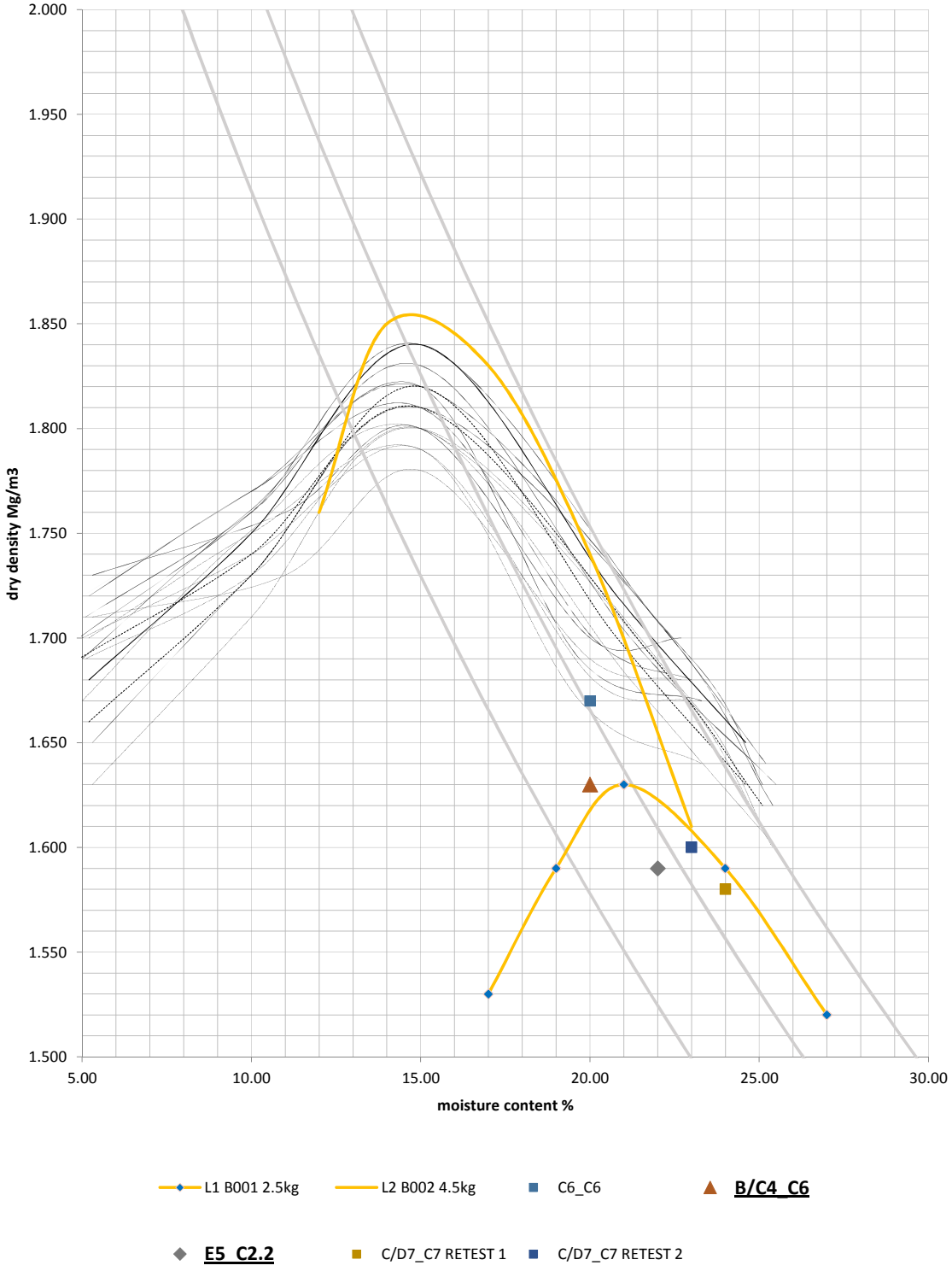
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 08.09.2015

(APEX Testing Solutions Certifactes : 7014)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7020**		

Site Reference:	**Core 1 - 3**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**10/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 E5-C2.2 Retest 1	Core 2 A/B7-C8	Core 3 E5-C2.2 Retest 2		
Bulk Density	2.01	2.02	2.00		
Moisture Content	22	21	23		
Dry Density	1.65	1.66	1.63		

Relative Compaction	N/A	N/A	N/A		

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

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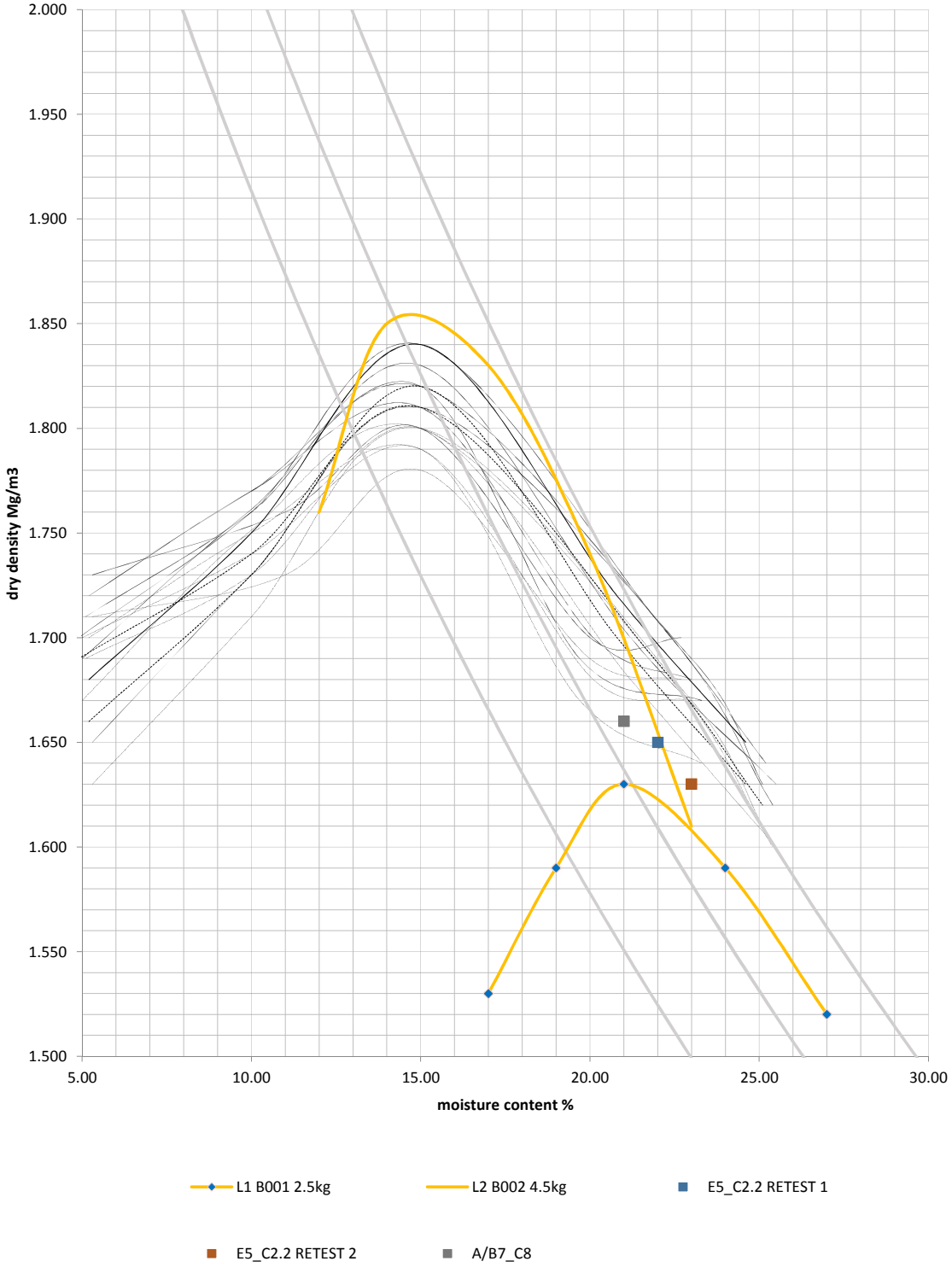
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 10.09.2015

(APEX Testing Solutions Certifactes : 7020)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7038**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**11/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G6/7-C1	Core 2 C/D7-C8	Core 3 A5/6-C9	Core 4 E/F7-C6	Core 5 E5-C3.1
Bulk Density	2.05	1.99	2.00	2.00	2.00
Moisture Content	20	22	22	23	22
Dry Density	1.71	1.64	1.64	1.63	1.64

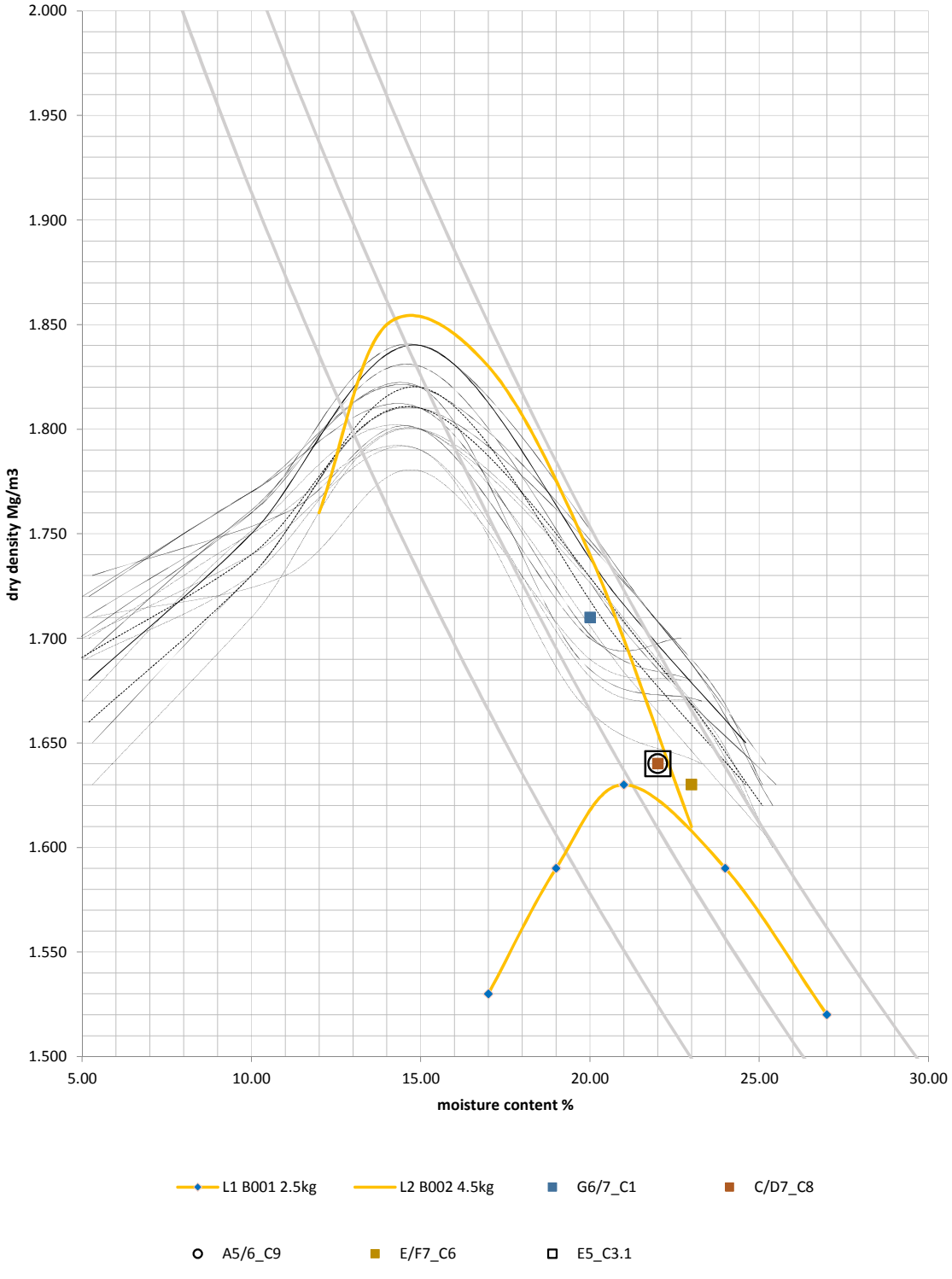
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 11.09.2015

(APEX Testing Solutions Certifactes : 7038)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7117**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**16/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 E5-C4				
Bulk Density	2.03				
Moisture Content	20				
Dry Density	1.70				

Relative Compaction	N/A				

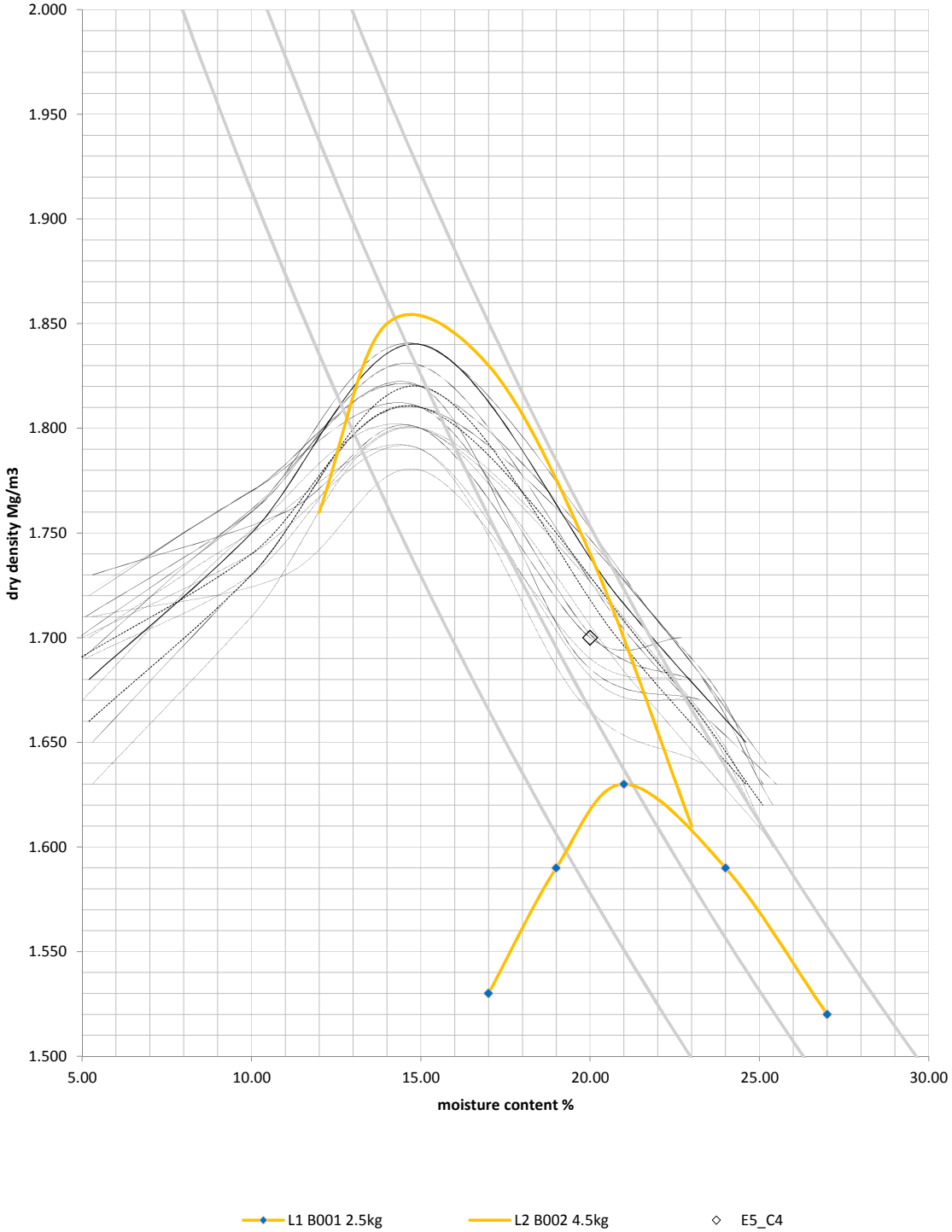
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 19/09/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 16.09.2015

(APEX Testing Solutions Certifactes : 7117)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7118**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**18/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 F4-C1				
Bulk Density	2.04				
Moisture Content	18				
Dry Density	1.73				

Relative Compaction	N/A				

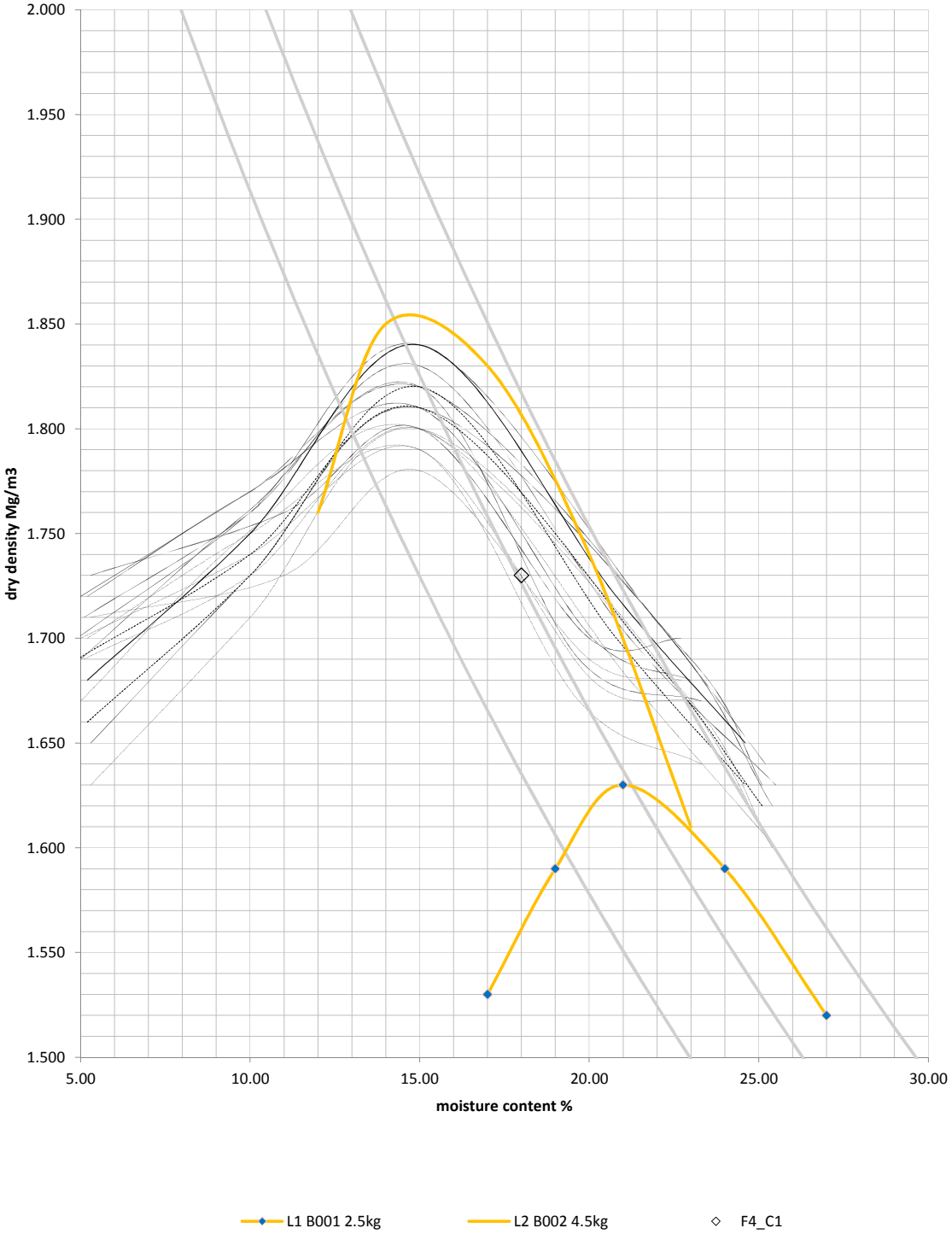
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 19/09/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 18.09.2015

(APEX Testing Solutions Certifactes : 7118)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7140**		

Site Reference:	**Core 1 - 3**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**21/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 F5-C3	Core 2 E4-C3	Core 3 F4-C2		
Bulk Density	2.03	1.99	1.99		
Moisture Content	20	20	19		
Dry Density	1.69	1.66	1.67		

Relative Compaction	N/A	N/A	N/A		

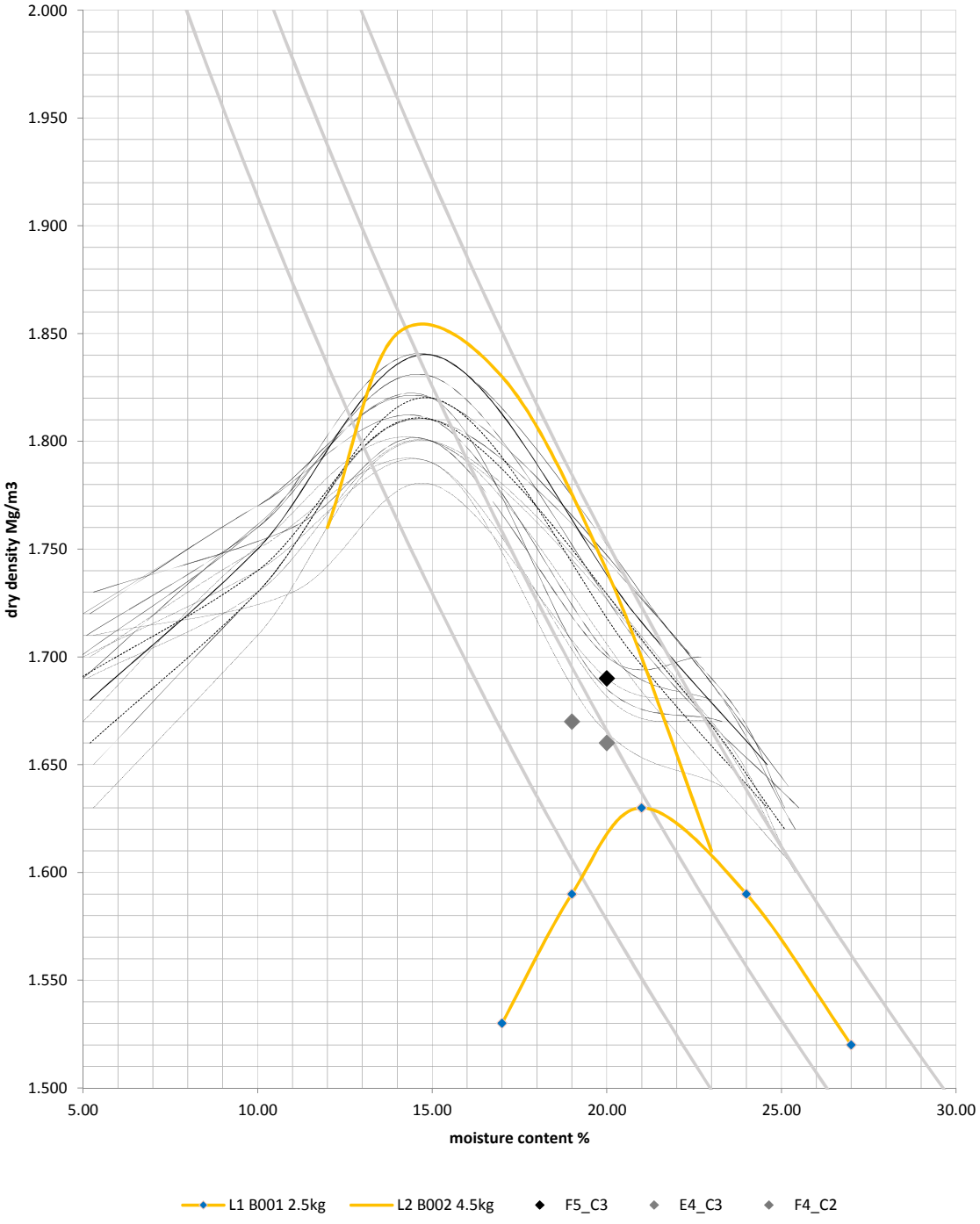
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 23/09/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 21.09.2015

(APEX Testing Solutions Certifactes : 71140)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7159**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**23/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 F4-C2 Retest 1	Core 2 F4-C2 Retest 2	Core 3 E4-C3 Retest 1	Core 4 E4-C3 Retest 2	Core 5 D4-C4 Retest 1
Bulk Density	1.99	2.02	2.02	2.03	2.01
Moisture Content	21	21	21	19	22
Dry Density	1.64	1.67	1.67	1.70	1.64

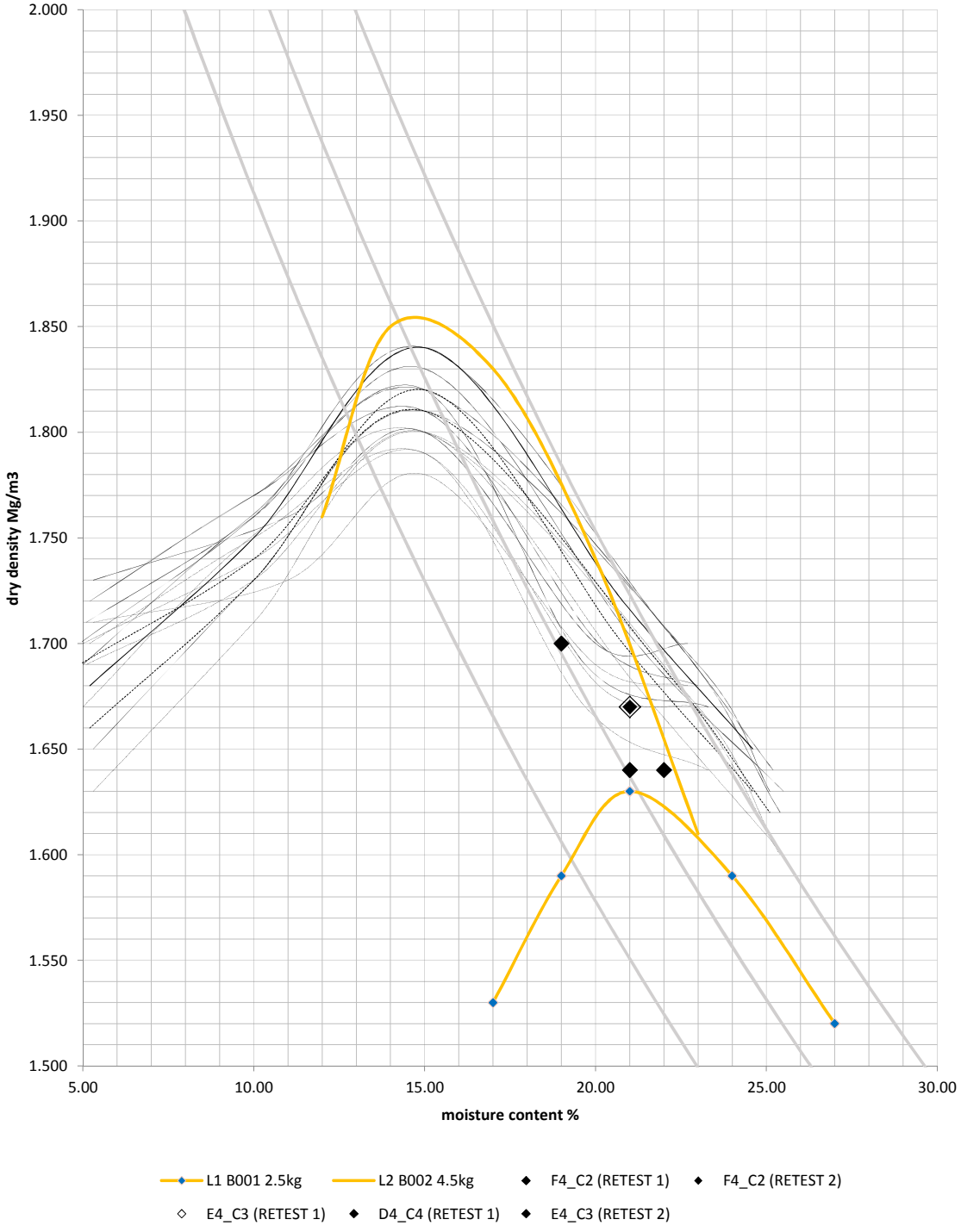
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 23.09.2015

(APEX Testing Solutions Certifactes : 7159)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7160**		

Site Reference:	**Core 6 - 8**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**23/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 6 D4-C4 Retest 2	Core 7 F5-C4	Core 8 E5-C5		
Bulk Density	2.00	1.98	2.00		
Moisture Content	23	23	22		
Dry Density	1.62	1.61	1.64		

Relative Compaction	N/A	N/A	N/A		

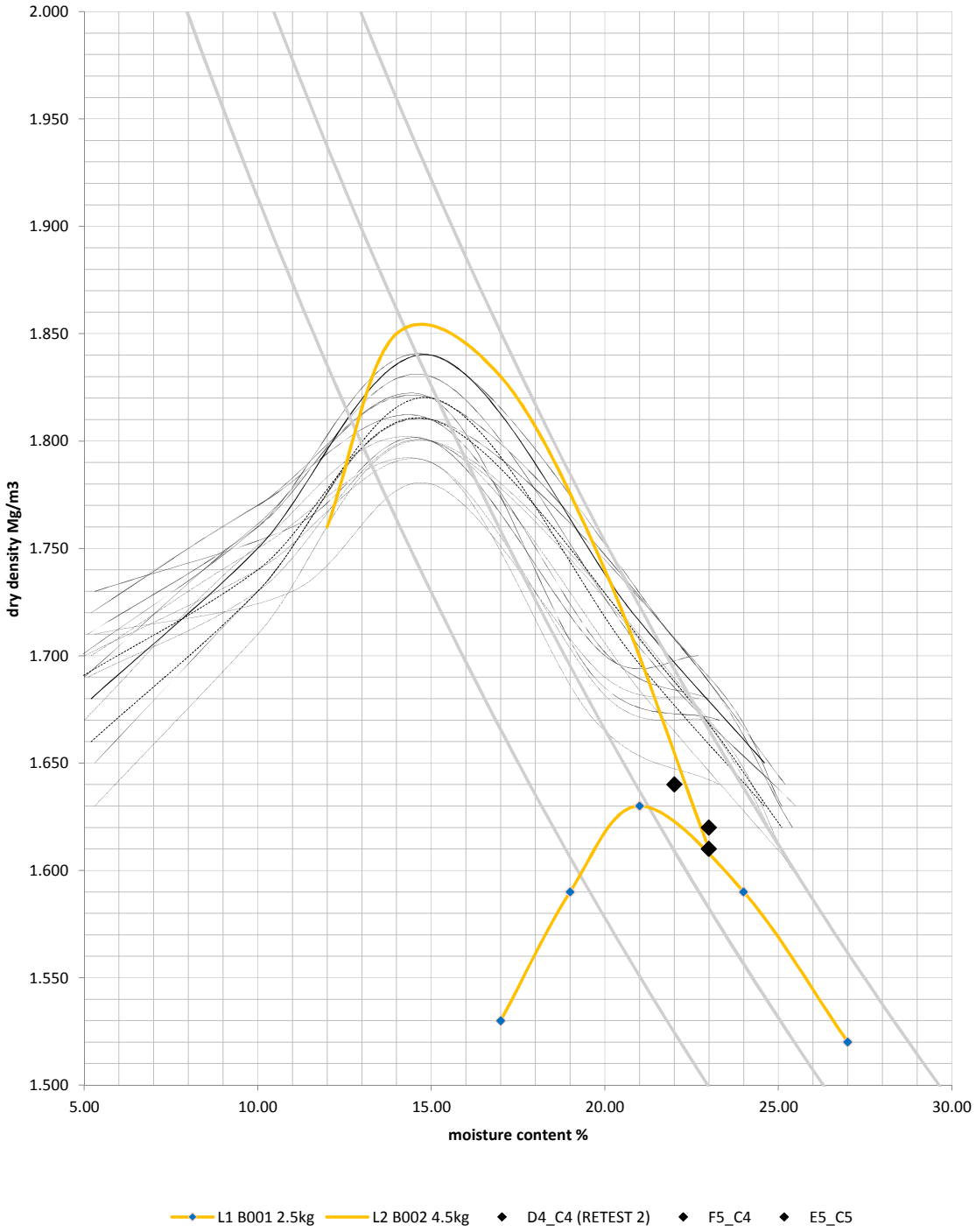
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 25/09/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 23.09.2015

(APEX Testing Solutions Certifactes : 7160)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7190**		

Site Reference:	**Core 1 - 2**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**25/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 B/C7-C9	Core 2 D/E7-C7			
Bulk Density	1.98	2.01			
Moisture Content	22	20			
Dry Density	1.62	1.67			

Relative Compaction	N/A	N/A			

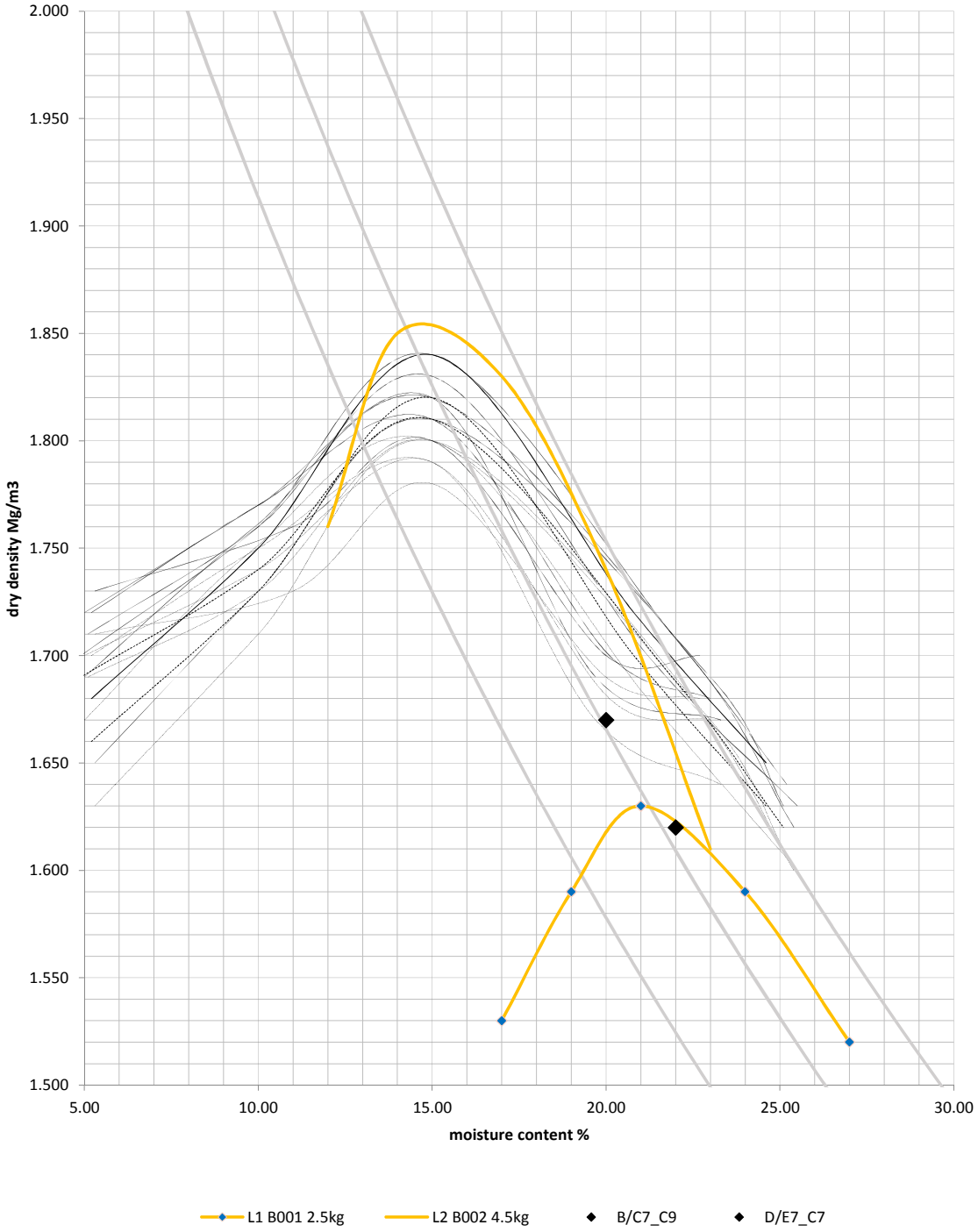
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 29/09/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 25.09.2015

(APEX Testing Solutions Certifactes : 7190)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7191**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**26/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 F7-C7				
Bulk Density	2.02				
Moisture Content	19				
Dry Density	1.70				

Relative Compaction	N/A				

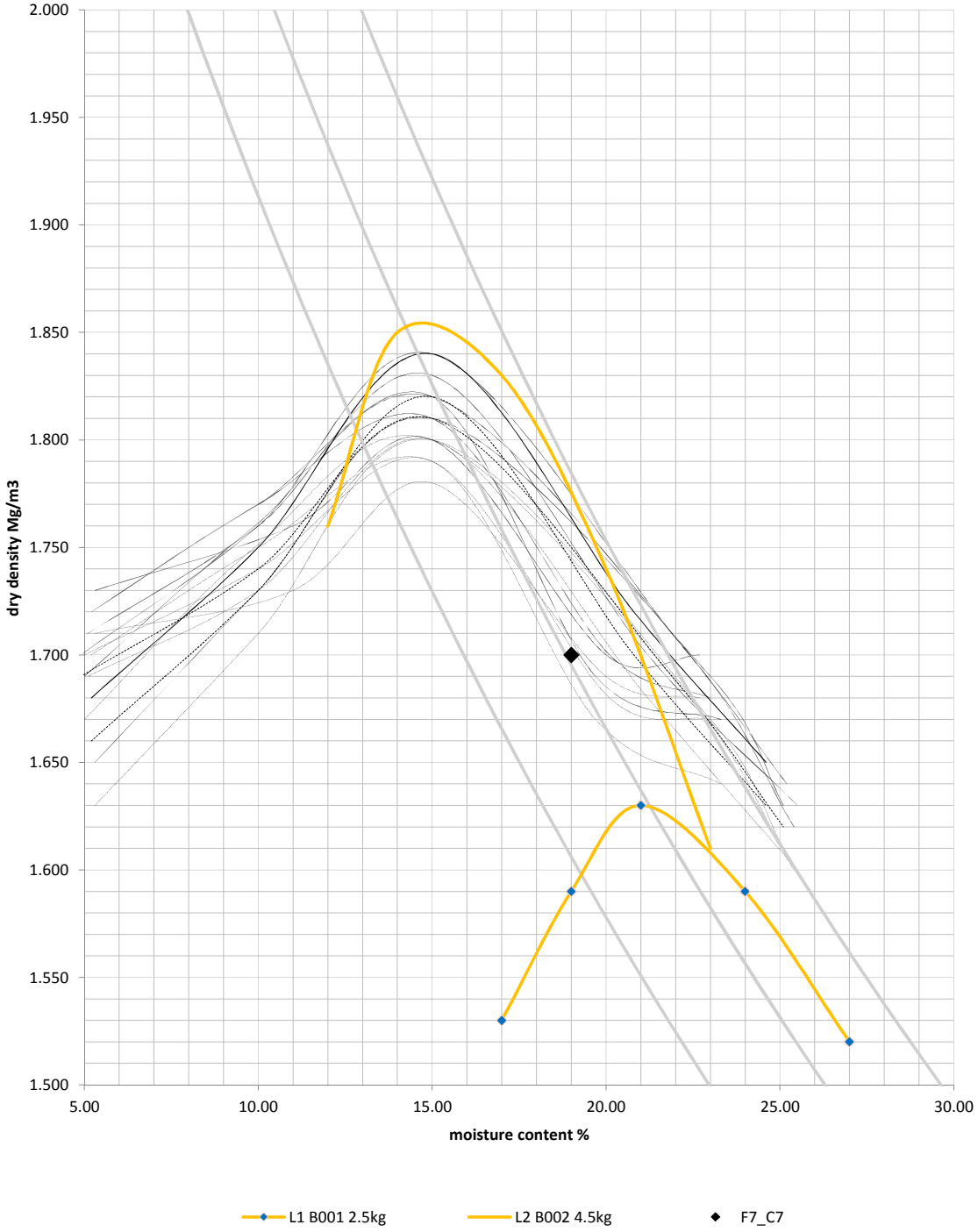
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 29/09/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 25.09.2015

(APEX Testing Solutions Certifactes : 7190)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7192**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**28/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 A567-C10				
Bulk Density	2.02				
Moisture Content	19				
Dry Density	1.69				

Relative Compaction	N/A				

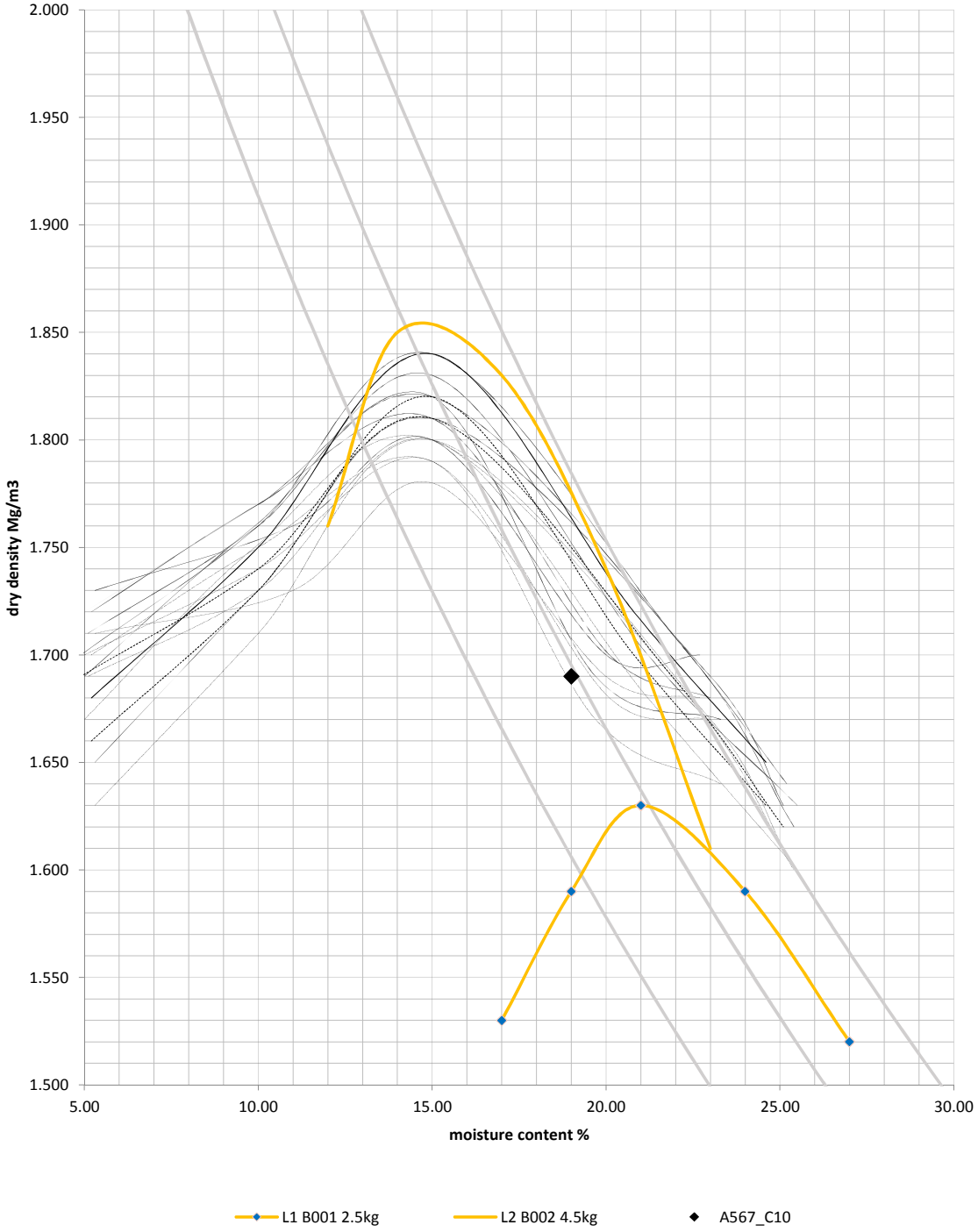
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 29/09/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 25.09.2015

(APEX Testing Solutions Certifactes : 7191)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7195**		

Site Reference:	**Core 1 - 3**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**28/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 E4-C4	Core 2 D4-C5	Core 3 G4-C1		
Bulk Density	1.97	2.00	2.03		
Moisture Content	23	22	21		
Dry Density	1.60	1.64	1.67		

Relative Compaction	N/A	N/A	N/A		

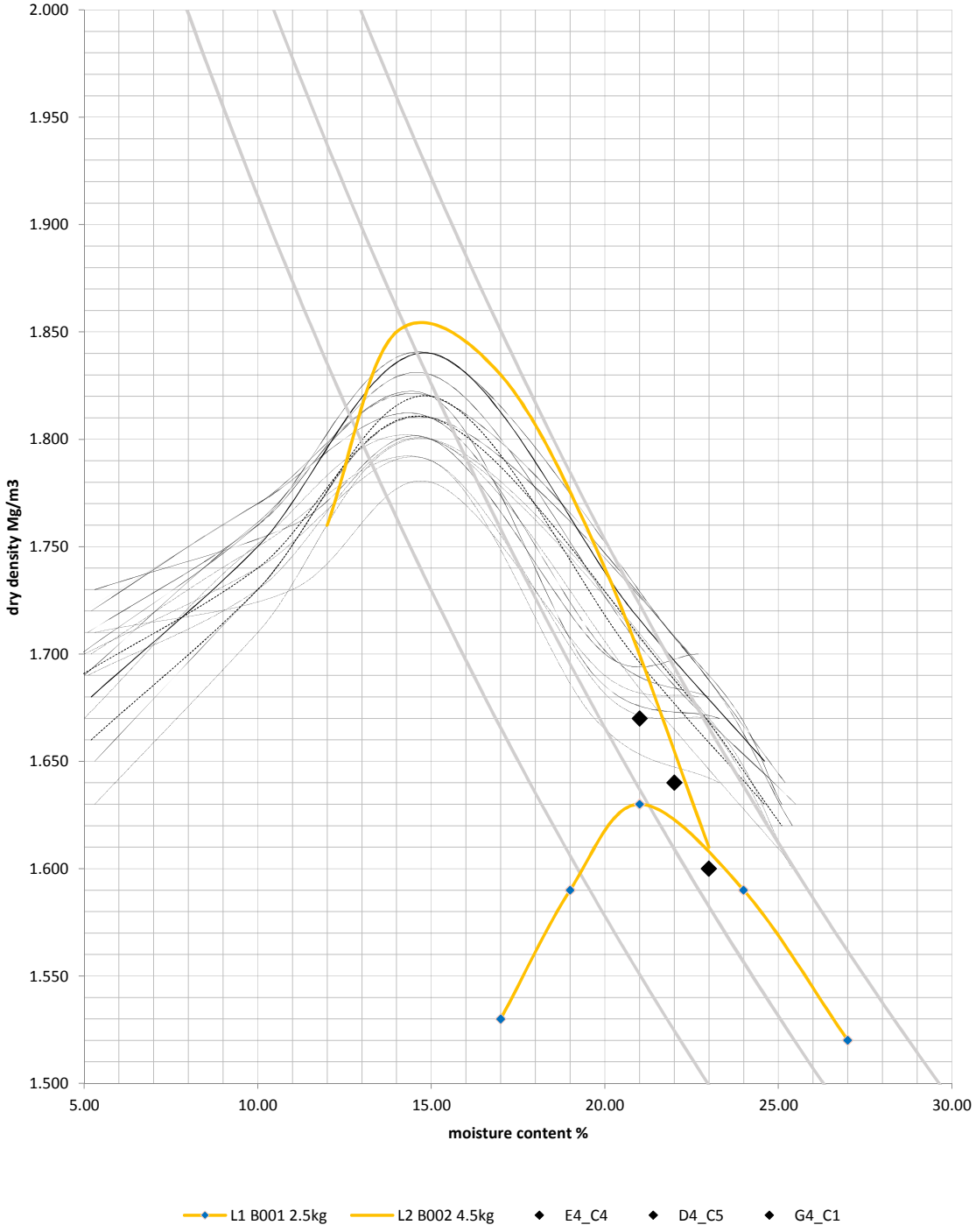
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 30/09/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 28.09.2015

(APEX Testing Solutions Certifactes : 7195)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7196**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**29/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G6/7-C2				
Bulk Density	1.99				
Moisture Content	21				
Dry Density	1.64				

Relative Compaction	N/A				

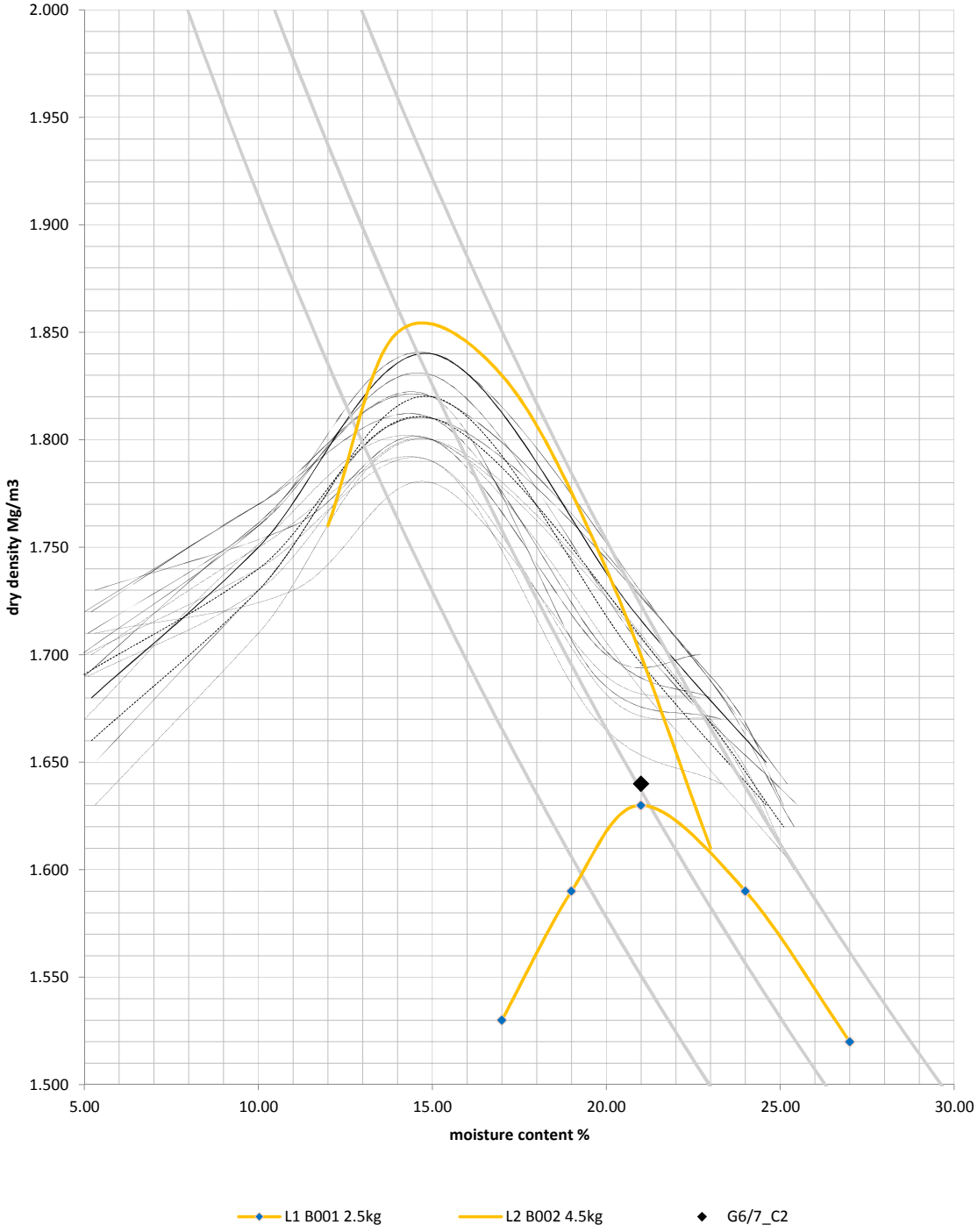
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 01/10/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 29.09.2015

(APEX Testing Solutions Certifactes : 7196)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7201**		

Site Reference:	**Core 1 - 5**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**30/09/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 A567-C10 Retest 1	Core 2 A567-C10 Retest 2	Core 3 E4-C5	Core 4 G4-C3	Core 5 F4-C4
Bulk Density	2.02	2.01	2.00	2.00	1.99
Moisture Content	21	21	23	23	23
Dry Density	1.66	1.66	1.62	1.62	1.61

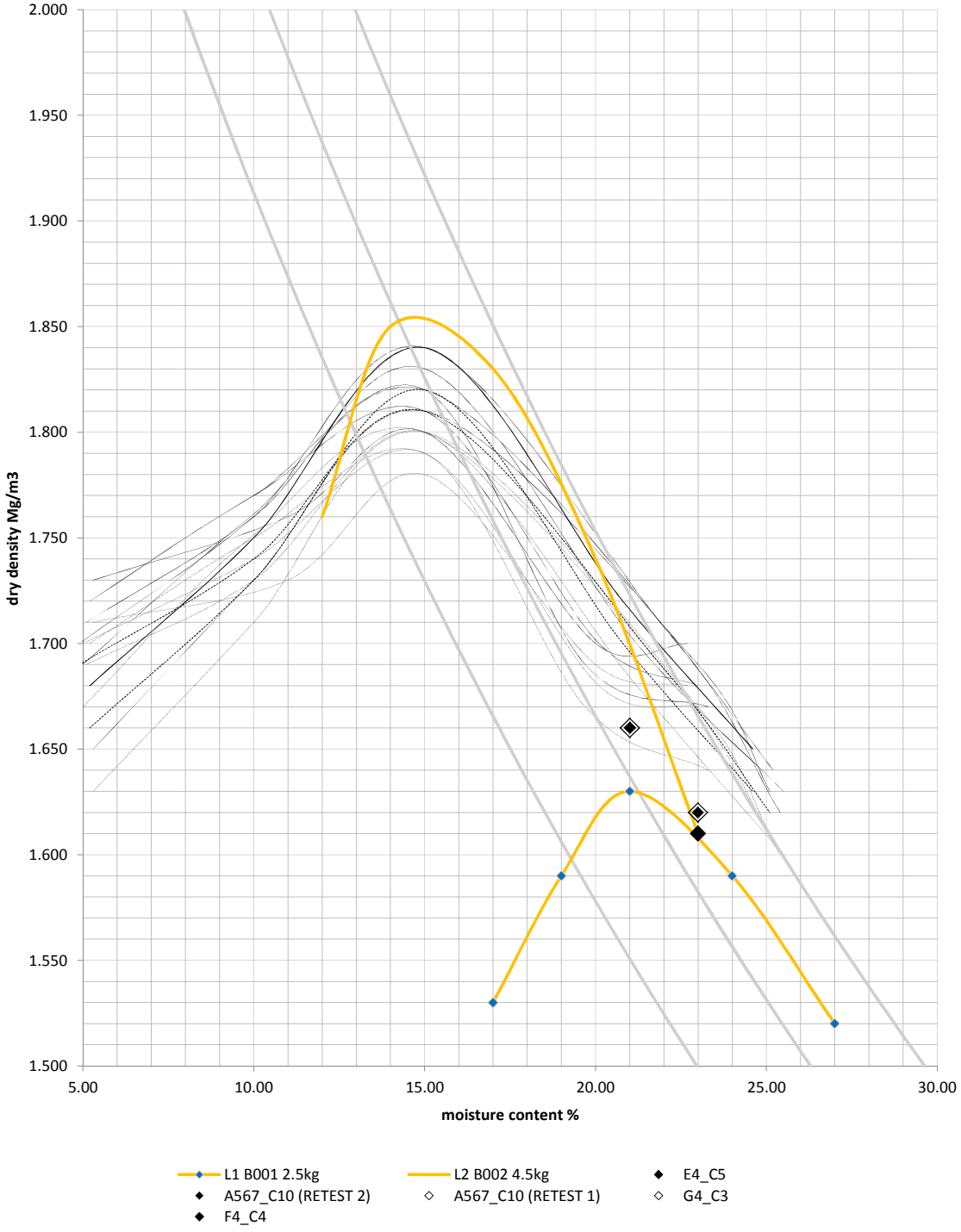
Relative Compaction	N/A	N/A	N/A	N/A	N/A

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 23.09.2015

(APEX Testing Solutions Certifactes : 7159)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7234**		

Site Reference:	**Core 1 - 2**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**01/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 EFG7-C8	Core 2 ABCD7-C10			
Bulk Density	1.93	2.01			
Moisture Content	23	21			
Dry Density	1.57	1.66			

Relative Compaction	N/A	N/A			

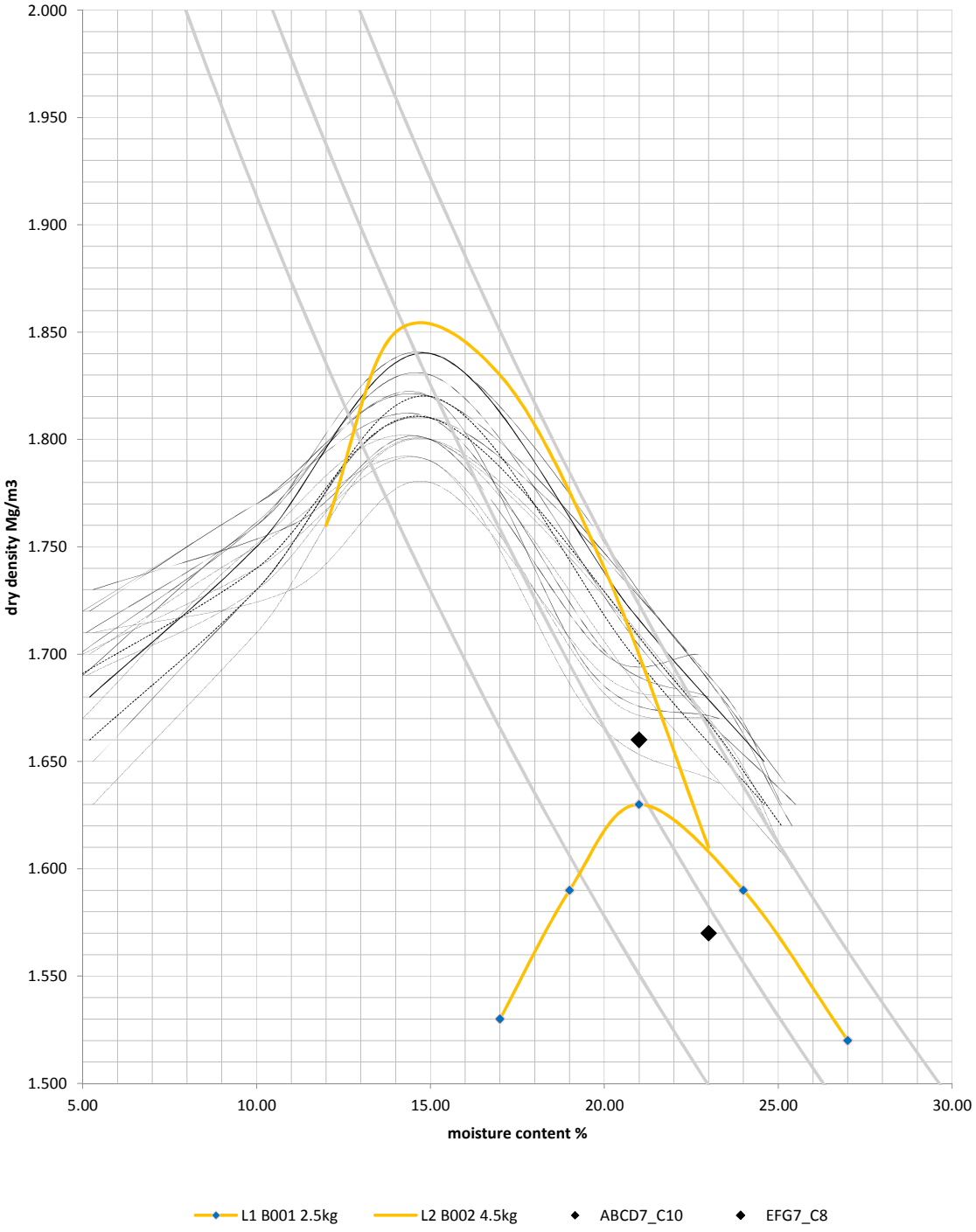
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 02/10/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 01.10.2015

(APEX Testing Solutions Certifactes : 7234)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7235**		

Site Reference:	**Core 1 - 2**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**01/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 A56-C11	Core 2 F4-C3 (EXC)			
Bulk Density	1.97	1.99			
Moisture Content	24	22			
Dry Density	1.59	1.64			

Relative Compaction	N/A	N/A			

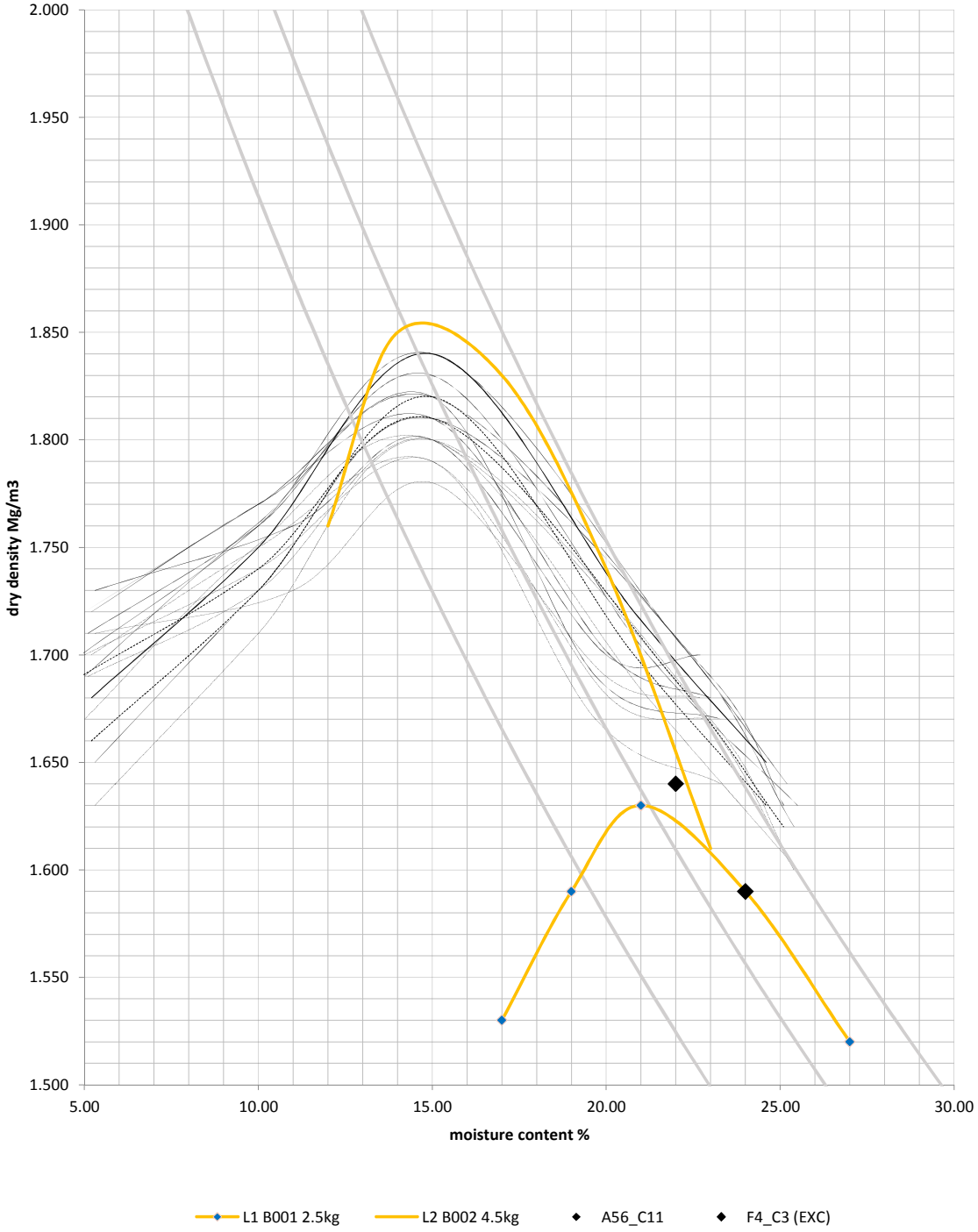
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 03/10/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 01.10.2015

(APEX Testing Solutions Certifactes : 7235)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7236**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**02/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G7-C3 Batter				
Bulk Density	2.02				
Moisture Content	23				
Dry Density	1.64				

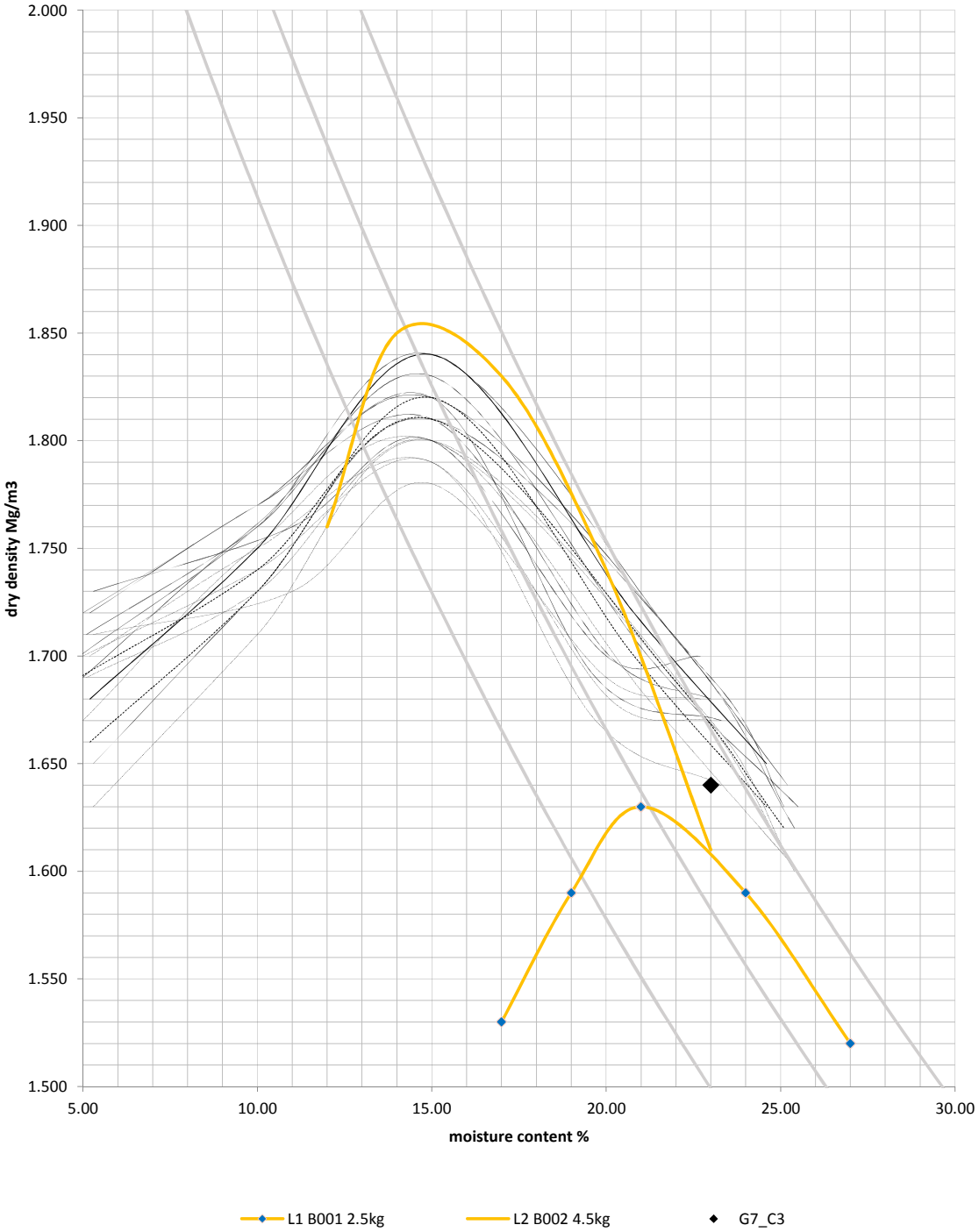
Relative Compaction	N/A				

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 02.10.2015

(APEX Testing Solutions Certifactes : 7236)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7252**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**02/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G4-C2				
Bulk Density	2.01				
Moisture Content	23				
Dry Density	1.63				

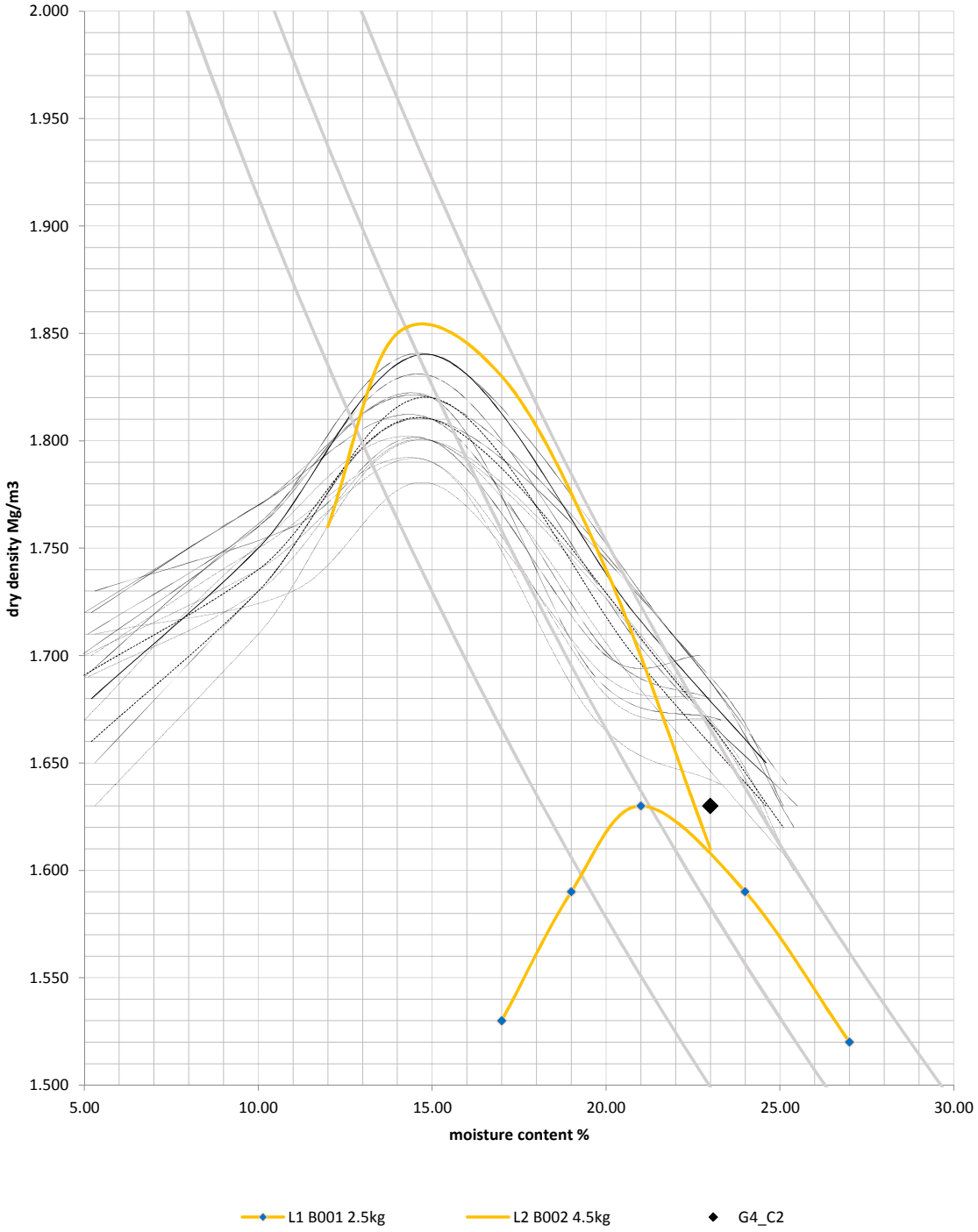
Relative Compaction	N/A				

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 02.10.2015

(APEX Testing Solutions Certifactes : 7252)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7253**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**03/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 DEFG7-C10				
Bulk Density	1.97				
Moisture Content	23				
Dry Density	1.61				

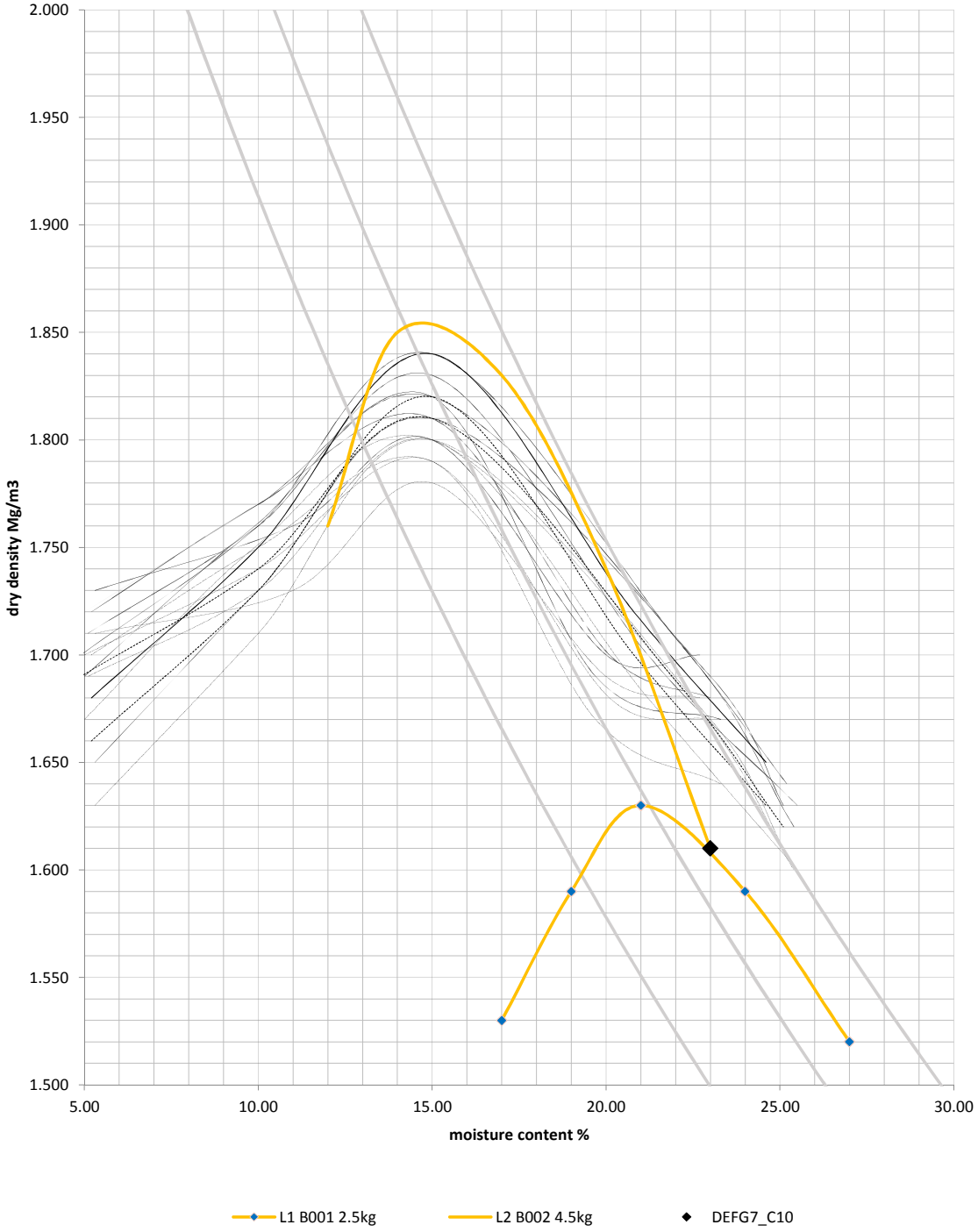
Relative Compaction	N/A				

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 03.10.2015

(APEX Testing Solutions Certifactes : 7253)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7254**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**05/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G6-C3 Batter				
Bulk Density	1.98				
Moisture Content	22				
Dry Density	1.62				

Relative Compaction	N/A				

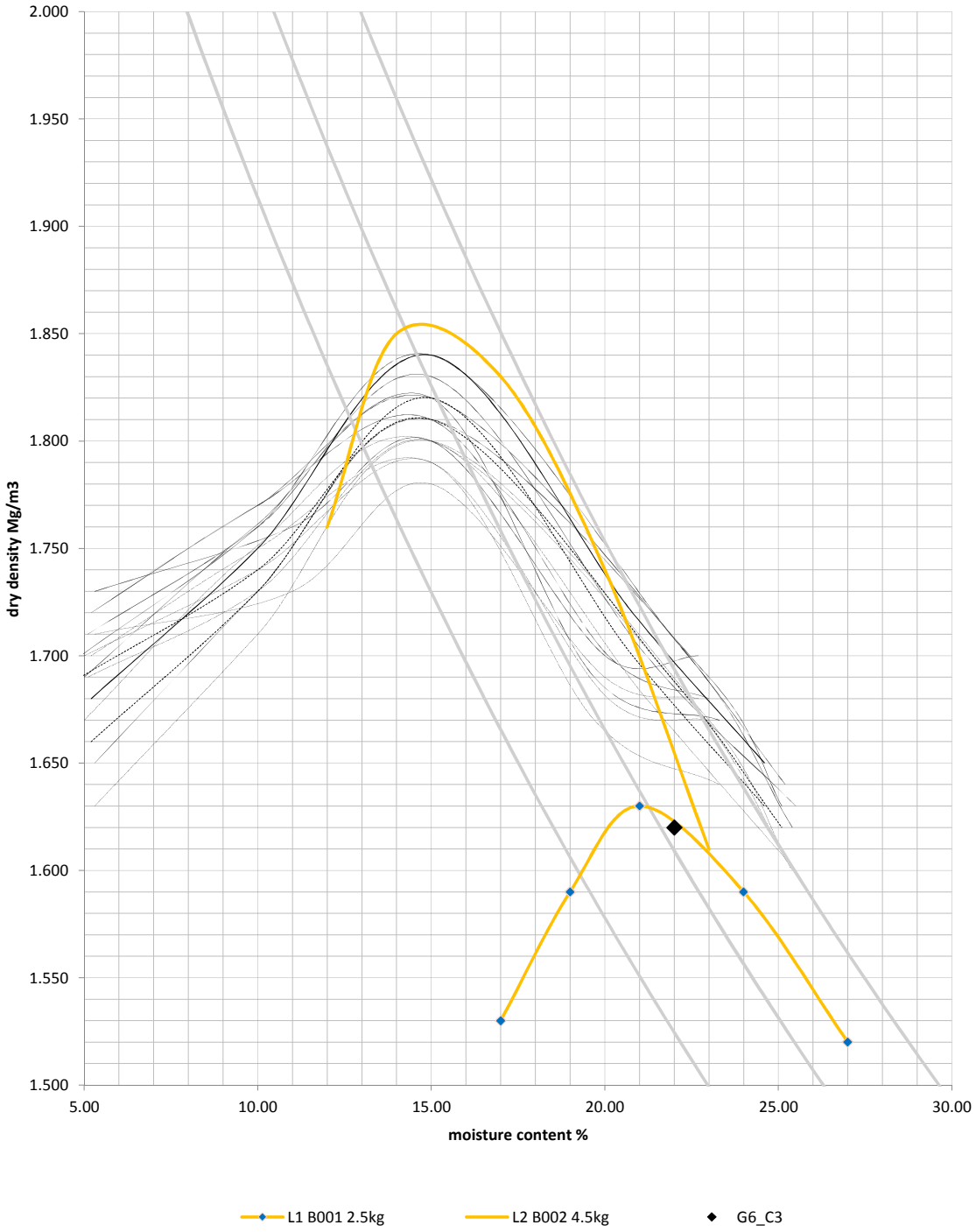
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 06/10/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 05.10.2015

(APEX Testing Solutions Certifactes : 7254)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7259**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**02/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 F4-C5	Core 2 DEFG7-C9			
Bulk Density	2.02	2.03			
Moisture Content	21	21			
Dry Density	1.67	1.68			

Relative Compaction	N/A	N/A			

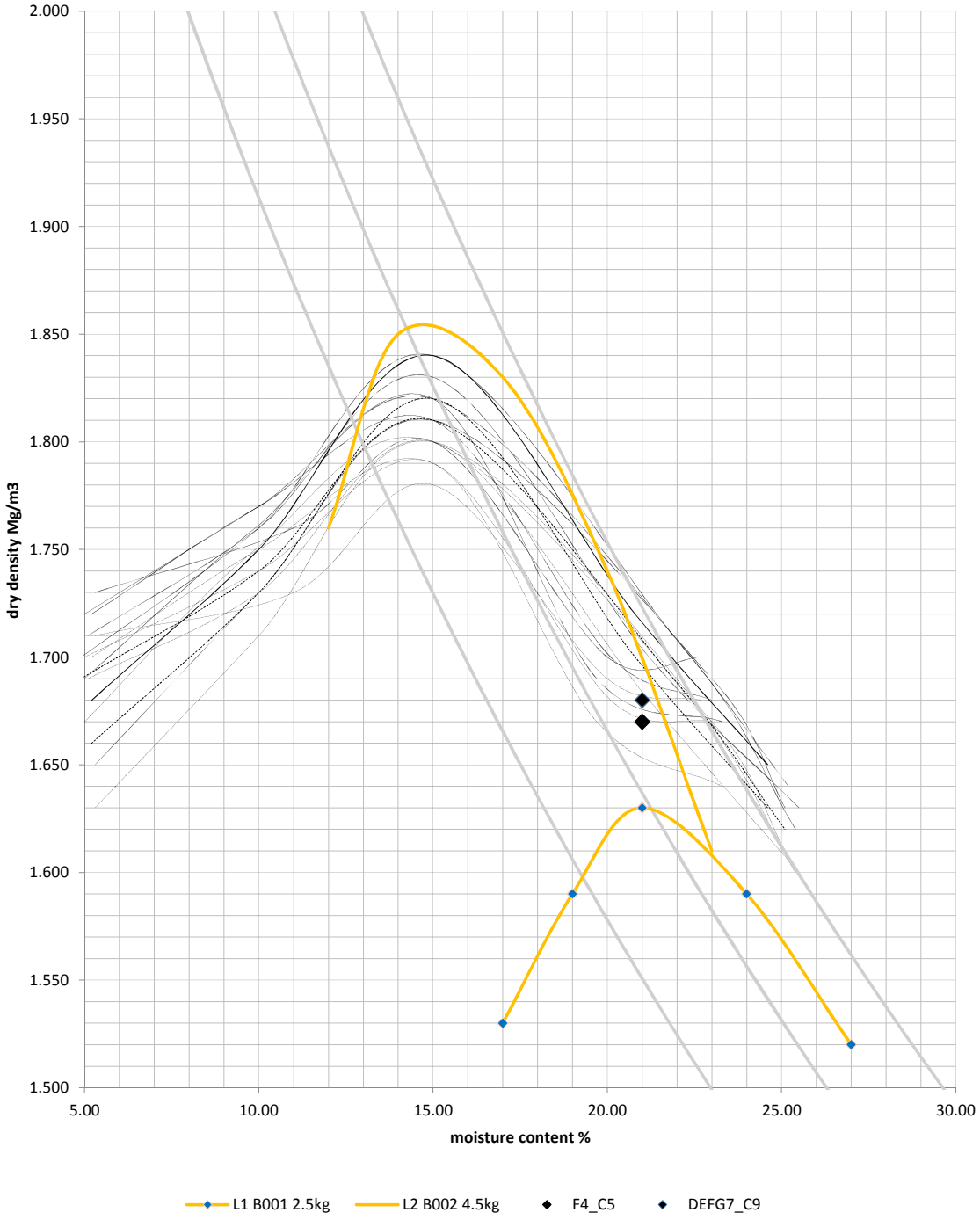
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 07/10/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 02.10.2015

(APEX Testing Solutions Certifactes : 7259)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7283**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**07/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G4-C3 Batter				
Bulk Density	2.04				
Moisture Content	20				
Dry Density	1.69				

Relative Compaction	N/A				

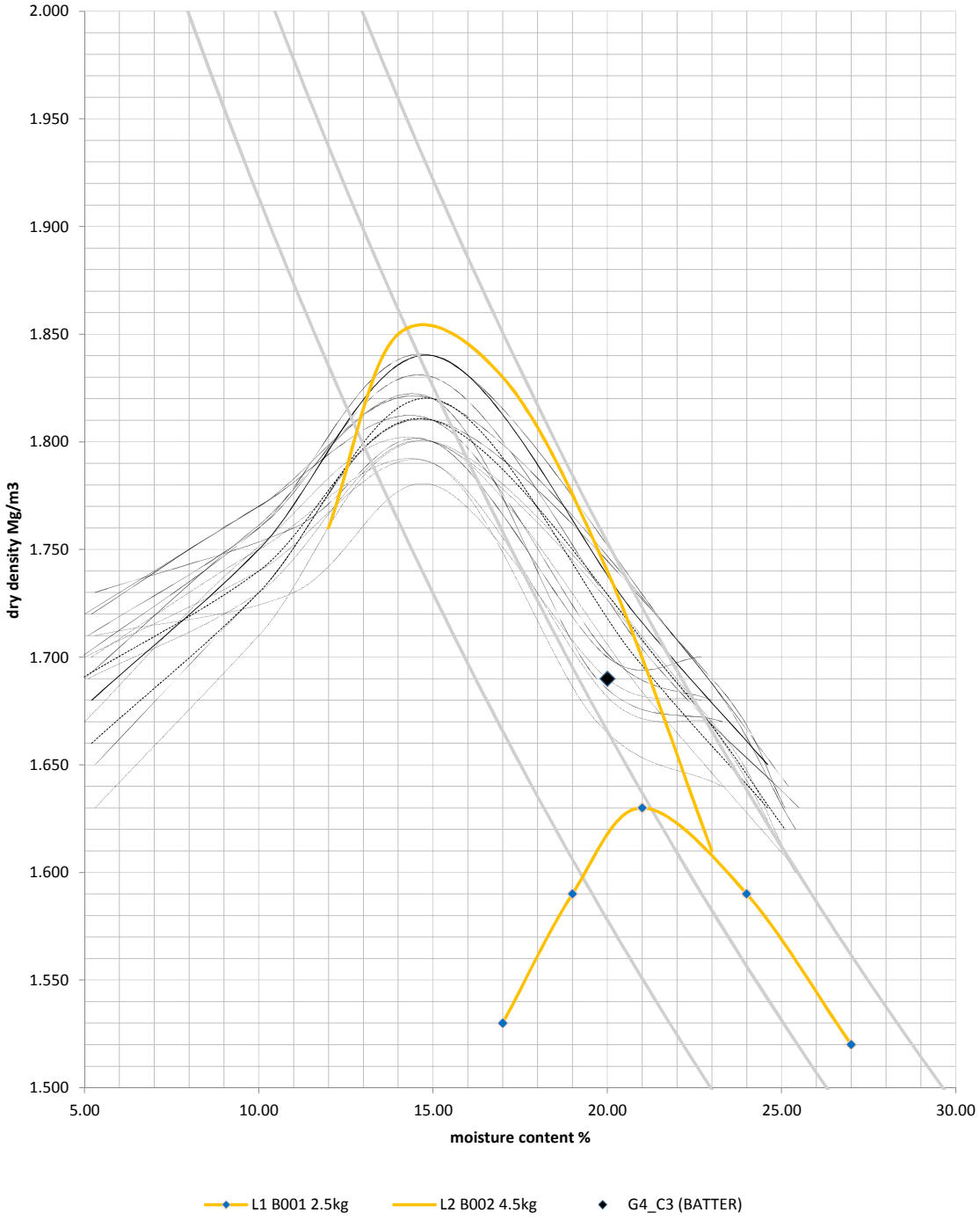
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref.				
BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver R. Anstee, Laboratory Manager	Date 08/10/2015	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 07.10.2015

(APEX Testing Solutions Certifactes : 7283)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7295**		

Site Reference:	**Core 1 - 3**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**08/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G6-C4 Batter	Core 2 G7-C4 Batter	Core 3 G4-C4 Batter		
Bulk Density	2.01	1.99	2.02		
Moisture Content	22	22	22		
Dry Density	1.65	1.62	1.65		

Relative Compaction	N/A	N/A	N/A		

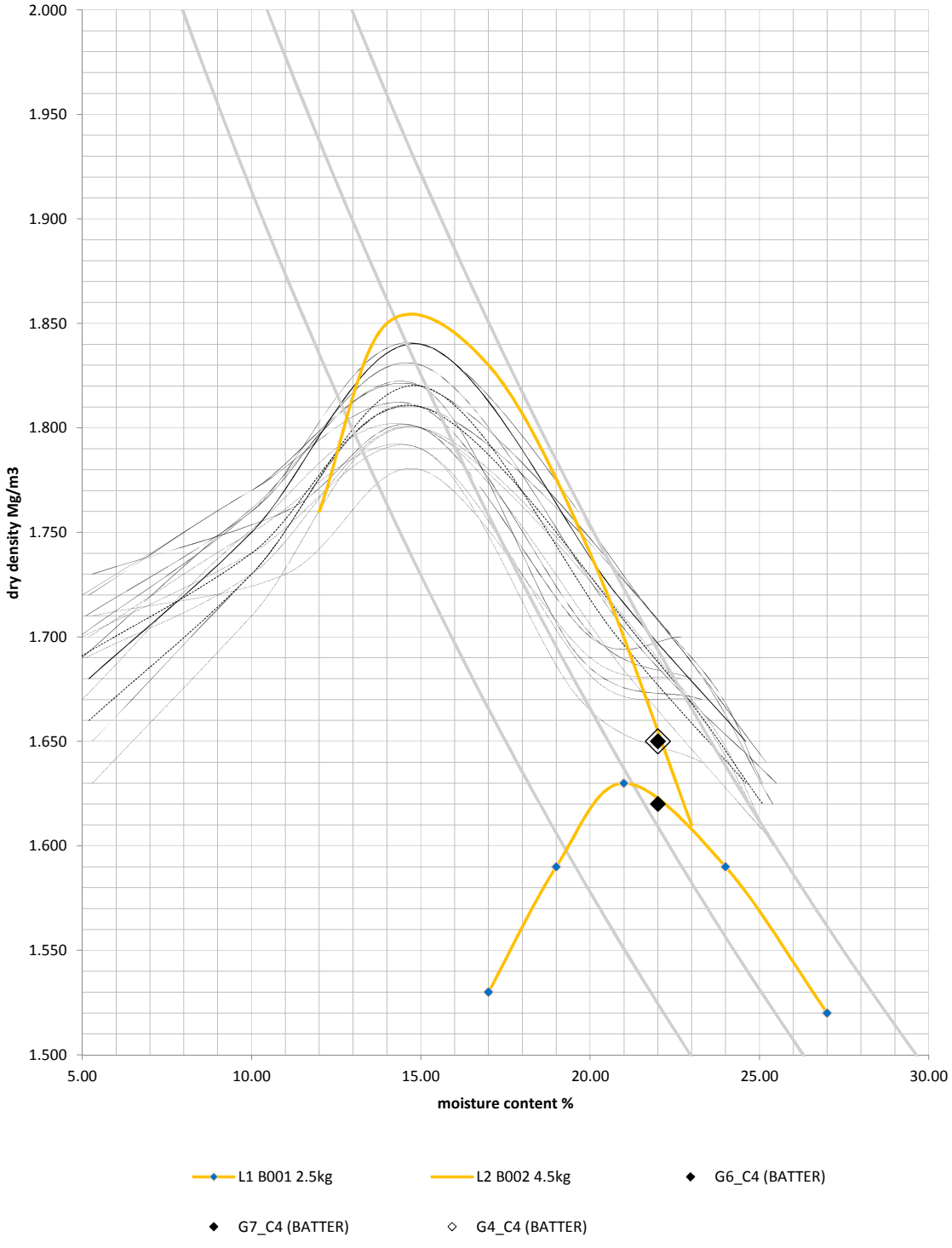
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 09/10/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 08.10.2015

(APEX Testing Solutions Certifactes : 7295)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7296**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**09/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G4-C5 Batter				
Bulk Density	1.98				
Moisture Content	25				
Dry Density	1.59				

Relative Compaction	N/A				

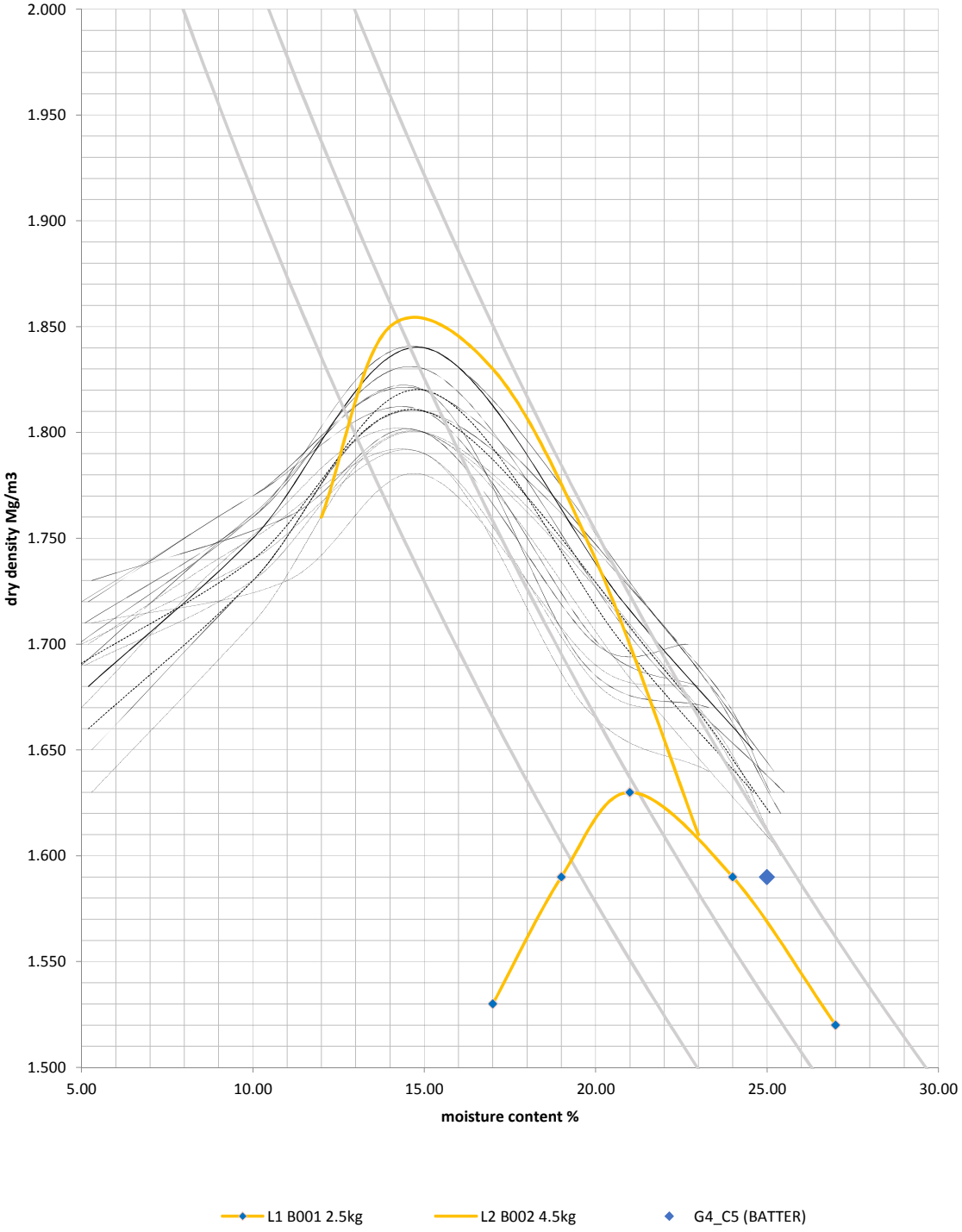
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 10/10/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 09.10.2015

(APEX Testing Solutions Certifactes : 7296)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7313**		

Site Reference:	**Core 1 - 3**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**12/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G6-C5 Batter	Core 2 G4-C5 Batter Retest 1	Core 3 G4-C5 Batter Retest 2		
Bulk Density	1.97	1.97	1.99		
Moisture Content	23	24	23		
Dry Density	1.59	1.59	1.61		

Relative Compaction	N/A	N/A	N/A		

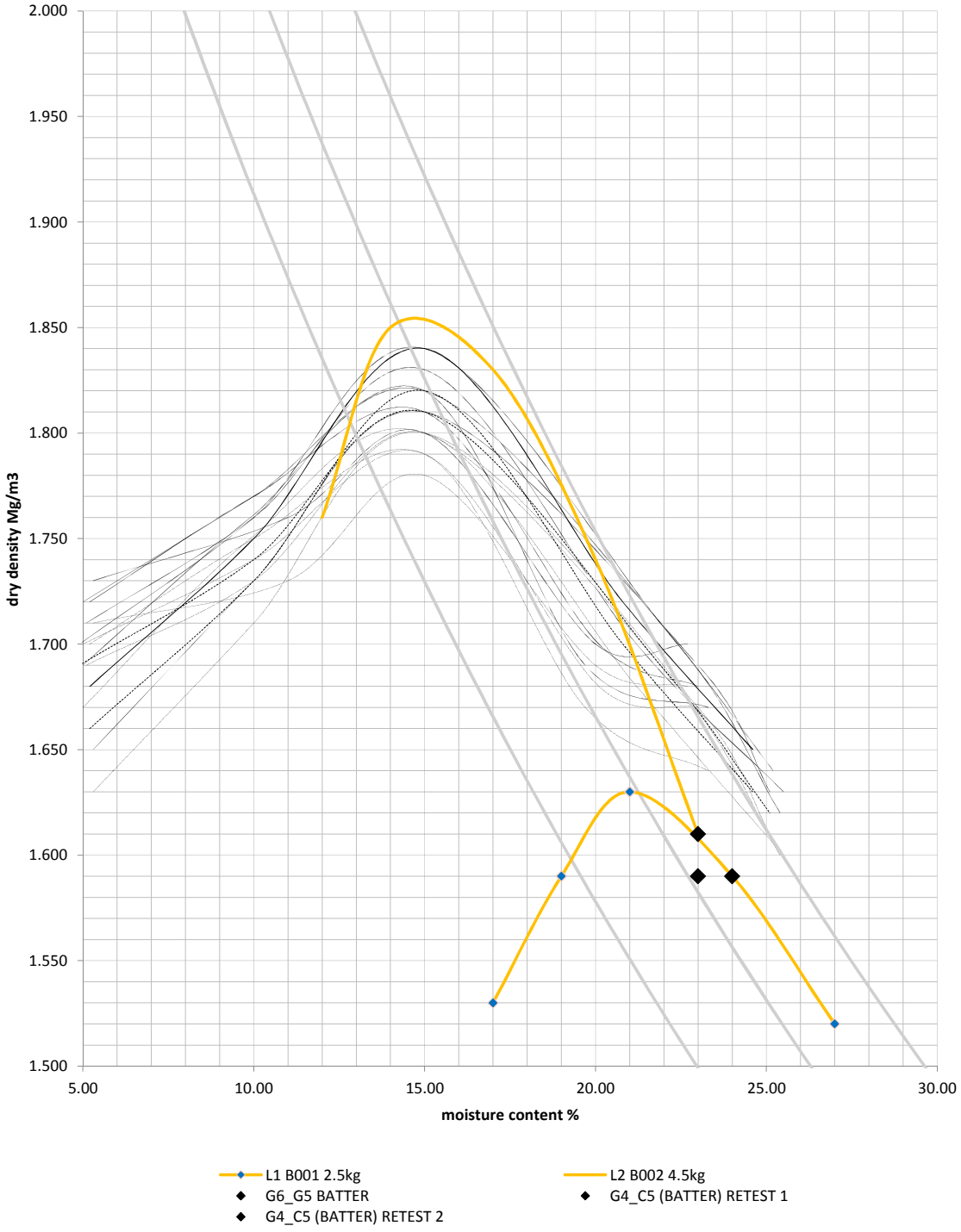
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 13/10/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 12.10.2015

(APEX Testing Solutions Certifactes : 7313)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7365**		

Site Reference:	**Core 1 - 2**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**14/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G4-C6	Core 2 G6 7-C6			
Bulk Density	2.02	2.00			
Moisture Content	20	22			
Dry Density	1.68	1.65			

Relative Compaction	N/A	N/A			

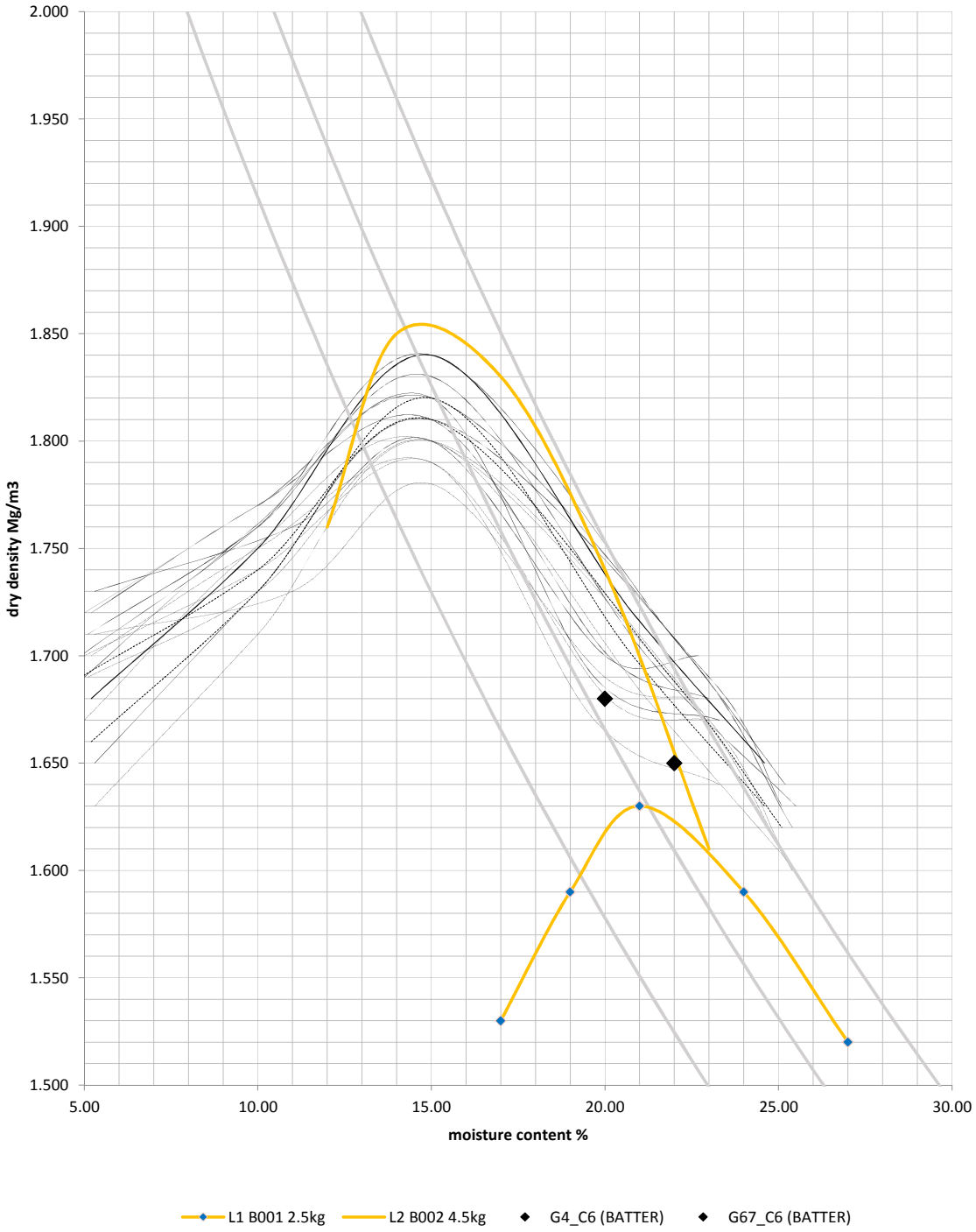
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 16/10/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 14.10.2015

(APEX Testing Solutions Certifactes : 7365)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7408**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**15/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G67-C7 Batter				
Bulk Density	2.00				
Moisture Content	22				
Dry Density	1.64				

Relative Compaction	N/A				

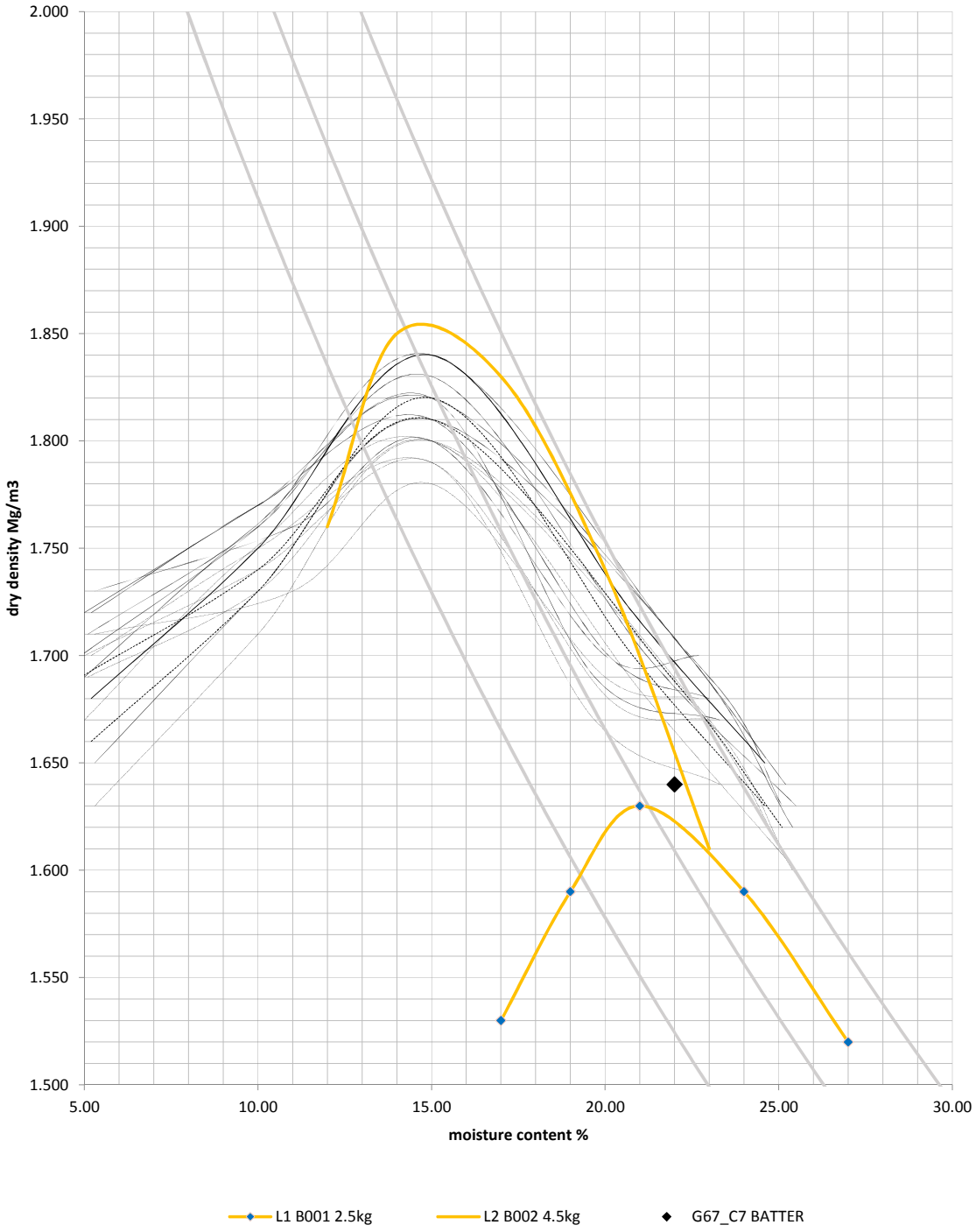
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 20/10/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 15.10.2015

(APEX Testing Solutions Certifactes : 7408)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7409**		

Site Reference:	**Core 1 - 3**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**19/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G5-C2	Core 2 G4-C7 Batter	Core 3 G5-C1		
Bulk Density	2.01	2.03	1.99		
Moisture Content	22	20	22		
Dry Density	1.65	1.69	1.63		

Relative Compaction	N/A	N/A	N/A		

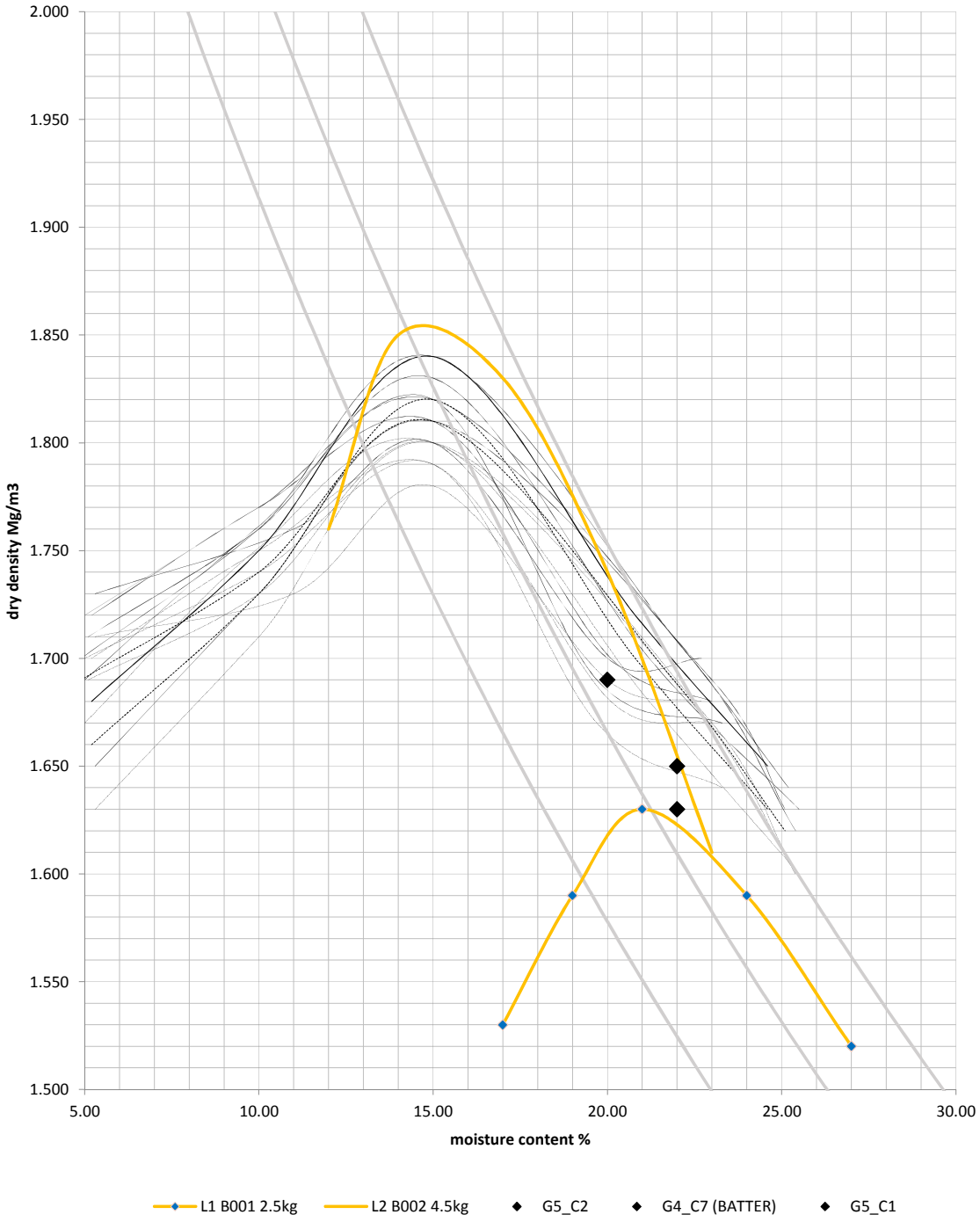
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 20/10/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 19.10.2015

(APEX Testing Solutions Certifactes : 7409)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7419**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**20/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G5-C3				
Bulk Density	1.99				
Moisture Content	21				
Dry Density	1.65				

Relative Compaction	N/A				

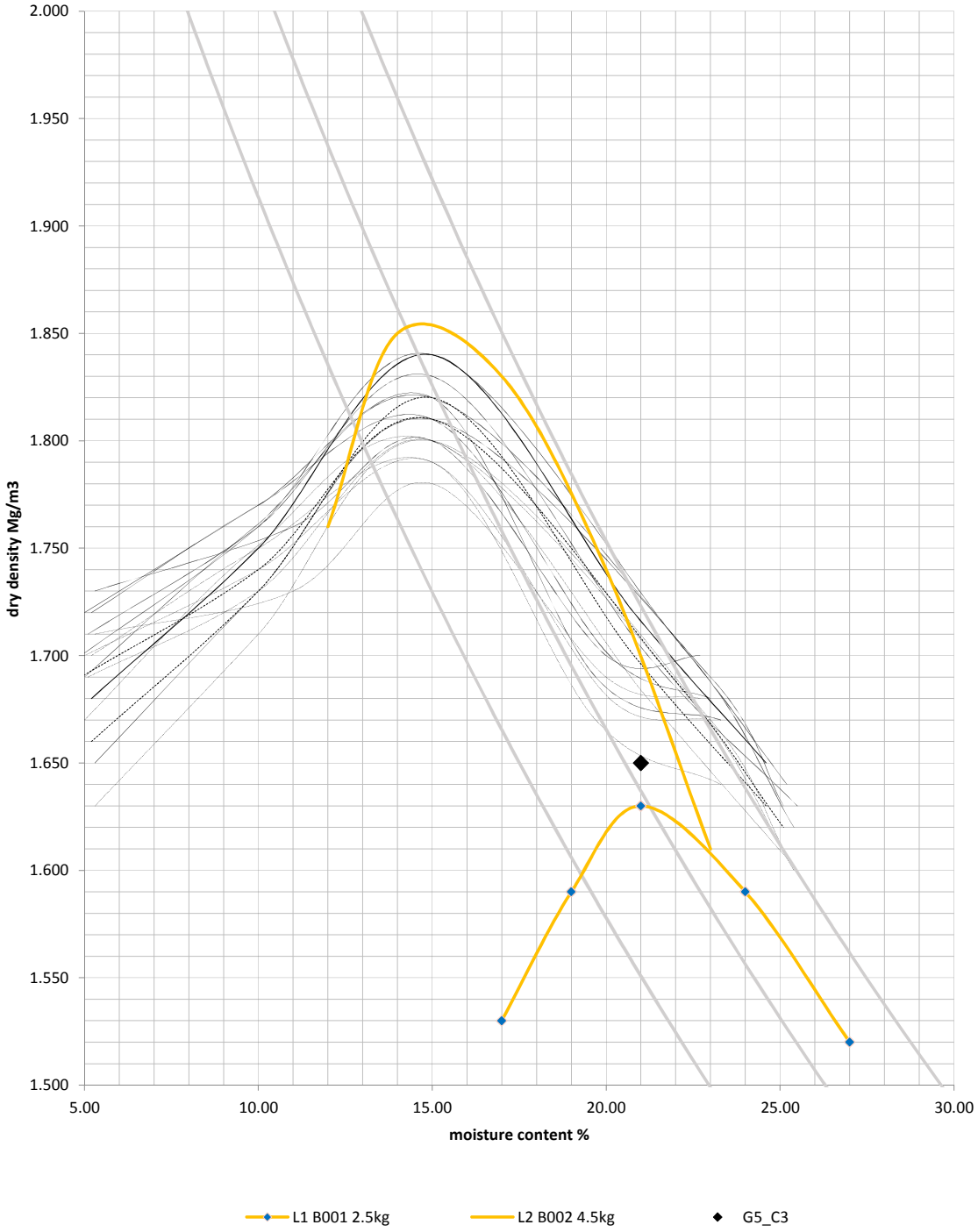
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 21/10/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 20.10.2015

(APEX Testing Solutions Certifactes : 7419)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7444**		

Site Reference:	**Core 1 - 2**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**22/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G5-C4	Core 2 F4-C5			
Bulk Density	1.99	2.03			
Moisture Content	23	23			
Dry Density	1.62	1.65			

Relative Compaction	N/A	N/A			

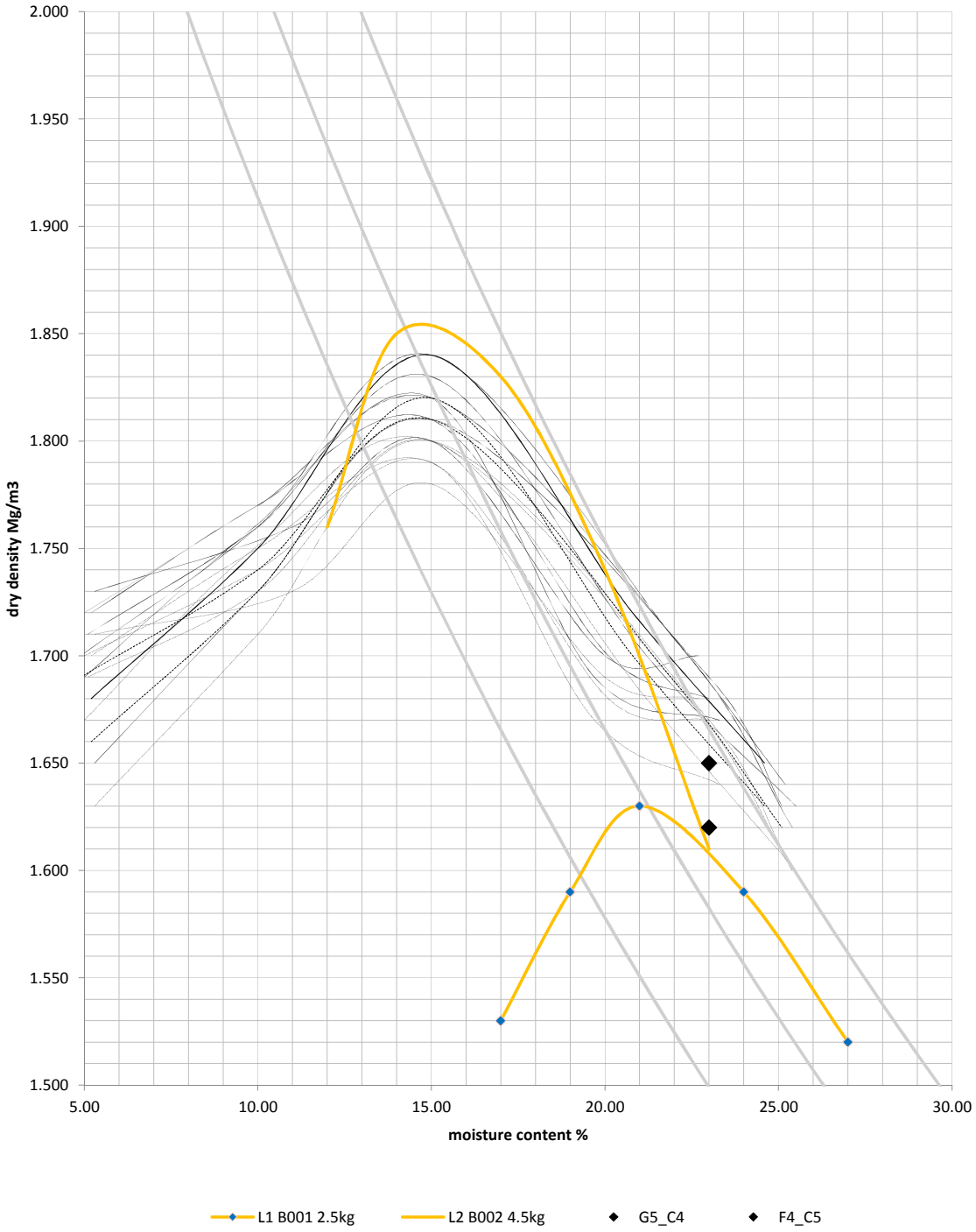
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 7771	Approver R. Anstee	Date 25/10/2015	Fig
		R Anstee, Laboratory Manager		

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 22.10.2015

(APEX Testing Solutions Certifactes : 7444)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D5266-15**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**7445**		

Site Reference:	**Core 1**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**23/10/2015**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 G5-C5				
Bulk Density	2.02				
Moisture Content	20				
Dry Density	1.69				

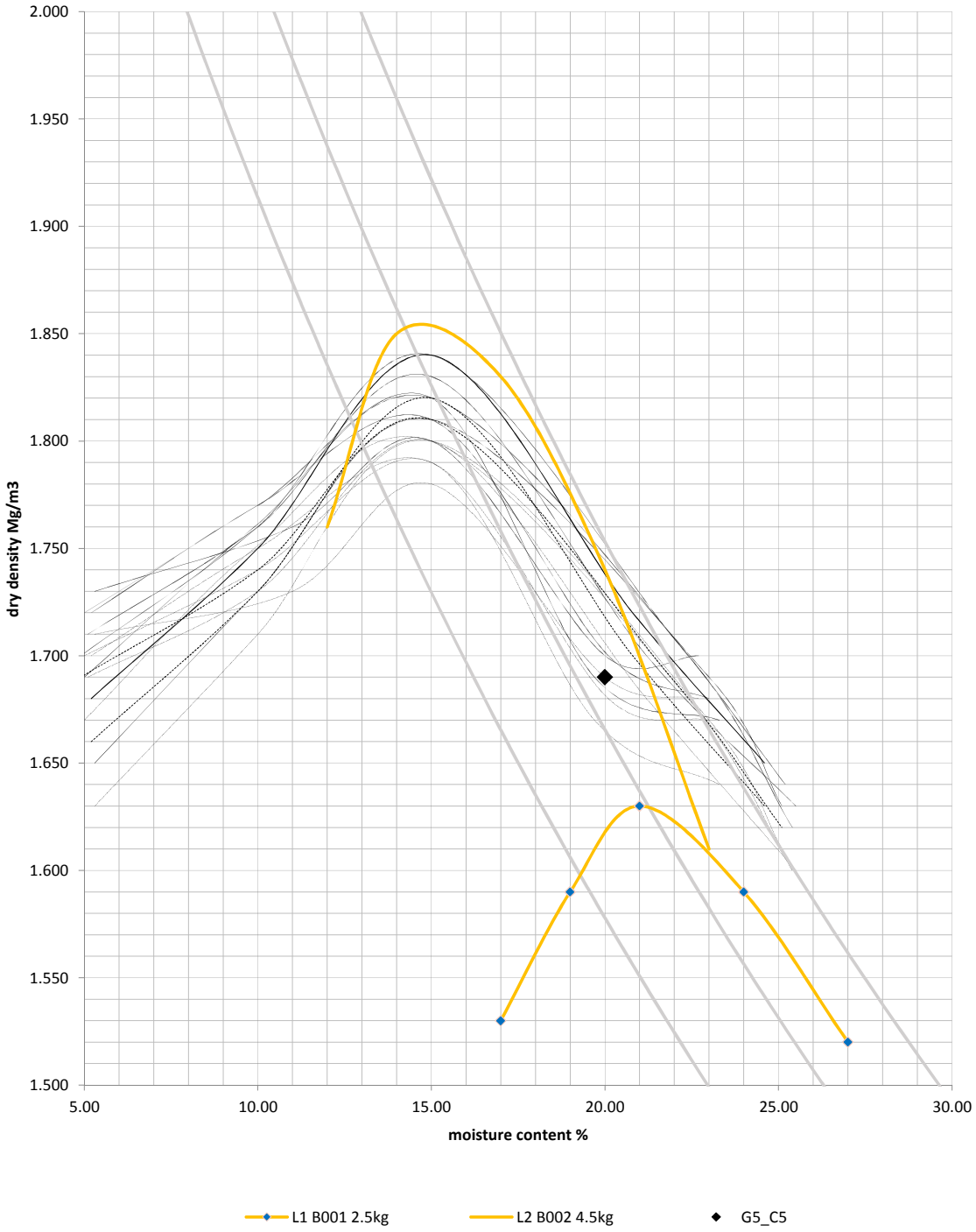
Relative Compaction	N/A				

Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 23.10.2015

(APEX Testing Solutions Certifactes : 7445)



TEST REPORT

Insitu Density Test (Core Cutter)

BS 1377 Part 9

Project No.:	**D6225-16**	Client:	**Jim Davies Civil Engineering Limited**
Project Name:	**Docksway Landfill**	Address:	**Ty Gwyn Banalog Terrace Hollybush Blackwood NP12 0SG**
Sample No.:	**10264**		

Site Reference:	**Core 1 - 3**	Sample Type:	**Insitu**
Location in works:	**Please see Location Reference**	Material Description:	**Grey slightly sandy slightly gravelly CLAY**
Date Tested:	**22/07/2016**	Material Source:	**Unknown**
Tested By:	**Client**	Material Supplier:	**Unknown**
Environmental Conditions:	**Unknown**	Specification:	**BS1377: Part 9**

Test Results

Location Reference	Core 1 A567-C12	Core 2 BC7-C11	Core 3 DE7-C11		
Bulk Density	2.09	2.06	2.03		
Moisture Content	19	19	23		
Dry Density	1.76	1.73	1.66		

Relative Compaction	N/A	N/A	N/A		

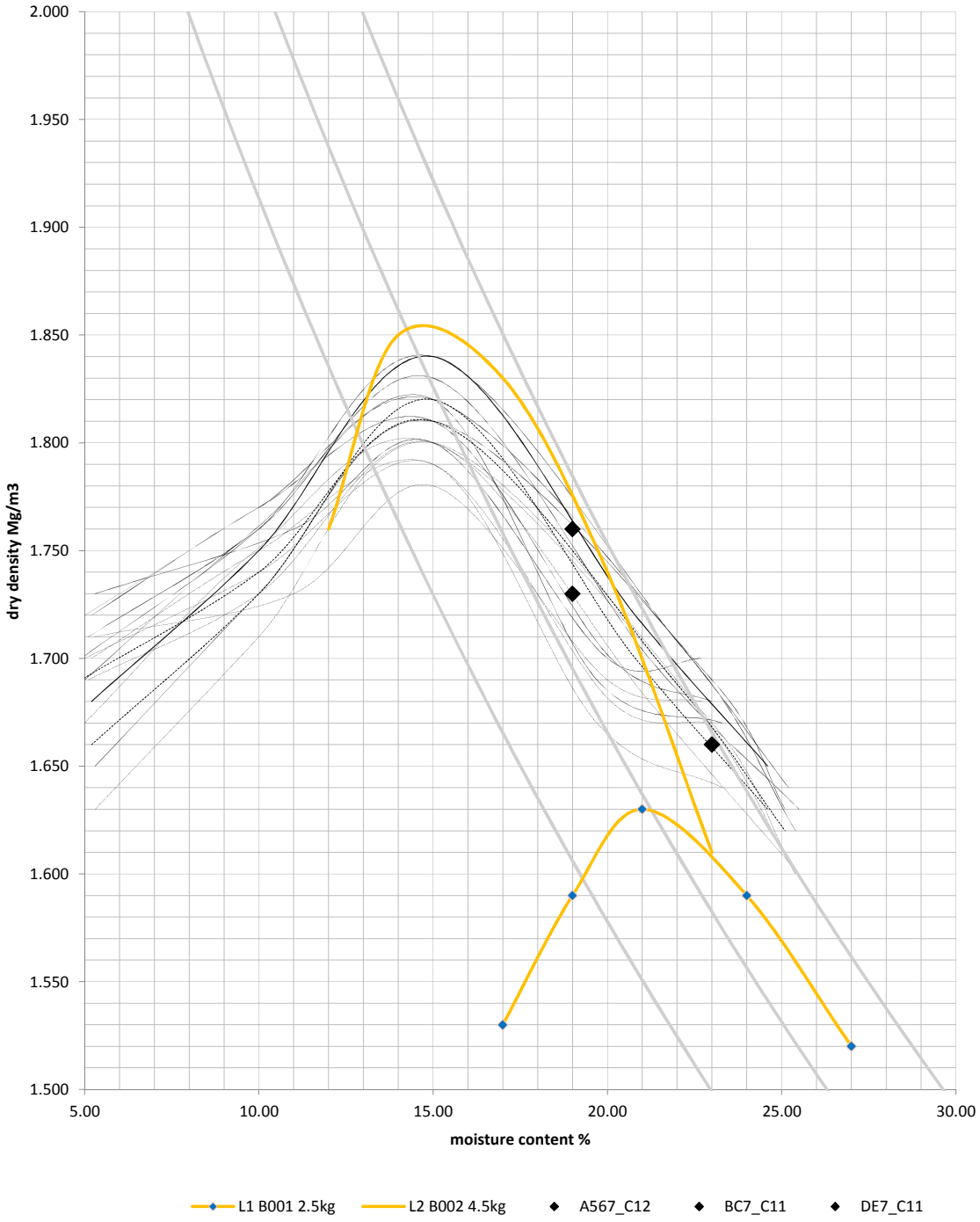
Relative compaction based on:-	Maximum Dry Density	N/A	Mg/m^3
	Optimum Moisture Content	N/A	%
OMC/MDD relates to sample:-			

QA Ref. BS 1377 Part 9 CC Rev. 1.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver R. Anstee	Date 25/07/2016
			R Anstee, Laboratory Manager	Fig

Docksway Waste Disposal Site - Phase 2 Cell 3 Clay Lining

Compaction Data - 22.07.2016

(APEX Testing Solutions Certifactes : 10264)



TEST REPORT

MOISTURE CONTENT

BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6519		

Site Ref / Hole ID:	A4 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	04 August 2015

Test Results

Moisture Content (%)	20

Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	K Maid	11/08/2015	**MC**
			L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

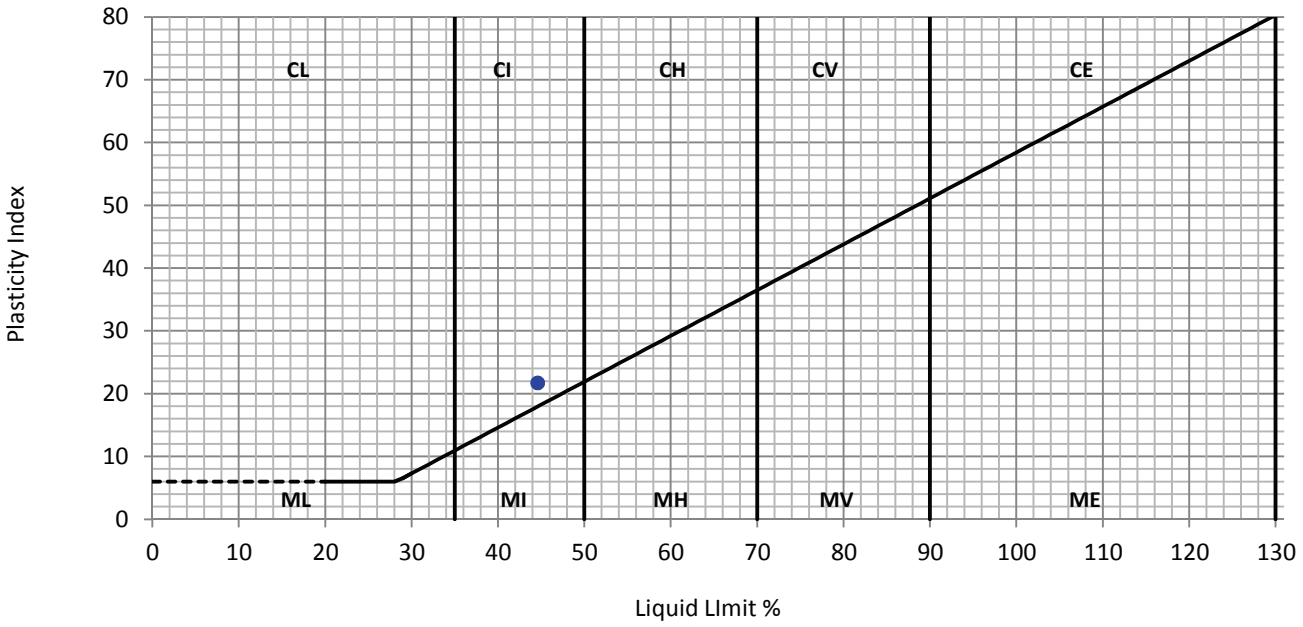
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6519		

Site Ref / Hole ID:	A4 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	07 August 2015

Test Results

Liquid Limit	45	%
Plastic Limit	23	%
Plasticity Index	22	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	1	%



Remarks:

TEST REPORT

MOISTURE CONTENT

BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6520		

Site Ref / Hole ID:	A5 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	04 August 2015

Test Results

Moisture Content (%)	23

Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	K Maid	11/08/2015	**MC**
			L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

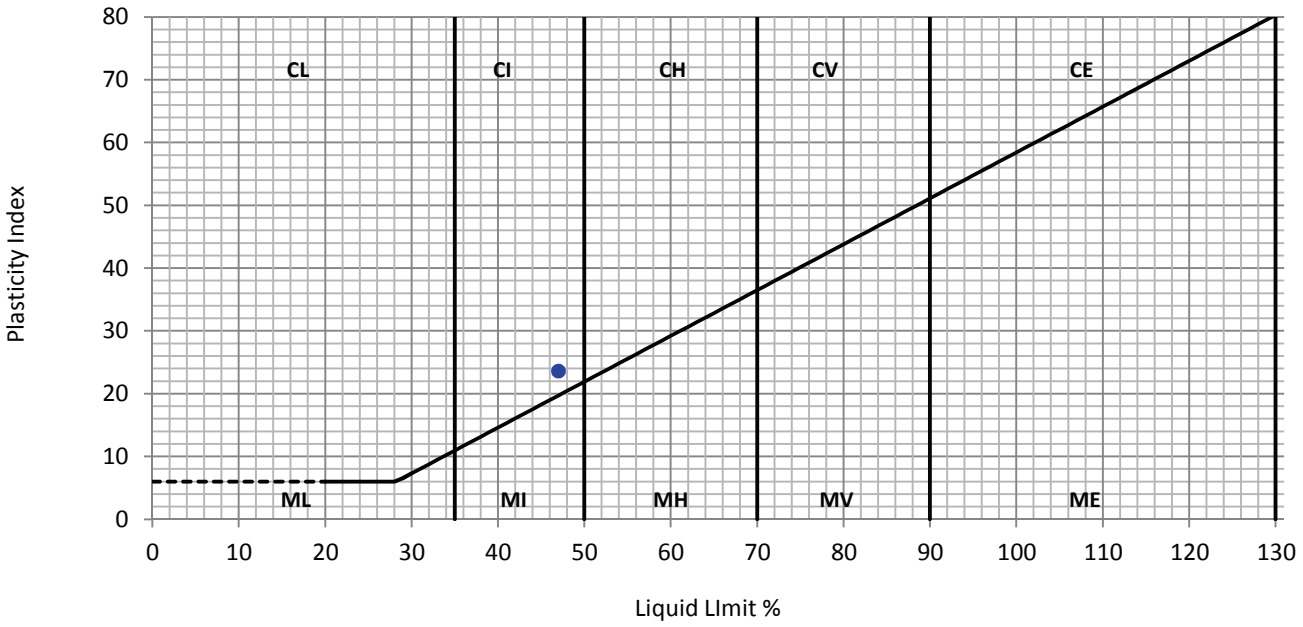
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6520		

Site Ref / Hole ID:	A5 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	03 August 2015

Test Results

Liquid Limit	47	%
Plastic Limit	23	%
Plasticity Index	24	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	1	%



Remarks:

QA Ref.	Apex Testing Solutions		Approver	Date	Fig.
BS1377-2	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ	7771	K Maid	11/08/2015	ATT
Rev 3.0	Tel: 01656 746762 Fax: 01656 749096		L Maiden, Laboratory Supervisor		

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6521		

Site Ref / Hole ID:	A6 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	04 August 2015

Test Results

Moisture Content (%)	20

Remarks:

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

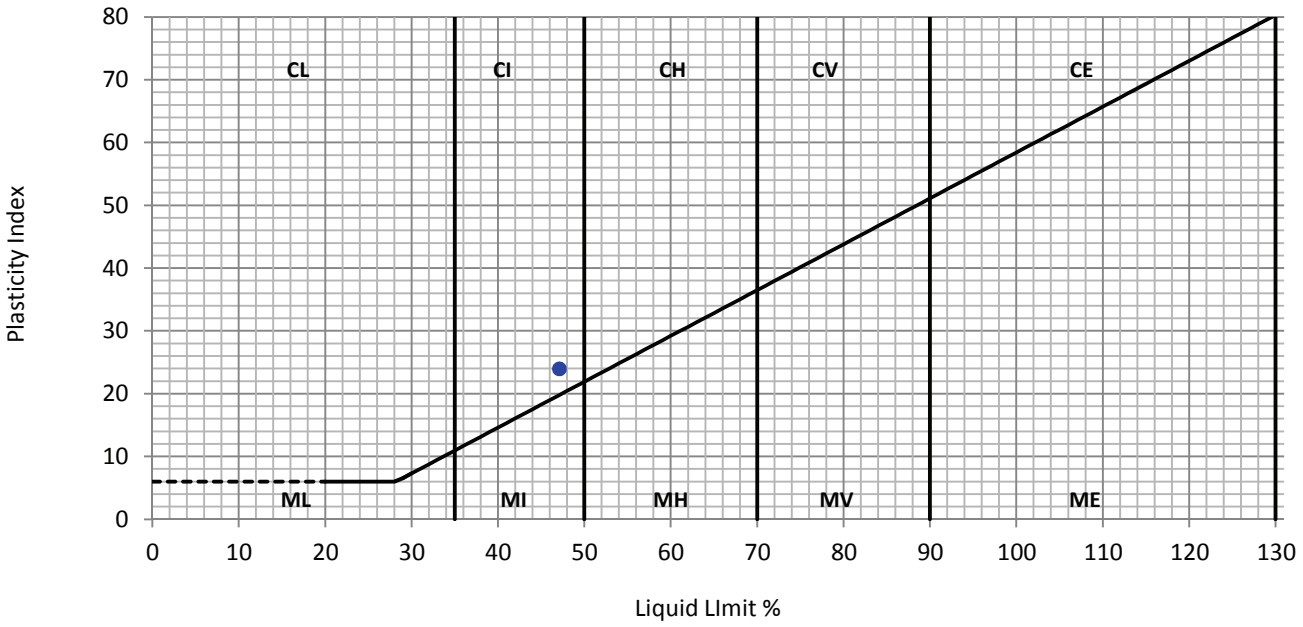
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6521		

Site Ref / Hole ID:	A6 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	05 August 2015

Test Results

Liquid Limit	47	%
Plastic Limit	23	%
Plasticity Index	24	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	1	%



Remarks:

QA Ref.	Apex Testing Solutions		Approver	Date	Fig.
BS1377-2 Rev 3.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	K Maid	11/08/2015	ATT
			L Maiden, Laboratory Supervisor		

TEST REPORT

MOISTURE CONTENT

BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6522		

Site Ref / Hole ID:	B4 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	04 August 2015

Test Results

Moisture Content (%)	23

Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	K Maid	11/08/2015	**MC**
			L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

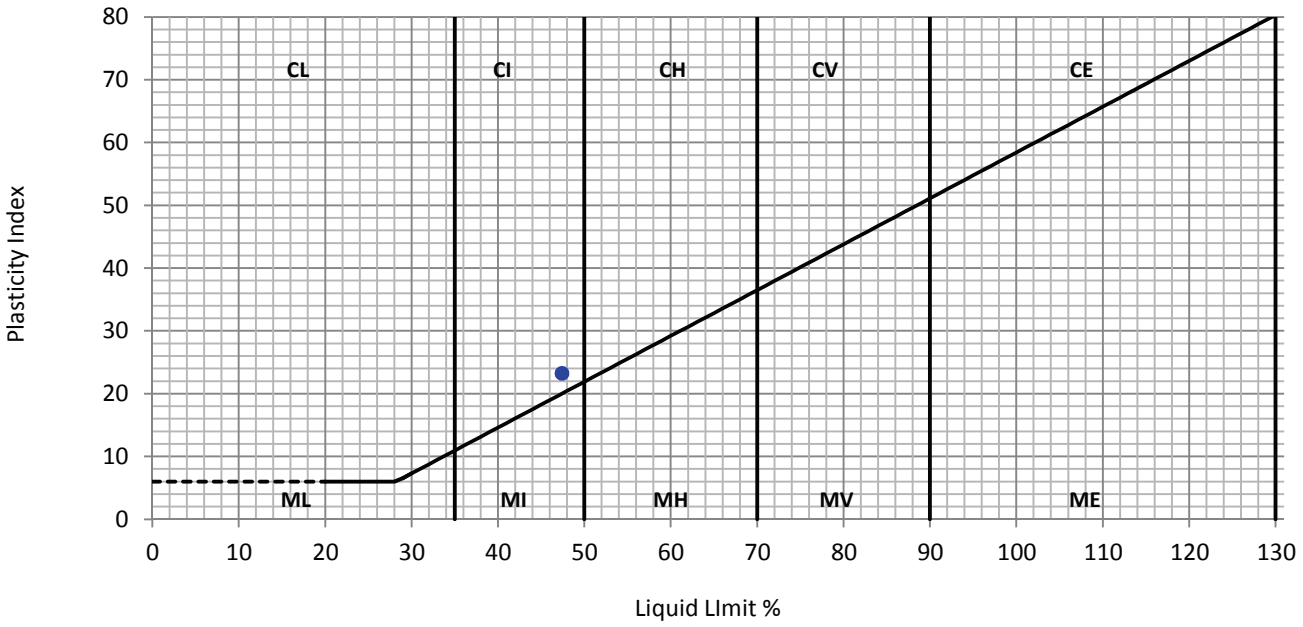
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6522		

Site Ref / Hole ID:	B4 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	05 August 2015

Test Results

Liquid Limit	47	%
Plastic Limit	24	%
Plasticity Index	23	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

QA Ref.	Apex Testing Solutions		Approver	Date	Fig.
BS1377-2	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ	7771	K Maid	11/08/2015	ATT
Rev 3.0	Tel: 01656 746762 Fax: 01656 749096		L Maiden, Laboratory Supervisor		

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6523		

Site Ref / Hole ID:	C4 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	04 August 2015

Test Results

Moisture Content (%)	20

Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	K Maid	11/08/2015	**MC**
			L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

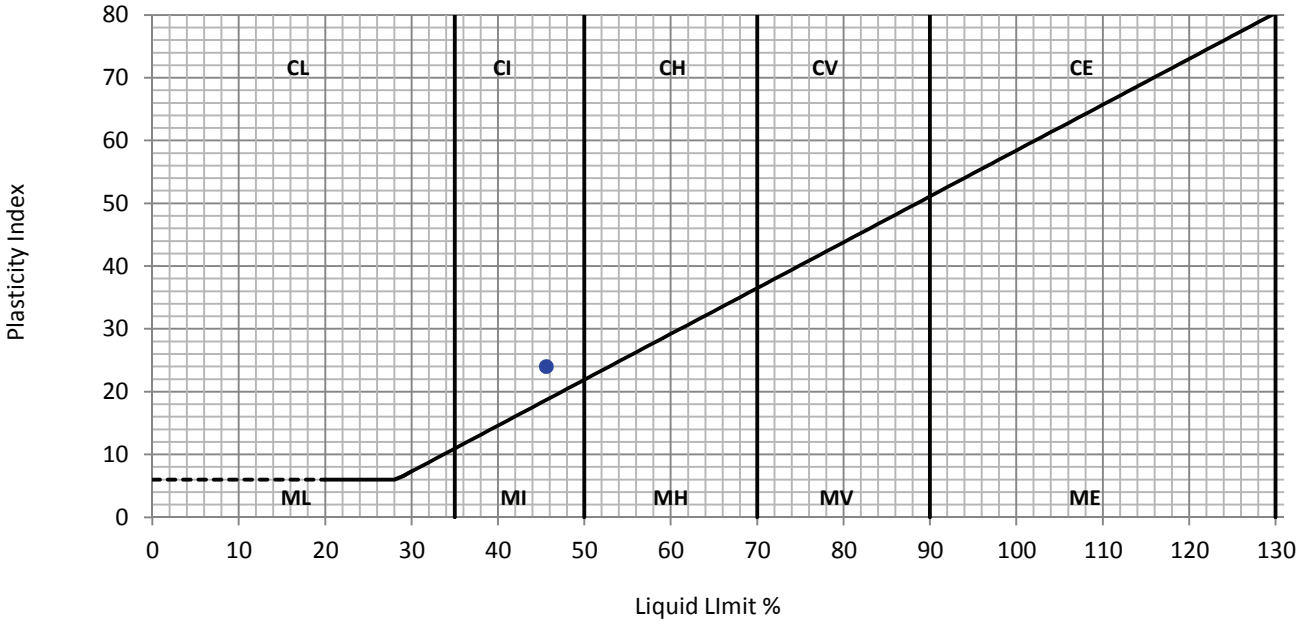
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6523		

Site Ref / Hole ID:	C4 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	07 August 2015

Test Results

Liquid Limit	46	%
Plastic Limit	22	%
Plasticity Index	24	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

QA Ref. BS1377-2 Rev 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver K Maid L Maiden, Laboratory Supervisor	Date 11/08/2015	Fig. **ATT**

TEST REPORT

MOISTURE CONTENT

BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6524		

Site Ref / Hole ID:	C5 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	04 August 2015

Test Results

Moisture Content (%)	22

Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	K Maid	11/08/2015	**MC**
	7771	L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

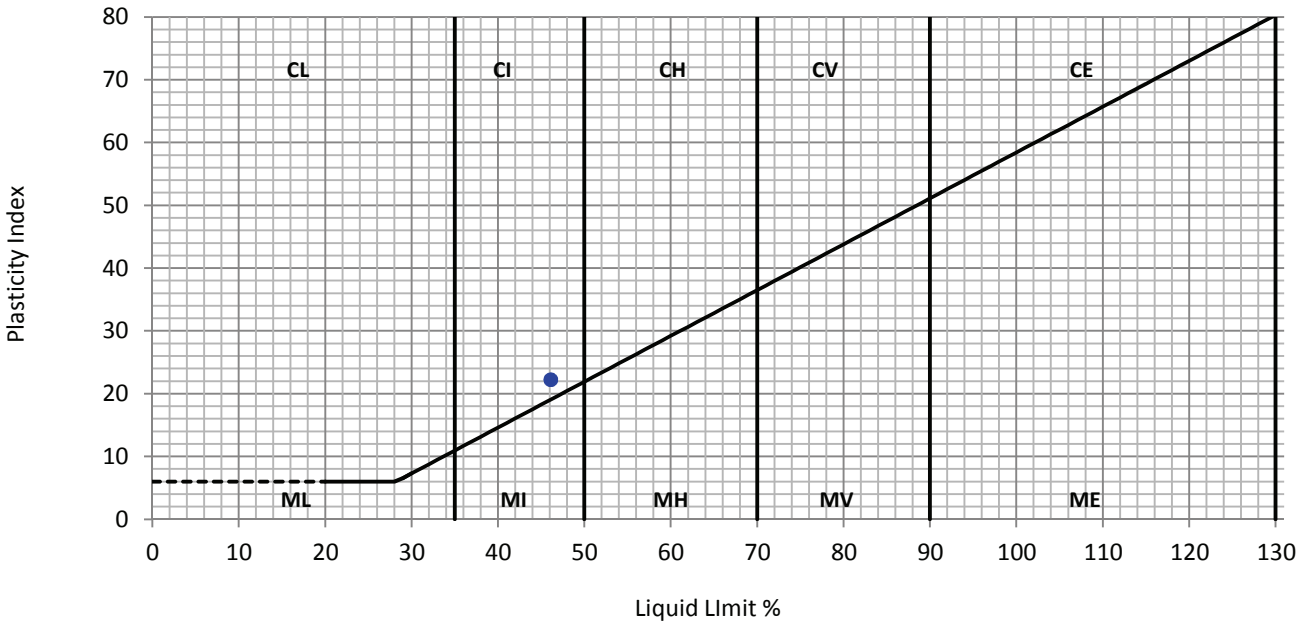
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6524		

Site Ref / Hole ID:	C5 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	05 August 2015

Test Results

Liquid Limit	46	%
Plastic Limit	24	%
Plasticity Index	22	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	2	%



Remarks:

QA Ref. BS1377-2 Rev 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver K Maid L Maiden, Laboratory Supervisor	Date 11/08/2015	Fig. **ATT**

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6525		

Site Ref / Hole ID:	D5 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	04 August 2015

Test Results

Moisture Content (%)	19

Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	K Maid	11/08/2015	**MC**
			L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

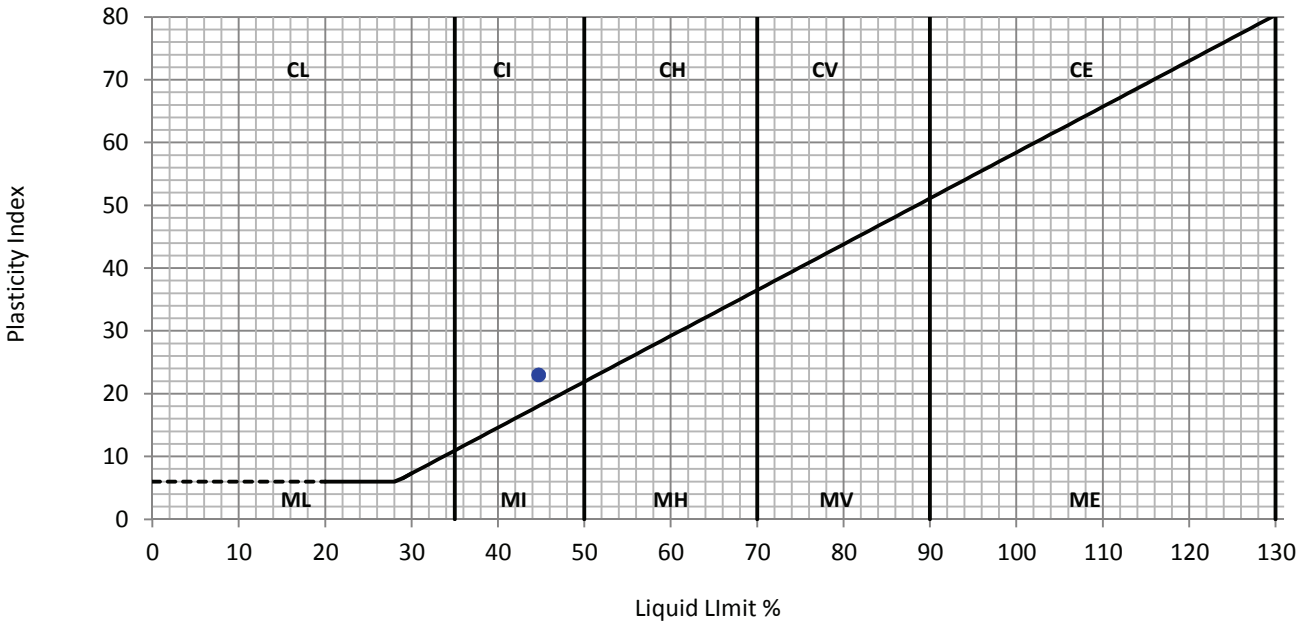
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6525		

Site Ref / Hole ID:	D5 - C3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	31 July 2015	**Material Supplier:**	N/A
Sampled By:	G Tucker	**Specification:**	BS1377
Date Received:	31 July 2015	**Date Tested:**	03 August 2015

Test Results

Liquid Limit	45	%
Plastic Limit	22	%
Plasticity Index	23	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	1	%



Remarks:

QA Ref.	Apex Testing Solutions		Approver	Date	Fig.
BS1377-2	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ	7771	K Maid	11/08/2015	ATT
Rev 3.0	Tel: 01656 746762 Fax: 01656 749096		L Maiden, Laboratory Supervisor		

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6536		

Site Ref / Hole ID:	B6 - B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	03 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	03 August 2015	**Date Tested:**	06 August 2015

Test Results

Moisture Content (%)	20

Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	K Maid	19/08/2015	**MC**
	7771	L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

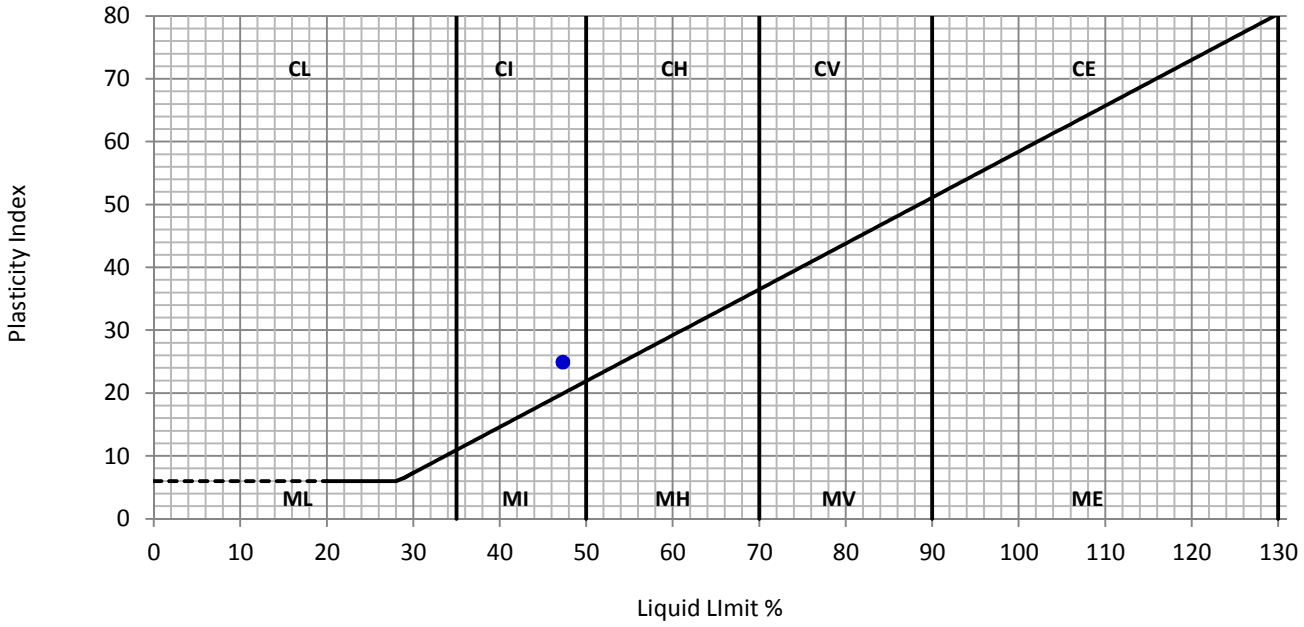
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6536		

Site Ref / Hole ID:	B6 - B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	03 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	03 August 2015	**Date Tested:**	07 August 2015

Test Results

Liquid Limit	47	%
Plastic Limit	22	%
Plasticity Index	25	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

QA Ref. BS1377-2 Rev 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver: K Maid L Maiden, Laboratory Supervisor	Date: 19/08/2015	Fig. **ATT**

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6538		

Site Ref / Hole ID:	C5 - B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	Unknown	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	03 August 2015	**Date Tested:**	06 August 2015

Test Results

Moisture Content (%)	21

Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	K Maid	19/08/2015	**MC**
	7771	L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

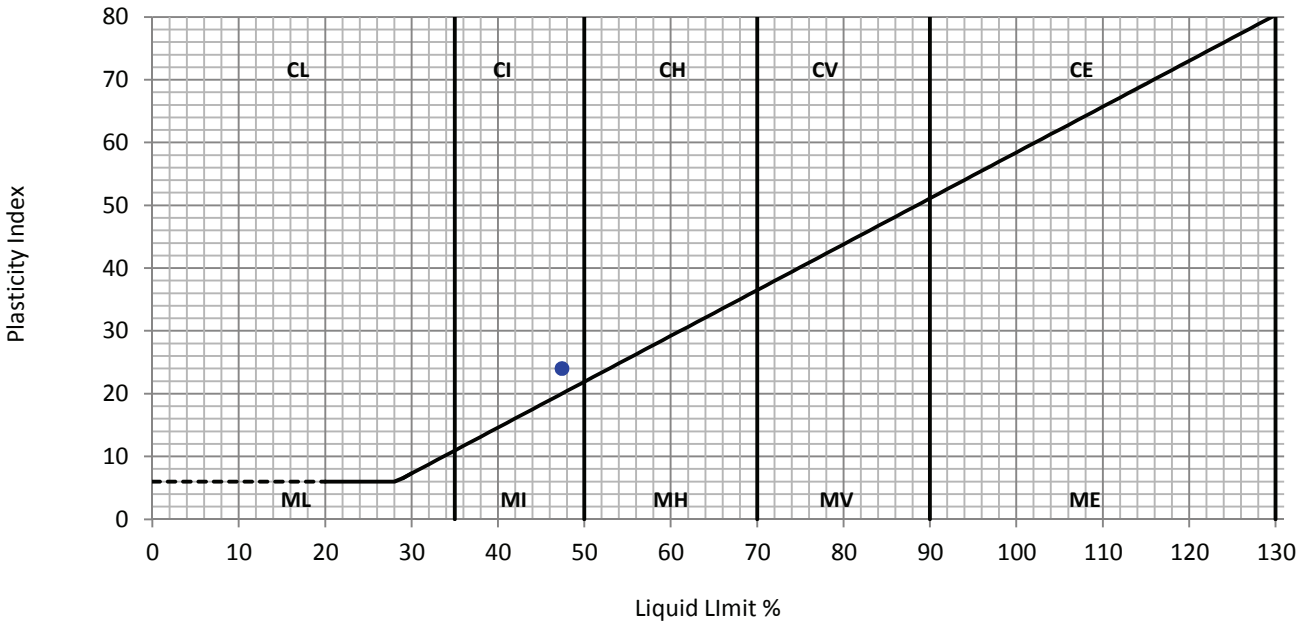
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6538		

Site Ref / Hole ID:	C5 - B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	Unknown	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	03 August 2015	**Date Tested:**	12 August 2015

Test Results

Liquid Limit	47	%
Plastic Limit	23	%
Plasticity Index	24	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6539		

Site Ref / Hole ID:	A6 B4	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	05 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	14 August 2015

Test Results

Moisture Content (%)	21

Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	K Maid	19/08/2015	**MC**
	7771	L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

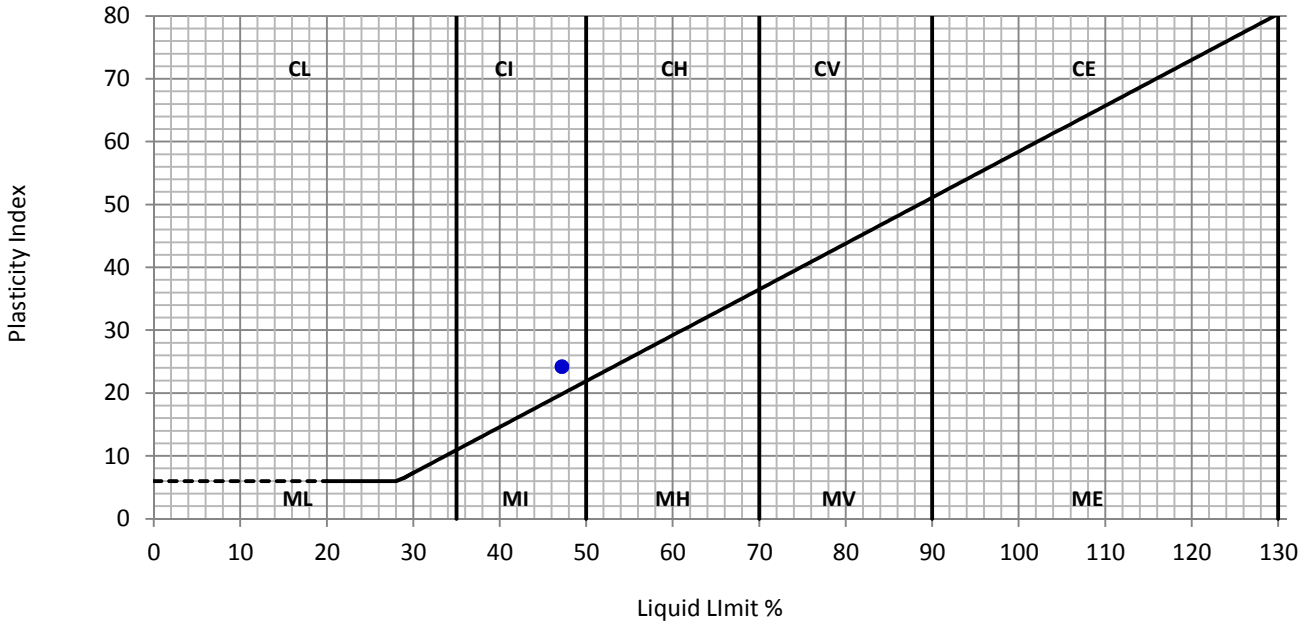
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6539		

Site Ref / Hole ID:	A6 B4	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	05 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	14 August 2015

Test Results

Liquid Limit	47	%
Plastic Limit	23	%
Plasticity Index	24	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig.
BS1377-2	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ	7771	K Maid	19/08/2015	**ATT**
Rev 3.0	Tel: 01656 746762 Fax: 01656 749096		L Maiden, Laboratory Supervisor		

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6540		

Site Ref / Hole ID:	A7 B4	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	05 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	14 August 2015

Test Results

Moisture Content (%)	18

Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	K Maid	19/08/2015	**MC**
	7771	L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

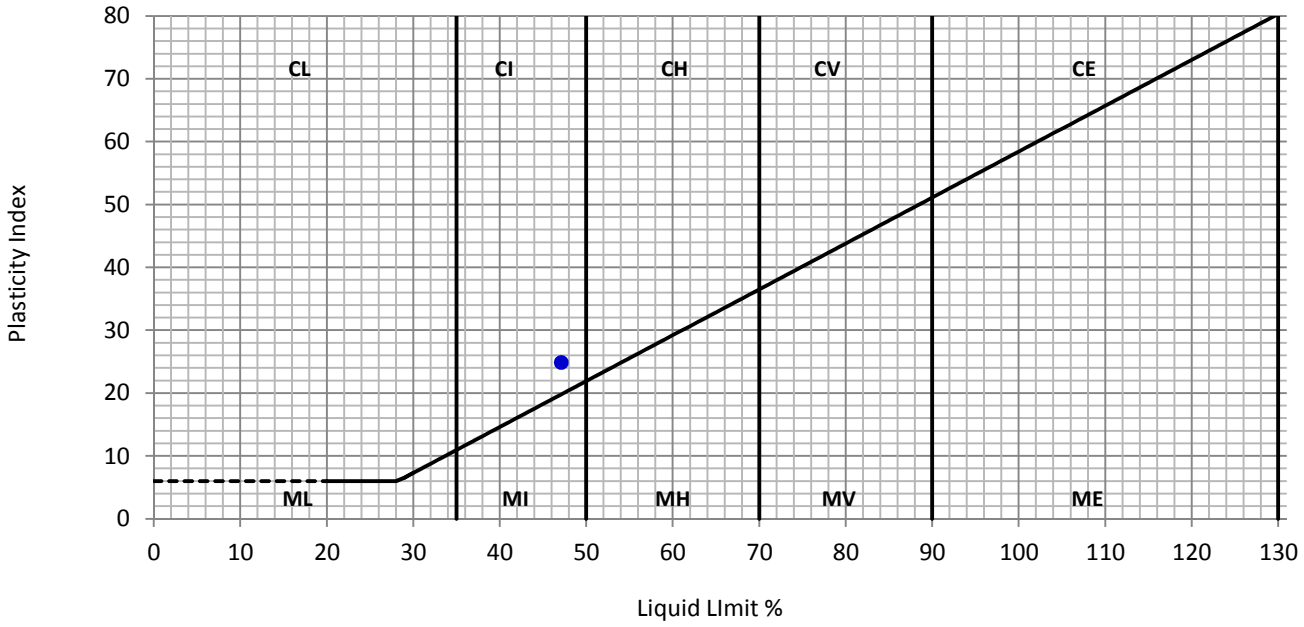
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6540		

Site Ref / Hole ID:	A7 B4	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	05 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	17 August 2015

Test Results

Liquid Limit	47	%
Plastic Limit	22	%
Plasticity Index	25	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	1	%



Remarks:

QA Ref. BS1377-2 Rev 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver: K Maid L Maiden, Laboratory Supervisor	Date: 19/08/2015	Fig. **ATT**

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6541		

Site Ref / Hole ID:	A5 B4	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	05 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	14 August 2015

Test Results

Moisture Content (%)	21

Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	K Maid	19/08/2015	**MC**
	7771	L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

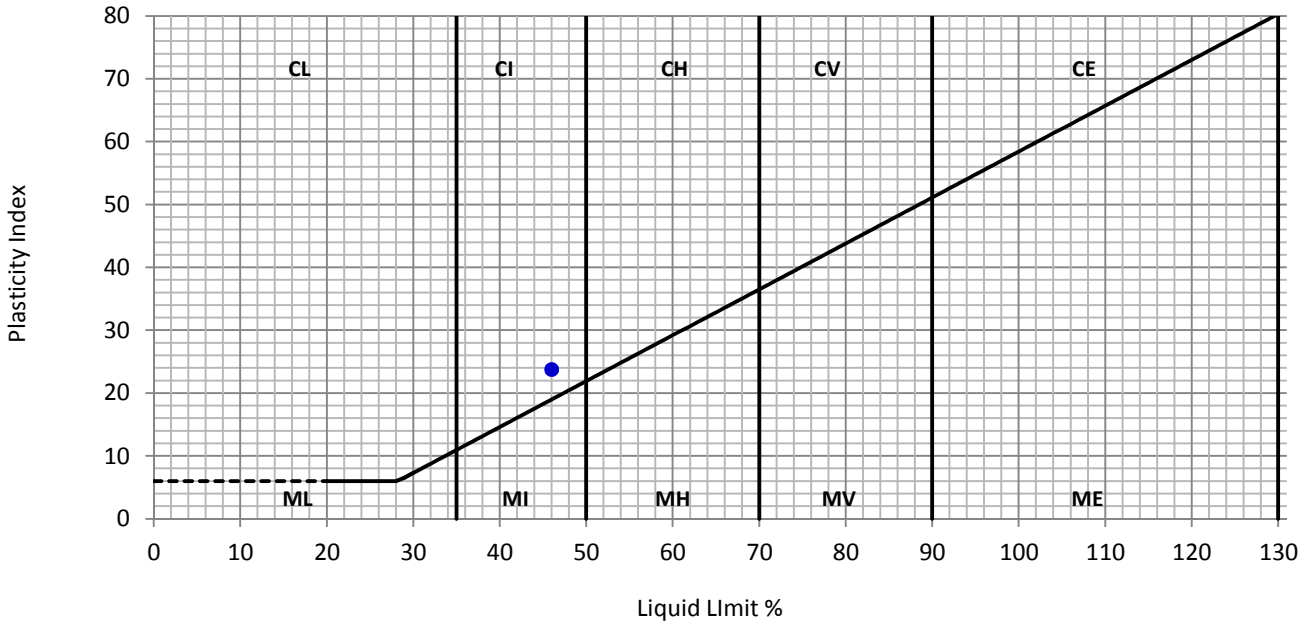
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6541		

Site Ref / Hole ID:	A5 B4	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	05 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	17 August 2015

Test Results

Liquid Limit	46	%
Plastic Limit	22	%
Plasticity Index	24	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	1	%



Remarks:

QA Ref. BS1377-2 Rev 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver: K Maid L Maiden, Laboratory Supervisor	Date: 19/08/2015	Fig. **ATT**

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6542		

Site Ref / Hole ID:	B5 B4	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	05 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	14 August 2015

Test Results

Moisture Content (%)	20

Remarks:

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

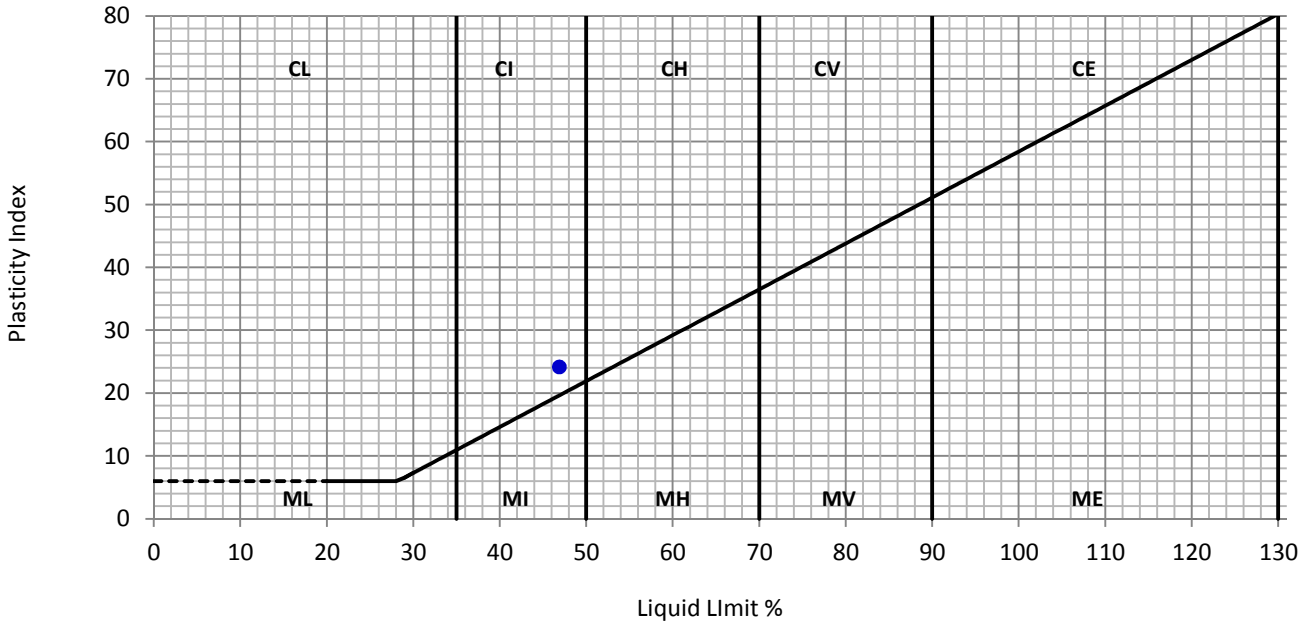
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6542		

Site Ref / Hole ID:	B5 B4	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	05 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	17 August 2015

Test Results

Liquid Limit	47	%
Plastic Limit	23	%
Plasticity Index	24	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

QA Ref. BS1377-2 Rev 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver: K Maid L Maiden, Laboratory Supervisor	Date: 19/08/2015	Fig. **ATT**

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6543		

Site Ref / Hole ID:	B7 B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	04 August 2015	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	14 August 2015

Test Results

Moisture Content (%)	20

Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	K Maid	19/08/2015	**MC**
	7771	L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

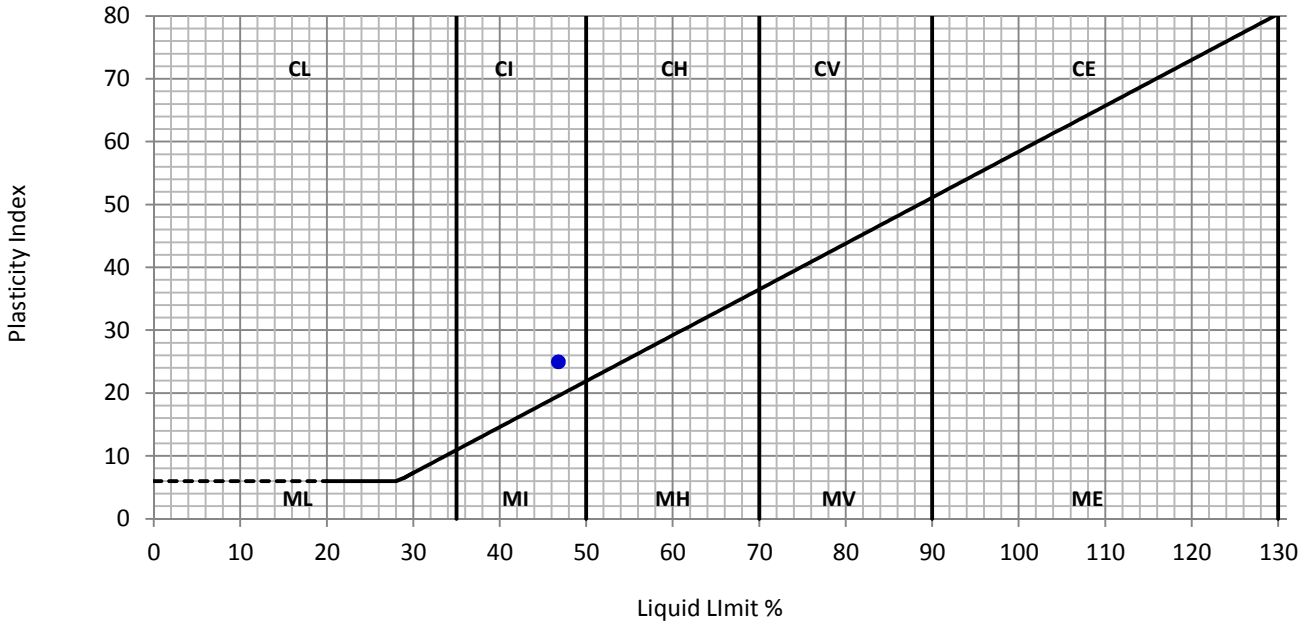
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6543		

Site Ref / Hole ID:	B7 B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	04 August 2015	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	17 August 2015

Test Results

Liquid Limit	47	%
Plastic Limit	22	%
Plasticity Index	25	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

QA Ref. BS1377-2 Rev 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver: K Maid L Maiden, Laboratory Supervisor	Date: 19/08/2015	Fig. **ATT**

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6544		

Site Ref / Hole ID:	C7 B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	04 August 2015	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	14 August 2015

Test Results

Moisture Content (%)	21

Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	K Maid	19/08/2015	**MC**
	7771	L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

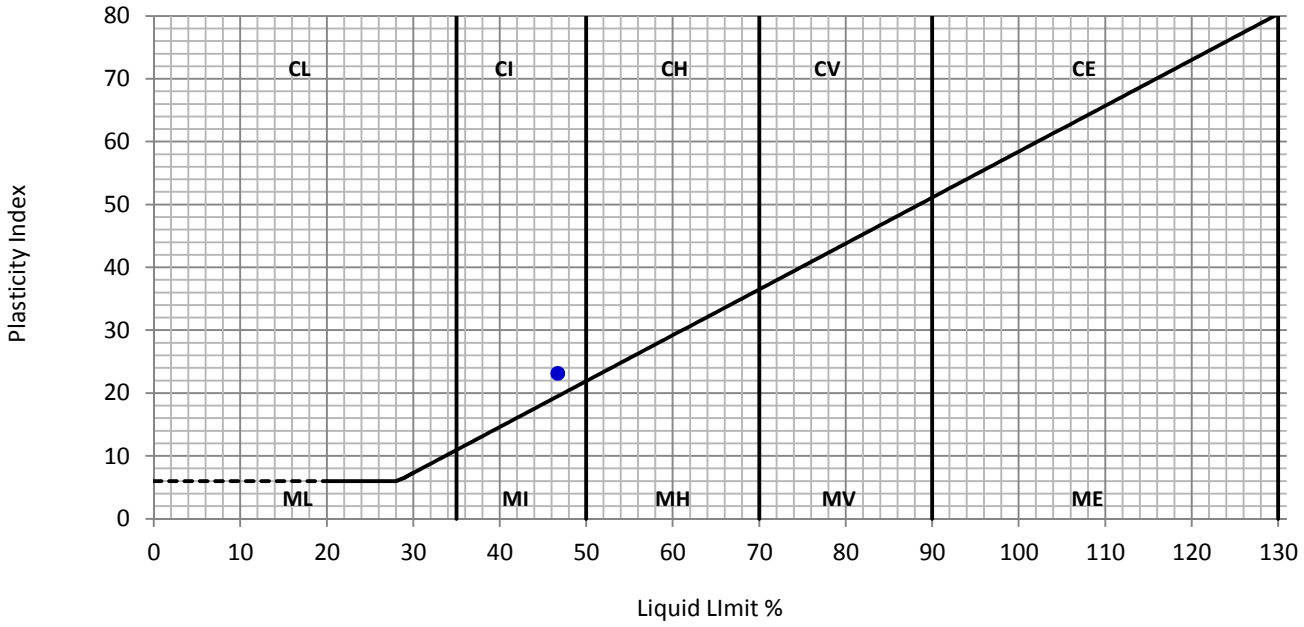
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6544		

Site Ref / Hole ID:	C7 B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	04 August 2015	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	17 August 2015

Test Results

Liquid Limit	47	%
Plastic Limit	24	%
Plasticity Index	23	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

QA Ref. BS1377-2 Rev 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver: K Maid L Maiden, Laboratory Supervisor	Date: 19/08/2015	Fig. **ATT**

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6545		

Site Ref / Hole ID:	D7 B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	04 August 2015	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	14 August 2015

Test Results

Moisture Content (%)	21

Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	K Maid	19/08/2015	**MC**
	7771	L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

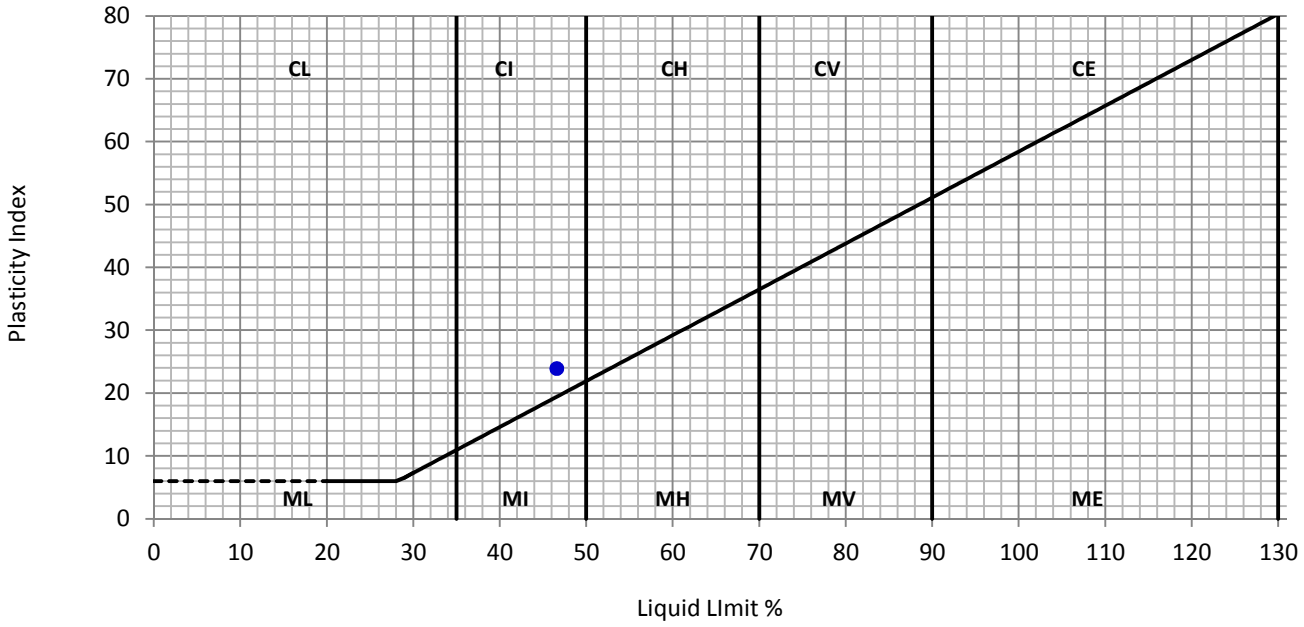
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6545		

Site Ref / Hole ID:	D7 B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	04 August 2015	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	18 August 2015

Test Results

Liquid Limit	47	%
Plastic Limit	23	%
Plasticity Index	24	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

QA Ref. BS1377-2 Rev 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver: K Maid L Maiden, Laboratory Supervisor	Date: 19/08/2015	Fig. **ATT**

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6546		

Site Ref / Hole ID:	D7 B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	05 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	14 August 2015

Test Results

Moisture Content (%)	21

Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	K Maid	19/08/2015	**MC**
	7771	L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

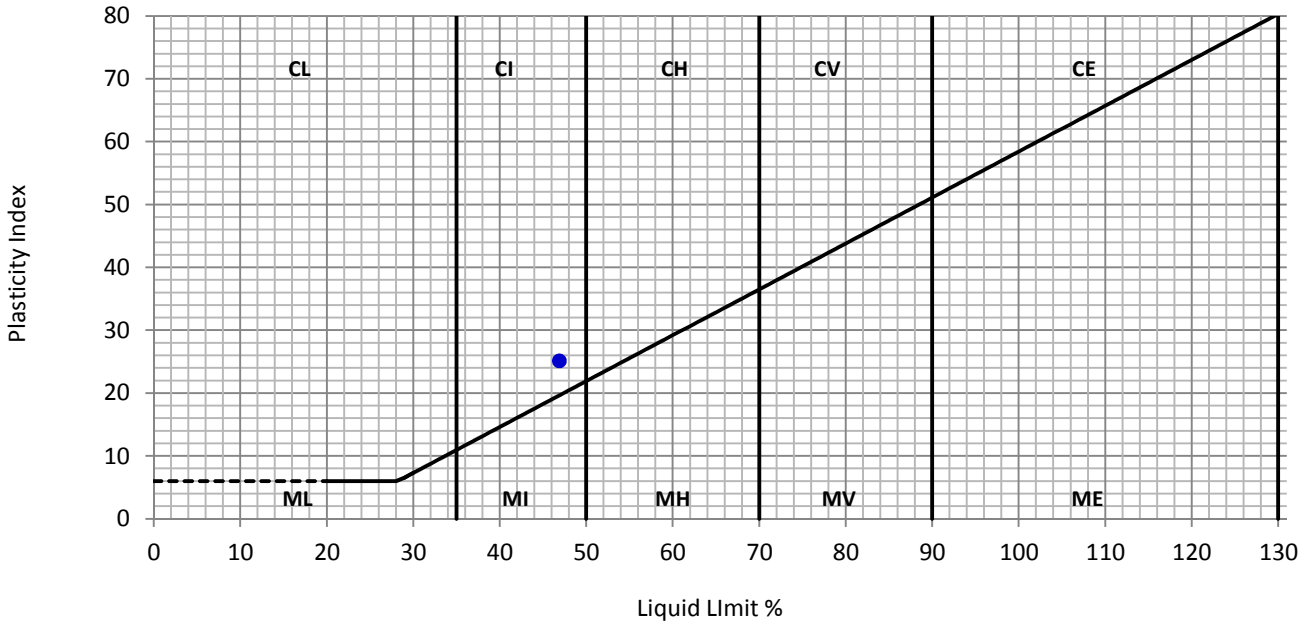
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6546		

Site Ref / Hole ID:	D7 B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	05 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	18 August 2015

Test Results

Liquid Limit	47	%
Plastic Limit	22	%
Plasticity Index	25	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	1	%



Remarks:

QA Ref.	**Apex Testing Solutions**		Approver	Date	Fig.
BS1377-2 Rev 3.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	K Maid	19/08/2015	**ATT**
			L Maiden, Laboratory Supervisor		

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6547		

Site Ref / Hole ID:	C6 B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	05 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	14 August 2015

Test Results

Moisture Content (%)	18

Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig
BS1377-2 Rev. 2.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	K Maid	19/08/2015	**MC**
	7771	L Maiden, Laboratory Supervisor		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

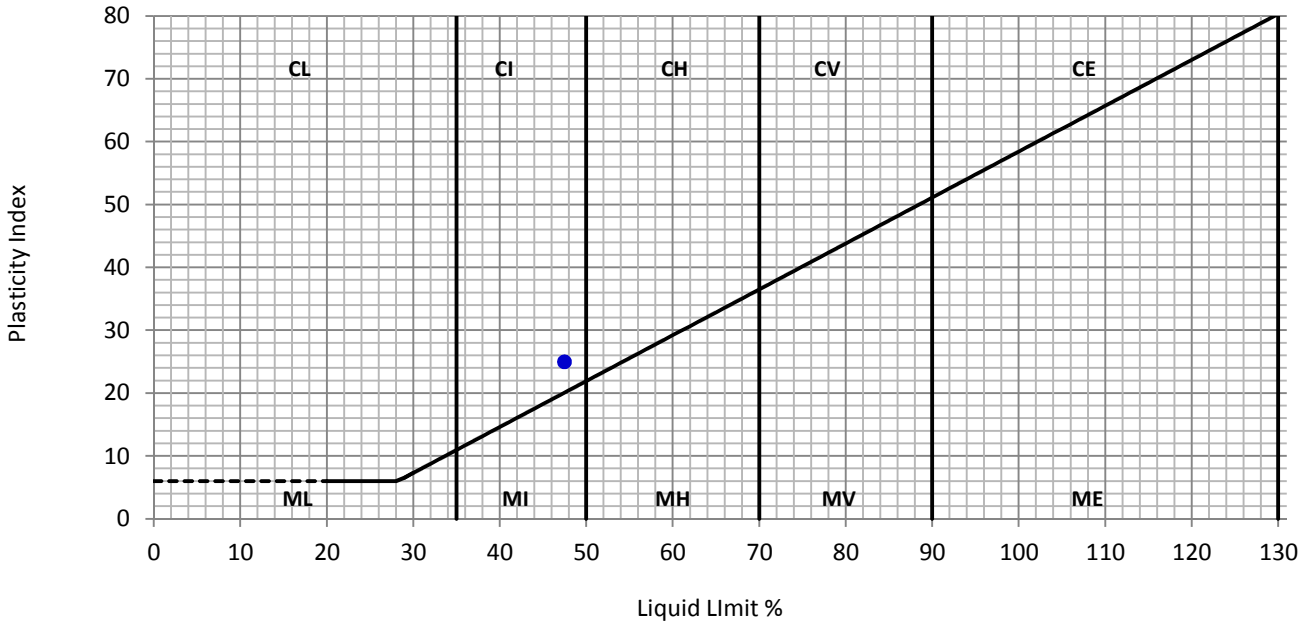
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	6547		

Site Ref / Hole ID:	C6 B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	Yes	**Material Description:**	Dark grey slightly gravelly slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	05 August 2015	**Material Supplier:**	N/A
Sampled By:	T Thomas	**Specification:**	BS1377
Date Received:	05 August 2015	**Date Tested:**	18 August 2015

Test Results

Liquid Limit	48	%
Plastic Limit	23	%
Plasticity Index	25	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

QA Ref. BS1377-2 Rev 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver K Maid L Maiden, Laboratory Supervisor	Date 19/08/2015	Fig. **ATT**

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	7315		

Site Ref / Hole ID:	A5-B7	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	Unknown	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	02 September 2015	**Date Tested:**	05 October 2015

Test Results

Moisture Content (%)	21

Remarks:

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

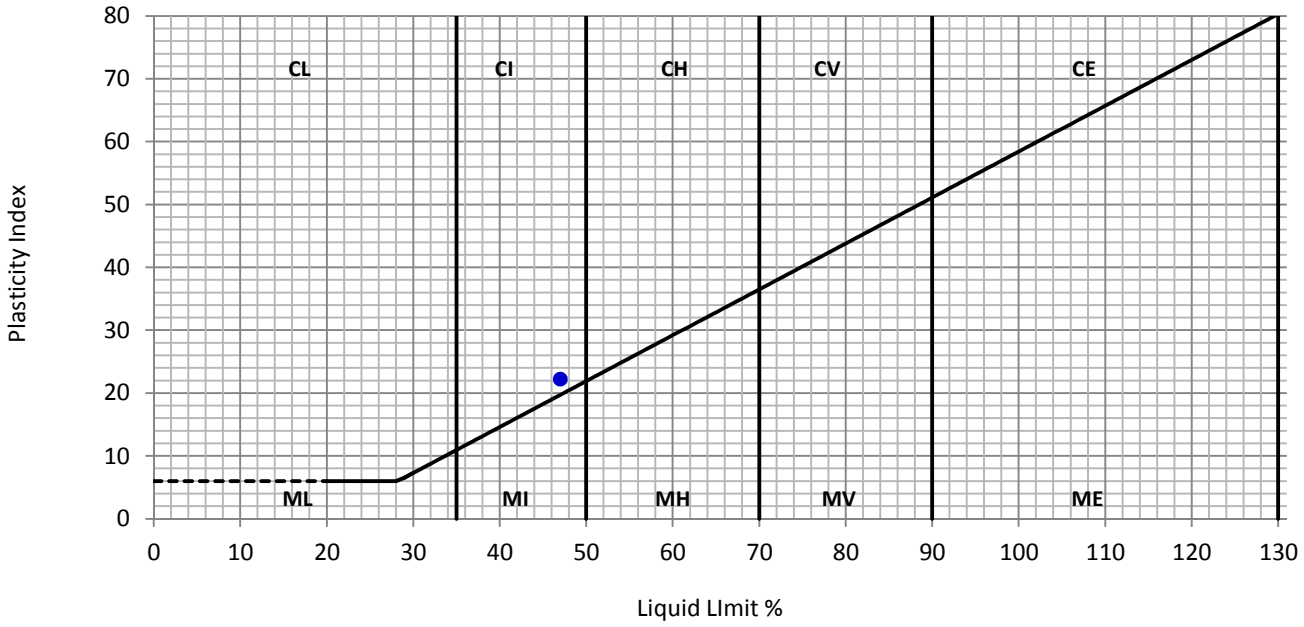
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	7315		

Site Ref / Hole ID:	A5-B7	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	Unknown	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	02 September 2015	**Date Tested:**	05 October 2015

Test Results

Liquid Limit	47	%
Plastic Limit	25	%
Plasticity Index	22	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

QA Ref. BS1377-2 Rev 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver: K Maid L Maiden, Laboratory Supervisor	Date: 14/10/2015	Fig. **ATT**

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	7316		

Site Ref / Hole ID:	B7-B7	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	Unknown	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	02 September 2015	**Date Tested:**	05 October 2015

Test Results

Moisture Content (%)	20

Remarks:

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

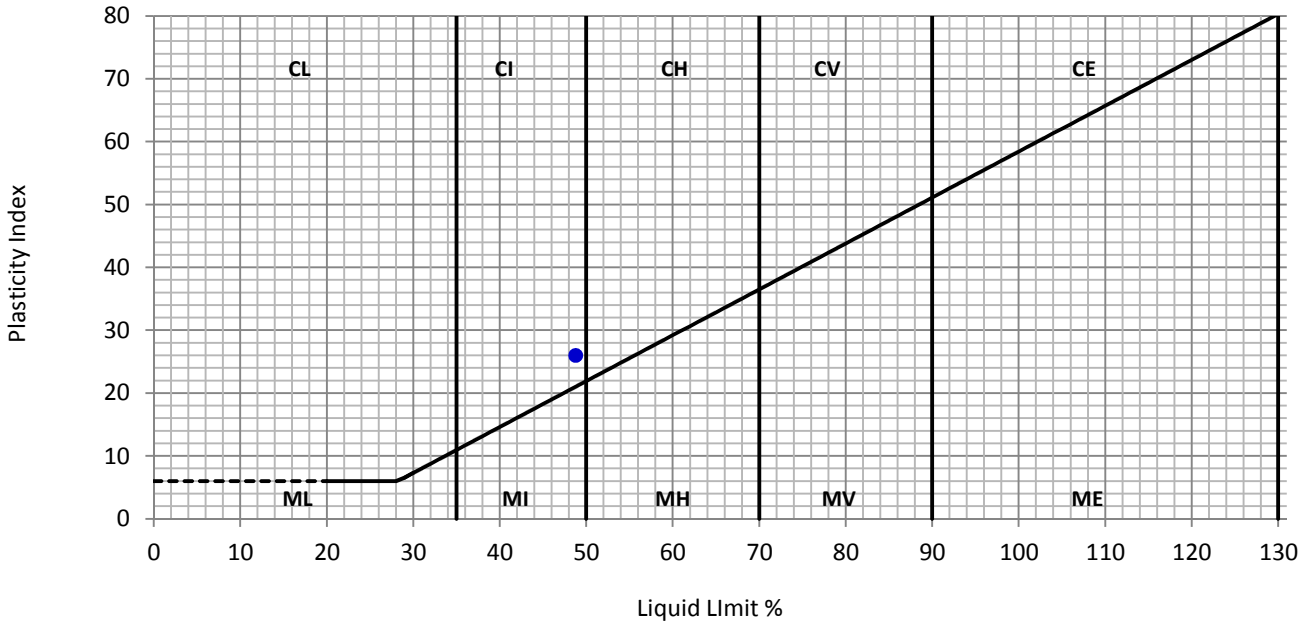
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	7316		

Site Ref / Hole ID:	B7-B7	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	Unknown	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	02 September 2015	**Date Tested:**	07 October 2015

Test Results

Liquid Limit	49	%
Plastic Limit	23	%
Plasticity Index	26	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	7317		

Site Ref / Hole ID:	D6-B6	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	Unknown	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	02 September 2015	**Date Tested:**	05 October 2015

Test Results

Moisture Content (%)	20

Remarks:

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

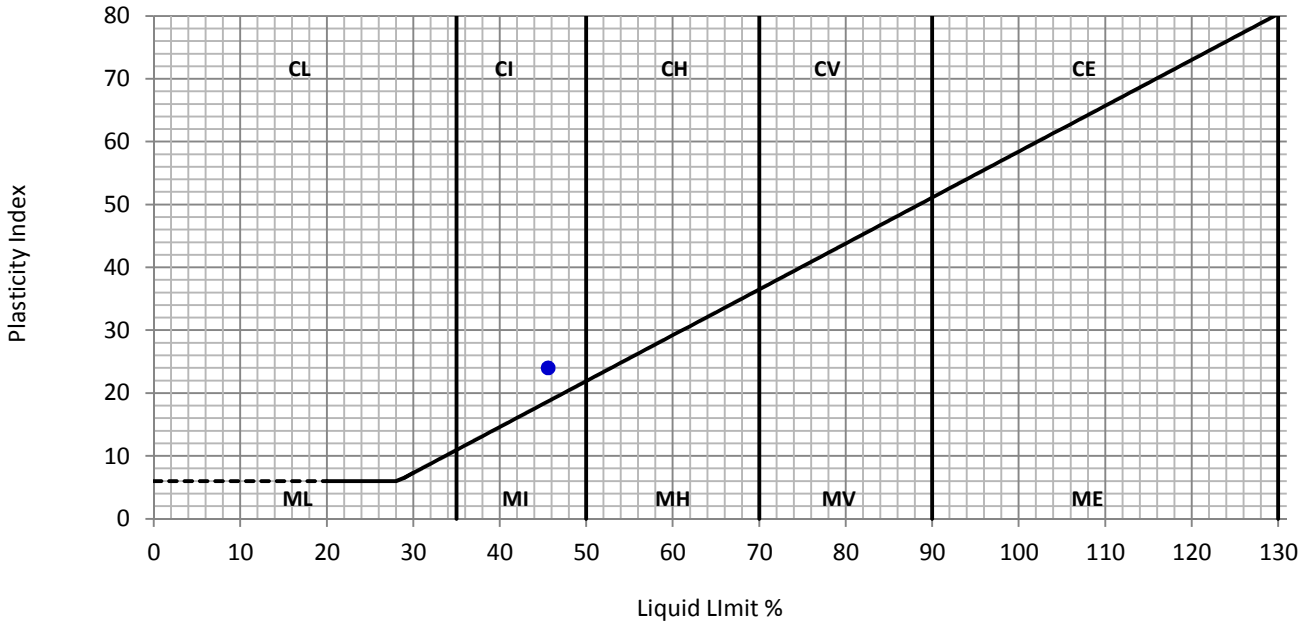
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	7317		

Site Ref / Hole ID:	D6-B6	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	Unknown	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	02 September 2015	**Date Tested:**	07 October 2015

Test Results

Liquid Limit	46	%
Plastic Limit	22	%
Plasticity Index	24	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	1	%



Remarks:

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	7318		

Site Ref / Hole ID:	D7-B7	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	Unknown	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	02 September 2015	**Date Tested:**	08 October 2015

Test Results

Moisture Content (%)	20

Remarks:

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990: Clause 4.3/5.3/5.4

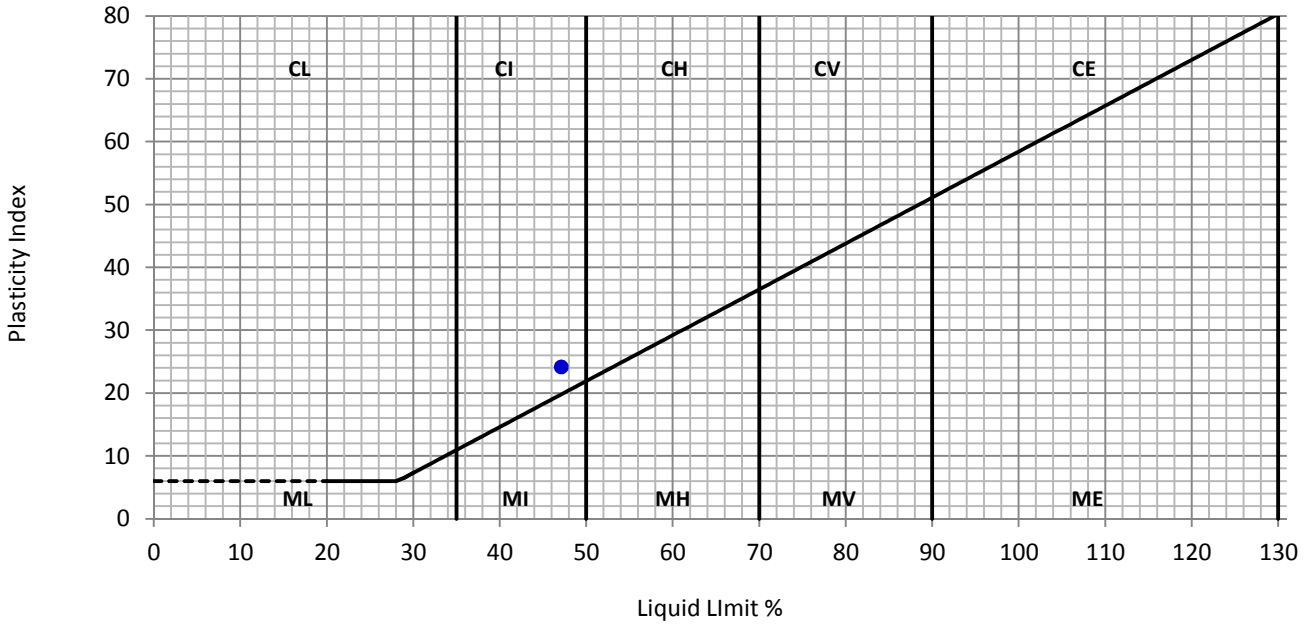
Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	7318		

Site Ref / Hole ID:	D7-B7	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	Unknown	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	02 September 2015	**Date Tested:**	05 October 2015

Test Results

Liquid Limit	47	%
Plastic Limit	23	%
Plasticity Index	24	%

Preparation:	4.2.3 Natural Specimen	
Proportion retained on 425µm sieve:	1	%



Remarks:

QA Ref. BS1377-2 Rev 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver: K Maid L Maiden, Laboratory Supervisor	Date: 14/10/2015	Fig. **ATT**

TEST REPORT
MOISTURE CONTENT
BS1377: Part 2: 1990 : Clause 3.2

Project No:	D5266-15	**Client:**	Jim Davies Civil Engineering Limited
Project Name:	Docksway Landfill	**Address:**	Ty Gwyn Banalog Terrace, Hollybush, Blackwood, NP12 0SG
ATS Sample No:	7319		

Site Ref / Hole ID:	E6-B3	**Depth (m):**	
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Dark grey slightly sandy CLAY
Location in Works:	Unknown	**Material Source:**	N/A
Date Sampled:	Unknown	**Material Supplier:**	N/A
Sampled By:	Client	**Specification:**	BS1377
Date Received:	02 September 2015	**Date Tested:**	05 October 2015

Test Results

Moisture Content (%)	23

Remarks:

Appendix 2

CELL 4A

CELL 4B

CELL 3A

CELL 3B

Northern Bund

Western Cell Division Bund

Cell Division Bund

Spine Drain

Feeder Drain

Temporary Rodding Eye

Temporary Rodding Eyes

MW

Sump

A

B

C

D

E

Key

- Spine Drain
- Feeder Drain
- Sump
- MW Monitoring Well
- Side Slope Sump
- Rodding Eye

0 10 20
metres

Mark	Revision	Drawn	Date	Chkd

SCALING NOTE: Do not scale from this drawing. If in doubt, ask.

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake his own investigation where the presence of any existing sewers, services, plant or apparatus may affect his operations.

Drawing Issue Status

DRAFT

DOCKSWAY DISPOSAL SITE AREA 2, CELLS 3 AND 4 GENERAL ARRANGEMENT AND LEACHATE EXTRACTION DETAIL

Client

NEWPORT CITY COUNCIL

Date of 1st Issue	Drawn by
20.03.2015	davco
A1 Scale	Checked by
1:500	VKR/PJ
Drawing Number	Revision
14739/155/001	0

peterbrett

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READING
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