

E011056/PMA/051206

5 December 2006

The Environment Agency  
Waterside House  
Waterside North  
Lincoln  
LN2 5HA

For the attention of Mr J Branson

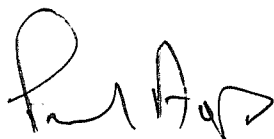
Dear Sirs

**RE: LEADENHAM LANDFILL SITE, CQA PLAN AND SPECIFICATION FOR THE  
CONSTRUCTION WORKS TO CELL 4 – WASTE RECYCLING GROUP LIMITED**

Please find enclosed the Construction Quality Assurance Plan and Specification for the Construction Works to Cell 4 at Leadenham Landfill site, dated December 2006, Reference Number E011056/QP01.

I trust this information is suitable for your needs but please do not hesitate to contact the undersigned if you require any further information.

Yours faithfully  
**For WHITE YOUNG GREEN ENVIRONMENTAL**



**PAUL AYRES**  
Associate

Enc

Copies to Mr I York (WRG - Letter Only)

Environmental

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Minerals

**Construction Quality Assurance  
Plan and Specification for the  
Construction Works to Cell 4**

**Leadenham Landfill Site**

**Waste Recycling Group Limited**

**December 2006**

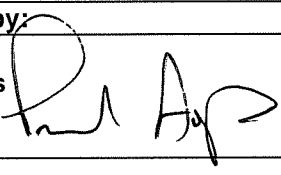
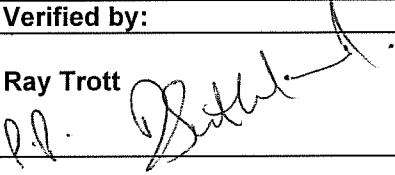


## Construction Quality Assurance Plan and Specification for the Construction Works to Cell 4

**Leadenham Landfill Site**

**Waste Recycling Group Limited**

**December 2006**

<b>Reference: E011056/PMA/December 2006/CQA Plan &amp; Specification for the Construction Works to Cell 4</b>					
<b>Issue</b>		<b>Prepared by:</b>		<b>Verified by:</b>	
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# Environmental Consultancy

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## 1.0 GENERAL

### 1.1 Project Description

This document has been prepared to consolidate the details of the Construction Quality Assurance (CQA) procedures and Specification that will be adopted during the construction of Cell 4 at the Leadenham Landfill site.

The Leadenham Landfill site is located at approximately 750m east of the village of Leadenham at National Grid Reference SK 964 524. The site is owned and operated by Waste Recycling Group Limited.

The lining system shall comprise a 1.0m thick engineered clay liner to the basal area and side slopes, the formation of intercell bunds, keying in to the existing lining system and a leachate collection system.

### 1.2 Project Team Members

CQA Project Manager	-	P M Ayres
CQA Project Engineer	-	M Holzer
CQA Engineer	-	A copy of the curriculum vitae of the CQA Engineer will be forwarded to the Environment Agency prior to the commencement of the works.
Client Contact	-	I York

### 1.3 Responsibilities of Team Members

#### CQA Project Manager

The CQA Project Manager retains overall responsibility for the project, together with the review and approval of the Construction Quality Assurance procedures.

#### CQA Project Engineer

The CQA Project Engineer is responsible for:

- i) Project and technical management and will attend pre-contract and progress meetings.
- ii) Establishment and implementation of the on-site CQA procedures thereafter responsible for the day-to-day office/site based project liaison work.
- ii) Provision of the certification for the final third party CQA Report, a copy of which is to be forwarded to the Environment Agency.

#### CQA Engineer

The CQA Engineer will be responsible for:

- i) The daily implementation of the CQA Plan including inspection, verification and documentation.

- ii) Attendance at progress meetings and advising the CQA Project Engineer of any events or occurrences that he considers are likely to have a Quality Assurance related effect on the permanent works.
- iii) Monitoring and supervision of the lining works, together with the co-ordination and/or undertaking of any ancillary materials testing that is required. Typical CQA proforma used by the CQA Engineer on site are shown at Appendix C.

#### Contractor

The Contractor will undertake the engineering works to develop the Cell 4 lining system in accordance with the Specification. The Contractor for the development of the lining system to Cell 4 at the Leadenham Landfill site will be May Gurney (Construction) Limited.

### **1.4 Materials Testing**

#### **i) Clay Liner**

The clay liner will be constructed from suitable materials, compacted to achieve no greater than 5% air voids as determined using the measured particle density for the clay, and achieve a hydraulic conductivity of less than  $1 \times 10^{-9}$  m/sec. All testing will be in accordance with British Standards at the frequency detailed in Table 1 of this document. The laboratory testing of the clay materials will be undertaken by an independent testing laboratory which will be UKAS accredited.

Any supplementary testing that may be required during the works will be undertaken as directed by the CQA Engineer.

#### **ii) Separator Geotextile**

All testing will be carried out in accordance with the requirements of Section 5.1.9 of the Specification presented at Appendix A.

The laboratory testing of the geotextile materials will be undertaken by an independent testing laboratory which will be UKAS accredited. Any supplementary testing that may be required during the works will be undertaken as directed by the CQA Engineer.

#### **iii) Leachate Drainage Blanket**

All testing will be carried out in accordance with the requirements of Table 3 and Section 6.2 of the Specification presented at Appendix A. The laboratory testing of the drainage blanket will be undertaken by an independent laboratory which will be UKAS accredited.

Any other supplementary testing that may be required during the works will be undertaken as directed by the CQA Engineer.

## 1.5 Definitions

*BS1377* – British Standard Methods of test for Soils for civil engineering purposes.

*CQA* – Construction Quality Assurance.

*DTP SHW* – Department of Transport Manual of Contract documents for Highway Works, Volume 1: Specification for Highway Works 1991.

*NDG* – Nuclear Density Gauge.

## 2.0 OUTLINE DESIGN DETAILS

### 2.1 Outline of Works

The development works for the construction of Cell 4 at the Leadenham Landfill site will comprise, but are not limited to, the following elements:

- bulk excavation and filling to formation preparation as shown on Drawing No. 2219.C4D.02;
- placement of a 1.0m thick engineered clay liner to the basal area and inter cell bunds with a maximum permeability of  $1 \times 10^{-9}$  m/s as shown on Drawing Nos. 2219.C4D.02 and 2219.C4D.03;
- placement of a 1.0m thick engineered clay liner to the side slope area of the cell with a maximum permeability of  $1 \times 10^{-9}$  m/s as shown on Drawing No. 2219.C4D.03;
- installation of a separator geotextile as shown on Drawing No. 2219.C4D.03;
- installation of a leachate collection system comprising a 500mm thick aggregate drainage blanket and leachate collection pipework as shown on Drawing No. 2219.C4D.03 and 2219.C4D.03;
- construction of a leachate collection chamber as shown on Drawing No. 2219.C4D.04, and
- construction of 2 No. remote monitoring points.

The construction details of the proposed Cell 4 development are shown on Drawing Nos. 2219.C4D.01, 2219.C4D.02, 2219.C4D.03 and 2219.C4D.04. The drawings are contained in the Specification document which is presented at Appendix A.

### 2.2 Definitions

<i>Formation Level</i>	The term 'Formation Level' will mean the reprofiled surface of in-situ materials, prepared for the placement of lining materials.
<i>Clay Liner</i>	The term 'Clay Liner' will mean the 1.0m thick engineered clay hydraulic barrier overlying the Formation Level.
<i>Separator Geotextile</i>	The term 'Separator Geotextile' will mean the geotextile overlying the upper surface of the engineered clay liner.
<i>Leachate Drainage Blanket</i>	The term 'Leachate Drainage Blanket' will mean the 500mm thick granular drainage material overlying the Separator Geotextile and incorporating the leachate collection pipework.

### 3.0 CONSTRUCTION DETAILS

#### 3.1 The Clay Liner

##### General

The clay liner shall be constructed with a minimum thickness of 1.0m on the basal and inter cell bund areas and on the side slope areas as detailed in Section 4 of the Specification presented at Appendix A and as shown on Drawing Nos. 2219.C4D.02 and 2219.C4D.03. Prior to the installation of the clay liner the formation will be developed to the profiles shown on Drawing No. 2219.C4D.02.

##### Material Suitability

It is proposed that site derived clay materials will be used for the development of Cell 4 at the Leadenham Landfill site. This material has been previously approved by the Environment Agency for use in the construction of engineered clay seals.

If an alternative clay source is proposed then prior to the commencement of engineering works a full geotechnical report of the clay source will be forwarded to the Environment Agency for approval. The report will include:

- a) Details of the source location.
- b) Laboratory test results for:
  - ◆ Moisture Content.
  - ◆ Particle Size Distribution.
  - ◆ Particle Density.
  - ◆ Compaction.
  - ◆ Plastic and liquid Limits.
  - ◆ Permeability.
  - ◆ Shear strength.

The testing frequency applied to the source material will be justified within the Source Evaluation Report.

The Source Evaluation Report will also include a plot of the dry density versus moisture content showing the acceptance envelope.

Prior to the start of the clay liner construction works a bulk sample of the clay shall be taken and tested for Atterberg Limits, PSD (including clay content) particle density, moisture content and dry density / moisture content relationship.

Supplementary material suitability testing will be undertaken on the clay during the construction works should the consistency of the material be deemed to change significantly. If there is a significant change in the consistency of the clay materials then a further compaction trial will be carried out.

All supplementary material suitability testing will be carried out in accordance with BS1377 (1990) 'Method of Test for Soils for Civil Engineering Purposes' and will comprise one, some, or all of the following tests, depending on the nature of the variability:-

- ◆ Moisture Content.
- ◆ Particle Size Distribution.
- ◆ Particle Density.
- ◆ Compaction.
- ◆ Atterberg limits.
- ◆ Permeability.

The results of any supplementary testing will be presented to the Environment Agency and detailed in the Construction Quality Assurance Report which will be prepared on completion of the development works.

For the purpose of the QA programme, 'Suitable Clay Materials' will be defined as; those materials which comply with, and can be engineered such that their resultant state is in compliance with Section 4 of the Specification presented at Appendix A.

### Compaction

Adequate compaction of the clay materials will be carried out to ensure that the clay materials used in the construction of liner achieves suitable strength and a minimum practical permeability. The maximum specified permeability is  $1 \times 10^{-9}$  m/s.

The clay will be compacted to achieve no greater than 5% air voids as determined using the measured particle density for the clay materials. The permeability characteristics of the clay with less than 5% air voids have been proven during previous testing.

It is considered that the process set down in Series 600, 'Earthworks', of the DTP SHW; Part 2 should be used as a guide. For the purpose of the Specification the lining clay should be classified as 'cohesive soil'.

### Compaction Trial

Prior to the commencement of the liner construction works, a compaction trial will be carried out in accordance with Clause 4.3 of the Specification to ensure that the compaction plant for the works is capable of affording adequate compaction to the placed clay. Similarly, should an alternative clay source or compaction method be proposed, a separate Source Evaluation Report and compaction trial for that material or method will be carried out.

The compaction trial will provide information upon which a suitable placed layer thickness will be determined, together with the minimum number of passes that will be required by the roller to afford adequate compaction to the placed clay and to ensure that the clay achieves the specified minimum permeability.

Each layer of the compaction trial will be tested for thickness, PSD, Atterberg limits and dry density and moisture content at 3 locations evenly distributed over the entire area. The moisture content is to be determined on the top and bottom of each layer. Tests shall be carried out in accordance with the relevant British Standard. If a nuclear density gauge (NDG) is to be used, calibration will be carried out using the compaction trial pad.

All measurements and observations shall be recorded and submitted in writing to the Environment Agency.

The compaction trial will be supervised by the CQA Engineer and/or the Project Engineer.

### Placement

The compaction plant will be suitable for compacting the full thickness of the specified layer and carrying out the works in reasonable lifts as detailed in Clause 4.4 of the Specification presented at Appendix A.

The clay liner will be constructed in horizontal layers unless the suitability of additional methods is proved by testing results and the alternative method is approved by the CQA Engineer.

Any prints formed by a sheepfoot roller in the final layer will be sealed using a vibratory smooth roller. The top surface of the smooth rolled layer will be lightly scarified to facilitate the keying in of successive layers. The depth of the scarification will be between 20mm and 30mm.

Earthworks will be carried out in suitable weather conditions to avoid rendering the clay unsuitable due to high moisture content. Appropriate measures will be taken to ensure that the clay is not rendered unsuitable due to drying out before placement.

If the clay becomes desiccated following placement, the topmost layer will be removed and the moisture content of the new surface will be adjusted by a water spray.

The construction of the clay liner will include the following operations: -

- a) Suitable low permeability clay will be placed in horizontal layers of approximately  $1.25D$  thickness, where  $D$  is the maximum thickness of the compacted layer detailed in the Specification, or as determined by the compaction trial.
- b) The clay will be compacted to a final thickness  $D$  with the number of passes appropriate to the roller, as determined by the compaction trial.
- c) If a smooth wheeled roller is used during the construction, the top surface of each placed and compacted layer will be lightly scarified to facilitate keying in of successive layers of the placed seal.
- d) The upper surface of the in situ clay will be compacted and the top surface smoothed and made free from soft and loose materials, boulders, vegetation and standing water.
- e) On the completion of the works the upper surface of the clay liner will be rolled using a suitable roller to provide a smooth and tight surface which will restrict water ingress.

The construction works will be monitored in accordance with the agreed CQA procedures to ensure that the materials, the method of construction and the constructed earthworks are in accordance with Section 4 of the Specification presented at Appendix A and Table 1 contained therein.



### Quality Assurance

The CQA Engineer will supervise and monitor the clay lining works on a full-time basis.

The results of all supplementary testing will be detailed in the CQA Report prepared on completion of the lining works.

### Field Testing and Documentation

The CQA Engineer will carry out the field testing at the frequency listed in Table 1 of this document to ensure that the clay seals are constructed using suitable materials, which have been engineered in accordance with Section 4 of the Specification presented at Appendix A.

The samples will be submitted to the independent laboratory for testing in accordance with the requirements of Table 1.

Calibration cores (6 No.) will be taken during the compaction trial for use in conjunction with the NDG, if required. The methodology for calibrating the NDG is detailed in Appendix B. Additional cores will be collected at the stated frequency to ensure that the NDG calibration remains valid.

The location at which in situ tests have been carried out will be filled and re-compacted in accordance with Section 4 of the Specification, to ensure that no preferential pathways for leachate or landfill gas migration from the site are created.

Moisture content and dry density will be determined at each testing location.

The CQA Engineer will monitor the construction works to ensure that: -

- ◆ the subgrade to the clay liner;
- ◆ the placed clay liner thickness;
- ◆ the compacted clay layer thickness;
- ◆ the type of compaction plant used;
- ◆ the number of passes by the roller, and
- ◆ the clay materials;

are in accordance with Section 4 of the Specification.

The CQA Engineer shall keep such records that facilitate correlation between testing point locations and field and laboratory testing results.

Copies of all field test data sheets and records will be kept on site during the lining works for inspection by the Environment Agency if so required.

The physical dimensions of the constructed earthworks will be checked regularly during the works. Checks will be made daily by the CQA Engineer, as well as by topographic survey before and after the construction works.

On completion of the works a survey will be carried out to facilitate the preparation of an as-built plan of the works and an isopachyte drawing.

### Defects Remediation

If, on the basis of the results of the field testing or any supplementary laboratory testing, the CQA Engineer considers that part of the earthworks does not comply with the stated specification criteria, then remedial action will be carried out. The extent of the remediation will depend upon the nature of the non-conformance.

Failures and non-conformance will be remediated by instigating one or more of the following actions depending upon the cause.

CAUSE	REMEDIAL ACTION
Unsuitable material	Excavate and replace with suitable material.  This will apply to both the subgrade and the clay lining materials.
Material too dry	Scarify or break up the affected area, ensure uniform wetting using a water spray and recompact.
Material too wet	Excavate and stockpile to dry out or excavate and mix with drier material, place and recompact.
Insufficient compaction	Afford additional compaction to the area.

Following each remedial action undertaken, the CQA Engineer will carry out field testing on that location or area.

The CQA Engineer will confirm to the Contractor that each layer is acceptable and has conformed to the Specification prior to the placement of a subsequent layer.

## **3.2 Separator Geotextile**

### Geotextile Material

The CQA Engineer will ensure that the geotextile material delivered to site complies with Clause 5.1 of the Specification. This will be checked by assessing the manufacturer's quality control information, required by Clause 5.1.8 of the Specification, against the information detailed in Table 2 of the Specification.

If the material delivered to site appears to be unsatisfactory for any reason, the CQA Engineer will inform the Contractor and deployment will not be permitted until the situation has been resolved.

### Delivery, Handling and Storage

Prior to delivery to site, the CQA Engineer will inspect the storage area prepared by the Contractor for compliance with Clause 5.1.3 of the Specification. If the area is deemed to be unsatisfactory, remediation of the area will be required before approval for the storage of geotextile may be given.

The CQA Engineer will ensure that each roll of geotextile delivered to site is undamaged and labelled with the information required by Clause 5.1.4 of the Specification. Any damaged materials will be dealt with in accordance with Clause 5.1.6 of the Specification.

The CQA Engineer will ensure that materials are unloaded in accordance with Clause 5.1.5 of the Specification, unless the Contractor can demonstrate the suitability of other methods. The CQA Engineer will not permit the unloading of the geotextile in any manner that may cause damage to the material.

The unloaded geotextile rolls will be stored in the approved prepared area only and will be stored no more than three high. The CQA Engineer will prepare an inventory of the materials delivered to site along with a schematic of the location of each roll.

#### Manufacturer's Quality Control

The manufacturer's quality control information should be passed to the CQA Engineer on the day that it is delivered to site for use in assessing the compliance of the geotextile with the Specification. Where the manufacturer's quality control information is not available to the CQA Engineer, unloading of the geotextile and any subsequent use of the material will be entirely at the Contractor's own risk. In the event that the geotextile deployment is due to commence before the CQA Engineer has received the information, the Employer will be contacted and given the opportunity to halt the works if he feels that this is appropriate.

#### Geotextile Deployment

The CQA Engineer shall ensure that the geotextile is deployed in accordance with Section 5.1.10 – 5.1.14 of the Specification. The CQA Engineer will ensure that the Contractor marks the geotextile with the minimum specified overlap of 300mm to ensure that the minimum lap is achieved. The Contractor shall demonstrate compliance with the Specification by good working practise and where appropriate remedial actions.

The method of placement of the geotextile will be approved by the CQA Engineer at the start of the works and will be monitored to ensure continued compliance with the Specification.

#### Temporary Surcharge

Temporary surcharge will be applied to the deployed geotextile as required by Clause 5.1.12 of the Specification.

The CQA Engineer will ensure that the method of surcharging is not likely to damage the geotextile in any way. Any damage noted by the CQA Engineer will be repaired in accordance with Clause 5.1.14 of the Specification and to the satisfaction of the CQA Engineer.

### Conformance Testing

The CQA Engineer will recover samples of the geotextile at a rate of 1 per 5000m<sup>2</sup> or part thereof, each sample will be tested for the properties detailed in Table 2 of the Specification.

The samples will be taken in accordance with Clause 5.1.9 of the Specification. The samples will be cut into two, with one part being sent to an independent laboratory for testing and the other part being retained by the CQA Engineer on site.

Where a conformance test fails to meet the Specification the part of the sample retained by the CQA Engineer shall be sent to the independent laboratory for testing.

If this sample also fails then further samples from the same roll of material may be taken for testing, if these materials prove to be satisfactory the geotextile will remain in the permanent works. The CQA Engineer will identify all material that has been used from that roll using the site records. Where it is not possible to remove further samples of material, in cases where the geotextile has already been covered, the CQA Engineer will provide a copy of the site records to the CQA Project Engineer, with the affected panels clearly marked.

The CQA Project Engineer will then assess the test information and material locations. The course of action to be undertaken will then be discussed with the Client and the Environment Agency. The nature of the action to be taken will depend on the aspect and magnitude of the failure and the location of the failed materials with the works.

### Damage, Defects and Repairs

The CQA Engineer will inspect the placed geotextile for any damage or defects. Any areas that require repair will be treated in accordance with Clause 5.1.14 of the Specification.

The CQA Engineer will record the nature and size of the defect and the size of the patch / area that has been replaced, along with the date that the repair is carried. The patch / repaired area will be noted on a site layout drawing prepared by the CQA Engineer.

## **3.3 Leachate Collection and Extraction System**

### General

The Leachate Collection and Extraction System will comprise a 500mm thick granular drainage blanket containing leachate collection pipework. The leachate drainage blanket will be installed over the separation geotextile to the basal area of the cell, and it will drain to a basal leachate sump located in the centre of the cell. The details of the leachate collection and extraction system are shown on Drawing Nos. 2219.C4D.03 and 2219.C4D.04.

The Leachate Collection and Extraction System shall be laid in accordance with the levels, grades and cross-sections shown on Drawing Nos. 2219.C4D.03 and 2219.C4D.04. The Leachate Collection and Extraction System and all associated works shall be carried out in accordance with Clause 505 of the DTP SHW and the details presented in Section 6.0 of the Specification presented at Appendix A.

### Leachate Drainage Blanket

The leachate drainage blanket will comprise of a 500mm thick layer 40mm coarse aggregate.

The leachate drainage material shall be selected 40mm inert, non-calcareous, free draining, fines free, non-plastic rounded or sub-rounded granular material. The granular material shall comply with Table 3 in Section 6.2.2 of the Specification. The CQA Engineer will obtain samples of the material which will be taken for testing prior to incorporation into the works at a rate of 1 sample per 5,000 tonnes with a minimum of two tests being carried out for each gravel source. The material shall exhibit:-

- ◆ A minimum permeability of  $1 \times 10^{-4}$  m/s.
- ◆ A minimum TFV (soaked) of 100KN.
- ◆ A maximum Calcium Carbonate content of 10%.

The leachate drainage blanket material shall be spread uniformly across the separation geotextile in accordance with Clauses 6.2.6 - 6.2.9 of the Specification. The CQA Engineer will ensure that the specified minimum depth is being attained.

No vehicles shall be driven directly onto the exposed separation geotextile or without at least 500mm of cover of the leachate drainage blanket material. The material will be pushed out to the specified thickness using low ground pressure plant. The LGP plant will not run on a layer thickness less than 500mm. Sharp turns and aggressive stopping and starting will be avoided to ensure that the separation geotextile and the underlying lining system are not compromised during placement of the leachate drainage blanket material.

The CQA Engineer will continually check the thickness of the leachate drainage blanket during the works. Upon completion of the leachate drainage blanket the CQA Engineer will check the final thickness at 20m centres and record the approximate location of each measurement on a testing grid for inclusion in the CQA Report. On completion of the leachate management system, the contractor shall provide documented evidence of the thickness of the leachate drainage blanket and the verticality and invert levels of leachate collection chambers, by surveying.

### Leachate Collection Pipework

Leachate collection pipework will be installed from each corner of the cell and will drain to the leachate collection sump, as shown on Drawing No. 2219.C4D.04. The leachate collection pipework will be surrounded with a minimum thickness of 500mm of 40mm non-calcareous free-draining aggregate. The leachate collection pipework will be 225mm ID HDPE pipe as detailed Clause 6.3 of the Specification presented at Appendix A.

Storage sites for the materials should be cleared and levelled and necessary measures taken to avoid mixing with the substrate in accordance with Clause 6.3.5 of the Specification.

The leachate collection pipework will be installed in accordance with Clause 6.3 of the Specification and CQA Engineer will ensure that all pipework, fitting and welding operations comply with the requirements of the Specification.

All information and calculations shall be received by the CQA Engineer a minimum of five days before installation begins.

General quality assurance certificates for all prefabricated pipework and leachate collection chamber will be provided on delivery of the materials to site to CQA Engineer as detailed in Clause 6.3.4 of the Specification.

#### Remote Monitoring Points

Two remote monitoring wells will be installed at locations distant from the sump in each cell, as shown on Drawing No. 2219.C4D.04.

#### Leachate Collection Sump

The basal leachate sump will be a leachate collection chamber constructed as detailed in Drawing No. 2219.C4D.04. All chambers are to be constructed to an initial height of 3m. Any anomalies within the construction drawings are to be brought to the attention of the CQA Engineer before construction commences.

## 4.0 CONSTRUCTION QUALITY ASSURANCE

### 4.1 Pre-Installation Documentation

Prior to the construction works, the following documentation must be submitted to the CQA Engineer by the Contractor:

- ◆ Clay characterisation and suitability analysis data for all sources of clay to be used within the works.
- ◆ Particle size distribution / grading analysis documentation for all granular materials for use within the works.
- ◆ General quality assurance certificates for geotextile and all prefabricated pipework and/or leachate collection chambers will be provided on delivery of the materials to site to CQA Engineer.

### 4.2 On-Site Pre-Installation Review

The Project Manager, CQA Engineer and the Contractor's Site Supervisor will meet and discuss the following:-

- ◆ the Construction Quality Assurance requirements placed upon the Contractor by this document;
- ◆ the CQA Engineer's installation documentation requirements outlined under Section 4.1.

### 4.3 Supervision

All engineering works will be supervised and monitored by the personnel listed in Section 1, should additional personnel be utilised then the Environment Agency will be informed.

The CQA Engineer will supervise, test and monitor the engineering works on a full-time basis to ensure that the works are undertaken in compliance with the construction method, the design and the specification.

### 4.4 On-Site Daily Documentation

The CQA Engineer will maintain, in the form of a site diary, a record of the on-site activities and events related to the works. Specific records relating to the components of the lining system will be maintained as detailed in Section 3 of this document.

### 4.5 Quality Assurance Procedures

#### Formation Preparation

The CQA Engineer will ensure the formation has been prepared to an acceptable standard as outlined in Section 3 of the Specification presented at Appendix A of this document.

The surface of the formation will be compacted with a smooth wheel roller in order to provide a surface suitable for receipt of the clay liner. The surface of the formation will be prepared to the satisfaction of the CQA Engineer prior to placement of the clay liner.

The physical dimensions of the constructed earthworks will be checked regularly during the works by the CQA Engineer and the Contractor.

### ***Clay Liner***

Installation of the clay liner will be assessed by the CQA Engineer to ensure material suitability. The CQA Engineer will monitor the engineering works to ensure that the clay liner is constructed in accordance with Section 4 of the Specification as presented at Appendix A of this document. The CQA Engineer will monitor the works and proceed with supplementary sampling and testing as outlined in Section 3 of this document.

### ***Separator Geotextile***

Installation of the Separator Geotextile will be assessed by the CQA Engineer to ensure material suitability. The CQA Engineer will monitor the engineering works to ensure that the Separator Geotextile is installed in accordance with Section 5 of the Specification as presented at Appendix A of this document. The CQA Engineer will monitor the works and proceed with supplementary sampling and testing as outlined in Section 3 of this document.

### ***Leachate Collection and Extraction System***

Installation of the Leachate Collection and Extraction System will be assessed and inspected to ensure that the materials are deployed in accordance with the criteria specified in Section 6 of the Specification presented at Appendix A of this document.

The CQA Engineer will visually inspect all materials to be used to assess suitability. The shredded tyre and aggregate leachate drainage materials will be installed as detailed in Section 6 of the Specification presented at Appendix A of this document. The CQA Engineer will ensure that plant only run on the specified thickness of material allowed, to protect the integrity of the clay liner.

On completion of the works, a survey will be carried out by May Gurney (Construction) Limited to facilitate the preparation of 'as-built' plans of the work.

## **4.6 CQA Report**

A CQA report will be prepared on completion of the works. The CQA report will incorporate the following aspects:-

- ◆ details of the design;
- ◆ details of any design modification;
- ◆ details of the construction works;
- ◆ details of the Specification;
- ◆ details of the QA procedures;



- ◆ records of any non-compliance and the solution adopted;
- ◆ site records as applicable;
- ◆ details of the material characterisation and suitability tests, together with a commentary of their results;
- ◆ results of the clay testing;
- ◆ plans showing clay testing locations;
- ◆ results of leachate drainage material testing;
- ◆ results of the separator geotextile testing;
- ◆ as-built drawings for all elements of the lining system;
- ◆ a commentary on the works and all results of the field testing;
- ◆ appendices combining testing results and certificates; and
- ◆ certification.

#### **4.7 Certification**

The CQA report will also include a certificate signed by the Project Engineer detailing the extent of the works, which comply with the PPC Permit and the CQA Plan and Specification details.

A copy of the CQA report will be presented to the Environment Agency for approval of the works.

## **TABLES**

### **TABLE 1 - SPECIFICATION FOR THE ENGINEERED CLAY LINER**

**Table 1 - Specification for the Engineered Clay Liner**

Parameter	Test Standard	Frequency	Requirement
Visual Thickness	-	-	Min 1.0m thick
Layer Thickness	-	-	Max 250mm
NDG (Moisture and Density)	BS1377 1990, Part 9 Method 2.5	1/250m <sup>3</sup>	
Moisture Content	BS1377 1990, Part 2 Method 3.2	1/250m <sup>3</sup> (or 1 in 5 NDG readings if using NDG)	
Density	BS1377 1990, Part 9 Method 2.4	1/250m <sup>3</sup> (or 1 in 5 NDG readings if using NDG)	
Plastic Limit	BS1377 1990, Part 2 Method 5.3	1/1000m <sup>3</sup> or 1 in 10 NDG readings/cores	
Liquid Limit	BS1377 1990, Part 2 Method 4.3	1/1000m <sup>3</sup>	< 90%
Plasticity Index	BS1377 1990, Part 2 Method 5.4	1/1000m <sup>3</sup>	Min 10% < 65%
Particle Density	BS1377 1990, Part 2 Method 8	1/1000m <sup>3</sup> <b><u>if using a percentage air voids specification</u></b>	
Moisture Content / Dry Density Relationship (2.5kg rammer)	BS1377 1990, Part 4 Method 3	1/1000m <sup>3</sup> <b><u>if using a compaction specification</u></b>	
Particle Size Distribution	BS1377 1990, Part 2 Method 9	1/1000m <sup>3</sup>	Fines content must exceed 20% - 30%
Maximum Particle Size	-	-	125mm in diameter
Hydraulic Conductivity (Permeability)	BS1377 1990, Part 6 Method 6	1/1000m <sup>3</sup>	< 1 x 10 <sup>-9</sup> m/s

## APPENDICES

- Appendix A - Specification
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**APPENDIX A**  
**SPECIFICATION**

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## 1.0 Introduction

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### 1.1 General

- 1.1.1 This Specification details the engineering requirements for the construction of the basal and side slope lining to the new landfill Cell 4, at Leadenham Landfill Site, operated by Waste Recycling Group.

### 1.2 Site Location

- 1.2.1 Leadenham Landfill is located at National Grid Reference SK 964 524, 750m east of Leadenham village.
- 1.2.2 A general layout of the landfill showing the extent of the cell is shown on Drawing 2219.C4.01

### 1.3 Scope of the Works

- 1.3.1 The Works comprise but are not limited to the following main elements:
- Bulk excavation to the basal and side slope area formation;
  - Placement of a minimum 1000mm thick engineered clay liner to the basal and side-slope areas of the cell to a maximum permeability of  $1 \times 10^{-9}$ m/s;
  - Installation of a separator geotextile over the clay liner to the base of the cell;
  - Installation of a leachate collection and removal system in the base of the cell which includes the 500mm thick granular drainage blanket on the base and inter-cell bund as well as leachate collection pipework and the construction of a leachate collection chamber and two remote leachate monitoring points in the base of the cell.

### 1.4 Drawings

Drawing	Title
2219.C4.01	– Existing Site Layout and Topography
2219.C4.02	– Proposed Formation and Top of Clay Liner Levels
2219.C4.03	– Construction Details and Section Locations
2219.C4.04	– Proposed Leachate Collection and Extraction System



## 2.0 General Items

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### 2.1 Access to the Site

- 2.1.1 Access to the Site shall be via the main landfill entrance as shown on 2219.C4.01. Access to the Cell 4 area will be via existing internal access roads as agreed with the Employer.
- 2.1.2 The Contractor shall not construct any temporary access roads without the approval of the Employer.
- 2.1.3 The Contractor's vehicles shall give way to landfill traffic and not impede the daily movement of landfill operations traffic.
- 2.1.4 The Contractor shall carry out jointly with the Supervisor a condition survey of any access roads made available to him under the Contract prior to the commencement of any work at these locations that will affect the condition of these roads.
- 2.1.5 The Contractor shall repair and make good any damage to the Employer's landfill access roads which occur as a result of the Contractor's activities.

### 2.2 Compliance with Employer's Safety Requirements

- 2.2.1 The Contractor shall comply with the safety requirements set out in the following documents:
- (i) Waste Recycling Group Plc Health and Safety Policy;
  - (ii) Waste Recycling Group Plc Site Managers Rules;
  - (iii) Waste Recycling Group Plc Ltd General Policy Statement for Contractors Conditions of Contract and Safety Rules;
  - (iv) Waste Recycling Group Plc Safety Instructions for all site users;
  - (v) The May Gurney Construction Ltd Health & Safety Policy, and;
  - (vi) The May Gurney Construction Ltd Health & Safety Site Plan.

A copy of these documents is available for inspection at the Employers landfill site office.

- 2.2.2 The landfill site speed limits shall be observed at all times. Non-compliance may result in expulsion and exclusion of any offender from the Site.
- 2.2.3 All mobile plant shall be assessed for the risk of impeded rearward vision and, dependant upon the outcome of this assessment, will be fitted with appropriate equipment in order to minimise the risk to within acceptable limits.
- 2.2.4 The Contractor shall implement a system for signing in and out of the Site which shall apply to all persons present on the Site at any time. This system shall be approved by the Supervisor and the Employer prior to commencement of any work on Site.

## 2.0 General Items

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### 2.3 British Standards and British Standard Codes of Practice.

2.3.1 British Standards and British Standard Codes of Practice incorporated in the Contract by a reference which does not include a date shall be the respective editions current 42 days prior to the date of the Works, and incorporating all British Standards Institution amendments current on that date. British Standards and British Standard Codes of Practice incorporated in the Contract by a reference that includes a date shall be deemed to exclude British Standards Institution amendments issued after that date except any such amendments shown in brackets immediately following the stated date.

### 2.4 Setting Out and Construction Surveys

2.4.1 The Contractor will be given Ordnance Survey or temporary benchmarks on or near the Site to which all setting out shall be referred. The Contractor will be expected to liaise with the Employer's nominated land surveyor in regard to all setting out and construction level control. Prior to Works commencing the Contractor shall establish Works benchmarks at a ratio of one per hectare of the Site and provide a list of the co-ordinates and reduced levels to the Supervisor.

2.4.2 The Contractor shall carry out construction surveys where practicable to determine ground elevations at each of the following stages of earthworks and at other times as may be necessary for record purposes and to measure quantities for evaluation purposes:

- i) prior to commencing the Works;
- ii) on completion of trimming to the existing formation;
- iii) on completion of placement of the engineered clay layer;
- iv) on completion of the placement of the leachate drainage blanket.

2.4.3 Each survey should be carried out on a fixed 20m square grid of points. The Contractor shall agree the fixed grid arrangement with the Supervisor. Further detail such as crests and toes of slopes will also be required.

2.4.4 The Contractor shall forward a paper and disc copy in 3D DXF, or other equivalent formats approved by the Supervisor, of each survey within one week of undertaking the survey.

### 2.5 Tolerances

2.5.1 The tolerance limits for the Works shall be as follows:

- i) Positions in plan shall be  $\pm 75\text{mm}$  of the required positions.
- ii) Levels shall be within the range  $-10\text{mm}$  to  $+20\text{mm}$  of the required elevation.

### 2.6 Surface Water Control

2.6.1 The Contractor shall carry out any operations necessary for dealing with flowing water, standing water or surface water run-off within the Site, as necessary to facilitate the construction of the Works, to prevent damage to the Works, the Site, or adjoining properties.

## 2.0 General Items

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2.6.2 Flowing water, standing water or surface water run-off shall only be discharged to locations as shown on the Drawings, or as otherwise approved by the Employer.

### 2.7 Materials

2.7.1 Materials and components used in the Works shall, where applicable be in accordance with the relevant British Standard or equivalent standard approved by the Supervisor.

#### *Storage of Materials*

2.7.2 All materials and components shall be stored and transported in such a manner as to preserve their quality and integrity to the standards required by the Contract.

#### *Handling and Use of Materials*

2.7.3 Materials and components shall be handled in such a manner as to avoid any damage or contamination and in accordance with the particular manufacturers' recommendations.

2.7.4 Unless otherwise described in the Contract, the use, installation, application or fixing of materials and components shall be in accordance with the particular manufacturers' recommendations.

### 2.8 Site Clearance and Waste Disposal

2.8.1 Trees, stumps, bushes, shrubs and fencing shall be grubbed up and long grass, weeds and scrub shall be cut down and all collected for disposal on Site or in the landfill, as directed by the Employer.

2.8.2 All abandoned metal, scrap or other waste, or waste generated by the Contractor, shall be disposed of in the same manner as Section 2.8.1.

### 2.9 Daily Journal

2.9.1 The Contractor shall maintain a detailed record of work performed and progress made during the course of each working day. The daily journal shall be in a format approved by the Supervisor and shall include the following:

- i) date of shift;
- ii) names of personnel in attendance during the shift;
- iii) weather conditions, including ambient temperature;
- iv) type of plant used; plant breakdowns and hours;
- v) approximate totals of earthworks carried out including identification of source and destination;
- vi) removal of foreign matter and oversize materials;
- vii) depth of material placed;
- viii) delays;
- ix) additional works, reasons and reference; and
- x) deliveries.

2.9.2 The Contractor shall submit a copy of the daily journal to the Supervisor at the start of the first working day following the day to which the journal refers.

## 2.0 General Items

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### 2.10 Permitted Hours of Working

2.10.1 The permitted hours of working are:

Monday to Friday      07.00 – 18.00

Saturday                07.00 – 12.00 noon

Unless approved otherwise beforehand by the Supervisor working on Sundays and Bank Holidays will not be permitted.

### 2.11 Naked Flames and Smoking

2.11.1 Naked flames are prohibited outdoors on Site at all times. Smoking will only be permitted indoors in areas approved by the Employer.

### 2.12 Control of Noise and Vibration

2.12.1 The Contractor shall comply with the recommendations for practical measures to reduce noise set out in BS 5228 : Parts 1, 2 and 4 and with the following specific requirements:-

- i) During the permitted working hours noise from the operations on site including both fixed plant and mobile machinery will be controlled such that it does not exceed 55 dB LA eq (1 hour) as measured 3.5m from the facade of any residential property within 150m of the site boundary.
- ii) Plant and equipment for the control of groundwater may be operated outside the permitted working hours (Clause 2.10). Any such plant and equipment shall be controlled so there is no increase greater than 3.5 dBA (corrected) in accordance with BS 4142 above the ambient noise level at 3.5m from the facade of any residential building within 150m of the site boundary.
- iii) Reversing beepers or other means of warning of reversing vehicles shall be fixed to and used on any mobile site plant and shall comply with the noise limits above except as may be agreed otherwise by the Supervisor in writing.
- iv) No work other than the operation of plant and equipment for the control of the groundwater shall take place outside the permitted hours except in case of emergency. The Employer shall be informed of any such emergency immediately.
- v) All mobile plant, equipment and vehicles under the control of the Contractor, his sub-contractors and suppliers, and in use or calling at the Site, shall be fitted with appropriate silencing equipment, which shall be maintained to manufacturers' standards and be in accordance with sub clause (ii).

### 2.13 Substances Hazardous to Health

2.13.1 In this Clause 'substance hazardous to health', has the same meaning as in:

## 2.0 General Items

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- i) Regulation 2 of the Control of Substances Hazardous to Health Regulations 1988 (COSHH).
  - ii) Regulation 2 of the Control of Lead at Work Regulations 1980 (CLAW).
  - iii) Regulation 2 of the Control of Asbestos at Work Regulations 1987 (CAW).
- 2.13.2 A substance hazardous to health shall only be used or generated in or about the Works where specified in the Contract or with the consent of the Supervisor.
- 2.13.3 Where any substance hazardous to health is so used or generated the Contractor shall provide the Supervisor with:
- i) a copy of the assessment of the risks created by the use of that substance as required by Regulation 6 of the COSHH Regulations, Regulation 4 of the CLAW Regulations or Regulation 5 of the CAW Regulations as appropriate; and
  - ii) details of the measures to be taken to prevent or adequately control the exposure of those working with or those who may be affected by the substance as required by Regulation 7 of the COSHH Regulations, Regulations 5-16 of the CLAW Regulations or Regulations 7-18 of the CAW Regulations as appropriate.
  - iii) The information required in i) and ii) above shall be provided to the Supervisor at least 14 days prior to the use of or incorporation into the Works of substances hazardous to health or where appropriate at the commencement of the Works where this is less than 14 days.
- 2.13.4 The Contractor shall, in relation to work with any substance hazardous to health, advise the Supervisor of the information, instruction, training and supervision to be provided for the Contractor's employees and any other person with reason to enter the area in which the hazard exists, and the provision to be made for monitoring health.
- 2.13.5 Where the measures referred to necessitate the use of protective clothing or other safety apparatus the Contractor shall:
- i) provide the Supervisor and his staff with sufficient suitable items of such protective clothing and other safety apparatus so far as they are not otherwise supplied;
  - ii) arrange for the proper storage, maintenance and, if necessary, regular testing and replacement of the items provided to the Supervisor and his staff; and,
  - iii) arrange for appropriate training or instruction for the Supervisor and his staff in the use of such items.
- ### 2.14 Contractor's Fuel and Oil Installations
- 2.14.1 Contractor's fuel and oil installations within the Site shall only be provided at locations approved by the Supervisor.
- 2.14.2 All fuel and oil installations provided by the Contractor within the site shall be contained within an impermeable bund capable of containing 110% of the tank capacity in the event of a spillage.

## **2.0 General Items**

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### **2.15 Training Requirement For Contractor's Personnel**

- 2.15.1 Contractors personnel engaged in plant operation shall be CTA certified, or equivalent, for the relevant item(s) of plant. Certification shall be provided for inspection when required by the Supervisor.
- 2.15.2 All of the Contractors personnel shall receive training in the Rules and Regulations pertaining to operations on the landfill site. This training will be provided by the Employer at the Commencement Date, and at such further times as may be necessary. The Contractor shall be responsible for ensuring that his personnel adhere to these Rules and Regulations.

### **2.16 Dust and Mud Nuisance**

- 2.16.1 The Contractor shall take all necessary steps to eliminate dust nuisance during the Works.
- 2.16.2 Existing highways, site and access roads used by vehicles of the Contractor or any of his sub-contractors or suppliers of materials or plant, shall be kept clean and clear of all dust and mud dropped by the said vehicles or their tyres. All dust and mud from the works spreading on these highways, site and access roads shall be immediately cleared by the Contractor by use of mechanical plant to the approval of the Supervisor.
- 2.16.3 Compliance with this clause shall not relieve the Contractor of any responsibility for complying with the requirements of any Highway Authority in respect of keeping roads clean.

### **2.17 Landfill Tax**

- 2.17.1 The Contractor will be responsible for all costs which arise as a consequence of Landfill Tax liabilities for materials brought to site, and will be required to prove exemption for all material used in the Works that so qualify.
- 2.17.2 The Contractor will be responsible for any costs which arise as a consequence of the Landfill Tax and are due in respect of the disposal of arisings from the Works.
- 2.17.3 Where it is necessary for the Employer to make payments on behalf of the Contractor to HM Customs and Excise as a consequence of the Landfill Tax Regulations, any such payments made by the Employer will be recovered from the Contractor by the deduction of monies from any sums then due or which at any time thereafter may become due to the Contractor under the Contract.

### **2.18 Contractor's Compound and Facilities for the Contractor**

- 2.18.1 The layout of the Contractor's compound is to be agreed with the Supervisor prior to commencement on site.
- 2.18.2 No lodgings or caravans will be allowed on Site.
- 2.18.3 The Contractor's personnel are not permitted access to any of the Employer's mess, shower and toilet facilities.
- 2.18.4 The Contractor shall ensure that adequate provision is made within his compound area for parking of all his plant and any private vehicles owned by operatives / supervisor and visitors at all times.

## **2.0 General Items**

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Parking shall not be permitted in any other areas of the landfill site.

- 2.18.5 The Contractor shall set out an area within his compound for carrying out plant maintenance and repairs. The Contractor shall ensure that all routine maintenance takes place within this area and where possible all repairs also.

### **2.19 Telephones, Radio Systems and other Communication Devices**

- 2.19.1 The Contractor shall obtain the approval of the Supervisor prior to commissioning any communication equipment and shall ensure that they will not interfere with any existing systems on the site.

### **2.20 Method Statements and Risk Assessments**

- 2.20.1 The Contractor shall submit for the approval of the Supervisor, prior to commencement of the Works, method statements and risk assessments detailing his proposals for all the works to be undertaken

### **2.21 Landfill Gas and Leachate Management Systems**

- 2.21.1 The Employer has installed landfill gas and leachate management systems across the Site including areas within and adjacent to the Works. The Contractor shall liaise with the Employer to determine which systems are to remain undisturbed during the period of the Works and which can be, or have been, decommissioned. Should the Contractor damage or disturb any operational system he shall immediately inform the Supervisor and the Employer. The Contractor shall carry out such reasonable remedial measures, as are deemed necessary by the Employer, to reinstate any damaged or disturbed system to the same condition as immediately prior to commencement of the Works.

## 3.0 Earthworks

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### 3.1 Definition of Earthworks Material

3.1.1 The following definitions shall apply to the Contract wherever reference is made to the defined material.

**“Suitable material”** – shall comprise material which is not unsuitable material and is in accordance with the Contract for use in the Works and is approved by the Supervisor.

**“Unsuitable material”** – shall mean material other than suitable materials and shall include:

- i) Peat, material from swamps, marshes and bogs.
- ii) Logs, stumps and perishable material.
- iii) Material in a frozen condition or susceptible to spontaneous combustion.
- iv) Building rubble or non-ferrous material.
- v) Any industrial, commercial or domestic waste.
- vi) Any material greater than 125mm in any dimension.
- vii) Fill material with a high moisture content which when compacted does not provide a firm foundation sufficient to permit the movement of vehicles without causing excessive rutting
- viii) Clay liner material having a moisture content greater than the maximum or less than the minimum permitted for such material unless otherwise approved by the Supervisor.
- ix) Clay of liquid limit exceeding 90% and/or plasticity index less than 10% or exceeding 65%.

Unsuitable Materials of Class (viii) if otherwise suitable shall be classified as suitable when wetted or dried sufficiently as appropriate.

**“Rock”** – shall mean those geological strata that cannot be removed from an excavation up to 4m deep with a Caterpillar 345 or equivalent excavator in good working order.

### 3.2 Excavation Requirements

3.2.1 The proposed formation profile shall be to the lines and levels as detailed on Drawing 2219.C4.02.

3.2.2 The Contractor shall, unless otherwise agreed by the Supervisor, carry out the excavation in such a manner that suitable materials are excavated separately for re-use in the Works without contamination by mixing with unsuitable materials. All unsuitable materials shall be either removed to the nearest operational landfill cell as directed by the Employer or transported to stockpiles at a locations agreed with the Employer. Unsuitable material shall be stockpiled separately according to the nature and consistency of the material. The stockpiles shall be sealed and graded to prevent the ingress and ponding of surface water.

3.2.3 Excavated suitable materials shall be either re-used in the Works, or removed to stockpiles at a location as agreed with the Employer. Excavated suitable materials may be used as general fill, clay liner material or soil making material suitable for restoration of the site. Suitable material shall be stockpiled separately according to the nature and consistency of the material. The stockpiles shall be sealed and graded to prevent the ingress and ponding of surface water.



## 3.0 Earthworks

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- 3.2.4 The Contractor shall excavate and handle in-situ suitable material and suitable material from on-site stockpiles in such a manner that the nature and consistency of the material is not adversely affected. Where more than one type or consistency of material is encountered the Contractor, wherever practicable, shall excavate in such a manner that the materials can be separated.
- 3.2.5 Should any groundwater or leachate ingress occur into the Works the Contractor shall discuss and agree the appropriate remedial measures with the Supervisor. Any such remedial measures shall be completed and approved by the Supervisor before placement of fill material at the location of the ingress.

### 3.3 Excavation of Waste

- 3.3.1 Where waste materials are encountered and required to be excavated during the Works, they shall be disposed of in the operational area of the landfill as directed by the Employer.

### 3.4 Engineered Fill

#### *General*

- 3.4.1 The engineered fill shall be suitable material sourced from either the general excavation works or designated stockpiles.

#### *Placement Procedure and Compaction Requirement*

- 3.4.2 Engineered fill shall be placed and compacted in accordance with Volume 1 of the Specification for Highway Works, Section 612 Compaction of Fill, Method Compaction, as published by the Department of Transport, December 1991, reprinted August 1993 with amendments.
- 3.4.3 Haulage of material to areas of placement shall only proceed when sufficient spreading and compaction plant is operating at the place of deposition. There shall be a minimum delay between placement and compaction.
- 3.4.4 Contact surfaces between adjacent layers of fill shall be scarified prior to the placement of the next layer of fill. The depth of fill to be reworked shall correspond to the depth of any desiccation or softening but not less than 100mm, or as otherwise directed by the Supervisor.
- 3.4.5 Where the surface of the fill is to be left overnight or for longer periods, it shall be sealed against moisture ingress.
- 3.4.6 Individual lumps and clods of fill material shall be broken down such that the material can be compacted in layers to form a homogeneous mass without contact planes or surfaces between adjacent layers.
- 3.4.7 If material to be placed is in or attains a condition as a result of inclement weather, such that it cannot be placed or compacted in compliance with the Contract then:
- (i) the affected material shall be removed and discarded or stockpiled until it is suitable material, or;
  - (ii) the material shall be treated in-situ by wetting or allowed to dry, as appropriate.

## 3.0 Earthworks

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### 3.5 Formation Preparation

- 3.5.1 The formation shall be trimmed and proof rolled using a vibratory tamping roller in dead weight mode with a mass per metre width of between 2,000kg and 5,000kg, to provide a clean, even, firm unyielding foundation sufficient to permit the movement of vehicles without causing rutting or other deleterious effects. The formation shall be smooth without shrinkage cracks or other surface defects and free from unsuitable material, vegetation, debris, roots, sharp stones, or areas excessively wetted or softened. The formation shall also be free from sudden sharp or abrupt changes in grades, undulations, hollows or mounds.
- 3.5.2 Any soft spots or, areas exhibiting heave during the proof rolling shall be removed and replaced with suitable fill material, placed and compacted in accordance with the Contract.
- 3.5.3 The Contractor shall not place the clay liner at any location until the formation at that location has been approved by the Supervisor. Areas deemed to be unacceptable will be identified by the Supervisor and the Contractor shall discuss and agree with him proposed remedial measures which may include re-trimming and re-rolling of the surface.

## 4.0 Clay Lining

### 4.1 General Description

4.1.1 A minimum 1000mm clay liner will be constructed over the approved formation to the cell intercell bunds and side slopes in accordance with Drawing 2219.C4.02.

### 4.2 Clay Liner Material

4.2.1 The clay liner material shall be London Clay sourced from on-site excavations. The clay liner material shall be suitable material and in addition meet the requirements given in Table 1.

**Table 1 – Clay Liner Material Requirements**

PARAMETER	TEST METHOD	REQUIREMENT
Permeability	BS: 1377: 1990: Part 6	$<1 \times 10^{-9}$ m/s
Plasticity Index	BS 1377: 1990: Part 2	>10% and <65%
Liquid Limit	BS 1377: 1990: Part 2	<90%
Clay Content (0.002mm)	BS 1377: 1990: Part 2	>10%
Moisture Content (min. and max.)	BS 1377: 1990: Part 2	<u>To be confirmed</u>
Air Voids	BS 1377: 1990: Part 9	<5%

4.2.2 The Contractor shall excavate, handle, treat if necessary and place all clay used in the Works in such a manner that it is deemed suitable for use in the Works. On completion of each day's activities the clay stockpiles shall be sealed to the satisfaction of the Supervisor in order to maintain the quality of the clay. On completion of the Works all clay not incorporated within the Works shall be returned to the clay stockpile area.

### 4.3 Compaction Trial

4.3.1 At least five working days prior to the commencement of placement of the clay liner, the Contractor shall carry out a compaction trial which shall not form part of the Works. The location of the trial pad shall be agreed beforehand with the Supervisor.

4.3.2 The purpose of the compaction trial is to assess the Contractor's proposed method of placement and compaction. From the compaction trial the following shall be evaluated by the Supervisor:

- (i) The Contractor's method of materials handling and placement;
- (ii) The Contractor's method of compaction and equipment employed;
- (iii) Mixing and breaking down of clay clods;
- (iv) The binding together and interlayer bonding of the compacted material;
- (v) Confirmation of the number of passes and layer thickness necessary to achieve the required compaction, and;
- (vi) Confirmation of the moisture content criteria to be implemented.

## 4.0 Clay Lining

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- 4.3.3 The compaction trial shall consist of a trial pad constructed out of the clay liner material. The trial pad shall be 15m wide by 25m long and shall be constructed in three layers each to a maximum thickness of 250mm. The layers shall be compacted with a range of passes of the compaction plant. A vibratory tamping roller or other suitable compaction plant approved by the Supervisor shall be used for construction of the clay liner. The Contractor shall provide access for the Supervisor to undertake in-situ testing of the compacted fill and to recover samples for laboratory testing.
- 4.3.4 Placement of the clay liner shall not be undertaken until the Contractor's method of compaction has been approved by the Supervisor on the basis of the laboratory and in-situ testing undertaken on samples recovered from the compaction trial pad.
- 4.3.5 On completion of the compaction trial, the Contractor shall excavate a trial trench through all three layers at a location determined by the Supervisor.
- 4.3.6 The trial pad shall not be removed without approval from the Supervisor. If the results of the trial prove unsuccessful, the placement methodology and/or compaction plant shall be changed and a further trial carried out. This process shall continue until the Supervisor is satisfied that the proposed plant and methodology will produce a clay liner in accordance with the Contract.

### 4.4 Placement of Clay Liner Material

- 4.4.1 On completion of the compaction trial the clay liner shall be constructed using the approved plant and methodology. The Contractor shall not change the method of compaction or compaction plant without further trials to demonstrate that any revised method will achieve the required compaction.
- 4.4.2 Haulage of clay material to areas of placement shall only proceed when sufficient spreading and compaction plant is operating at the place of deposition. There shall be a minimum delay between placement and compaction.
- 4.4.3 The Contractor may have to condition the material so that it meets the requirements of the Contract. Conditioning may include, but not be restricted to, adjusting the moisture content by wetting or drying and breaking down the size of individual clods of clay such that their maximum dimension does not exceed 75mm and such that the clay can be compacted to form a homogeneous mass without contact planes or surfaces between adjacent clods and adjacent layers.
- 4.4.4 The compacted thickness of each layer shall not exceed 250mm unless otherwise approved by the Supervisor. Contact surfaces between adjacent layers of fill shall be scarified prior to the placement of the next layer of fill. The depth of fill to be reworked shall correspond to the depth of any desiccation or softening but not less than 100mm, or as otherwise directed by the Supervisor
- 4.4.5 The surface of the compacted clay liner shall be sealed with a smooth roller at the end of each working day on which fill has been placed at that location
- 4.4.6 Joints between sections of clay liner shall be constructed with a stepped connection between successive layers with intermixing of the liner material to provide a homogeneous mass.

## 4.0 Clay Lining

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- 4.4.7 The final surface of the clay liner shall be trimmed to the required grades and levels and sealed with a smooth drum roller to provide a smooth surface without undulations, peaks, hollows, shrinkage cracks, ruts or other surface defects and free from loose material.
- 4.4.8 Clay liner material removed during the final trimming process and surplus to the Works shall be removed to stockpile or other location on Site to be agreed with the Employer.

### 4.5 Quality Control Testing

- 4.5.1 The Contractor shall provide access for the Supervisor to undertake a regime of field quality control testing and sampling for laboratory testing during placement of the clay liner.
- 4.5.2 All quality control testing of the clay liner will be undertaken in accordance with BS 1377: 1990 and all laboratory testing shall be undertaken at an approved UKAS Laboratory.
- 4.5.2 Sampling and testing will not be undertaken at the exact same location in each successive layer.
- 4.5.3 All perforations made in the clay liner for testing shall be remediated by the Contractor using either one of the following methods:
- i) The perforation shall be backfilled with clay compacted by hand tamping in thin layers to the satisfaction Supervisor, or;
  - ii) The perforation shall be backfilled with a mixture of sand and bentonite. The materials shall be mixed at a ratio of 3 parts sand to 1 part bentonite i.e. 25% bentonite.
- 4.5.4 The Supervisor may forward to the Contractor a copy of the quality control testing results but this shall not relieve the Contractor from any of his obligations under the Contract.

### 4.6 Non-Compliance Remedial Work

- 4.6.1 Where the results of in-situ field and laboratory testing demonstrates that the clay liner material does not meet the requirements of the Contract, the extent of the non compliant area shall be determined by the Supervisor on the basis of surrounding locations of compliant tests.
- 4.6.2 Non-compliant areas shall be remediated by the Contractor by one of the following methods:
- i. Undertake additional works on the layer as necessary such that subsequent testing of the layer meets the required compaction criteria. This may include such measures as adjustment of the moisture content by scarification of the surface to allow drying or the addition of water until the required moisture content is obtained, followed by re-compaction, additional passes of the compacting plant or other measures as agreed with the Supervisor, or;
  - ii. Remove part or the whole of the layer demonstrated to have failed to meet the required compaction criteria and replace it to the satisfaction of the Supervisor.

## 4.0 Clay Lining

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### 4.7 Inclement Weather

- 4.7.1 Following wet weather conditions, any standing water on the clay liner shall be removed before fill is placed. The Contractor shall remove to spoil heaps any material rendered unsuitable by wetting. Earthworks placement operations following inclement weather conditions shall not proceed without the prior approval of the Supervisor.
- 4.7.2 Any material frozen in stockpiles shall be removed and put to one side until thawed. Previously compacted material that has become frozen shall be removed and stockpiled until suitable for re-use.

## 5.0 Separator Geotextile

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### 5.1 General Description

5.1.1 A separator geotextile will be placed in areas as shown on Drawing 2219.C4.03 to prevent penetration of the gravel leachate drainage blanket into the engineered clay.

#### *Separator Geotextile Material*

5.1.2 The separator geotextile shall be a thermally bonded non-woven material manufactured from 70% polypropylene and 30% polyethylene e.g. Terram 1000 or equivalent. The separator geotextile shall meet the requirements of Table 2.

**Table 2 – Separator Geotextile Material Requirements**

PARAMETER	TEST METHOD	MINIMUM VALUE
Wide width tensile strength: Mean peak strength Elongation	BS 6906: Part 1: 1987	8.0 kN/m 28%
CBR Puncture Resistance	BS 6906: Part 4: 1989	1500 N
Trapezoidal Tear Resistance	ASTM D4533	300 N

#### *Delivery, Handling and Storage*

- 5.1.3 The separator geotextile shall be delivered to site in the form of a roll, prepared, packed and loaded in a manner, so as to prevent any damage during handling. The geotextile shall be delivered to site in packaging which will protect the rolls from degradation by ultra violet light. The geotextile shall be kept in the wrappings provided by the manufacturer until required for use in the Works.
- 5.1.4 Each roll of separator geotextile delivered to Site shall be clearly labelled with the name of the manufacturer, product name and type, batch and roll number, batch number, roll length, width and roll weight and date of manufacture.
- 5.1.5 On delivery to site, rolls will be off-loaded to storage using a crane or suitable available construction equipment. Each roll should be equipped with canvas slings to facilitate unloading.
- 5.1.6 The Contractor shall mark any damaged or defective rolls and then segregate them for further investigation, as necessary.
- 5.1.7 The rolls shall be stacked not more than three high and stored in accordance with the manufacturer's recommendations in a storage area which shall be clean, firm, dry, and free of rocks or other detritus, and located so as to preclude damage from impact or puncture by working plant, vandals or such like. The location of the storage area shall be agreed with the Employer.

## 5.0 Separator Geotextile

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### *Manufacturers Quality Control*

- 5.1.8 The Contractor shall provide the Supervisor on the day that the geotextile is delivered to site with either a copy of the manufacturer's quality control documentation to cover each roll delivered to site or a copy of the manufacturers CE mark test certificate where appropriate, to cover each roll delivered to site.

### *Conformance Testing*

- 5.1.9 The Contractor shall provide access for the Supervisor to recover samples from the geotextile rolls for retention and/or conformance testing. Samples will be 1.0m long and the full width of the roll. Testing will be undertaken for the parameters given in Table 2 at a testing frequency of 1 per 5000m<sup>2</sup> or 1 every 5 rolls delivered to site whichever is the greatest no. of tests. The Supervisor will send a copy of the results of the testing to the Contractor but this shall not relieve the Contractor from any of his obligations under the Contract.

### *Installation*

- 5.1.10 The separator geotextile shall be installed with minimum overlap of 300mm between adjacent panels.
- 5.1.11 The method of installation shall not impose stresses and strains likely to cause damage to the geotextile. The geotextile shall be in continuous contact with the surface on which it is placed without stretching or bridging over humps or hollows.
- 5.1.12 On placing, exposed sections of geotextile shall be protected against wind load with sandbags or other similar weighting that will not damage the geotextile. This protection shall remain in place until sand drainage/protection layer is placed over the panels.
- 5.1.13 No equipment or tools may be used which could damage the geotextile by handling, trafficking, or by any other means. Personnel working on the geotextile shall not smoke, wear damaging shoes, or otherwise engage in any activity that could damage the geotextile. Construction plant must not operate directly on the geotextile.
- 5.1.14 The Contractor shall repair any visible damage or defects in the separator geotextile by the placement of a suitably sized patch of the same material ensuring a minimum overlap of 500mm in all directions.



## 6.0 Leachate Collection and Extraction System (LCES)

### 6.1 General Description

6.1.1 The LCES will consist of a 500mm thick granular drainage blanket containing leachate collection pipework, placed on a protector geotextile, two remote leachate monitoring points (RLMP)'s and a leachate collection point (LCP) in the base of the cell.

### 6.2 Leachate Drainage Blanket

#### *General Description*

6.2.1 A 500mm thick leachate drainage blanket shall be placed above the protector geotextile in accordance with Drawing Nos. 2219.C4.03 and 2219.C4.04. The leachate drainage blanket shall comprise a 500mm thick layer of 40mm coarse aggregate. The aggregate shall comply with the requirements of BS EN 12620:2002 and PD 6682-1:2003.

#### *Material*

6.2.2 The leachate drainage blanket material and pipework bedding and surround shall be a uniformly graded rounded or sub-rounded gravel and shall meet the given in Table 3.

**Table 3 – Leachate Drainage Blanket Material Requirements**

PARAMETER	TEST METHOD	REQUIREMENT
Grading: 40mm single size	BS EN 933-1	20/40 Gc 85/20
Fines content	BS EN 933-1	f <sub>4</sub>
10% Fines Value (TFV)	BS 812 Part 111 (Soaked Condition)	100kN (min)
Carbonate Content	BS 1881 Part 6	<10%
Permeability	BS 1377: 1990: Part 2	1 x 10 <sup>-4</sup> m/s (min)

6.2.3 The Contractor shall forward a grading analysis, carbonate content, TFV and permeability test results on representative samples of the proposed source for approval by the Supervisor five days prior to commencement of installation of the leachate drainage blanket.

6.2.4 To confirm the continued compliance of the material during placement, the Contractor shall provide access for the Supervisor to recover samples for laboratory testing from the placed material.

6.2.5 Any non-compliant material shall be rejected to the extent determined by the Supervisor.

## 6.0 Leachate Collection and Extraction System (LCES)

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### *Placement*

- 6.2.6 The Contractor shall undertake the placement of the leachate drainage blanket material with minimal trafficking and handling and in such a manner that causes no damage to, or displacement of, underlying layers and such that no wrinkles develop in the protector geotextile.
- 6.2.7 Plant used to place the leachate drainage blanket shall under no circumstance be driven directly on the underlying layers other than for safety of the Works. A minimum thickness of 1m of material shall be maintained beneath wheeled vehicles. The blanket shall be placed (spread and not spread) using tracked 360° operating from a minimum thickness of 500mm of blanket material.
- 6.2.8 In general the methods employed shall comprise the following:
- i) Tipping of fresh material on previously placed material.
  - ii) Casting material by 360° excavator (using a bucket without teeth).
  - iii) Pushing of material up and over the face of the tipped load allowing it to fall vertically onto the geotextile.
  - iv) Pre-loading of the geotextile with discrete mounds of material, to prevent the generation of excessive wrinkles or folds, and in-filling between mounds.
- 6.2.9 The Contractor shall remediate any damage to the underlying material in accordance with the Contract and to the satisfaction of the Supervisor who will determine the extent of the remedial work.

### **6.3 Leachate Collection Pipework**

- 6.3.1 The leachate collection pipework shall be installed in accordance with Drawing 2219.C4.04.
- 6.3.2 The leachate collection pipework shall consist of 225mm internal diameter perforated HDPE pipes.
- 6.3.3 The perforation/slots in the pipework should have a minimum open area of 10%. The perforation/slots shall be located on the upper two thirds of the pipe circumferences.
- 6.3.4 The Contractor shall submit the following information to the Supervisor for his approval, five working days prior to the installation of the leachate collection pipework:
- i) Details of his proposal for leachate collection pipework and fittings;
  - ii) Copies of the pipe manufacturers' quality control documentation;
  - iii) Copy of the manufacturers' recommendations for storage and installation;

## 6.0 Leachate Collection and Extraction System (LCES)

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- iv) A summary of his experience in the installation and welding of leachate collection pipework;
- v) Calculations from the pipe manufacturer to demonstrate that the pipe meets the following requirements:
  - Pipe deflection <5%
  - $D_{85}$ /hole diameter >1.0 (Circular Perforations)
  - $D_{85}$ /slot width >1.2 (Slotted Perforations)

Where  $D_{85}$  refers to the particle size of the drainage blanket material for which 85% is less than that size.

The following assumptions can be made:

- Uncompacted but confined gravel surround
- Maximum waste depth is 24 metres (assumed bulk density 10 kN/m<sup>3</sup>)
- 1m of cover soils (assumed bulk density 16 kN/m<sup>3</sup>)

The Contractor shall agree the methodology and input parameters for the calculation with the Supervisor.

6.3.5 All pipework and fittings shall be delivered, handled and stored in accordance with the manufacturers' recommendations. The pipework shall be stored on an area flat enough to accommodate the entire length of the pipe and in such a way that they are not deformed or damaged. The pipes shall not be stacked higher than one metre.

6.3.6 All sections of the leachate collection pipework shall be firmly fixed together using screw threaded fixings, butt fusion or electrofusion welding techniques. Push-fit couplings and hand welding techniques will not be accepted. The Contractor shall submit to the Supervisor his proposal for the method of jointing for his approval.

6.3.7 Where butt-welding is used, a fully automatic machine shall be used which shall:

- automate trimming of pipe faces;
- automate determination of drag forces during all stages of jointing process;
- automate incorrect heater temperature lock out;
- automate heater plate ejection;
- automate bead formation control;
- warn of and record incomplete cooling times.

In addition, the machine shall be capable of recording and storing weld specific parameters such as heater temperature, bead pressure, heat soak time, fusion pressure and actual and target cooling times. It shall also record the date, time, operator and joint number. This data shall be retrievable by a data capture unit and a digital and printed copy supplied to the Supervisor on the following working day.

6.3.8 If necessary, butt fused welds shall be undertaken in an enclosure to minimise the effects of wind and rain on the jointing process and to prevent contamination from wind borne dust.

## **6.0 Leachate Collection and Extraction System (LCES)**

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- 6.3.9 Where electrofusion couplers are used, the pipe should be first mounted in the appropriate clamps to prevent pipe movement during the jointing cycle. Only fully automatic electrofusion machines and couplers with automatic fusion time controllers shall be used. The fusion machines shall be capable of recording and storing weld specific parameters such as target and actual fusion times together with the date, time, operator and joint number. This data shall be retrievable by a data capture unit and a digital and printed copy supplied to the Supervisor on the following working day.
- 6.3.10 All butt fused and electrofused joints shall be labelled with a unique alpha numeric reference. The Contractor shall record the location of all joints and include these on the cell “as built” drawings.
- 6.3.11 No leachate collection pipes shall be installed until the Supervisor has inspected and approved the bedding conditions. The pipes shall be laid so that each one is in intimate contact with the bed throughout its full length.
- 6.3.12 The Contractor shall undertake the installation of the leachate collection pipework system in such a manner that it causes no damage or displacement to the underlying layers. Should the underlying layers be damaged in any way the Contractor shall repair the damage in accordance with the Contract.

### **6.4 Leachate Collection Point (LCP)**

- 6.4.1 The LCP shall be constructed at the lowest point of the cell as shown on Drawing 2219.C4.04, to an initial height of 3m. The LCP shall be constructed in accordance with the details as shown on Drawing 2219.C4.04.

### **6.5 Remote Leachate Monitoring Points (RLMP'S)**

- 6.5.1 The two RLMP'S shall be constructed at the locations as shown on Drawing 2219.C4.04, to an initial height of 3m. The RLMP'S shall be constructed in accordance with the details as shown on Drawing 2219.C4.04.

## Drawings

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2219.C4.01 – Existing Site Layout and Topography

2219.C4.02 – Proposed Formation and Top of Clay Liner Levels

2219.C4.03– Construction Details and Section Locations

2219.C4.04– Proposed Leachate Collection and Extraction System

**APPENDIX B**  
**NDG CALIBRATIONS**

## METHODOLOGY OF NDG CALIBRATION

Prior to the commencement of the lining works or during the compaction trial, the CQA Engineer will calibrate the NDG gauge with the material to be used in the engineering works. The CQA Engineer will choose a minimum of 6 locations to perform the calibration tests.

At each location, the CQA Engineer will test the engineering material for its moisture and density properties using the British Standard Method BS1377 1990, Part 9 Method 2.5.

At the same location of the NDG test, the CQA Engineer will take a core cutter sample for laboratory testing using British Standard Methods BS1377 1990, Part 2 Method 3.2 (determination of Moisture Content) and BS1377 1990, Part 9 Method 2.4 (determination of density).

The NDG results will be compared with the laboratory test results, and a correction factor for the Bulk Density and the Moisture Density will be calculated, using the following formulae:

$$y = \frac{\Sigma (\text{Core cutter } \rho_b) / 6}{\Sigma (\text{NDG } \rho_b) / 6}$$

Where  $y =$  bulk density correction factor  
 $\rho_b =$  bulk density ( $\text{Mg/m}^3$ )

$$b = \frac{\Sigma (\text{Core cutter } \rho_w) / 6}{\Sigma (\text{NDG } \rho_w) / 6}$$

Where  $b =$  moisture density correction factor  
 $\rho_w =$  moisture density ( $\text{Mg/m}^3$ )

All subsequent NDG readings will be multiplied by the correction factors determined by the above calculations to compute the corrected density readings, using the following formulae:

$$\begin{aligned} \text{Corrected } \rho_b &= \text{NDG } \rho_b * y \\ &\text{and} \\ \text{Corrected } \rho_w &= \text{NDG } \rho_w * b \end{aligned}$$

Once the correction factors are determined, a "Certificate of Nuclear Density Gauge Calibration" will be produced. The certificate will be retained on site for the duration of the works and will be submitted with the CQA Report. A sample certificate is attached.

## CERTIFICATE OF NDG CALIBRATION

**Certificate No.:**

**QA Plan Reference No.:**

**Client:**

**Site:**

**Project:**

**Test Method : Core Cutter Density and Moisture Content**

Test No.						
Date						
Area						
Bulk Density (Mg/m <sup>3</sup> )						
Moisture Content (%)						
Moisture Density (Mg/m <sup>3</sup> )						

Average Core Cutter Bulk Density (Mg/m<sup>3</sup>) =  
 Average Core Cutter Moisture Density (Mg/m<sup>3</sup>) =

**Test Method : Nuclear Density Gauge**

Test No.						
Date						
Area						
Bulk Density (Mg/m <sup>3</sup> )						
Moisture Content (%)						
Moisture Density (Mg/m <sup>3</sup> )						

Average NDG Bulk Density (Mg/m<sup>3</sup>) =  
 Average NDG Moisture Density (Mg/m<sup>3</sup>) =

**Bulk Density Correction (y) =**  
**Moisture Density Correction (b) =**

**CQA Engineer:**

**Notes:**

**Signature:** \_\_\_\_\_

**Test Methods:**

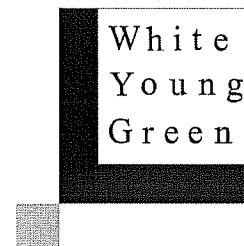
**Date:**

BS1377: Part 9: 1990: Clause 2.4 (Core Cutter Density)  
 BS1377: Part 3: 1990: Clause 3.2 (Moisture Content)  
 BS1377: Part 9: 1990: Clause 2.5 (NDG)



**APPENDIX C**  
**TYPICAL CQA PROFORMA**





RECORD OF COMMUNICATION	
<b>CONTRACT NUMBER</b>	<b>DATE</b>
<b>CQA ENGINEER</b>	<b>TIME</b>
<b>OTHER PARTY</b>	
<b>SUMMARY DISCUSSION</b>	
<b>AGREEMENT/CONCLUSION</b>	
<b>FURTHER ACTION REQUIRED</b>	
<b>SIGNED</b>	<b>DATE</b>





**Construction Quality Assurance  
Report for the Development of  
Cell 4**

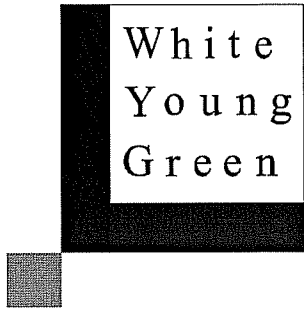
**Leadenham Landfill Site**

**Waste Recycling Group Limited**

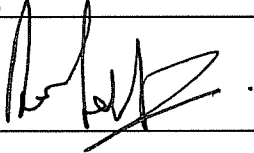
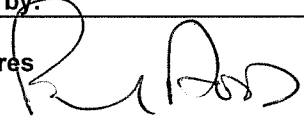
**October 2007**



Thinking beyond construction



**Construction Quality Assurance  
Report for the  
Development of Cell 4  
Leadenham Landfill Site  
Waste Recycling Group Limited  
October 2007**

Reference: E011056/RT/October 2007/CQA Report for the Development of Cell 4			
Issue		Prepared by:	Verified by:
V1	Oct 2007	Ray Trott 	Paul Ayres 
File Ref: E011056/QR01			
White Young Green Environmental, 4 Ramsay Court, Hinchingsbrooke Business Park, Kingfisher way, Huntingdon, Cambridgeshire PE29 6LF			
Telephone: 01480 410500 Facsimile: 01480 410551 E-Mail: <a href="mailto:enviro.huntingdons@wyg.com">enviro.huntingdons@wyg.com</a>			

**Environmental Consultancy**

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3. Clay Material Suitability	3
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8. Conclusions	10
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## APPENDICES

Appendix A	-	Daily Record Sheets
Appendix B	-	Field Test Results
Appendix C	-	Laboratory Test Results
Appendix D	-	Separator Geotextile Details
Appendix E	-	Gravel Drainage Blanket Test Results

## PLATES

Plate 1	-	Watering the clay prior to conditioning
Plate 2	-	Pushing out the clay prior to rolling
Plate 3	-	Conditioning and rolling the clay
Plate 4	-	Conditioning clay to mix water and reduce particle size
Plate 5	-	Clay placement and compaction
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Plate 7	-	Drainage blanket and leachate collection pipe work



## DRAWINGS

SL-7714-04-01	-	Formation Survey
SL-7714-04-02	-	Top of Engineered Clay Liner
SL-7714-04-03	-	Leachate Collection Pipework and Concrete Bases
SL-7714-04-04	-	Engineered Clay Depth Contours
SL-7714-04-05	-	Leachate Drainage Blanket Layer Survey
SL-7714-04-06	-	Leachate Drainage Blanket Depth Contours
SL-7714-04-07	-	Cross-sections Through Formation, Engineered Clay And Leachate Drainage Blanket (1 of 5)
SL-7714-04-08	-	Cross-sections Through Formation, Engineered Clay And Leachate Drainage Blanket (2 of 5)
SL-7714-04-09	-	Cross-sections Through Formation, Engineered Clay And Leachate Drainage Blanket (3 of 5)
SL-7714-04-10	-	Cross-sections Through Formation, Engineered Clay And Leachate Drainage Blanket (4 of 5)
SL-7714-04-11	-	Cross-sections Through Formation, Engineered Clay And Leachate Drainage Blanket (5 of 5)
SL-7714-04-12	-	Cross-section Location Plan
SL-7714-04-13	-	Full Size Survey Showing New Cell 4

**1.0 INTRODUCTION**

- 1.1 The Leadenham Landfill site is located at approximately 750m east of the village of Leadenham at National Grid Reference SK 964 524. The site is owned and operated by Waste Recycling Group Limited.
- 1.2 The lining system shall comprise a 1.0m thick engineered clay liner to the basal area and side slopes, the formation of intercell bunds, keying in to the existing lining system and a leachate collection system.
- 1.3 The objectives, requirements and standards for the installation of the clay liner are detailed in the Construction Quality Assurance Plan and Specification for the Development of Cell 4 dated December 2006, Reference Number E011056/QP01. This document was submitted to the Environment Agency prior to commencement of the lining works.
- 1.4 The engineering of Cell 4 comprised a 1 metre (minimum) thick clay liner, intercellular bund and a clay side slope liner. The construction also included a leachate collection system comprising a geotextile separator, 300mm thick granular drainage blanket and leachate collection pipework, a leachate collection chamber and 2 No. remote monitoring points.
- 1.5 The principal Contractor was May Gurney (Construction) Limited.
- 1.6 White Young Green Environmental (WYGE) were appointed to prepare the CQA Plan and Specification and to undertake the daily CQA monitoring, testing and recording in accordance with the protocols detailed in the CQA Plan and Specification and subsequent correspondence with the Environment Agency.
- 1.7 Full-time CQA supervision was undertaken by WYGE. Daily Record Sheets are presented at Appendix A.
- 1.7 Independent testing of the lining system was carried out by TerraTek Limited (clay and gravel).
- 1.8 This report has been prepared to document the works undertaken during the development of Cell 4 between 14 June 2007 and 3 October 2007. The report should be read in conjunction with the CQA Plan and Specification, Reference Number E011056/QP02.

## 2.0 AN OUTLINE OF THE ENGINEERING WORKS

2.1 The scope of the works agreed with the Environment Agency comprised the following activities: -

- bulk excavation and filling to formation preparation as shown on Drawing No. 2219.C4D.02;
- placement of a 1.0m thick engineered clay liner to the basal area and inter cell bunds with a maximum permeability of  $1 \times 10^{-9}$  m/s as shown on Drawing Nos. 2219.C4D.02 and 2219.C4D.03;
- placement of a 1.0m thick engineered clay liner to the side slope area of the cell with a maximum permeability of  $1 \times 10^{-9}$  m/s as shown on Drawing No. 2219.C4D.03;
- installation of a separator geotextile as shown on Drawing No. 2219.C4D.03;
- installation of a leachate collection system comprising a 300mm thick aggregate drainage blanket and leachate collection pipework as shown on Drawing No. 2219.C4D.03 and 2219.C4D.03;
- construction of a leachate collection chamber as shown on Drawing No. 2219.C4D.04, and
- construction of 2 No. remote monitoring points.

The drawing numbers quoted above are contained in the CQA Plan and Specification Reference No. E011056/QP02.

## 2.2 Definitions

<i>Formation Level</i>	The term 'Formation Level' will mean the reprofiled surface of in-situ materials, prepared for the placement of lining materials.
<i>Clay Liner</i>	The term 'Clay Liner' will mean the 1.0m thick engineered clay hydraulic barrier overlying the Formation Level.
<i>Separator Geotextile</i>	The term 'Separator Geotextile' will mean the geotextile overlying the upper surface of the engineered clay liner.
<i>Leachate Drainage Blanket</i>	The term 'Leachate Drainage Blanket' will mean the 300mm thick granular drainage material overlying the Separator Geotextile and incorporating the leachate collection pipework.

### **3.0 CLAY MATERIAL SUITABILITY**

#### **General**

- 3.1 The site derived clay materials were used for the development of Cell 4 at the Leadenham Landfill site. This material has been previously approved by the Environment Agency for use in the construction of engineered clay seals.
- 3.2 Historically, in-situ clay materials have been incorporated in to previous cells at Leadenham Landfill Site.

## 4.0 ENGINEERING, DESIGN AND SPECIFICATION DETAILS

### Formation

- 4.1 The formation was prepared to the required gradient to form a firm unyielding surface for the receipt of the clay liner. The formation was prepared in accordance with the requirements of the CQA Plan and Specification.

### Clay Liner

- 4.3 The Specification for the clay liner was prepared and documented by WYGE in the CQA Plan and Specification.
- 4.4 A summary of the design and specification details are presented below: -
- i) The clay liner will be constructed using suitable materials with a permeability of less than  $1 \times 10^{-9}$  m/sec.
  - ii) The clay liner will be constructed to a minimum thickness of 1m.
  - iii) The clay liner will be constructed in 250mm layers compacted using suitable mechanical plant.
  - iv) The clay will be compacted to achieve no greater than 5% air voids as determined using the measured particle density for the clay.
  - v) All clay lining works will be monitored by the CQA Engineer. Each layer will be passed by the CQA Engineer prior to the placement of subsequent layers.
- 4.5 Materials which do not conform to the engineering Specifications or are considered unsuitable by the CQA Engineer shall be excavated or remediated as appropriate.

## 5.0 CLAY LINER CONSTRUCTION QUALITY ASSURANCE PROGRAMME

- 5.1 The CQA programme was instigated to ensure that all engineering works were carried out in accordance with the CQA Plan and Specification.

The CQA Plan comprised the following main areas of work:

- ◆ Supervision
- ◆ Compaction Trial
- ◆ Field Testing
- ◆ Permeability Testing

### Supervision

- 5.2 The clay lining works were supervised on a full-time basis by the CQA Engineer. The Engineer's Daily Records are presented at Appendix A.
- 5.3 The works were supervised to ensure that suitable clay materials were placed to the correct thickness and compacted with plant capable of affording sufficient compaction, such that they achieved the specification criteria detailed in the CQA Plan and Specification. The depth of the as-built clay liner is detailed on Drawing No.

### Compaction Trial

- 5.4 A compaction trial was carried out on 17 May 2007 to establish the compaction methodology for the clay materials. The compaction trial was carried out in accordance with the requirements of the approved CQA Plan, Reference No. E011056/QP02.
- 5.5 A vibrating sheepsfoot roller was used to establish the suitably placed layer thickness and the minimum number of passes required to afford adequate compaction to the placed clay and to ensure that the clay achieves the specified minimum permeability.
- 5.6 Each layer of the compaction trial was subjected to 6, 8 and 10 passes of the roller and samples were taken from each of the three layers, at locations evenly distributed over the entire area.
- 5.7 The test results showed that 10 passes were sufficient to achieve the specified requirements.
- 5.8 The compaction trial area was not incorporated into the permanent works.

### Field Testing

- 5.9 Field testing was carried out using the NDG method during the construction works. The approximate testing frequency was one test per 250m<sup>3</sup> of placed engineered clay and was carried out randomly during the works. The locations and dates of the tests are shown in the Field Test Results presented at Appendix B.
- 5.10 The NDG testing was carried out to prove that the placed clay achieved the necessary compaction criteria and exhibited a permeability value less than the specified maximum.

- 5.11 Supplementary testing was undertaken during the works to prove the consistency of the imported materials throughout the contract.

**Permeability Testing**

- 5.12 Triaxial permeability tests were undertaken on samples collected at a minimum rate of 1 per 500m<sup>3</sup> of placed material. A total of 13 cores were submitted for the Cell 4 area.
- 5.13 The Laboratory Test Results are presented at Appendix C.

## 6.0 RESULTS OF THE FIELD TESTING

### General

- 6.1 The clay lining works were carried out between 3 September 2007 and 23 September 2007.
- 6.2 The field testing and full-time CQA supervision were carried out in accordance with the requirements detailed in the CQA Plan and Specification

### Materials

- 6.3 During the construction works, clay consistency was continually assessed by visual observation.

### Field Testing

- 6.4 During the clay liner construction works (including the compaction trial and re-tests) a total of 59 field tests were carried out and these were verified by 16 check cores which were laboratory tested. The dry density, moisture content and percentage of air voids were calculated for each test result. In addition, particle size distribution, plastic limit and particle density was determined on selected field test samples. Triaxial permeability tests were undertaken on a total of 13 field test samples. The results of the field testing are presented at Appendix B.
- 6.5 A general summary of the results of the field testing is presented below: -
- ◆ The moisture content of the field tests varied between 20.7% and 29.1% with an average value of 23.8%.
  - ◆ The dry density of the field tests varied between 1.48Mg/m<sup>3</sup> and 1.77Mg/m<sup>3</sup>.
  - ◆ The percentage of air voids of the engineered clay varied between -1.2% and 4.9% with an average value of 2.2%.
  - ◆ The plastic limit of the engineered clay varied between 19% and 24% with an average value of 20.9%.
  - ◆ The particle density of the engineered clay varied between 2.68Mg/m<sup>3</sup> and 2.75Mg/m<sup>3</sup> with an average value of 2.71Mg/m<sup>3</sup>.
  - ◆ The clay content varied between 45.5% and 75.7%
  - ◆ The permeability of the engineered clay varied between 1.0 x 10<sup>-10</sup> m/s and 2.1 x 10<sup>-11</sup>m/s.
- 6.6 On the basis of the field testing, no samples failed to achieve the specified degree of compaction and all samples tested achieved <1 x 10<sup>-9</sup> m/sec permeability.



## **Design**

- 6.7 During the construction of the clay liner, the levels were periodically checked to ensure that the works were in accordance with the design and engineering specification as detailed in the CQA Plan.
- 6.8 Details of the depth of the as-built engineered clay liner are presented on Drawing Numbers SL-7714-04-02 and SL-7714-04-04.
- 6.9 As built cross-sections for Cell 4 are shown on Drawing Numbers SL-7714-04-07 and SL-7714-04-11.

## **7.0 LEACHATE DRAINAGE SYSTEM**

- 7.1 The leachate drainage system to Cell 4 was installed in direct contact with the engineered basal areas and in accordance with the details laid out in the agreed CQA Plan and Specification.
- 7.2 During the placement of the leachate drainage system the geotextile separation layer, gravel and levels were checked by the CQA Engineer to ensure that the works were in accordance with the CQA Plan and Specification. The separator geotextile panel installation records are presented at Appendix D.
- 7.3 The details of the leachate drainage system are shown on the as-built surveys and cross sections, Drawing Numbers SL-7714-04-03 and SL-7714-04-05 to SL-7714-01-11.
- 7.4 The separator geotextile was placed with a minimum overlap of 300mm and the results of the conformance testing on eight samples are presented at Appendix D. The extent of the separator geotextile installation is shown on Drawing Number.
- 7.5 During the placement of the leachate drainage system two bulk samples were taken from the gravel and submitted to a laboratory for particle size distribution (PSD) analysis, 10% fines value (TFV) and Calcium Carbonate content. The test results are presented at Appendix E.
- 7.5 On the basis of the laboratory testing, the samples achieved the leachate drainage blanket material requirements for PSD, TFV and calcium carbonate content characteristics.

**8.0 CONCLUSIONS**

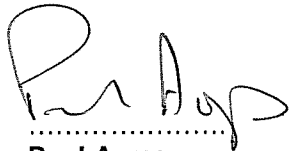
- 8.1 On the basis of visual inspections and the results of the laboratory testing programme, the clay used in the lining works was considered suitable for use in the construction of low permeability seals.
- 8.2 The clay liner construction works were supervised, tested and documented on a full-time basis in accordance with the details presented in the CQA Plan and Specification to the satisfaction of the CQA Engineer.
- 8.3 The results of the field testing show that the clay has been compacted to achieve less than 5% air voids.
- 8.4 The plastic limit of the materials used during the construction of Cell 4 varied between 19% and 24%, with an average value of 20.9%.
- 8.5 The moisture content of the materials used during the engineering works varied between 20.7% and 29.1%, with an average value of 23.8%.
- 8.6 On the basis of visual observations, and survey information it is considered that the clay liner has been constructed to a minimum thickness of 1m and the fall in Cell 4 is towards the centrally located sump.
- 8.7 Clay materials used during the construction works exhibit a permeability value less than the  $1 \times 10^{-9}$  m/s criteria specified in the CQA Plan and Specification.

## 9.0 CERTIFICATION

9.1 On the basis of the results of the survey information and the independent testing, together with the monitoring works carried out by the CQA Engineer, we hereby certify that: -

- ◆ The CQA supervision, field testing and documentation were carried out in accordance with the CQA Plan and Specification.
- ◆ The engineered clay liner was constructed in accordance with the CQA Plan and Specification and is likely to exhibit a permeability value less than  $1 \times 10^{-9}$  m/s.
- ◆ The leachate drainage system was installed in accordance with the CQA Plan and Specification.

9.2 We hereby certify that the lining works to Cell 4 at the Leaden ham Landfill site have been constructed in accordance with the CQA Plan and Specification, or to a satisfactory standard.



Paul Ayres  
CQA Project Engineer

18/10/07

Date

## APPENDICES

- Appendix A - Daily Record Sheets
- Appendix B - Field Test Results
- Appendix C - Laboratory Test Results
- Appendix D - Separator Geotextile Details
- Appendix E - Leachate Drainage Blanket Test Results

**APPENDIX A**

**DAILY RECORD SHEETS**



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b> Compaction Trial Pad for Cell 4 works	
<b>Date:</b> 17/5/07	<b>Weather:</b> 90% c/c dry		
<b>Start:</b> 09:00	<b>Finish:</b> 17:30		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	Compaction of Clay	<input checked="" type="checkbox"/>	Protection Layer Placement
Clay Conditioning	Geomembrane Placement	<input checked="" type="checkbox"/>	Restoration Soils Placement
Engineered Clay Placement	Geotextile Placement	<input checked="" type="checkbox"/>	GCL Placement
BES Placement	Drainage Blanket Installation		Leachate Sump & Collection Pipework
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)	Compaction trial		
Grid Reference	N/A		
Material	clay		
Layer Thickness	250mm		
Layer Number (Where applicable)	1		
Compaction (Passes) (Where applicable)	Between 6, 8 & 10		
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>	No
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>	No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
<p>The as dug clay is very dry and blocky so needs extensive conditioning. This was achieved by pushing out the layer, milling with 3 passes of the milling machine, wetting with 3 passes of the bowser, then a further three passes of the milling machine to achieve good consistency before rolling.</p> <p>Samples taken from each layer, core and bulk samples. Checked for inter layer bonding. Each layer subjected to 6, 8 and 10 passes.</p>			
<b>Plant Working:</b>			
MT31 dumper, tractor + Smiths miller, D6 + SF roller, DX300LC excavator.			
<b>Samples Taken (Including Lab Reference No.):</b>			
B1 to B5, C1 to C6			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			

Signed: M. Holzer

(CQA Engineer)

Dated : 17/05/07



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 14.06.07</b>		<b>Weather: Rainy</b>			
<b>Start: 08.30</b>		<b>Finish: 17.30</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning	<input checked="" type="checkbox"/>	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
General induction and demonstration of NDG equipment.					
<b>Plant Working:</b>					
Excavator, 2 x dumpers, conditioner attached to a tractor					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					
Observing work of the cell 4.					

**Signed: J Ota (CQA Engineer) Dated : 14.06.07**

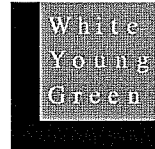




## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 15.06.07</b>		<b>Weather: Wet</b>			
<b>Start: 08.00</b>		<b>Finish: 13.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning	<input checked="" type="checkbox"/>	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>		No	
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>		No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
No work on site due to rain and the ground was too wet. But the clay conditioning was done according to standard.					
<b>Plant Working:</b>					
Conditioner, excavator, dumpers					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					
Monitoring work on cell 4.					

**Signed: J Ota (CQA Engineer) Dated : 15.06.07**



## DAILY RECORD SHEET

<b>Client:</b> WRG		<b>Site:</b> Leadenham		<b>Project:</b>	
<b>Date:</b> 18.06.07		<b>Weather:</b> A bit dry			
<b>Start:</b> 07.45		<b>Finish:</b> 17.15			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation		Compaction of Clay		Protection Layer Placement	
Clay Conditioning	✓	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes	✓	No		
Do All Works Comply With the Specification:	Yes	✓	No		
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Conditioning of clay. Pool of water at the base of cell 4. No further work on cell 4. Removing of topsoil dumped near cell 4.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
Engineer from Mitcham came to the site.					
<b>Planned Works for the following Day:</b>					
To monitor clay conditioning.					

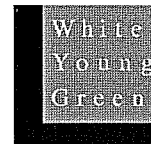
**Signed:** J Ota (CQA Engineer) **Dated :** 18.06.07



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 19.06.07	<b>Weather:</b> Dry		
<b>Start:</b> 08.00	<b>Finish:</b> 17.30		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay	Protection Layer Placement
Clay Conditioning	<input checked="" type="checkbox"/>	Geomembrane Placement	Restoration Soils Placement
Engineered Clay Placement		Geotextile Placement	GCL Placement
BES Placement		Drainage Blanket Installation	Leachate Sump & Collection Pipework
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes		No
Do All Works Comply With the Specification:	Yes		No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Water been pumped out of the cell 4 base. Removal of subgrade around cell 4 area. Conditioning of clay. Work on the cell 4 formation.			
<b>Plant Working:</b>			
Tractor with clay conditioner, excavator & dumpers.			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			
More work on the formation.			

**Signed:** J Ota (CQA Engineer)      **Dated :** 19.06.07



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 20.06.07</b>		<b>Weather: Dry</b>			
<b>Start: 07.00</b>		<b>Finish: 15.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning	<input checked="" type="checkbox"/>	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement	<input checked="" type="checkbox"/>	Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material		Clay			
Layer Thickness					
Layer Number (Where applicable)		1			
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
More work on the cell 4 sides. Engineered clay placed on cell 4 but could not compact the clay.					
<b>Plant Working:</b>					
Excavator, dumpers, NDG, compactor					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					
NDG measurements					

**Signed: J Ota (CQA Engineer) Dated : 20.06.07**

## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>			
<b>Date:</b> 21.06.07	<b>Weather:</b> Dry				
<b>Start:</b> 07.20	<b>Finish:</b> 19.00				
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay	<input checked="" type="checkbox"/>	Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement	<input checked="" type="checkbox"/>	Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
Description of Works (General Fill / Liner etc)	✓				
Grid Reference	A,B,A2,D1,A3, D1, A11,D3,A2,D2, A3,B				
Material	Clay				
Layer Thickness	250				
Layer Number (Where applicable)	1				
Compaction (Passes) (Where applicable)	No				
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>	No		
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>	No		
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Placing and compaction of clay. Initial NDG results showed low value of 0%M, advised to redo the compaction.					
<b>Plant Working:</b> Dumper, excavator, compactor					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b> NDG measurement					

**Signed:** J Ota (CQA Engineer) **Dated :** 21.06.07



## DAILY RECORD SHEET

<b>Client:</b> WRG		<b>Site:</b> Leadenham		<b>Project:</b>	
<b>Date:</b> 22.06.07		<b>Weather:</b> Dry, but later wet			
<b>Start:</b> 07.00		<b>Finish:</b> 16.00			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation		Compaction of Clay	✓	Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)	✓	✓			
Grid Reference	A3,D3,A2,D2, A1,D3,A1,D2, A2,D2,B3,B2				
Material	Clay	Clay			
Layer Thickness	250	250			
Layer Number (Where applicable)	1	2			
Compaction (Passes) (Where applicable)	✓				
Have Works Complied with Relevant Method Statements	Yes	✓	No		
Do All Works Comply With the Specification:	Yes	✓	No		
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Compaction of 1 <sup>st</sup> layer gave %M value b/w19-22%. Commenced compacting 2 <sup>nd</sup> layer but the weather became wet. Could not compact 2 <sup>nd</sup> layer due to wet weather.					
<b>Plant Working:</b>					
Dumper, excavator, compactor					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					
Monitor compaction of 2 <sup>nd</sup> layer and take NDG readings.					

**Signed:** J Ota (CQA Engineer) **Dated :** 22.06.07



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 25.06.07</b>		<b>Weather: Wet</b>			
<b>Start: 07.30</b>		<b>Finish: 16.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning	<input checked="" type="checkbox"/>	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>		No	
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>		No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Wet weather – has been raining throughout the weekend. The base of cell 4 was flooded, so the water had to be pumped out.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b> Pic 27, showing flooded cell 4 bottom					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

**Signed: J Ota (CQA Engineer) Dated : 25.06.07**

## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 26.06.07</b>		<b>Weather: Dry</b>			
<b>Start: 07.00</b>		<b>Finish: 14.30</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning	<input checked="" type="checkbox"/>	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>	No		
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>	No		
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Bottom of cell 4 still wet. Water still being pumped out of cell 4 bottom.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

**Signed: J Ota (CQA Engineer) Dated : 26.06.07**





### DAILY RECORD SHEET

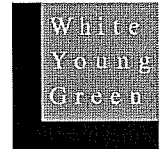
<b>Client:</b> WRG	<b>Site:</b> Leadenham		<b>Project:</b>		
<b>Date:</b> 27.06.07	<b>Weather:</b> Dry				
<b>Start:</b> 07.45	<b>Finish:</b> 16.00				
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay	<input type="checkbox"/>	Protection Layer Placement	<input type="checkbox"/>
Clay Conditioning	<input checked="" type="checkbox"/>	Geomembrane Placement	<input type="checkbox"/>	Restoration Soils Placement	<input type="checkbox"/>
Engineered Clay Placement	<input type="checkbox"/>	Geotextile Placement	<input type="checkbox"/>	GCL Placement	<input type="checkbox"/>
BES Placement	<input type="checkbox"/>	Drainage Blanket Installation	<input type="checkbox"/>	Leachate Sump & Collection Pipework	<input type="checkbox"/>
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Work could not continue because the mixer was hired out. Again the clay is still too wet for compaction.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota (CQA Engineer) Dated : 27.06.07

## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 28.06.07</b>		<b>Weather:</b>			
<b>Start: 08.00</b>		<b>Finish: 16.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning	<input checked="" type="checkbox"/>	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>	No		
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>	No		
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Bottom of cell 4 still wet. Channels being created so as to pump the remaining water out of the bottom of the cell.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

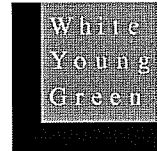
**Signed: J Ota (CQA Engineer) Dated : 28.06.07**



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 29.06.07</b>		<b>Weather: Rainy in the morning</b>			
<b>Start: 08.00</b>		<b>Finish: 16.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning	<input checked="" type="checkbox"/>	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>	No		
Do All Works Comply With the Specification:	Yes		No		
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
The cell is still too wet for the compactor to move in.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
Picture 28 showing nature of the bottom of cell 4 as at 29.06.07 and channel is created for the water to drain out of the cell 4.					
<b>Visitors to Site / Meetings</b>					
Supervisor from May Gurney					
<b>Planned Works for the following Day:</b>					
Compaction of cell, completion of layer 1 and commencing compaction of layer 2.					

**Signed: J Ota (CQA Engineer) Dated : 29.06.07**



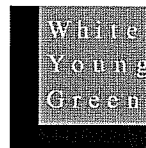
## DAILY RECORD SHEET

<b>Client:</b> WRG		<b>Site:</b> Leadenham LFS		<b>Project:</b>	
<b>Date:</b> 02/07/07		<b>Weather:</b>		<b>Cell 4</b>	
<b>Start:</b> 08.00		<b>Finish:</b> 16.30			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning	<input checked="" type="checkbox"/>	Geomembrane Placement	<input checked="" type="checkbox"/>	Restoration Soils Placement	
Engineered Clay Placement	<input checked="" type="checkbox"/>	Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Placing geomembrane in part of cell 3. Formation preparing to column 1 pumped water from cell 4 as the previous formations are filled with water.					
<b>Plant Working:</b> Excavator, dumpers, water pumping machines.					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Otu

(CQA Engineer)

Dated : 02/07/07



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 03/07/07</b>		<b>Weather: Wet</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 16.30</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
<p>There was rain overnight, again base of Cell 4 was flooded, pumping of water from cell 4 started again. Subgrade materials were removed from area near cell 4 and were moved/dumped close to where there was an old quarry.</p> <p>The engineered clay which has been previously conditioned are now too wet and need re-conditioning before using it.</p>					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 03.07.2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 04/07/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 17.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Formation preparation around cell 4. Water seeping from lagoon into cell 4 and surrounding areas. Pumping of water out of cell 4 continued.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
Picture 24: removal of subgrade material around cell 4.					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 04/07/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 05/07/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 07.20</b>		<b>Finish: 13.45</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
More rain over night, pumping of water out of cell 4 continued. Formation preparation around cell 4.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b> Picture 23: showing cell 4 as a 05.07.07 and formation preparation around cell 4.					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 05/07/2007



## DAILY RECORD SHEET

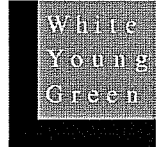
<b>Client:</b> WRG		<b>Site:</b> Leadenham LFS		<b>Project:</b>	
<b>Date:</b> 06/07/07		<b>Weather:</b> Dry		<b>Cell 4</b>	
<b>Start:</b> 07.45		<b>Finish:</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements		Yes		No	
Do All Works Comply With the Specification:		Yes		No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Not much work was done in the cell 4 area but most of the day's activities centred on preparing the formations to make way for next weeks work.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 06/07/2007





## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 09/07/07</b>		<b>Weather: Dry and sunny</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 17.30</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Construction of access road to waste dump area of the site.					
<b>Plant Working:</b>					
Dumpers, compactor, excavator					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 09/07/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 10/07/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 07.45</b>		<b>Finish:</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Formation preparation on bunds around cell 4					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 10.07/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 11/07/07</b>		<b>Weather: Dry and sunny</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 17.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Excavation of new lagoon, water from the lagoon nearer cell 4 will be pumped into the new lagoon. No work in cell 4 as water is leaking from the lagoon nearby into the cell 4.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 11/07/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 12/07/07</b>		<b>Weather: Cloudy</b>		<b>Cell 4</b>	
<b>Start: 08.16</b>		<b>Finish: 17.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
More work on the new lagoon No work on the Cell 4 yet					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 12/07/2007



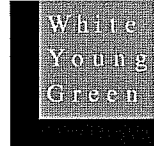
## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 13/07/07</b>		<b>Weather: Wet</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 16.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Construction of new lagoon continued.					
<b>Plant Working:</b>					
Excavator, dumptruck.					
<b>Samples Taken (Including Lab Reference No.):</b>					
None					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 13/07/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 16/07/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 16.30</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Construction of new lagoon so as to pump water from lagoon new cell 4 into the new lagoon.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 16/07/2007



## DAILY RECORD SHEET

<b>Client:</b> WRG		<b>Site:</b> Leadenham		<b>Project:</b>	
<b>Date:</b> 17/07/07		<b>Weather:</b> Wet		<b>Cell 4</b>	
<b>Start:</b> 08.30		<b>Finish:</b> 16.45			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input type="checkbox"/>	Compaction of Clay	<input type="checkbox"/>	Protection Layer Placement	<input type="checkbox"/>
Clay Conditioning	<input type="checkbox"/>	Geomembrane Placement	<input type="checkbox"/>	Restoration Soils Placement	<input type="checkbox"/>
Engineered Clay Placement	<input type="checkbox"/>	Geotextile Placement	<input type="checkbox"/>	GCL Placement	<input type="checkbox"/>
BES Placement	<input type="checkbox"/>	Drainage Blanket Installation	<input type="checkbox"/>	Leachate Sump & Collection Pipework	<input type="checkbox"/>
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Construction of new lagoon continued					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 17/07/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 18/07/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 17.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Construction of new lagoon continued.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 18/07/2007





## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham LFS	<b>Project:</b>	
<b>Date:</b> 19/07/07	<b>Weather:</b> Wet	<b>Cell 4</b>	
<b>Start:</b> 08.00	<b>Finish:</b> 16.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay	Protection Layer Placement
Clay Conditioning	<input type="checkbox"/>	Geomembrane Placement	Restoration Soils Placement
Engineered Clay Placement	<input type="checkbox"/>	Geotextile Placement	GCL Placement
BES Placement	<input type="checkbox"/>	Drainage Blanket Installation	Leachate Sump & Collection Pipework
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes		No
Do All Works Comply With the Specification:	Yes		No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Preparation of new lagoon continued.			
<b>Plant Working:</b>			
3 x diggers, 5 x dumpers			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			
More excavation of the new lagoon			

Signed: J Ota

(CQA Engineer)

Dated : 19/07/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 20/07/07</b>		<b>Weather:</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish:</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
More work on the new lagoon.					
<b>Plant Working:</b>					
Diggers, dumpers					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 20/07/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 23/07/07</b>		<b>Weather: Dry/wet</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 17.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Dug and removing of overburden from the new lagoon					
Dug new ramp					
Construction of drainage line					
Pumping out of groundwater from construction site (new lagoon)					
<b>Plant Working:</b>					
Dumpers (4) Diggers (3) Excavator					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 23/07/2007

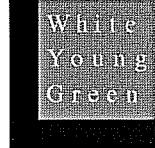
## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 24/07/07</b>		<b>Weather: wet/dry</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 17.30</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Dug and removed first layer of clay from the new lagoon (depth 2-3m of clay)					
Stockpile clay from the new lagoon					
<b>Plant Working:</b>					
3 diggers, 4 dumpers, 2 excavators					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 24/07/2007



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham LFS	<b>Project:</b>	
<b>Date:</b> 25/07/07	<b>Weather:</b> wet/raining	<b>Cell 4</b>	
<b>Start:</b> 08.00	<b>Finish:</b> 16.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay	Protection Layer Placement
Clay Conditioning	<input type="checkbox"/>	Geomembrane Placement	Restoration Soils Placement
Engineered Clay Placement	<input type="checkbox"/>	Geotextile Placement	GCL Placement
BES Placement	<input type="checkbox"/>	Drainage Blanket Installation	Leachate Sump & Collection Pipework
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes		No
Do All Works Comply With the Specification:	Yes		No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Dug and removal of more clay on the new lagoon			
Stockpiling of clay			
Pumping of groundwater out of the new lagoon			
<b>Plant Working:</b>			
3 x diggers, 4 x dumpers, 2 x excavators			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			

Signed: J Ota

(CQA Engineer)

Dated : 25/07/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 26/07/07</b>		<b>Weather: Rainy</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish:</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Digging and removal of more clay on the new lagoon.					
Stockpiling of clay from the new lagoon.					
Pumping of water from the new lagoon continued.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 26/07/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 27/07/07</b>		<b>Weather: dry/wet</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 16.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Digging of second lagoon. The ground was too slippery for work to continue.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 27/07/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 30/07/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 17.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
More work on the new lagoon extension Stockpiling of clay Start work on new second lagoon Digging and removing of overburden to the tip. 2 dumpers broke down before the end of the day.					
<b>Plant Working:</b>					
Dumpers, diggers, excavator.					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

**Signed: J Ota**

**(CQA Engineer)**

**Dated : 30/07/2007**





## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 31/07/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 17.30</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Digging and removing of overburden from the bund around the new constructed lagoon 1					
More on the new lagoon 2					
Removing of overburden from lagoon 2 to the tip					
Another dumper broke down					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 31/07/2007

## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 01/08/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 17.30</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Extension of new lagoon 1 Stockpile of clay from lagoon Digging and removing of overburden from lagoon 2					
<b>Plant Working:</b> Dumpers, excavator, diggers					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b> Pic 22: waterlogged cell 4 as at 01/08/07					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 01/08/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 02/08/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 17.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Extension of lagoon continued Stockpiling of clay from lagoon 1 Digging and removing overburden from lagoon 2					
<b>Plant Working:</b>					
2 excavators, 3 diggers, 3 dumpers					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 02/08/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 03/08/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 17.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Extension of lagoon 1 continued Stockpiling of clay from lagoon 1 Removing and dumping at the tip of overburden from lagoon 1					
<b>Plant Working:</b> Diggers, dumpers and excavator					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b> Pic 21 showing the construction and extension of lagoon 2					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Oto

(CQA Engineer)

Dated : 03/08/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 06/08/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 17.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Digging and construction of second lagoon More work on lagoon 1 extension Stockpiling of clay Digging and removal of overburden on new lagoon 2 and dumping of the overburden at the tip.					
<b>Plant Working:</b> 3 x dumpers, 2 x diggers, 2 x excavators.					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 06/08/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 07/08/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish:</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Construction of ramp bund around the new lagoon More work on the lagoon 1 extension Digging and removal of overburden from lagoon 2 Stockpiling of clay from lagoon 1					
<b>Plant Working:</b> 2 excavators, 4 dumpers, 3 diggers					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 07/08/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project: Cell 4</b>	
<b>Date: 08/08/07</b>		<b>Weather: Dry</b>			
<b>Start: 08.00</b>		<b>Finish: 17.30</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Digging of lagoon 2 Removal of overburden from lagoon 2 to tip Laying of pipe from cell 4 to lagoon 2					
<b>Plant Working:</b>					
4 dumpers, 2 excavators, 3 diggers					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 08/08/2007



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham LFS	<b>Project:</b>	
<b>Date:</b> 09/08/07	<b>Weather:</b> Dry	<b>Cell 4</b>	
<b>Start:</b> 08.00	<b>Finish:</b> 17.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay	Protection Layer Placement
Clay Conditioning		Geomembrane Placement	Restoration Soils Placement
Engineered Clay Placement		Geotextile Placement	GCL Placement
BES Placement		Drainage Blanket Installation	Leachate Sump & Collection Pipework
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes		No
Do All Works Comply With the Specification:	Yes		No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Digging and removal of overburden from lagoon 2 to tip continued Laying of pipe from cell 4 to lagoon 1 continued Build new ramp to complete one-way system on the clay stockpile			
<b>Plant Working:</b>			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
Meeting with May Gurney supervisor			
<b>Planned Works for the following Day:</b>			

Signed: J Ota

(CQA Engineer)

Dated : 09/08/2007





## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham LFS	<b>Project:</b>		
<b>Date:</b> 10/08/07	<b>Weather:</b> Dry	<b>Cell 4</b>		
<b>Start:</b> 08.00	<b>Finish:</b> 17.00			
<b>Activities Undertaken (Tick Box)</b>				
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay	Protection Layer Placement	
Clay Conditioning		Geomembrane Placement	Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement	GCL Placement	
BES Placement		Drainage Blanket Installation	Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)				
Grid Reference				
Material				
Layer Thickness				
Layer Number (Where applicable)				
Compaction (Passes) (Where applicable)				
Have Works Complied with Relevant Method Statements	Yes		No	
Do All Works Comply With the Specification:	Yes		No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>				
Digging and removal of overburden of clay from lagoon 2				
Stockpiling of clay from lagoon 2				
Laying of pipe from cell 4 to lagoon 1 continued				
<b>Plant Working:</b>				
4 dumpers, 2 excavators, 3 diggers				
<b>Samples Taken (Including Lab Reference No.):</b>				
<b>Photographs Taken (Description / Frame):</b>				
<b>Visitors to Site / Meetings</b>				
<b>Planned Works for the following Day:</b>				

**Signed:** J Ota

**(CQA Engineer)**

**Dated :** 10/08/2007



## DAILY RECORD SHEET

<b>Client:</b> WRG		<b>Site:</b> Leadenham LFS		<b>Project:</b>	
<b>Date:</b> 13/08/07		<b>Weather:</b> Dry		<b>Cell 4</b>	
<b>Start:</b> 08.00		<b>Finish:</b> 16.00			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Digging and removal of clay from lagoon 2 to stockpile					
Forming of dyke around lagoon 2					
<b>Plant Working:</b>					
3 diggers, 4 dumpers, 2 dozers (excavators)					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

**Signed:** J Ota

**(CQA Engineer)**

**Dated :** 13/08/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 14/08/07</b>		<b>Weather: Wet (raining)</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 16.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Digging and removal of clay from lagoon 2 to stockpile continued Pumping of water from cell 4 to lagoon 2					
<b>Plant Working:</b>					
3 diggers, 4 dumpers, 2 excavators					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

**Signed: J Ota**

**(CQA Engineer)**

**Dated : 14/08/2007**



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 15/08/07</b>		<b>Weather: Wet</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 15.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Digging and removal of clay from lagoon 2 to stockpile continued Changing of water pump for pumping water from cell 4 to lagoon The ground became too wet around 2.45 p.m. and site work was stopped for safety reasons					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 15/08/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project: Cell 4</b>	
<b>Date: 16/08/07</b>		<b>Weather: Dry</b>			
<b>Start: 08.00</b>		<b>Finish: 17.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Digging and removing of clay from lagoon 2 to stockpile Digging and removing of overburden from part of lagoon 2 to the top Pushing and shaping of tip Pumping of water from cell 4 to lagoon1 continued					
<b>Plant Working:</b> 2 diggers, 4 dumpers, 2 excavators					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

Dated : 16/08/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 17/08/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 08.15</b>		<b>Finish: 16.30</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Digging and removal of clay from lagoon 2 to stockpile continued Pumping of water from reservoir near cell 4 to lagoon 1 Shaping of tip					
<b>Plant Working:</b> 4 dumpers, 2 diggers, 2 excavators					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

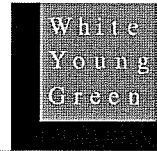
Dated : 17/08/2007



## DAILY RECORD SHEET

<b>Client:</b> WRG		<b>Site:</b> Leadenham LFS		<b>Project:</b>	
<b>Date:</b> 20/08/2007		<b>Weather:</b> Dry		<b>Cell 4</b>	
<b>Start:</b> 08.00		<b>Finish:</b> 16.30			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Digging and removing of clay from lagoon 2 to stockpile Pushing up and shaping of tip Pumping water from reservoir near cell 4 to lagoon 1					
<b>Plant Working:</b> 2 diggers, 4 dumpers, 2 excavators					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

**Signed:** J Ota (CQA Engineer)      **Dated :** 20/08/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 21/08/2007</b>		<b>Weather: Wet</b>		<b>Cell 4</b>	
<b>Start: 08.00</b>		<b>Finish: 17.30</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement	<input checked="" type="checkbox"/>	GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Clearing of pond leading to cell 4 Placing of geotextile material on the road leading to cell 4 Placing of gravelly material on the road leading to cell 4					
<b>Plant Working:</b> 1 digger, 4 dumpers, 1 excavator, roller compactor					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

**Signed: J Ota (CQA Engineer) Dated : 21/08/2007**





## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 22/08/2007</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start:</b>		<b>Finish:</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement	<input checked="" type="checkbox"/>	GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Placing of geotextile material along the road leading to cell 4 Placing of gravelly material on the road leading to cell 4 Compaction of gravelly material on the road leading to cell 4 Removal of sludge from cell 4 Removal of clay from cell 4					
<b>Plant Working:</b>					
1 x digger, 2 x dumpers, 1 x excavator, 1 x compactor					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

**Signed: J Ota**

**(CQA Engineer)**

**Dated : 22/08/2007**



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham LFS	<b>Project:</b>	
<b>Date:</b> 23/08/2007	<b>Weather:</b> Dry	<b>Cell 4</b>	
<b>Start:</b> 08.00	<b>Finish:</b> 17.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay	Protection Layer Placement
Clay Conditioning		Geomembrane Placement	Restoration Soils Placement
Engineered Clay Placement		Geotextile Placement	GCL Placement
BES Placement		Drainage Blanket Installation	Leachate Sump & Collection Pipework
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes		No
Do All Works Comply With the Specification:	Yes		No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Removal of overburden around cell 4 to tip Preparatoin of cell 4 base/floor			
<b>Plant Working:</b>			
1 digger, 1 dumper, 1 excavator			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			

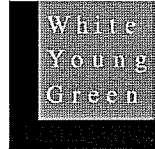
**Signed:** J Ota (CQA Engineer) **Dated :** 23/08/2007



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham LFS	<b>Project:</b>	
<b>Date:</b> 24/08/2007	<b>Weather:</b> Dry	<b>Cell 4</b>	
<b>Start:</b> 08.00	<b>Finish:</b> 17.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay	Protection Layer Placement
Clay Conditioning		Geomembrane Placement	Restoration Soils Placement
Engineered Clay Placement		Geotextile Placement	GCL Placement
BES Placement		Drainage Blanket Installation	Leachate Sump & Collection Pipework
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes		No
Do All Works Comply With the Specification:	Yes		No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Removal of overburden around cell 4 continued			
Preparation of cell 4 bunds			
Pumping of water from reservoir near cell to lagoon continued			
<b>Plant Working:</b>			
2 dumpers, 1 digger, 1 excavator			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			

**Signed:** J Ota (CQA Engineer)      **Dated :** 24/08/2007



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham LFS	<b>Project:</b>	
<b>Date:</b> 28/08/07	<b>Weather:</b> Dry	<b>Cell 4</b>	
<b>Start:</b> 08.00	<b>Finish:</b> 17.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay	Protection Layer Placement
Clay Conditioning		Geomembrane Placement	Restoration Soils Placement
Engineered Clay Placement		Geotextile Placement	GCL Placement
BES Placement		Drainage Blanket Installation	Leachate Sump & Collection Pipework
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes		No
Do All Works Comply With the Specification:	Yes		No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Construction of bund around cell 4 Removing of clay mixed with stone from the side of cell 4 and dumping at the tip			
<b>Plant Working:</b>			
2 dumpers, 1 digger, 1 excavator			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			

**Signed:** J Ota (CQA Engineer)      **Dated :** 28/08/2007

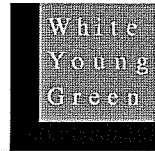
## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project: Cell 4</b>	
<b>Date: 29/08/07</b>		<b>Weather: Dry</b>			
<b>Start: 08.00</b>		<b>Finish: 17.30</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Digging and removing of slip from the back of cell 4 and dumping at the tip					
<b>Plant Working:</b>					
2 dumpers, 1 digger, 1 excavator					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: J Ota

(CQA Engineer)

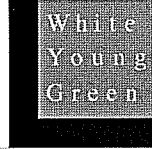
Dated : 29/08/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham LFS</b>		<b>Project:</b>	
<b>Date: 30/08/07</b>		<b>Weather: Dry</b>		<b>Cell 4</b>	
<b>Start: 07.55</b>		<b>Finish: 17.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay		Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Preparation of bunds in cell 4 Pushing and rolling of batter at the back of cell 4 Setting up pumps in lagoon 1					
<b>Plant Working:</b> 1 digger, tractor & roller, excavator, 1 dumper					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

**Signed:** J Ota (CQA Engineer)      **Dated :** 30/08/2007



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham LFS	<b>Project:</b>	
<b>Date:</b> 31/08/07	<b>Weather:</b> Dry	<b>Cell 4</b>	
<b>Start:</b> 08.00	<b>Finish:</b> 16.30		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay	Protection Layer Placement
Clay Conditioning	<input type="checkbox"/>	Geomembrane Placement	Restoration Soils Placement
Engineered Clay Placement	<input type="checkbox"/>	Geotextile Placement	GCL Placement
BES Placement	<input type="checkbox"/>	Drainage Blanket Installation	Leachate Sump & Collection Pipework
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes		No
Do All Works Comply With the Specification:	Yes		No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Formation preparation in cell 4 Draining of accumulated water in cell 4 Stabilisation of slope around cell 4			
<b>Plant Working:</b> 2 dumpers, 1 digger, 1 excavator, 1 compactor			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			

**Signed:** J Ota (CQA Engineer)      **Dated :** 31/08/07



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 03/09/07	<b>Weather:</b> Sunny	<b>Cell 4 construction</b>	
<b>Start:</b> 07.00	<b>Finish:</b> 18.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	√	Compaction of Clay	√
Clay Conditioning	√	Geomembrane Placement	
Engineered Clay Placement	√	Geotextile Placement	
BES Placement		Drainage Blanket Installation	
		Protection Layer Placement	
		Restoration Soils Placement	
		GCL Placement	
		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference	Cell 4		
Material	Clay		
Layer Thickness	300mm		
Layer Number (Where applicable)	LCP base		
Compaction (Passes) (Where applicable)	10		
Have Works Complied with Relevant Method Statements	Yes	√	No
Do All Works Comply With the Specification:	Yes	√	No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Toe at south east wall dug. LCP base filled and tested. Clay very dry. NDG giving false readings. 5 calibration cores taken to correct gauge. Cell bottom levelled reading for layer placement.			
<b>Plant Working:</b>			
2 x A25D, tractor & bowser, 210LC, D65PX, tractor and milling machine, SD122 x 1 other			
<b>Samples Taken (Including Lab Reference No.):</b>			
C1, C2, C3, C4, C5, P1, B1, NDG1, NDG2, NDG3, NDG4, NDG5, NDG6, NDG7			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			
Lay engineering clay			

**Signed:** C Newton (CQA Engineer) **Dated :** 03/09/2007

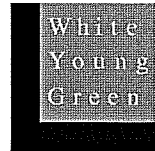




## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 04/09/07</b>		<b>Weather: Sunny</b>		<b>Cell 4 construction</b>	
<b>Start: 07.30</b>		<b>Finish: 18.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	√	Compaction of Clay	√	Protection Layer Placement	
Clay Conditioning	√	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement	√	Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference		Cell 4			
Material		Clay			
Layer Thickness		~300mm			
Layer Number (Where applicable)		1			
Compaction (Passes) (Where applicable)		10			
Have Works Complied with Relevant Method Statements	Yes	√		No	
Do All Works Comply With the Specification:	Yes	√		No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Layer 1 clay laid, milled, water added and milled again. Layer 1 compacted, retested. Clay added to top of SE side wall subgrade to give height across cell length. Clay removed to Subgrade on SW wall, clay used in layer 1.					
<b>Plant Working:</b>					
2 x A25D, tractor & bowser, tractor & miller, roller, 210LC, D64PX					
<b>Samples Taken (Including Lab Reference No.):</b>					
P2, B2, C6, NDG8, NDG9, NDG10, DNG11, NDG12, NDG13					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					
Continue laying and engineering clay					

**Signed: C Newton (CQA Engineer) Dated : 04/09/2007**



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 05/09/07</b>		<b>Weather: Sunny</b>		<b>Cell 4 construction</b>	
<b>Start: 07.00</b>		<b>Finish: 19.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation		Compaction of Clay	√	Protection Layer Placement	
Clay Conditioning	√	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement	√	Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference	Cell 4				
Material	Clay				
Layer Thickness	300mm				
Layer Number (Where applicable)	1½				
Compaction (Passes) (Where applicable)	10				
Have Works Complied with Relevant Method Statements	Yes	√		No	
Do All Works Comply With the Specification:	Yes	√		No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Layer 2 laid, engineered and tested (in G.R. C2 & C3). 10m wide strip along SW wall brought up to layer 2 level. Geofabric logged and sampled.					
<b>Plant Working:</b>					
3 x A250, tractor & bowser, tractor & miller, roller, 210LC, D65					
<b>Samples Taken (Including Lab Reference No.):</b>					
P3, B3, NDG14, NDG15, SG1, SG2					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					
Continue laying and engineering clay					

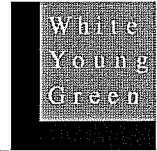
**Signed: C Newton (CQA Engineer) Dated : 05/09/2007**



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 06/09/07</b>		<b>Weather: Sunny</b>		<b>Cell 4 construction</b>	
<b>Start: 07.30</b>		<b>Finish: 19.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation		Compaction of Clay	√	Protection Layer Placement	
Clay Conditioning	√	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement	√	Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference	Cell 4				
Material	Clay				
Layer Thickness	300mm				
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)	10				
Have Works Complied with Relevant Method Statements	Yes			No	
Do All Works Comply With the Specification:	Yes			No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Rest of layer 2 engineered and tested. Layer 3 laid and engineered (only in GR C1, C2, C3) Much more water added to surface to avoid drying whilst waiting for conditioning.					
<b>Plant Working:</b>					
<b>Samples Taken (Including Lab Reference No.):</b> C7, P4, B4, NDG16, NDG17, NDG18, NDG19, NDG20, NDG21.					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

**Signed: C Newton (CQA Engineer) Dated : 06/09/2007**



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 07/09/07	<b>Weather:</b> Sunny	<b>Cell 4 construction</b>	
<b>Start:</b> 07.30	<b>Finish:</b> 19.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	Compaction of Clay	√	Protection Layer Placement
Clay Conditioning	Geomembrane Placement	√	Restoration Soils Placement
Engineered Clay Placement	Geotextile Placement	√	GCL Placement
BES Placement	Drainage Blanket Installation		Leachate Sump & Collection Pipework
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference	Cell 4		
Material	Clay		
Layer Thickness	300mm		
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)	10		
Have Works Complied with Relevant Method Statements	Yes	√	No
Do All Works Comply With the Specification:	Yes	√	No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Rest of layer 3 conditioned and tested. Layer 4 laid. Layer 6 conditioning begun .			
<b>Plant Working:</b>			
<b>Samples Taken (Including Lab Reference No.):</b> C8, P5, B5, NDG22, NDG23, NDG24, NDG25, GV1, GV2			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b> To bring SE side wall formation up to height, now finish reconditioning layers.			

**Signed:** C Newton (CQA Engineer) **Dated :** 07/09/2007



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 10/09/07</b>		<b>Weather: Sunny</b>		<b>Cell 4 construction</b>	
<b>Start: 07.30</b>		<b>Finish: 19.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	√	Compaction of Clay	√	Protection Layer Placement	
Clay Conditioning	√	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement		Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference	Cell 4				
Material					
Layer Thickness					
Layer Number (Where applicable)	4				
Compaction (Passes) (Where applicable)	10				
Have Works Complied with Relevant Method Statements	Yes	√	No		
Do All Works Comply With the Specification:	Yes	√	No		
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Layer 4 completed and tested. Layer 5 begun – layer 5 will be tested at the edges only, as conditioned clay on the majority of layer 5 and all layers above will be used for side walls and mid cell bund. Large volume of water required to be added. Engineering process: lay org clay, wet, mill, wet, mill, wet, mill, wet, roll.					
<b>Plant Working:</b>					
3 x A25D, tractor & bowser, tractor & miller, roller, 210LC, D65PX					
<b>Samples Taken (Including Lab Reference No.):</b>					
NDG26, NDG27, NDG28, NDG29, NDG30, NDG31, C9, B6, B7, P6, P7					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					
Continue with layer 5.					

**Signed: C Newton (CQA Engineer) Dated : 10/09/2007**



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 11/09/07</b>		<b>Weather: Sunny</b>		<b>Cell 4 construction</b>	
<b>Start: 07.30</b>		<b>Finish: 19.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation		Compaction of Clay	√	Protection Layer Placement	
Clay Conditioning	√	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement	√	Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)	3/4				
Compaction (Passes) (Where applicable)	10				
Have Works Complied with Relevant Method Statements	Yes	√		No	
Do All Works Comply With the Specification:	Yes	√		No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Layer 5 laid but not completed.					
<b>Plant Working:</b>					
3 x A25D, tractor & bowser, tractor & miller, roller, 210LC, D65PX					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					
Complete layer 5 and test.					

**Signed: C Newton**

**(CQA Engineer)**

**Dated : 11/09/2007**



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 12/09/07</b>		<b>Weather: Sunny</b>		<b>Cell 4 construction</b>	
<b>Start: 07.30</b>		<b>Finish: 19.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation		Compaction of Clay	√	Protection Layer Placement	
Clay Conditioning	√	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement	√	Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness	300mm				
Layer Number (Where applicable)	1				
Compaction (Passes) (Where applicable)	10				
Have Works Complied with Relevant Method Statements	Yes	√		No	
Do All Works Comply With the Specification:	Yes	√		No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Layer 5 completed and tested. Layer 6 begun.					
<b>Plant Working:</b>					
3 x A25D, tractor & bowser, tractor & miller, roller, 210LC, D65PX					
<b>Samples Taken (Including Lab Reference No.):</b>					
NDG32, NDG33, C10					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					
Complete and test layer 6.					

**Signed: C Newton**

**(CQA Engineer)**

**Dated : 12/09/2007**



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 13/09/07</b>		<b>Weather: Sunny</b>		<b>Cell 4 construction</b>	
<b>Start: 07.30</b>		<b>Finish: 19.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation		Compaction of Clay	√	Protection Layer Placement	
Clay Conditioning	√	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement	√	Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)	1				
Compaction (Passes) (Where applicable)	10				
Have Works Complied with Relevant Method Statements	Yes	√		No	
Do All Works Comply With the Specification:	Yes	√		No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Layer 6 completed and tested. Layer 7 begun.					
<b>Plant Working:</b>					
3 x A25D, tractor & bowser, tractor & miller, roller, 210LC, D65PX					
<b>Samples Taken (Including Lab Reference No.):</b>					
NDG34, NDG34, P8, B8					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					
Complete layer 7 and test.					

**Signed: C Newton**

**(CQA Engineer)**

**Dated : 13/09/07**





## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 14/09/07</b>		<b>Weather: Sunny</b>		<b>Cell 4 construction</b>	
<b>Start: 07.30</b>		<b>Finish: 19.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation		Compaction of Clay	√	Protection Layer Placement	
Clay Conditioning	√	Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement	√	Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)	1				
Compaction (Passes) (Where applicable)	10				
Have Works Complied with Relevant Method Statements	Yes	√		No	
Do All Works Comply With the Specification:	Yes	√		No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Layer 7 completed and tested. This will be the last full layer as there is now enough clay engineered to cover all the sides. Layer 8 laid just around edges, reading for testing tomorrow.					
<b>Plant Working:</b>					
3 x A25D, tractor & bowser, tractor & miller, roller, 210LC, D65PX					
<b>Samples Taken (Including Lab Reference No.):</b>					
NDG36, NDG37, C11					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					
Test layer 8					

**Signed: C Newton**

**(CQA Engineer)**

**Dated : 14/09/07**



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 15/09/07</b>		<b>Weather: Sunny</b>		<b>Cell 4 construction</b>	
<b>Start: 07.30</b>		<b>Finish: 13.30</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation		Compaction of Clay	√	Protection Layer Placement	
Clay Conditioning		Geomembrane Placement		Restoration Soils Placement	
Engineered Clay Placement	√	Geotextile Placement		GCL Placement	
BES Placement		Drainage Blanket Installation		Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)	2				
Compaction (Passes) (Where applicable)	10				
Have Works Complied with Relevant Method Statements	Yes	√		No	
Do All Works Comply With the Specification:	Yes	√		No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Layers 9 and 10 laid around edges (9 from stockpile, 10 from cell floor).					
<b>Plant Working:</b>					
3 x A250, tractor & bowser, tractor & miller, roller, 210LC, D65PX					
<b>Samples Taken (Including Lab Reference No.):</b>					
NDG38, NDG39, NDG40, NDG21, NDG42, P9, B9, C12					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

**Signed: C Newton**

**(CQA Engineer)**

**Dated : 15/09/07**



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 17/09/07	<b>Weather:</b> Sunny	<b>Cell 4 construction</b>	
<b>Start:</b> 07/30	<b>Finish:</b> 19.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	Compaction of Clay	✓	Protection Layer Placement
Clay Conditioning	Geomembrane Placement	✓	Restoration Soils Placement
Engineered Clay Placement	Geotextile Placement	✓	GCL Placement
BES Placement	Drainage Blanket Installation		Leachate Sump & Collection Pipework
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)	1½		
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes	✓	No
Do All Works Comply With the Specification:	Yes	✓	No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Clay layers 10 and 11 completed and both tested (inner cell bund) Clay begun to be pushed up SE wall			
<b>Plant Working:</b>			
Tractor & bowser, 250LS, D5M, roller, mini digger			
<b>Samples Taken (Including Lab Reference No.):</b>			
NDG43, NDG44, NDG46, NDG47, P10, B10, C13, B11			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			

**Signed: C Newton**

**(CQA Engineer)**

**Dated : 17/09/2007**



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 18/09/07	<b>Weather:</b>	<b>Cell 4 construction</b>	
<b>Start:</b> 07.30	<b>Finish:</b> 19.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	Compaction of Clay	Protection Layer Placement	
Clay Conditioning	Geomembrane Placement	Restoration Soils Placement	
Engineered Clay Placement	Geotextile Placement	GCL Placement	
BES Placement	Drainage Blanket Installation	Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)	1		
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>	No
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>	No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Clay laid on SE wall and rolling begun. Trimming of inner cell bund commenced.			
<b>Plant Working:</b>			
Tractor & bowser, 250LS, D5M, roller, mini digger			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			

**Signed: C Newton**

**(CQA Engineer)**

**Dated : 18/09/2007**



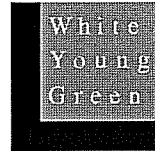
## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 19/09/07	<b>Weather:</b> Sunny	<b>Cell 4 construction</b>	
<b>Start:</b> 07.30	<b>Finish:</b> 19.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	Compaction of Clay	Protection Layer Placement	
Clay Conditioning	Geomembrane Placement	Restoration Soils Placement	
Engineered Clay Placement	Geotextile Placement	GCL Placement	
BES Placement	Drainage Blanket Installation	Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness	300mm		
Layer Number (Where applicable)	1		
Compaction (Passes) (Where applicable)	12-14		
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>	No
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>	No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
ND52 taken as retest of NDG27 due to failed core, location is layer 4 in base of cell which has been uncovered and is on final clay level – anchor trenches begun.			
<b>Plant Working:</b>			
Tractor & bowser, 250LS, D5M, roller, mini digger			
<b>Samples Taken (Including Lab Reference No.):</b>			
NDG48, NDG49, NDG50, NDG51, NDG52, P12, B12, C14 – retest for C9			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			

Signed: C Newton

(CQA Engineer)

Dated : 19/09/2007



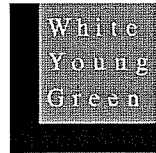
## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 20/09/07	<b>Weather:</b> Overcast	<b>Cell 4 construction</b>	
<b>Start:</b> 07.30	<b>Finish:</b>		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	Compaction of Clay	Protection Layer Placement	
Clay Conditioning	Geomembrane Placement	Restoration Soils Placement	
Engineered Clay Placement	Geotextile Placement	GCL Placement	
BES Placement	Drainage Blanket Installation	Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)	2		
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes		No
Do All Works Comply With the Specification:	Yes		No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Layer 2 tested. Layers 3 and 4 laid and tested. Batters and floor continued to be trimmed. Flat roller driven over trimmed areas. Anchor trenches continue to be dug.			
<b>Plant Working:</b> Tractor & bowser, 250LS, D5M, roller, mini digger			
<b>Samples Taken (Including Lab Reference No.):</b> NDG53, ND54, NDG55, NDG56, NDG57, NDG58, NDG59, P13, B13, C15, C16 – retest of C13.			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			

**Signed: C Newton**

**(CQA Engineer)**

**Dated : 20/09/2007**



## DAILY RECORD SHEET

<b>Client: WRG</b>		<b>Site: Leadenham</b>		<b>Project:</b>	
<b>Date: 21/09/07</b>		<b>Weather: Overcast</b>		<b>Cell 4 construction</b>	
<b>Start: 07.30</b>		<b>Finish: 19.00</b>			
<b>Activities Undertaken (Tick Box)</b>					
Subgrade/Formation Preparation	<input type="checkbox"/>	Compaction of Clay	<input type="checkbox"/>	Protection Layer Placement	<input type="checkbox"/>
Clay Conditioning	<input type="checkbox"/>	Geomembrane Placement	<input type="checkbox"/>	Restoration Soils Placement	<input type="checkbox"/>
Engineered Clay Placement	<input type="checkbox"/>	Geotextile Placement	<input type="checkbox"/>	GCL Placement	<input type="checkbox"/>
BES Placement	<input type="checkbox"/>	Drainage Blanket Installation	<input type="checkbox"/>	Leachate Sump & Collection Pipework	<input type="checkbox"/>
<b>Earthworks Details</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Description of Works (General Fill / Liner etc)					
Grid Reference					
Material					
Layer Thickness					
Layer Number (Where applicable)					
Compaction (Passes) (Where applicable)					
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>		No	
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>		No	
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>					
Trimming of batters and floor. Anchor trenches completed.					
<b>Plant Working:</b>					
Tractor & bowser, 250LS, D5M, roller, mini digger					
<b>Samples Taken (Including Lab Reference No.):</b>					
<b>Photographs Taken (Description / Frame):</b>					
<b>Visitors to Site / Meetings</b>					
<b>Planned Works for the following Day:</b>					

Signed: C Newton

(CQA Engineer)

Dated : 21/09/2007



## DAILY RECORD SHEET

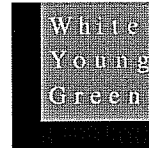
<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 24/09/07	<b>Weather:</b> wet	<b>Cell 4 construction</b>	
<b>Start:</b> 07.30	<b>Finish:</b>		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay	Protection Layer Placement
Clay Conditioning		Geomembrane Placement	Restoration Soils Placement
Engineered Clay Placement		Geotextile Placement	GCL Placement
BES Placement		Drainage Blanket Installation	Leachate Sump & Collection Pipework
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>	No
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>	No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Weekend work without CQA consisted of the building on access ramp to cell.			
<b>Plant Working:</b>			
Tractor & bowser, 250LS, D5M, roller			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			
Dig LCP sumps, remove excess clay			

**Signed: C Newton**

**(CQA Engineer)**

**Dated : 24/09/2007**





## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 25/09/07	<b>Weather:</b> Patchy rain	<b>Cell 4 construction</b>	
<b>Start:</b> 07.30	<b>Finish:</b> 18.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	Compaction of Clay	Protection Layer Placement	
Clay Conditioning	Geomembrane Placement	Restoration Soils Placement	
Engineered Clay Placement	Geotextile Placement	GCL Placement	
BES Placement	Drainage Blanket Installation	Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness	100-200mm		
Layer Number (Where applicable)	1		
Compaction (Passes) (Where applicable)	12-14		
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>	No
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>	No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Thin layer of clay placed on SE wall due to surveying error causing the removal of too much clay. Clay of very high standard. LCP sumps dug in centre and south corner. Issues with surveying caused some confusion, profiles placed inaccurately.			
<b>Plant Working:</b>			
Tractor & bowser, 250LS, D5M, roller			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			
Remove excess clay from cell. Install base concrete for CCP.			

Signed: C Newton

(CQA Engineer)

Dated : 25/09/2007



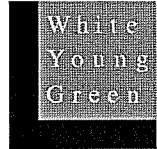
## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 26/09/07	<b>Weather:</b> Overcast/co ld	<b>Cell 4 construction</b>	
<b>Start:</b> 07.30	<b>Finish:</b> 19.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	Compaction of Clay	Protection Layer Placement	
Clay Conditioning	Geomembrane Placement	Restoration Soils Placement	
Engineered Clay Placement	Geotextile Placement	GCL Placement	
BES Placement	Drainage Blanket Installation	Leachate Sump & Collection Pipework	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>	No
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>	No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Clay removal from cell back to stockpile. Iron rod reinforcement cages put in sump holes. Holes filled with concrete. Addition of sandstone to access ramp to cell.			
<b>Plant Working:</b>			
Tractor & bowser, 2 x A25, 210LS, D5M, tractor bowser			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			
Continue removing excess clay.			

**Signed: C Newton**

**(CQA Engineer)**

**Dated : 26/09/2007**



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 28/09/07	<b>Weather:</b> Overcast	<b>Cell 4 construction</b>	
<b>Start:</b> 07.00	<b>Finish:</b> 18.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	<input checked="" type="checkbox"/>	Compaction of Clay	Protection Layer Placement
Clay Conditioning		Geomembrane Placement	Restoration Soils Placement
Engineered Clay Placement		Geotextile Placement	GCL Placement
BES Placement		Drainage Blanket Installation	Leachate Sump & Collection Pipework
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)	Cell 4 construction		
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes	<input checked="" type="checkbox"/>	No
Do All Works Comply With the Specification:	Yes	<input checked="" type="checkbox"/>	No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Continual removal of excess clay from all. Trimming of inner cell bund.			
<b>Plant Working:</b> A25 x 2, D5M, 210LS			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b> Complete trimming works over weekend			

**Signed:** C Newton (CQA Engineer)      **Dated:** 28/09/2007



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 01/10/07	<b>Weather:</b> Overcast	<b>Cell 4 construction</b>	
<b>Start:</b> 07.00	<b>Finish:</b> 18.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	Compaction of Clay	Protection Layer Placement	
Clay Conditioning	Geomembrane Placement	Restoration Soils Placement	
Engineered Clay Placement	Geotextile Placement	GCL Placement	
BES Placement	Drainage Blanket Installation	✓	Leachate Sump & Collection Pipework
		✓	
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
	<b>4</b>		
Description of Works (General Fill / Liner etc)	Cell 4 construction		
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes	✓	No
Do All Works Comply With the Specification:	Yes	✓	No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Approximately ¾ of geotextile laid in cell (see maps)			
Gravel added to cell on top of fabric			
Leachate monitoring point and Leachate collection points built			
<b>Plant Working:</b>			
A25 x 2, JCB, 210LS, D5M			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			
Continue adding gravel, complete geotextile laying			

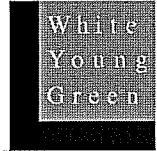
**Signed:** C Newton (CQA Engineer)      **Dated:** 01/10/2007



## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 2/10/07	<b>Weather:</b> Overcast	<b>Cell 4 construction</b>	
<b>Start:</b> 07.00	<b>Finish:</b> 18.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	Compaction of Clay	Protection Layer Placement	
Clay Conditioning	Geomembrane Placement	Restoration Soils Placement	
Engineered Clay Placement	Geotextile Placement	GCL Placement	
BES Placement	Drainage Blanket Installation	Leachate Sump & Collection Pipework	✓
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes	✓	No
Do All Works Comply With the Specification:	Yes	✓	No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Geofabric laying completed All gravel needed now in cell LCP and LMP concrete added			
<b>Plant Working:</b>			
A25 x 2, D5M, 210LS, JCB			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b>			
Continue levelling gravel			

**Signed:** C Newton (CQA Engineer)      **Dated:** 02/10/2007

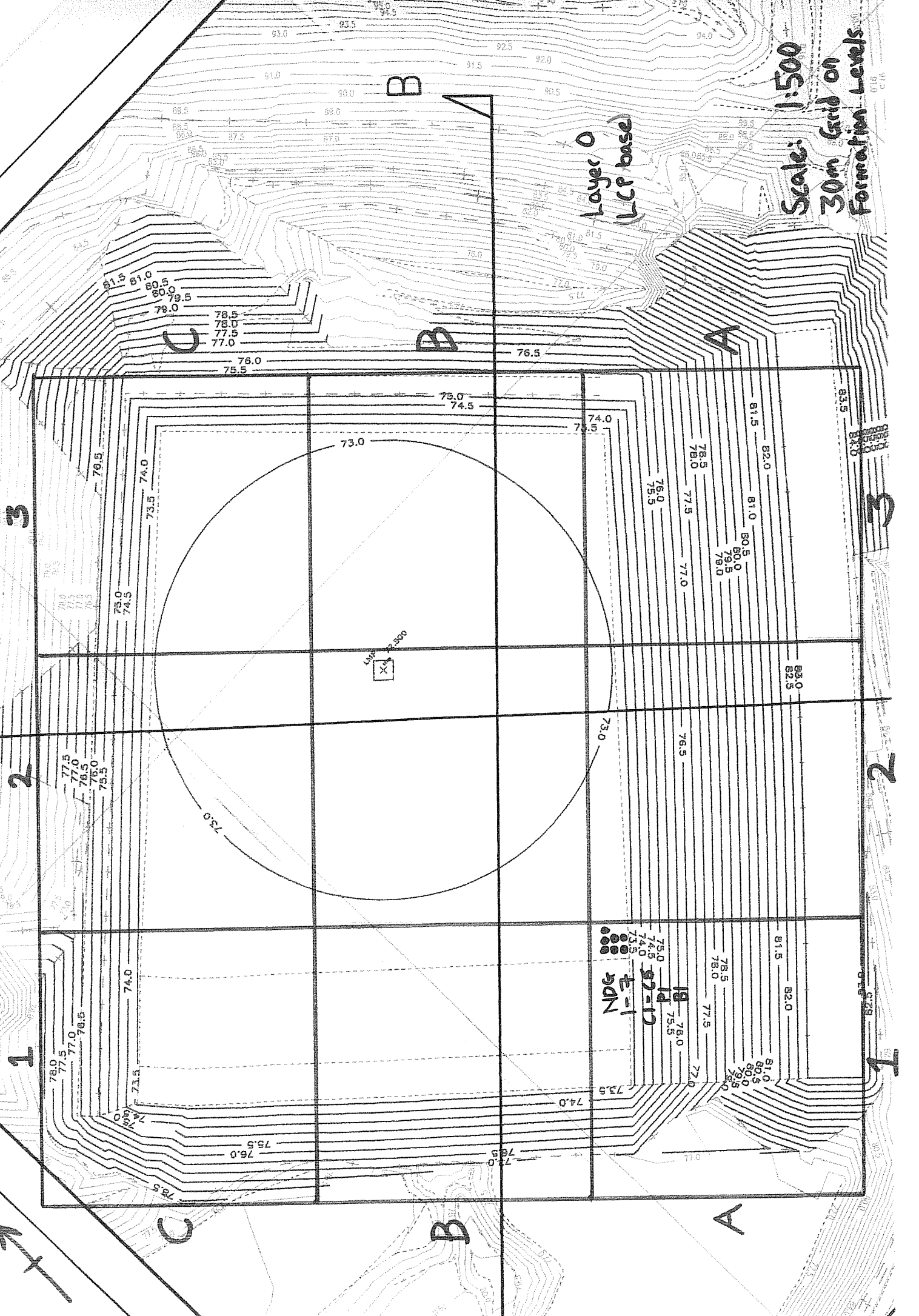


## DAILY RECORD SHEET

<b>Client:</b> WRG	<b>Site:</b> Leadenham	<b>Project:</b>	
<b>Date:</b> 03/10/07	<b>Weather:</b> Overcast	<b>Cell 4 construction</b>	
<b>Start:</b> 07.30	<b>Finish:</b> 18.00		
<b>Activities Undertaken (Tick Box)</b>			
Subgrade/Formation Preparation	Compaction of Clay	Protection Layer Placement	
Clay Conditioning	Geomembrane Placement	Restoration Soils Placement	
Engineered Clay Placement	Geotextile Placement	GCL Placement	
BES Placement	Drainage Blanket Installation	Leachate Sump & Collection Pipework	✓
<b>Earthworks Details</b>	<b>1</b>	<b>2</b>	<b>3</b>
Description of Works (General Fill / Liner etc)			
Grid Reference			
Material			
Layer Thickness			
Layer Number (Where applicable)			
Compaction (Passes) (Where applicable)			
Have Works Complied with Relevant Method Statements	Yes	✓	No
Do All Works Comply With the Specification:	Yes	✓	No
<b>General Details / Comments / Problems Encountered / Deviation from Method Statements and Specification</b>			
Gravel in cell shaped and levelled Anchor trench on inner cell barrier filled in with conditioned clay from stockpile LCP pipes laid and set in gravel			
<b>Plant Working:</b> 2 x A25, JCB, D5M, 210LS			
<b>Samples Taken (Including Lab Reference No.):</b>			
<b>Photographs Taken (Description / Frame):</b>			
<b>Visitors to Site / Meetings</b>			
<b>Planned Works for the following Day:</b> Complete drainage pipework			

**Signed:** C Newton (CQA Engineer)      **Dated:** 03/10/2007

**APPENDIX B**  
**FIELD TEST RESULTS**



Scale: 1:500  
30m Grid on Formation Levels

Layer 0  
(LCP base)

3

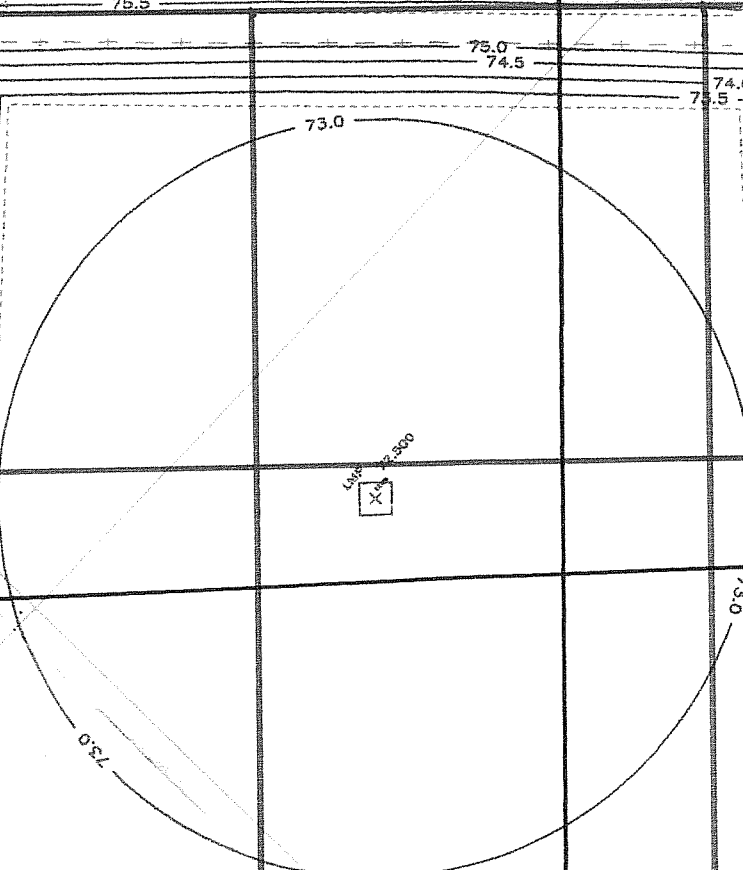
3

2

2

1

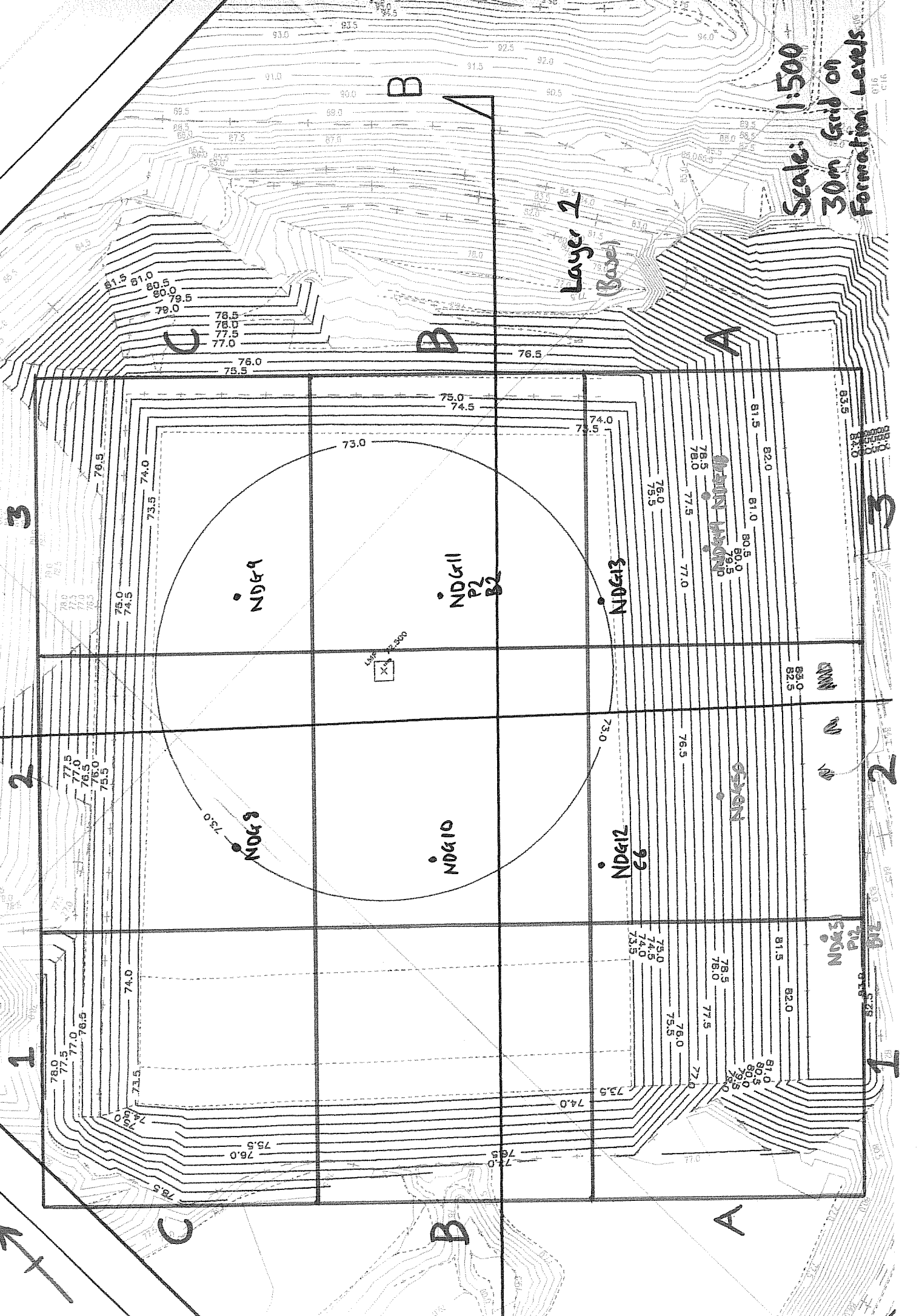
1



NDG  
1-3  
11-12  
13-14  
15-16







Scale: 1:500  
30m Grid on Formation Levels

Layer 2  
(Base)

B

B

A

C

3

3

2

2

1

1

NDG9

NDG11  
P2  
B2

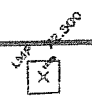
NDG13

NDG8

NDG10

NDG12  
E6

NDG5  
P12



NDG14  
P12  
B2

NDG15

81.5  
81.0  
80.5  
79.5  
78.5  
78.0  
77.5  
77.0

91.0  
89.0  
87.5  
86.5  
85.5

91.5  
92.0  
92.5

94.0  
93.5  
93.0  
92.5

79.5  
74.0  
73.5  
73.0

75.0  
74.5

74.0  
73.5  
73.0

73.0

75.0  
74.5

74.0  
73.5

81.5  
82.0  
81.0  
80.5  
80.0  
79.5

78.5  
78.0  
77.5  
77.0

83.5  
83.0  
82.5

77.5  
77.0  
76.5  
76.0  
75.5

75.0  
74.5

73.0

73.0

73.0

76.5  
76.0  
75.5

83.0  
82.5

78.0  
77.5  
77.0  
76.5

74.0  
73.5  
73.0

74.0

75.5  
76.0  
76.5

74.0

73.5  
73.0

74.0

73.5  
73.0

76.0  
75.5

72.0

78.5  
78.0  
77.5

81.5  
82.0

81.0  
80.5  
80.0  
79.5

78.5  
78.0  
77.5

81.5  
82.0

81.0  
80.5  
80.0  
79.5

78.5  
78.0  
77.5

81.5  
82.0

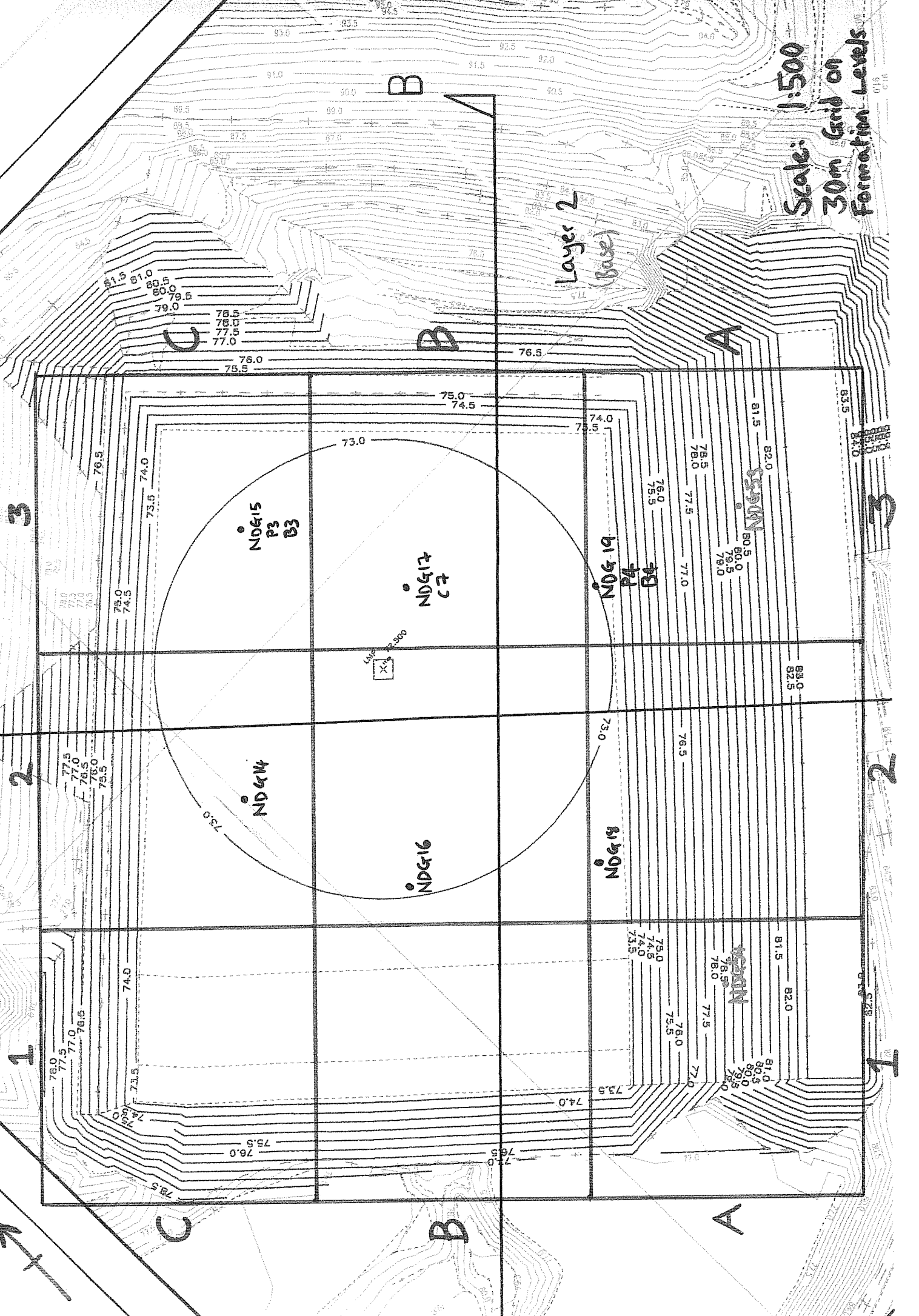
81.0  
80.5  
80.0  
79.5

78.5  
78.0  
77.5

81.5  
82.0

81.0  
80.5  
80.0  
79.5

78.5  
78.0  
77.5



Scale: 1:500  
30m Grid on Formation Levels

Layer 2  
(Base)

3

2

1

3

2

1

B

B

A

C

C

B

A

NDG 15  
P3  
B3

NDG 17  
P3  
B3

NDG 19  
P4  
B4

NDG 25  
P5  
B5

NDG 14  
P3  
B3

NDG 16  
P3  
B3

NDG 18  
P4  
B4

NDG 26  
P5  
B5

NDG 30  
P5  
B5

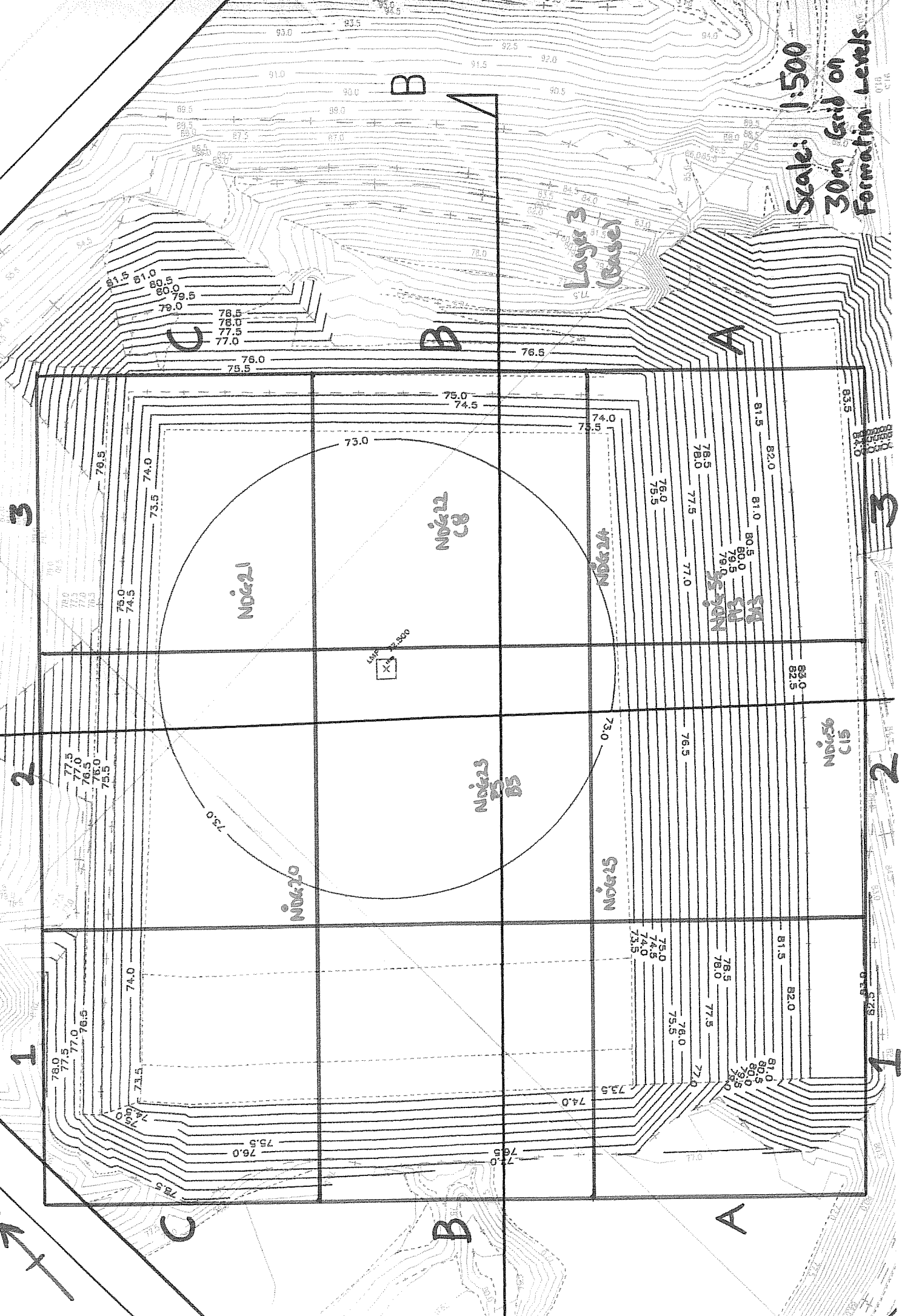
NDG 34  
P5  
B5

NDG 38  
P5  
B5

X



Scale: 1:500  
30m Grid on  
Formation Levels



Layer 3  
(base)

NO. 21  
C8

NO. 23  
B5

NO. 26  
B3

NO. 26  
C15

3

2

1

3

2

1

C

B

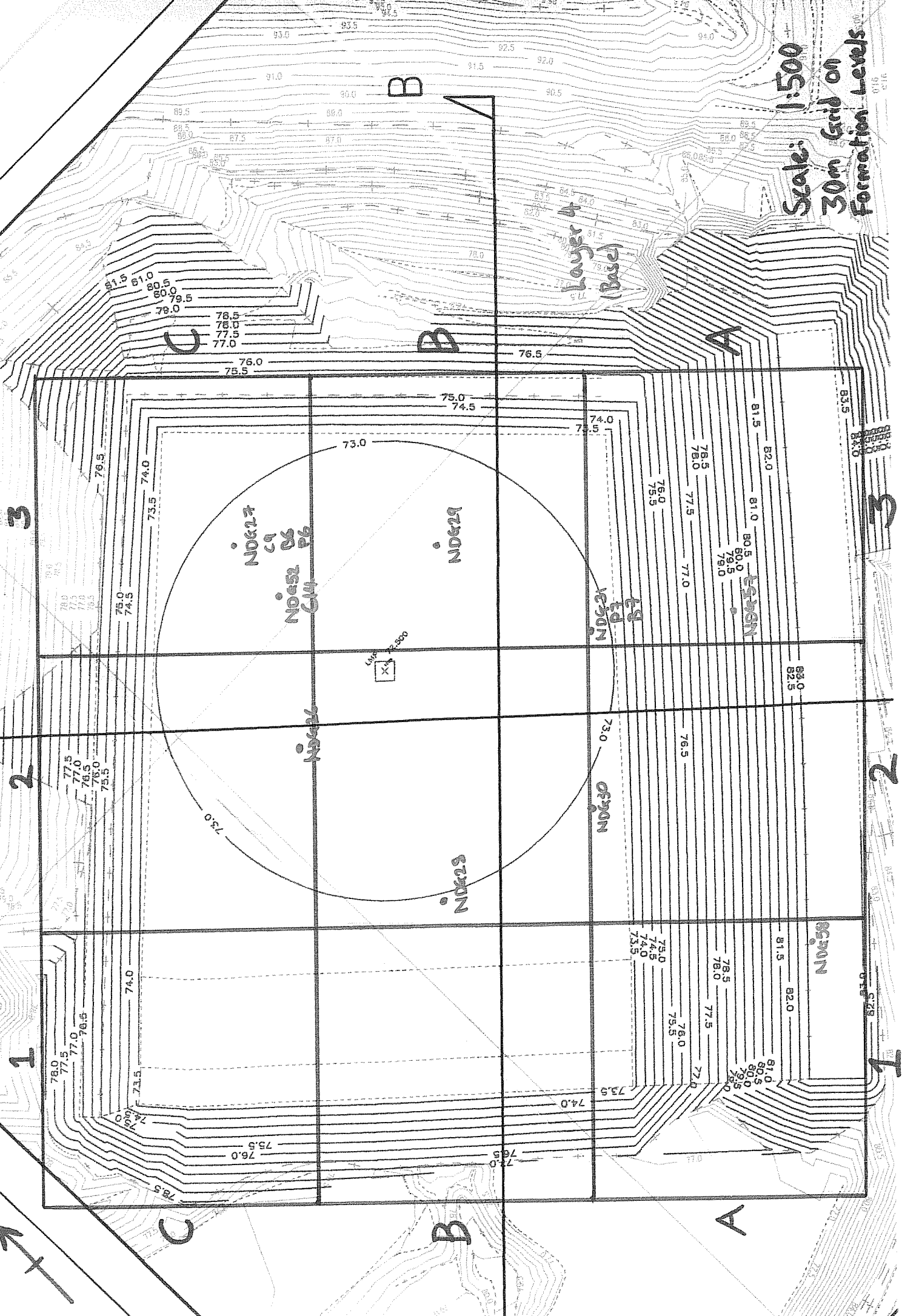
B

A

C

B

A



Scale: 1:500  
30m Grid on Formation Levels

Layer 4  
(Base)

3 3 2 2 1 1

C B A

C B A

X

ND627  
96  
97

ND628  
94

ND629

ND625  
97  
97

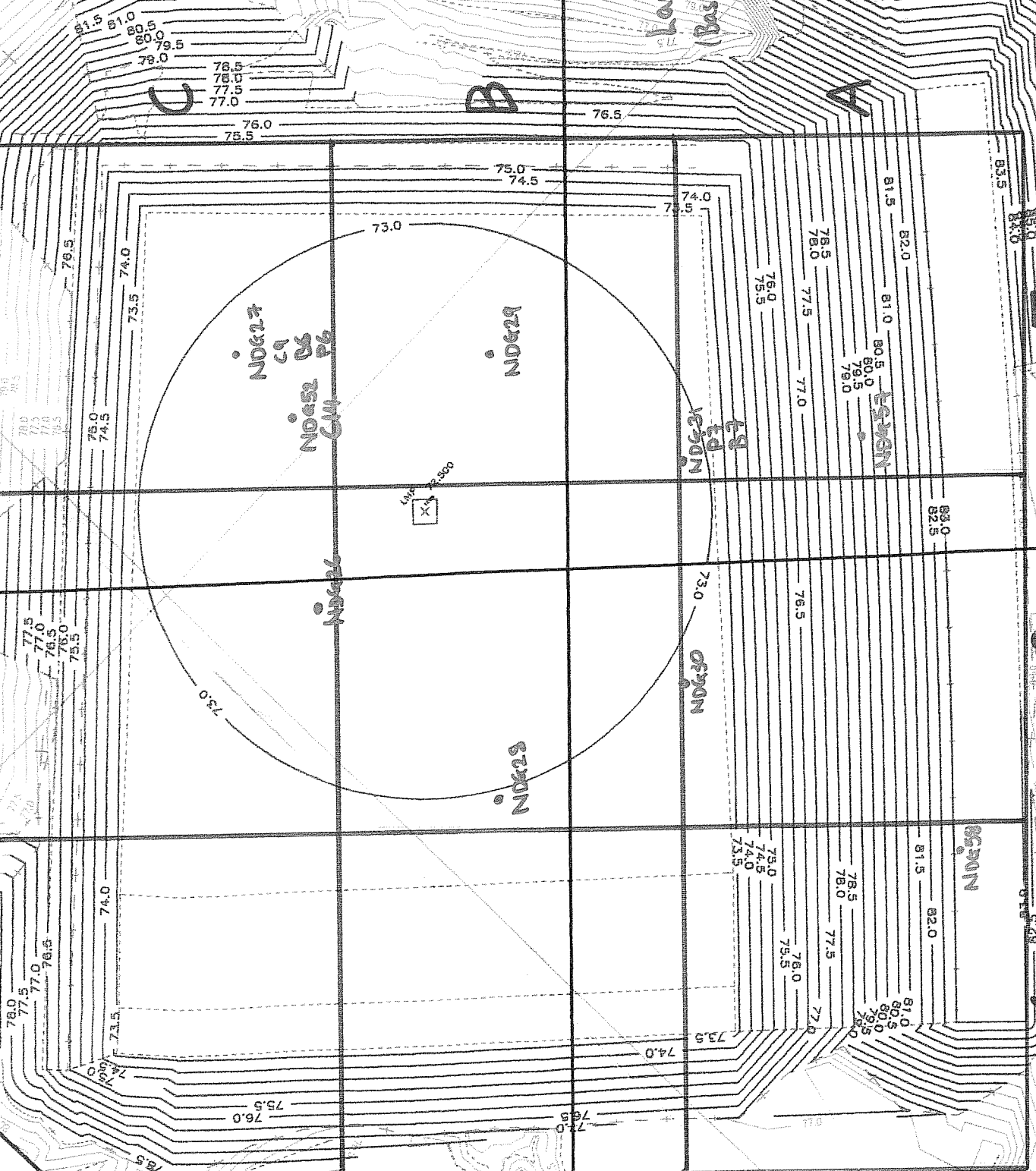
ND626

ND622

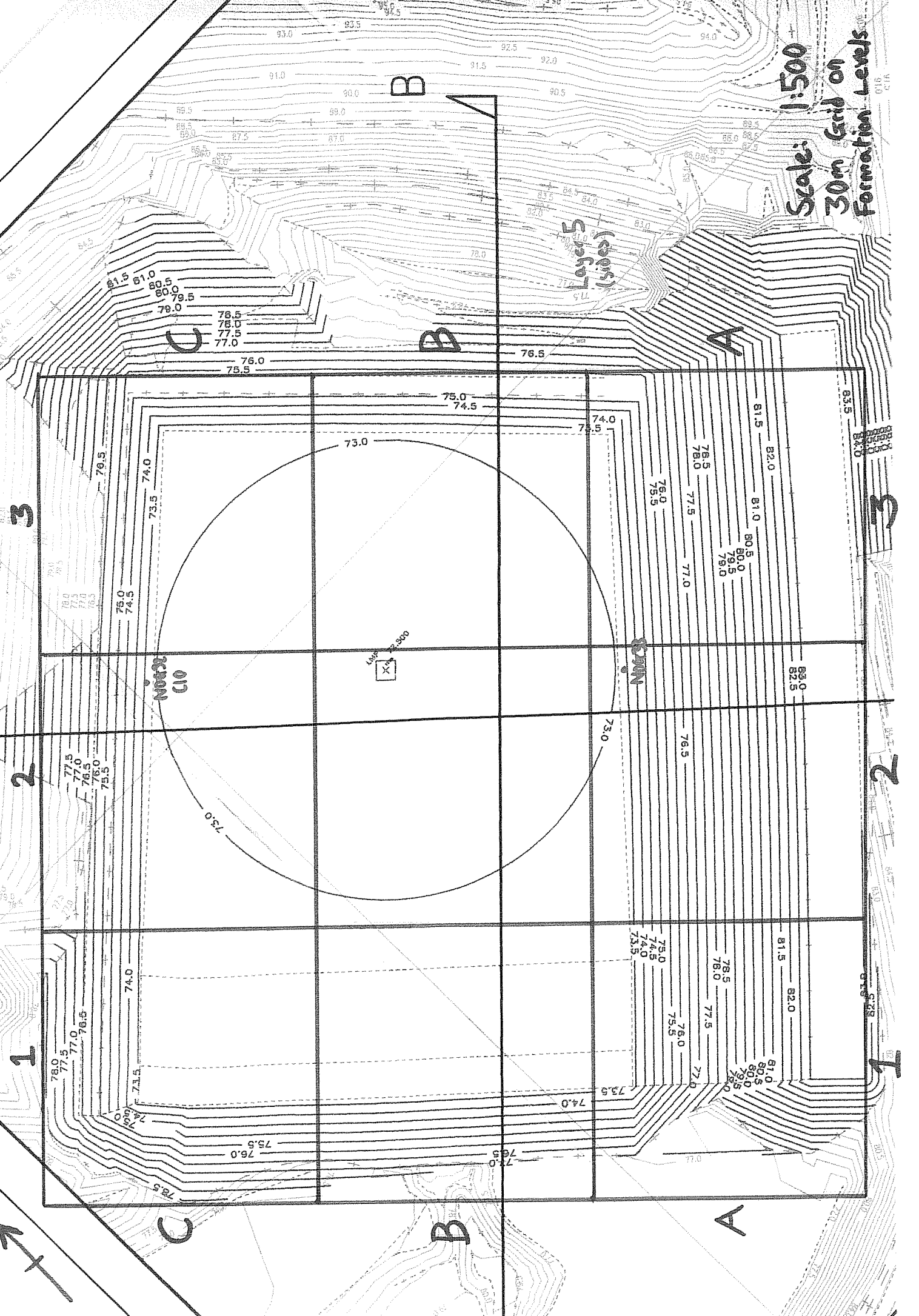
ND629

ND628

ND626

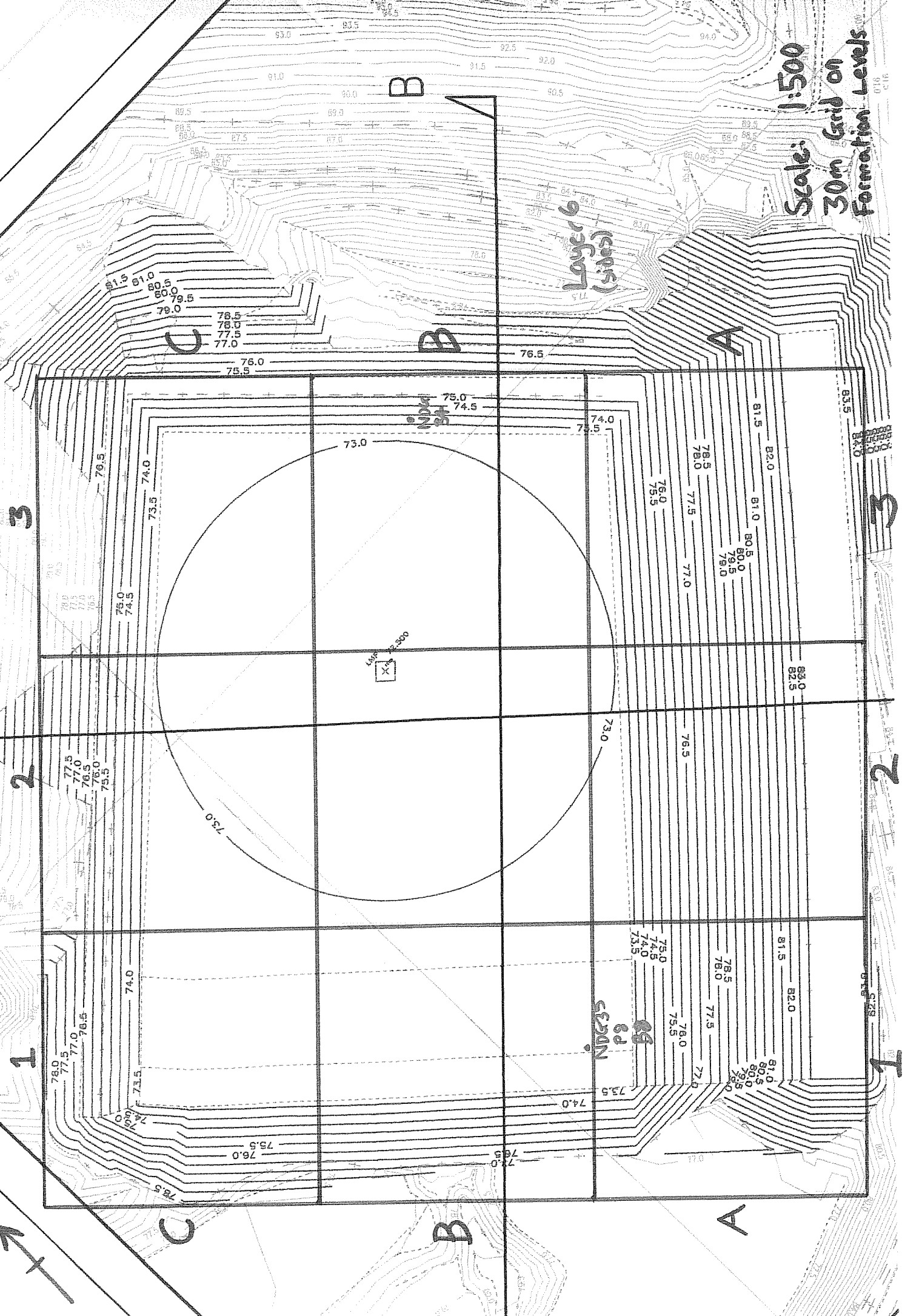


Scale: 1:500  
30m Grid on  
Formation Levels

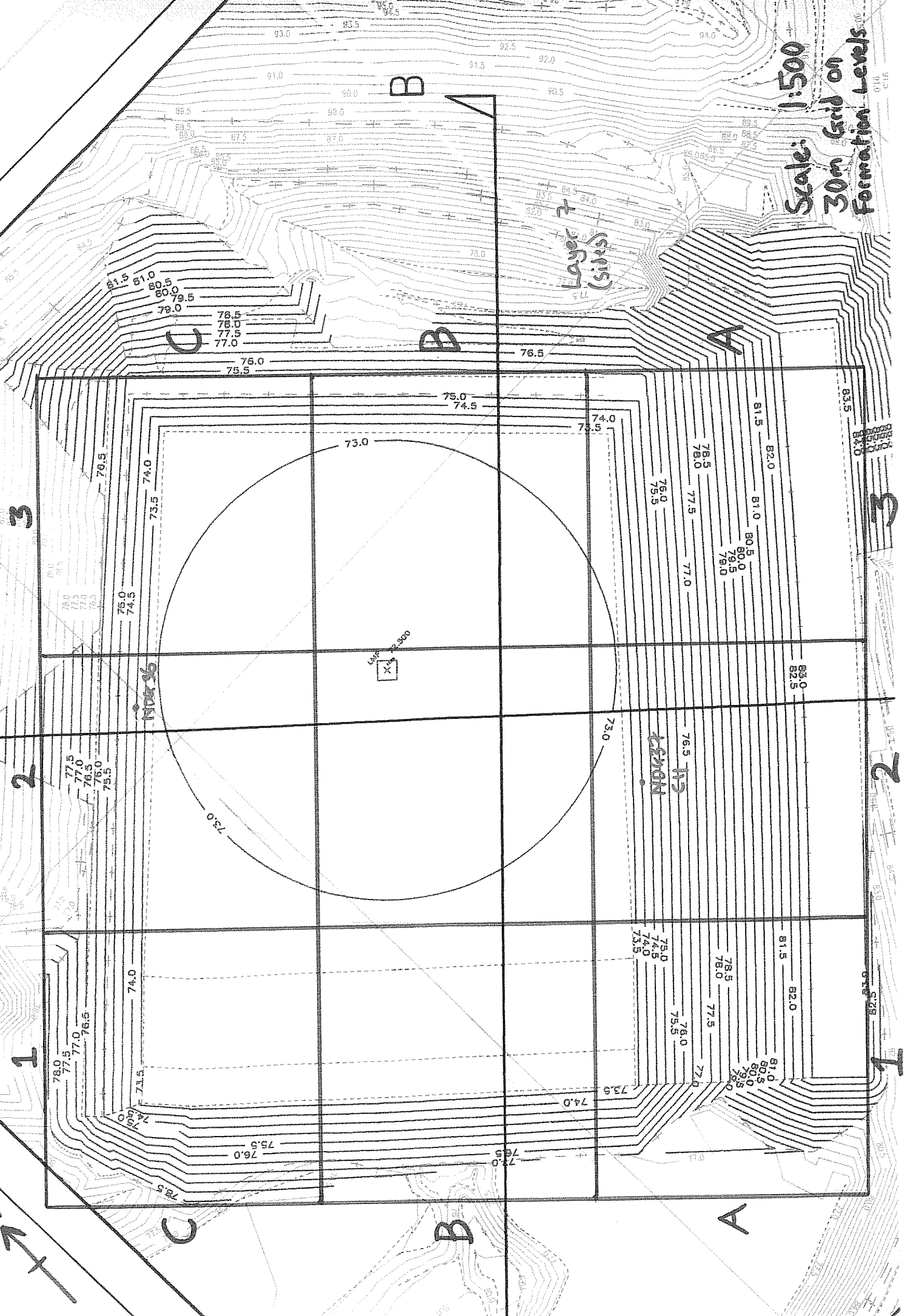




Scale: 1:500  
30m Grid on  
Formation Levels



Scale: 1:500  
30m Grid on  
Formation Levels



Layer 7  
(sils)

81.5  
81.0  
80.5  
80.0  
79.5  
79.0  
78.5  
78.0  
77.5  
77.0

1000 96

1000 96

3

2

1

3

2

1

B

B

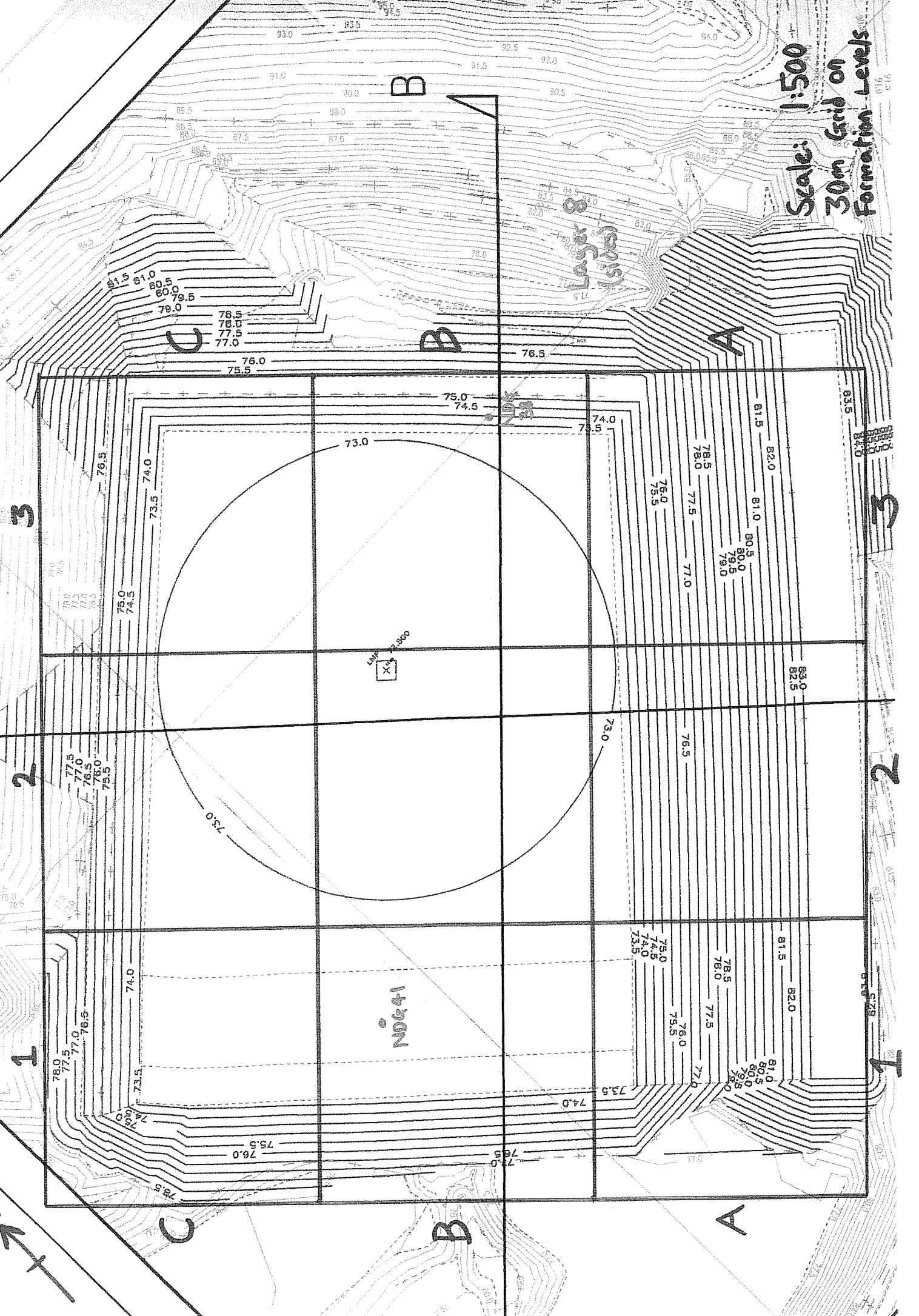
A

C

B

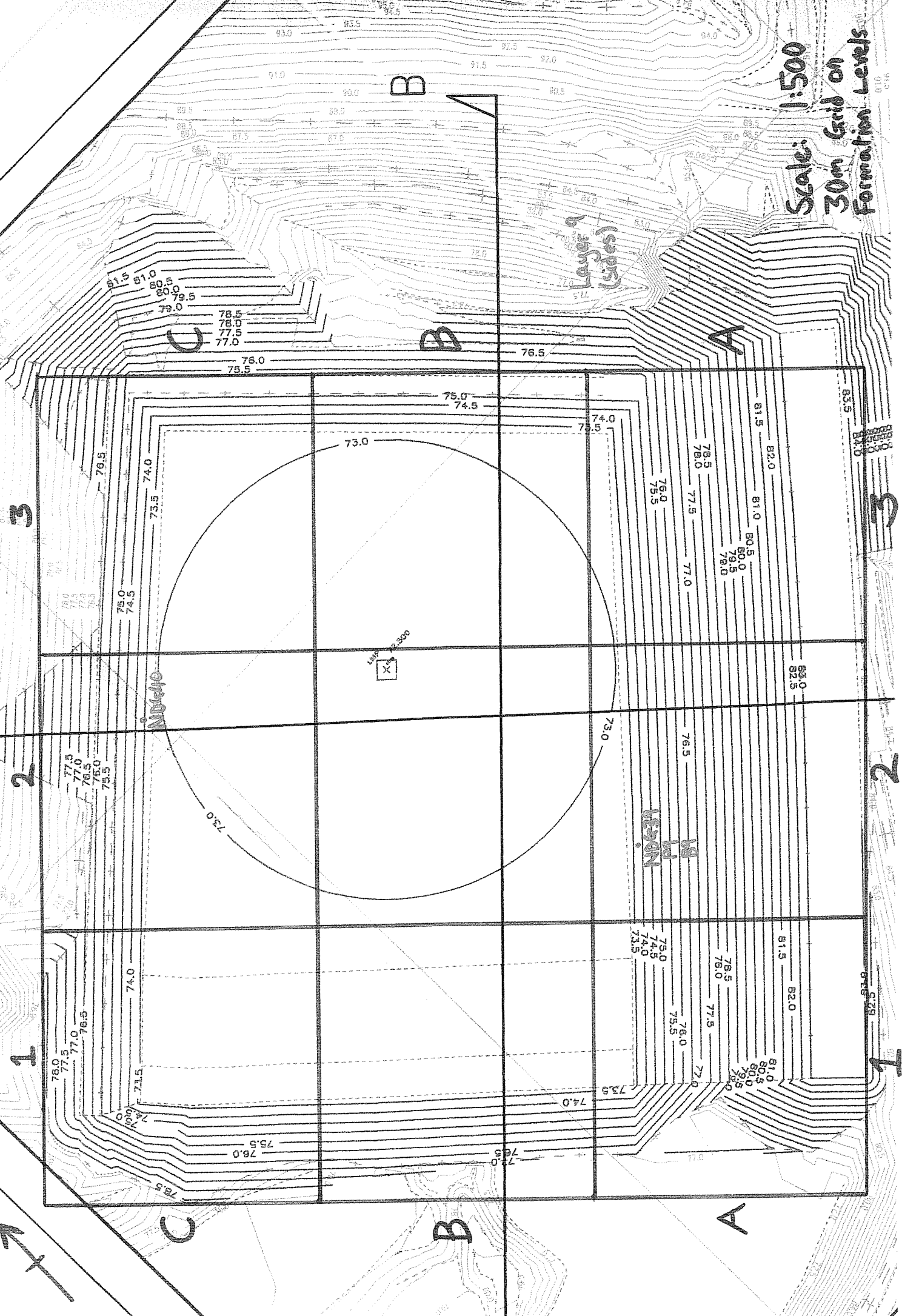
A

Scale: 1:500  
30m Grid on  
Formation Levels

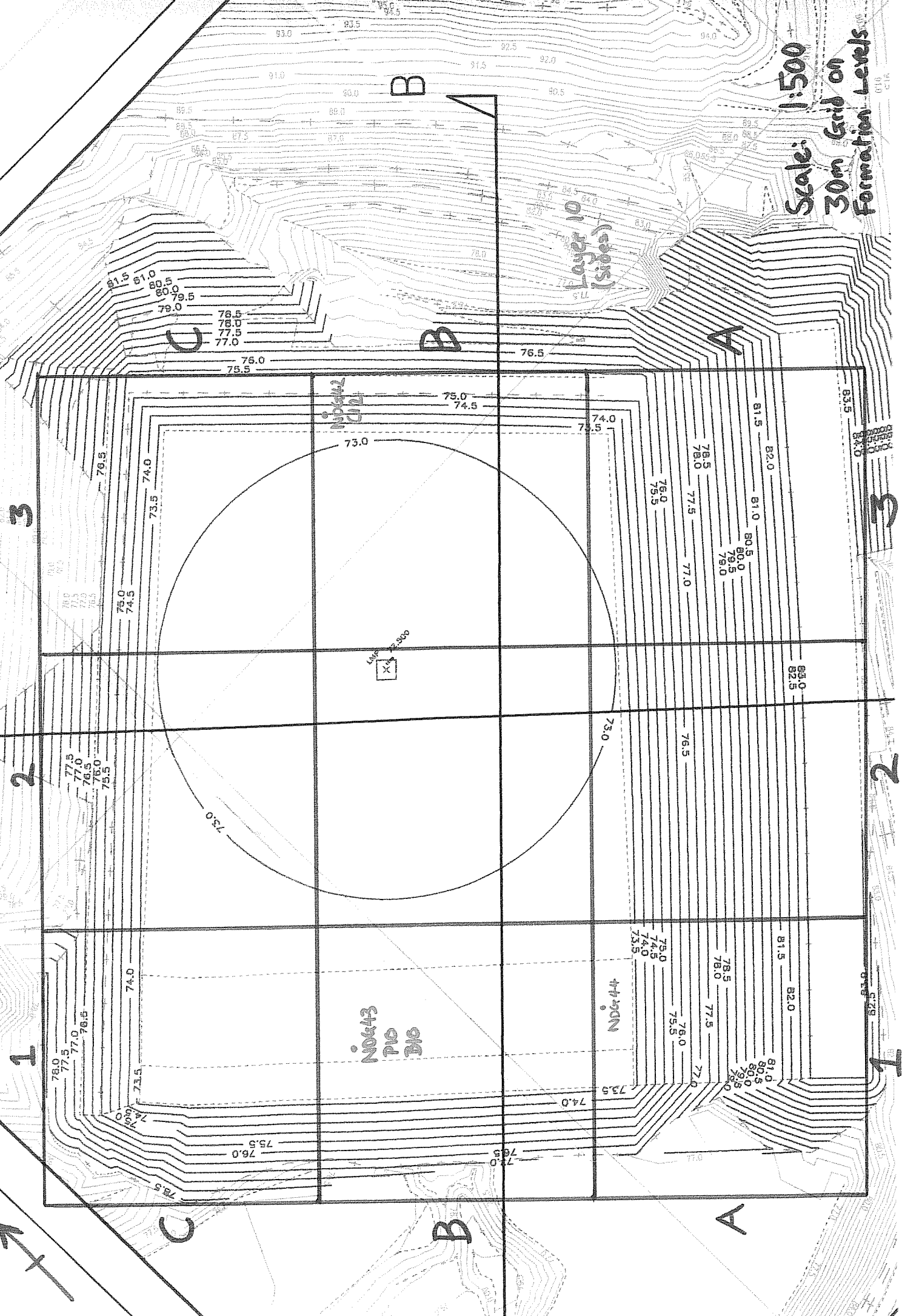




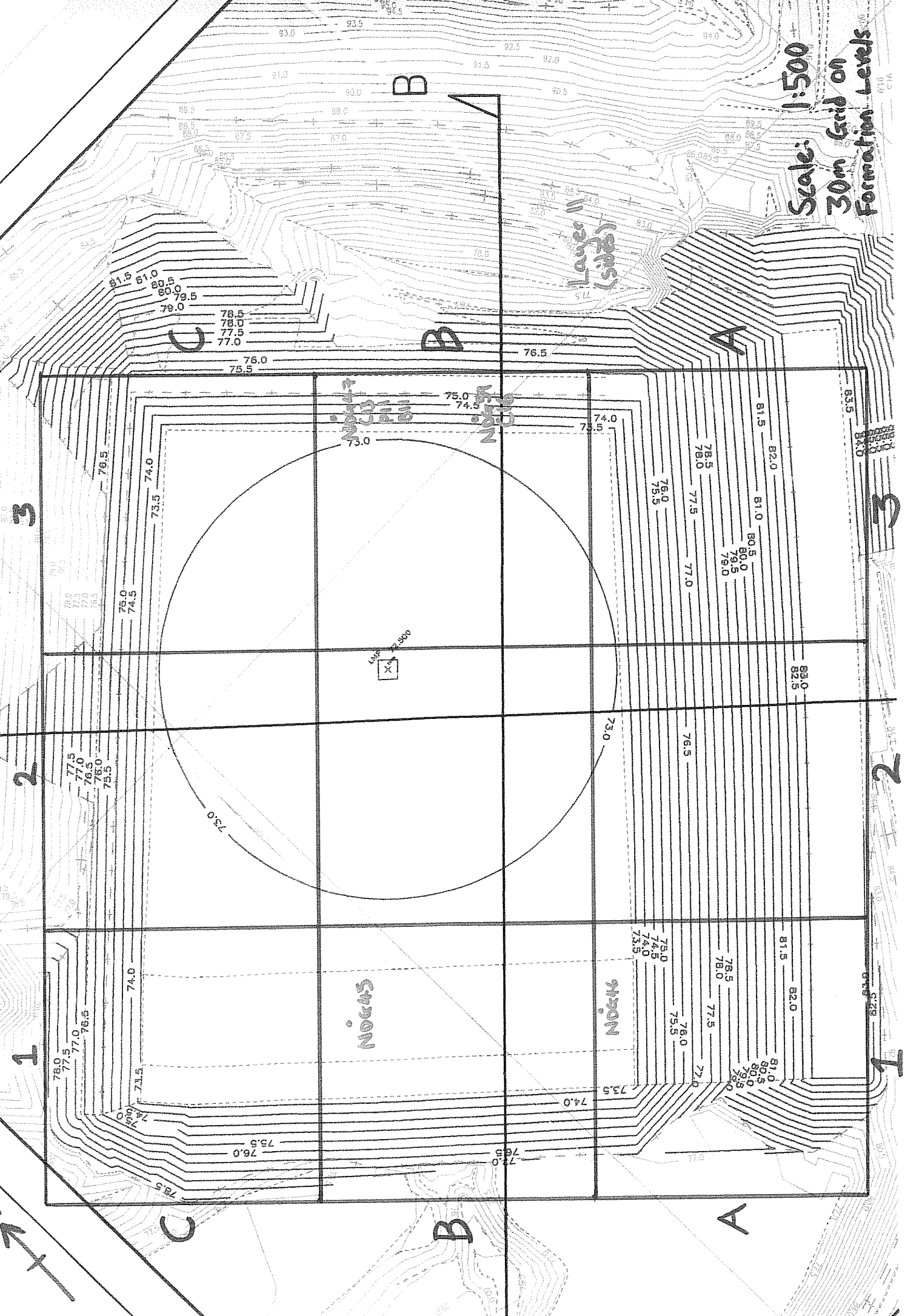
Scale: 1:500  
30m Grid on  
Formation Levels



Scale: 1:500  
30m Grid on  
Formation Levels



Scale: 1:500  
30m Grid on  
Formation Levels



<b>On-Site NDG Test Results Record (% Air Voids)</b>		CQA Engineer: Chris Newton
		Date: 03/09/2007

White  
Young  
Green

Project:	Cell 4 construction
QA Plan:	

Client:	WRG
Site:	Leadenham Cell 4

Test Results													
Test No.	Location Grid Ref.	Layer No.	Gauge Dry Density (kg/m <sup>3</sup> )	Gauge Bulk Density (kg/m <sup>3</sup> )	Gauge Moisture Density (kg/m <sup>3</sup> )	Gauge Moisture Content (%)	Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	Air Voids (%)	Comments (Retests Logged, Check Cores)	
NDG1	A1	LCP base	1645.000	1984.000	339.600	20.6%	1993.320	353.707	1639.61	21.6%	4.2%	Retest of NDG 1	
			1633.000	1971.000	338.000	20.7%							
NDG2	A1	LCP base	1635.000	1982.000	347.600	21.3%	1989.792	362.268	1627.52	22.3%	3.8%		
			1622.000	1966.000	346.400	21.2%							
NDG3	A1	LCP base	1578.000	1949.000	371.000	23.5%	1949.472	374.796	1574.68	23.8%	4.5%		C1 taken for gauge calibration
			1572.000	1919.000	347.000	22.1%							
NDG4	A1	LCP base	1620.000	1994.000	374.800	23.1%	1989.288	384.610	1604.68	24.0%	2.4%		
			1591.000	1953.000	362.000	22.8%							
NDG5	A1	LCP base	1636.000	1988.000	352.400	21.5%	1976.688	363.730	1612.96	22.6%	4.2%		
			1590.000	1934.000	344.400	21.7%							
NGD6	A1	LCP base	1609.000	1968.000	358.800	22.3%	1998.864	377.928	1620.94	23.3%	2.5%	C4 taken for gauge calibration	
			1633.000	1998.000	365.200	22.4%							
NDG7	X1	LCP base	1598.000	1958.000	320.400	22.6%	1985.760	352.872	1632.89	21.6%	4.6%		
			1627.000	1982.000	355.600	21.9%							
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	C5 taken for gauge calibration P1, B1, take	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!		

Correction Factors:	Bulk Density $\gamma = 1.008$	Particle Density: SG = 2.72
	Moisture Density $b = 1.044$	

The CQA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer numbers.

CQA Engineer: C Newton  
Date: 04/09/2007

**On-Site NDG Test Results Record (% Air Voids)**

Project: \_\_\_\_\_  
QA Plan: \_\_\_\_\_

Client: WRG  
Site: Leadenham

Test Results												
Test No.	Location Grid Ref.	Layer No.	Gauge Dry Density (kg/m <sup>3</sup> )	Gauge Bulk Density (kg/m <sup>3</sup> )	Gauge Moisture Density (kg/m <sup>3</sup> )	Gauge Moisture Content (%)	Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	Air Voids (%)	Comments (Retests Logged, Check Cores)
NDG8	C2	1	1485.000	1893.000	407.600	27.4%	1912.680	431.485	1481.19	29.1%	2.3%	
			1483.000	1902.000	419.000	28.3%						
NDG9	C3	1	1523.000	1909.000	386.300	25.4%	1919.736	410.971	1508.77	27.2%	3.3%	
			1505.000	1900.000	394.500	26.2%						
NDG10	B2	1	1545.000	1946.000	401.000	26.0%	1950.480	408.465	1542.02	26.5%	2.4%	
			1513.000	1924.000	410.900	27.2%						
NDG11	B3	1	1529.000	1897.000	371.600	24.4%	1891.512	409.091	1482.42	27.6%	4.5%	P2 and B2 also taken
			1490.000	1856.000	366.300	24.6%						
NDG12	A2	1	1497.000	1914.000	417.400	27.9%	1935.360	399.904	1535.46	26.0%	3.5%	C6 taken
			1567.000	1926.000	419.000	27.8%						
NDG13	A3	1	1609.000	1956.000	347.100	21.6%	1975.176	358.979	1616.20	22.2%	4.6%	
			1623.000	1963.000	340.600	21.0%						
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	

Correction Factors: Bulk Density y= 1.008 Particle Density:SG= 2.72  
Moisture Density b= 1.044

The CQA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer numbers.

<b>On-Site NDG Test Results Record (% Air Voids)</b>		CQA Engineer: C Newton
		Date: 04/09/2007

White  
Young  
Green

Client: WRG	Project: Cell 4 construction
Site: Leadenham	QA Plan:

Test Results												
Test No.	Location Grid Ref.	Layer No.	Gauge Dry Density (kg/m <sup>3</sup> )	Gauge Bulk Density (kg/m <sup>3</sup> )	Gauge Moisture Density (kg/m <sup>3</sup> )	Gauge Moisture Content (%)	Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	Air Voids (%)	Comments (Retests Logged, Check Cores)
NDG14	C2	2	1581.000	1947.000	366.600	23.2%	1956.024	380.225	1575.80	24.1%	3.9%	
			1572.000	1934.000	361.800	23.0%						
NDG15	C3	2	1502.000	1885.000	383.000	25.5%	1901.592	398.286	1503.31	26.5%	4.8%	P3 & B3 taken
			1508.000	1888.000	380.000	25.2%						
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	

Correction Factors:	Bulk Density y= 1.008	Particle Density: SG= 2.72
	Moisture Density b= 1.044	

The CQA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer numbers.

White  
Young  
Green

<b>On-Site NDG Test Results Record (% Air Voids)</b>	
CQA Engineer: C Newton	Date: 06/09/2007

Client: WRG	Project: Cell 4 construction
Site: Leadenham	QA Plan:

Test No.	Location Grid Ref.	Layer No.	Test Results										Comments (Retests Logged, Check Cores)
			Gauge Dry Density (kg/m <sup>3</sup> )	Gauge Bulk Density (kg/m <sup>3</sup> )	Gauge Moisture Density (kg/m <sup>3</sup> )	Gauge Moisture Content (%)	Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	Air Voids (%)		
WDG16	B2	2	1595.000	1990.000	395.000	24.8%	1995.840	411.858	1583.98	26.0%	0.5%	C7 taken	
			1576.000	1970.000	394.000	25.0%	1979.712	406.638	1573.07	25.8%			
WDG17	B3	2	1560.000	1955.000	395.000	25.3%	1941.912	407.682	1534.23	26.6%	2.7%	P4 and B4 taken	
			1589.000	1973.000	384.000	24.2%	1957.536	422.820	1534.72	27.6%			
WDG18	A2	2	1537.000	1919.000	382.000	24.9%	0.000	0.000	0.00	#DIV/0!	#DIV/0!		
			1535.000	1934.000	399.000	26.0%	0.000	0.000	0.00	#DIV/0!			
WDG19	A3	2	1558.000	1950.000	392.000	25.2%	0.000	0.000	0.00	#DIV/0!	#DIV/0!		
			1516.000	1934.000	418.000	27.6%	0.000	0.000	0.00	#DIV/0!			
										#DIV/0!			
										#DIV/0!			
										#DIV/0!			
										#DIV/0!			
										#DIV/0!			

Correction Factors:	Particle Density: SG= 2.72
Bulk Density y= 1.008	
Moisture Density b= 1.044	

The CQA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer numbers.

White  
Young  
Green

CQA Engineer: C Newton  
Date: 06/09/2007

**On-Site NDG Test Results Record (% Air Voids)**

Project: Cell 4 construction  
QA Plan:

Client: WRG  
Site: Leadenham

Test No.	Location Grid Ref.	Layer No.	Gauge Dry Density (kg/m <sup>3</sup> )		Gauge Bulk Density (kg/m <sup>3</sup> )		Gauge Moisture Density (kg/m <sup>3</sup> )		Gauge Moisture Content (%)		Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	Air Voids (%)	Comments (Retests Logged, Check Cores)
			1636.000	1675.000	1986.000	2023.000	350.700	347.500	21.4%	20.7%						
NDG20	C2	3	1573.000	1584.000	1943.000	1927.000	370.300	432.600	23.5%	21.6%	2020.536	364.460	1656.08	22.0%	2.6%	
NDG21	C3	3									1950.480	419.114	1531.37	27.4%	1.7%	
											0.000	0.000	0.00	#DIV/0!	#DIV/0!	
											0.000	0.000	0.00	#DIV/0!	#DIV/0!	
											0.000	0.000	0.00	#DIV/0!	#DIV/0!	
											0.000	0.000	0.00	#DIV/0!	#DIV/0!	
											0.000	0.000	0.00	#DIV/0!	#DIV/0!	
											0.000	0.000	0.00	#DIV/0!	#DIV/0!	
											0.000	0.000	0.00	#DIV/0!	#DIV/0!	
											0.000	0.000	0.00	#DIV/0!	#DIV/0!	
											0.000	0.000	0.00	#DIV/0!	#DIV/0!	

**Test Results**

Correction Factors:  
Bulk Density y= 1.008  
Moisture Density b= 1.044  
Particle Density:SG= 2.72

The CQA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer numbers.



<b>On-Site NDG Test Results Record (% Air Voids)</b>		CQA Engineer: C Newton
		Date: 07/09/2007

Client: WRG	Project:
Site: Leadenham	QA Plan:

Test Results												
Test No.	Location Grid Ref.	Layer No.	Gauge Dry Density (kg/m <sup>3</sup> )	Gauge Bulk Density (kg/m <sup>3</sup> )	Gauge Moisture Density (kg/m <sup>3</sup> )	Gauge Moisture Content (%)	Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	Air Voids (%)	Comments (Retests Logged, Check Cores)
NDG22	B3	3	1647.000	2023.000	357.900	22.8%	2033.136	372.969	1660.17	22.5%	1.6%	C8 taken
			1655.000	2011.000	356.600	21.6%						
NDG23	B2	3	1645.000	2012.000	367.900	22.4%	2023.560	374.796	1648.76	22.7%	1.8%	P5 & B5 taken
			1653.000	2003.000	350.100	21.2%						
NDG24	A3	3	1570.000	1958.000	388.000	24.7%	1966.104	393.066	1573.04	25.0%	2.8%	
			1578.000	1943.000	365.000	23.1%						
NDG25	A2	3	1631.000	1982.000	351.800	21.6%	2001.888	370.620	1631.27	22.7%	2.9%	
			1632.000	1990.000	358.200	21.9%						
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	

Correction Factors:	Bulk Density y= 1.008	Particle Density:SG= 2.72
	Moisture Density b= 1.044	

The CQA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer numbers.

<b>On-Site NDG Test Results Record (% Air Voids)</b>		CQA Engineer:	C Newton
		Date:	10/09/2007

White  
Young  
Green

Project:	Cell 4 Construction
QA Plan:	

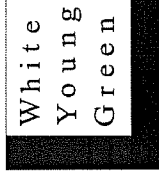
Client:	WRG
Site:	Leadenham

Test Results												
Test No.	Location Grid Ref.	Layer No.	Gauge Dry Density (kg/m <sup>3</sup> )	Gauge Bulk Density (kg/m <sup>3</sup> )	Gauge Moisture Density (kg/m <sup>3</sup> )	Gauge Moisture Content (%)	Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	Air Voids (%)	Comments (Retests Logged, Check Cores)
NDG26	C2	4	1569.000 1590.000	1956.000 1945.000	387.000 355.000	24.7% 22.3%	1966.104	387.324	1578.78	24.5%	3.1%	
NDG27	C3	4	1578.000 1558.000	1957.000 1936.000	379.000 378.000	24.0% 24.3%	1962.072	395.154	1566.92	25.2%	2.8%	C9, B6 and P6 taken
NDG28	B2	4	1556.000 1540.000	1942.000 1932.000	386.600 383.300	24.8% 24.7%	1952.496	401.888	1550.61	25.9%	2.7%	
NDG29	B3	4	1704.000 1678.000	2053.000 2022.000	348.100 344.200	20.5% 20.5%	2053.800	361.381	1692.42	21.4%	1.5%	
NDG30	A2	4	1608.000 1587.000	1969.000 1949.000	361.000 362.000	22.5% 22.8%	1974.672	377.406	1597.27	23.6%	3.4%	
NDG31	A3	4	1610.000 1566.000	1974.000 1948.000	363.800 381.700	22.6% 24.4%	1976.688	389.151	1587.54	24.5%	2.6%	P7 and B7 taken
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	

Correction Factors:	Bulk Density y= 1.008	Particle Density:SG= 2.72
	Moisture Density b= 1.044	

The CQA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer numbers.

<b>On-Site NDG Test Results Record (% Air Voids)</b>		CQA Engineer: L Newton
		Date: 12/09/2007



Client: WRG	Project: Cell 4 construction
Site: Leadenham	QA Plan:

Test No.	Location Grid Ref.	Layer No.	Gauge Dry Density (kg/m <sup>3</sup> )		Gauge Bulk Density (kg/m <sup>3</sup> )		Gauge Moisture Density (kg/m <sup>3</sup> )		Gauge Moisture Content (%)		Corrected					Comments (Retests Logged, Check Cores)
			Density	Density	Density	Density	Density	Density	Density	Density	Density	Density	Density	Density	Density	
NDG32	C2	5	1654.000	2001.000	346.800	21.0%	2038.680	363.782	1674.90	21.7%	1.9%	C10 taken				
			1694.000	2044.000	350.100	20.7%	1980.216	378.293	1601.92	23.6%	3.2%					
NDG33	A2	5	1605.000	1969.000	363.200	22.6%	0.000	0.000	0.00	#DIV/0!	#DIV/0!					
			1598.000	1960.000	361.500	22.6%	0.000	0.000	0.00	0.00	0.00	0.00	#DIV/0!			
							0.000	0.000	0.00	0.00	0.00	#DIV/0!				
							0.000	0.000	0.00	0.00	0.00	#DIV/0!				
							0.000	0.000	0.00	0.00	0.00	#DIV/0!				
							0.000	0.000	0.00	0.00	0.00	#DIV/0!				
							0.000	0.000	0.00	0.00	0.00	#DIV/0!				
							0.000	0.000	0.00	0.00	0.00	#DIV/0!				
							0.000	0.000	0.00	0.00	0.00	#DIV/0!				
							0.000	0.000	0.00	0.00	0.00	#DIV/0!				
							0.000	0.000	0.00	0.00	0.00	#DIV/0!				

**Test Results**

Correction Factors:	Bulk Density y= 1.008	Particle Density:SG= 2.72
	Moisture Density b= 1.044	

The CQA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer numbers.

**On-Site NDG Test Results Record (% Air Voids)**

CQA Engineer: C Newton  
Date: 13/09/2007

White  
Young  
Green

Client: WRG  
Site: Leadenham

Project: Cell 4 construction  
QA Plan:

Test Results												
Test No.	Location Grid Ref.	Layer No.	Gauge Dry Density (kg/m <sup>3</sup> )	Gauge Bulk Density (kg/m <sup>3</sup> )	Gauge Moisture Density (kg/m <sup>3</sup> )	Gauge Moisture Content (%)	Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	Air Voids (%)	Comments (Retests Logged, Check Cores)
NDG34	B3	6	1655.000	2046.000	391.200	23.6%	2047.752	408.413	1639.34	24.9%	-1.2%	
			1626.000	2017.000	391.200	24.1%						
NDG35	B1	6	1621.000	1985.000	364.000	22.5%	2014.488	378.972	1635.52	23.2%	1.9%	P8 & B8 taken
			1650.000	2012.000	362.000	21.9%						
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	

Correction Factors:  
Bulk Density  $\gamma = 1.008$   
Moisture Density  $b = 1.044$

Particle Density: SG = 2.72

The CQA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer n

On-Site NDG Test Results Record (% Air Voids)

CQA Engineer: C Newton  
Date: 14/09/2007

Client: WRG  
Site: Leadenham

Project: Cell 4 construction  
QA Plan:

Test Results												
Test No.	Location Grid Ref.	Layer No.	Gauge Dry Density (kg/m <sup>3</sup> )	Gauge Bulk Density (kg/m <sup>3</sup> )	Gauge Moisture Density (kg/m <sup>3</sup> )	Gauge Moisture Content (%)	Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	Air Voids (%)	Comments (Retests Logged, Check Cores)
NDG36	A2	7	1630.000	1967.000	336.500	20.6%	1983.744	357.257	1626.49	22.0%	4.4%	
			1621.000	1969.000	347.900	21.5%						
NDG37	C2	7	1550.000	1914.000	364.000	23.5%	1924.776	382.626	1542.15	24.8%	4.9%	C11 taken
			1536.000	1905.000	369.000	24.0%						
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	

Correction Factors: Bulk Density y= 1.008  
Moisture Density b= 1.044  
Particle Density: SG= 2.72

The CQA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer numbers.

**On-Site NDG Test Results Record (% Air Voids)**

CQA Engineer: C Newton  
Date: 15/09/2007



Client: WRG  
Site: Leadenham

Project: Cell 4 construction  
QA Plan:

**Test Results**

Test No.	Location Grid Ref.	Layer No.	Gauge Dry Density (kg/m <sup>3</sup> )	Gauge Bulk Density (kg/m <sup>3</sup> )	Gauge Moisture Density (kg/m <sup>3</sup> )	Gauge Moisture Content (%)	Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	Air Voids (%)	Comments (Retests Logged, Check Cores)
NDG38	B3	8	1610.000	1965.000	354.300	22.0%	2001.384	364.826	1636.56	22.3%	3.2%	
			1662.000	2006.000	344.600	20.7%						
NDG39	A2	9	1620.000	1984.000	304.100	22.5%	1999.872	345.407	1654.46	20.9%	4.5%	P9 and B9 taken
			1626.000	1984.000	357.600	22.0%						
NDG40	C2	9	1658.000	2022.000	399.800	22.0%	2044.728	402.984	1641.74	24.5%	-0.8%	
			1663.000	2035.000	372.200	22.1%						
NDG41	B1	8	1610.000	2002.000	391.700	24.3%	2021.544	404.654	1616.89	25.0%	0.0%	
			1626.000	2009.000	383.500	23.6%						
NDG42	B3	10	1636.000	2013.000	377.000	23.0%	2007.936	387.689	1620.25	23.9%	1.6%	C12 taken
			1605.000	1971.000	365.700	22.8%						
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	
							0.000	0.000	0.00	#DIV/0!	#DIV/0!	

Correction Factors: Bulk Density y= 1.008  
Moisture Density b= 1.044  
Particle Density:SG= 2.72

The CQA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer numbe

<b>On-Site NDG Test Results Record (% Air Voids)</b>		CQA Engineer: C Newton
Client: WRG	Project: Cell 4 construction	Date: 17/09/2007
Site: Leadenham	QA Plan:	

White  
Young  
Green

Test No.	Location Grid Ref.	Layer No.	Gauge Dry Density (kg/m <sup>3</sup> )		Gauge Bulk Density (kg/m <sup>3</sup> )		Gauge Moisture Density (kg/m <sup>3</sup> )		Gauge Moisture Content (%)		Test Results				Comments (Retests Logged, Check Cores)
											Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	
NDG43	B1	10	1629.000	2019.000	390.000	23.9%	2031.624	407.160	1624.46	25.1%	-0.5%	P10 & B10 taken			
			1622.000	2012.000	390.000	24.1%	2028.096	376.675	1651.42	22.8%					
NDG44	A1	10	1648.000	2001.000	352.700	21.4%	2050.776	376.675	1674.10	22.5%	0.7%				
			1654.000	2023.000	368.900	22.3%	1966.608	397.868	1568.74	25.4%					
NDG45	B1	11	1671.000	2038.000	367.300	22.0%	2026.584	386.019	1640.57	23.5%	1.0%	C13 & B11 taken			
			1677.000	2031.000	354.300	21.1%	0.000	0.000	0.00	#DIV/0!					
NDG46	A1	11	1569.000	1948.000	378.700	24.1%	0.000	0.000	0.00	0.00	#DIV/0!				
			1571.000	1954.000	383.500	24.4%	0.000	0.000	0.00	0.00					
NDG47	A3	11	1650.000	2014.000	364.100	22.1%	0.000	0.000	0.00	0.00	#DIV/0!				
			1632.000	2007.000	375.400	23.0%	0.000	0.000	0.00	0.00					

Correction Factors:	Bulk Density y= 1.008	Particle Density:SG= 2.72
	Moisture Density b= 1.044	

The CQA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer numbers.

CQA Engineer: C Newton  
Date: 19/09/2007

**On-Site NDG Test Results Record (% Air Voids)**

Project: Cell 4 construction  
QA Plan:

Client: WRG  
Site: Leadenham

Test No.	Location Grid Ref.	Layer No.	Gauge Density (kg/m <sup>3</sup> )		Gauge Moisture Density (kg/m <sup>3</sup> )		Gauge Moisture Content (%)		Corrected Bulk Density (kg/m <sup>3</sup> )		Corrected Moisture Density (kg/m <sup>3</sup> )		Corrected Dry Density (kg/m <sup>3</sup> )		Corrected Moisture Content (%)		Air Voids (%)	Comments (Retests Logged, Check Cores)
			Dry	Moisture	Dry	Moisture	Dry	Moisture	Dry	Moisture	Dry	Moisture	Dry	Moisture	Dry	Moisture		
NDG48	A3	1	1600.000	1958.000	358.000	358.000	22.4%	1965.600	362.268	1603.33	22.6%	1603.33	4.7%	Air voids fail				
			1606.000	1942.000	336.000	336.000	20.9%	1962.576	420.941	1541.64	27.3%	1541.64	1.1%	Retest of NDG48				
NDG49	A3	1	1629.000	1978.000	449.200	449.200	21.4%	2095.632	368.741	1726.89	21.4%	1726.89	-0.5%					
			1559.000	1916.000	357.200	357.200	22.9%	2043.216	375.944	1667.27	22.5%	1667.27	1.0%	P12 & B12 taken				
NDG50	A2	1	1719.000	2067.000	347.500	347.500	20.2%	2074.968	373.804	1701.16	22.0%	1701.16	0.0%	Retest of NDG27/20 C14 taken				
			1732.000	2091.000	358.900	358.900	20.7%	0.000	0.000	0.00	#DIV/0!	0.00	#DIV/0!					
NDG51	A1	1	1684.000	2042.000	358.100	358.100	21.3%	0.000	0.000	0.00	0.00	0.00	#DIV/0!					
			1650.000	2012.000	362.100	362.100	21.9%	0.000	0.000	0.00	0.00	0.00	#DIV/0!					
NDG52	C3	4	1712.000	2064.000	352.400	352.400	20.6%	0.000	0.000	0.00	0.00	0.00	#DIV/0!					
			1689.000	2053.000	363.700	363.700	21.5%	0.000	0.000	0.00	0.00	0.00	#DIV/0!					

**Test Results**

Correction Factors: Bulk Density y= 1.008 Particle Density:SG= 2.72  
Moisture Density b= 1.044

The COA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer numbers.



White  
Young  
Green

CQA Engineer: C Newton  
Date: 20/09/2007

**On-Site NDG Test Results Record (% Air Voids)**

Project: Cell 4 construction  
QA Plan:

Client: WRG  
Site: Leadenham

Test No.	Location Grid Ref.	Layer No.	Test Results										Comments (Retests Logged, Check Cores)
			Gauge Density (kg/m <sup>3</sup> )	Gauge Bulk Density (kg/m <sup>3</sup> )	Gauge Moisture Density (kg/m <sup>3</sup> )	Gauge Moisture Content (%)	Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	Air Voids (%)		
NDG53	A1	2	1659.000	2009.000	348.800	21.1%	2053.800	363.834	1689.97	21.5%	1.4%		
			1717.000	2066.000	348.200	20.3%							
NDG54	A3	2	1675.000	2021.000	346.600	20.7%	2006.424	360.963	1645.46	21.9%	3.3%		
			1615.000	1960.000	344.900	21.4%							
NDG55	A1	3	1689.000	2039.000	349.800	20.7%	2052.792	366.026	1686.77	21.7%	1.3%	P13 & B13 taken	
			1683.000	2034.000	351.400	20.9%							
NDG56	A2	3	1753.000	2102.000	348.500	19.9%	2118.816	366.340	1752.48	20.9%	-1.2%	C15 taken	
			1749.000	2102.000	353.300	20.2%							
NDG57	A1	4	1702.000	2067.000	364.700	21.4%	2089.584	373.126	1716.46	21.7%	-0.5%		
			1729.000	2079.000	350.100	20.2%							
NDG58	A3	4	1742.000	2090.000	348.500	20.0%	2089.080	357.883	1731.20	20.7%	0.4%		
			1718.000	2055.000	337.100	19.6%							
NDG59	B3	11	1711.000	2068.000	356.600	20.8%	2089.584	367.175	1722.41	21.3%	-0.2%	Retest of NDG59 C16 taken	
			1731.000	2078.000	346.800	20.0%							
						0.000	0.000	0.00	#DIV/0!	#DIV/0!			
						0.000	0.000	0.00	#DIV/0!	#DIV/0!			

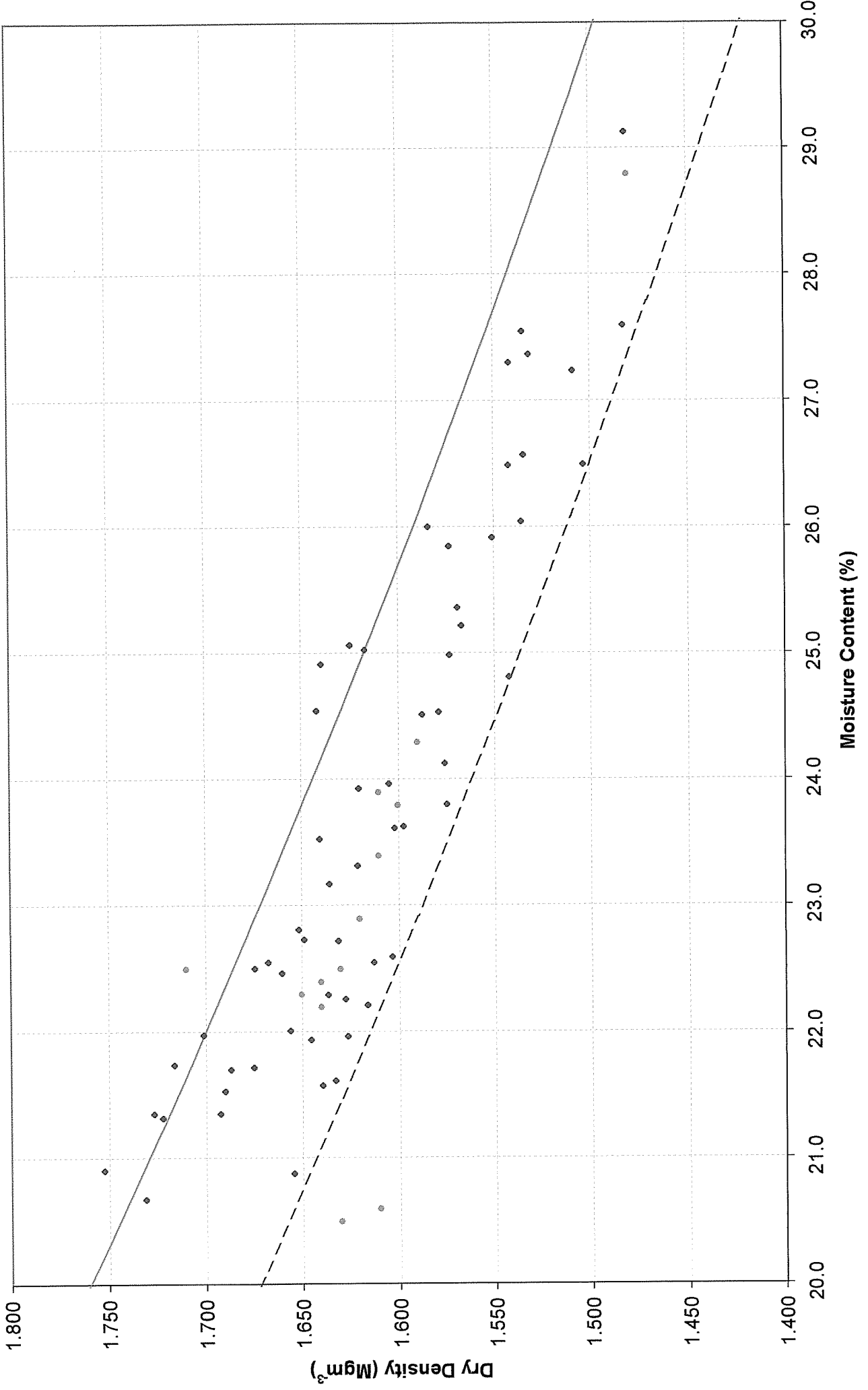
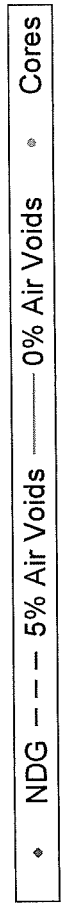
Correction Factors: Bulk Density y= 1.008  
Moisture Density b= 1.044

Particle Density: SG= 2.72

The CQA Engineer should log ALL NDG readings taken and their relevant grid locations. Retests should be clearly marked and cross referred to the relevant failed test. The test number / retest should then be marked on the sampling grid. Colour codes can be used to differentiate between layer numbers.

**APPENDIX C**  
**LABORATORY TEST RESULTS**

# Leadenham Cell 4 Clay Summary





**COMPACTION TRIAL  
TEST RESULTS**

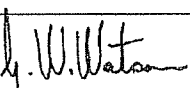
CLIENT : May Gurney Ltd.  
 ADDRESS: Buckden Landfill Site  
 Brampton Road  
 Brampton  
 St. Neots  
 Cambridgeshire  
 PE19 5UH

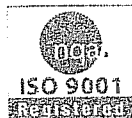
For the attention of : Mr. D. Osborne

### LABORATORY TESTING

Transmittal No: C2558  
 Report No: 3

### TEST REPORT TRANSMITTAL NOTE

Project Name :		Leadenham Cell 4 Trial Pad (2)	
Project Number :	C2558	Date samples received :	18-May-2007
Your Ref :	S-SL7714/004	Date written instructions received :	18-May-2007
		Date testing commenced	18-May-2007
<b>Please find enclosed the results as summarised below</b>			
Item No	Quantity	Description	UKAS Accredited
6.31	1	Triaxial permeability	Yes
Remarks : This completes the testing for this project			
Issued by : G.W.Watson		Date of Issue : 12-Jun-2007	
			
Approved Signatories :			
G Wilson (Joint Managing Director/Laboratories Director), G W Watson (Laboratory Manager), L Anaz (Supervisor)			
Note: Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.			



Mineral Lane, off Amersham Road, Chesham HP5 1NL, UK  
 Tel: +44 (0)1494 810 136 Fax: +44 (0)1494 784 837  
 email: chesham@terratek.co.uk  
 www.terratek.co.uk

Terra Tek Ltd is registered in Scotland No. 121594  
 Offices also at Airdrie, Belfast and Birmingham.



Site	<b>LEADENHAM CELL 4 TRIAL PAD (2)</b>	Contract No.	S-SL7714/004
Client		Sample Date	17/05/2007
Engineer		Layer no.	1
		Passes	8
		Sample Ref	C3

Description: Stiff intact dark grey slightly gravelly slightly sandy CLAY. Gravel is fine

Sample Details:	Initial:	Final:
Diameter:	100.5 mm	99.2 mm
Height:	100.8 mm	99.5 mm
Moisture content:	20 %	23 %
Bulk density:	2.02 Mg/m <sup>3</sup>	2.16 Mg/m <sup>3</sup>
Dry density:	1.68 Mg/m <sup>3</sup>	1.75 Mg/m <sup>3</sup>
Sample condition:	Undisturbed	

**Saturation Stage:**

Initial pore pressure coefficient, B:	
Final pore pressure coefficient, B:	0.98
Duration of stage:	4 days

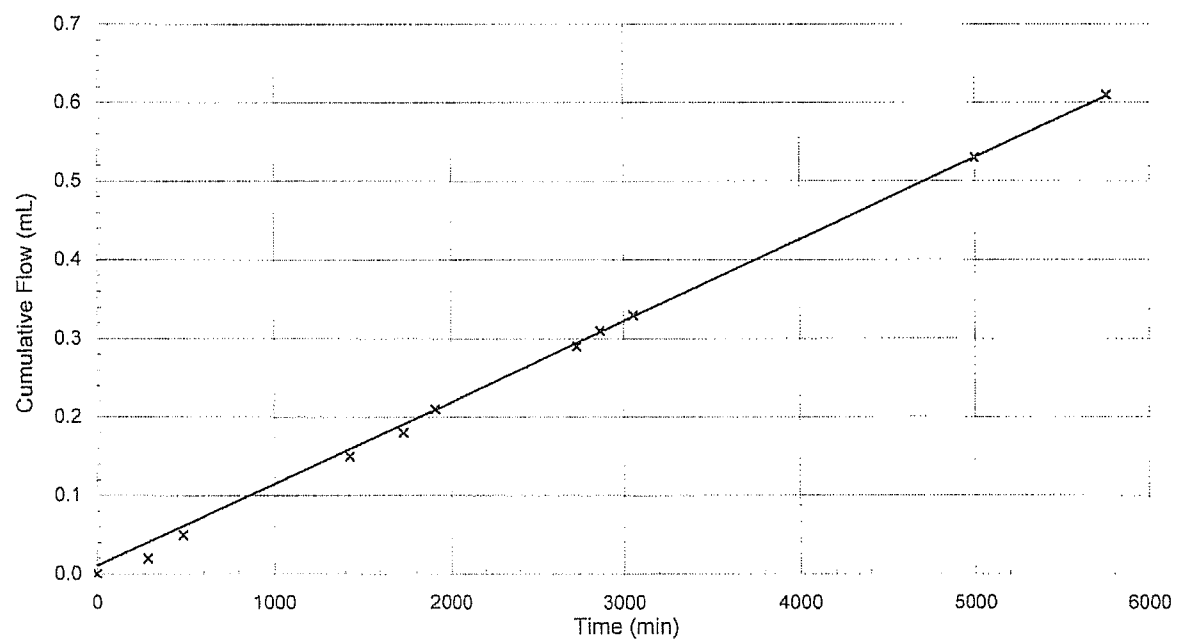
**Consolidation stage:**

Effective pressure:	100 kPa
Duration of stage:	2 days

**Permeability stage:**

Pressure difference across specimen:	20 kPa
Mean effective stress:	100 kPa
Duration of stage:	4 days

Coefficient of permeability at 20°C,  $K_v: 1.0 \times 10^{-11}$  m/s



Originator	Checked & Approved	<b>PERMEABILITY IN A TRIAXIAL CELL</b> BS1377 : Part 6 : Clause 6 : 1990 Permeability under constant head conditions in a triaxial cell	Figure 1 Sheet 1 of 1
MB	<i>GW</i> 12/6/07		

CLIENT : May Gurney Ltd.  
 ADDRESS : Buckden Landfill Site  
 Brampton Road  
 Brampton  
 St. Neots  
 Cambridgeshire  
**PE19 5UH**

For the attention of : Mr. D. Osborne

### LABORATORY TESTING

Transmittal No: C2558  
 Report No: 1

### TEST REPORT TRANSMITTAL NOTE

Project Name :		Leadenham Cell 4 Trial Pad (2)	
Project Number :	C2558	Date samples received :	18-May-2007
Your Ref :	S-SL7714/004	Date written instructions received :	18-May-2007
		Date testing commenced	18-May-2007
<b>Please find enclosed the results as summarised below</b>			
Item No	Quantity	Description	UKAS Accredited
2.11	5	Moisture content	Yes
2.22	5	One point liquid and plastic limit	Yes
2.51	5	Particle Density	Yes
10.11	5	Core cutter density	Yes
Remarks :			
Issued by : L. Anaz		Date of Issue : 29-May-2007	
Approved Signatories :			
G Wilson (Joint Managing Director/Laboratories Director), G W Watson (Laboratory Manager), L Anaz (Supervisor)			
Note: Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.			



Mineral Lane, off Amersham Road, Chesham HP5 1NL, UK  
 Tel: +44 (0)1494 810 136 Fax: +44 (0)1494 784 837  
 email: chesham@terratek.co.uk

[www.terratek.co.uk](http://www.terratek.co.uk)

Terra Tek Ltd is registered in Scotland No. 121594  
 Offices also at Airdrie, Belfast and Birmingham.





Site **LEADENHAM CELL 4 TRIAL PAD (2)**

Contract No **S-SL7714/004**

Client

Date Taken **17/05/2007**

Engineer

Sample **1**

Sample Type **B1**

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	98
5.00 mm	98
3.35 mm	98
2.00 mm	97
1.18 mm	96
600 µm	95
425 µm	95
300 µm	95
212 µm	94
150 µm	94
63 µm	93
20 µm	92
6 µm	72
2 µm	48

**Non Engineering Description**

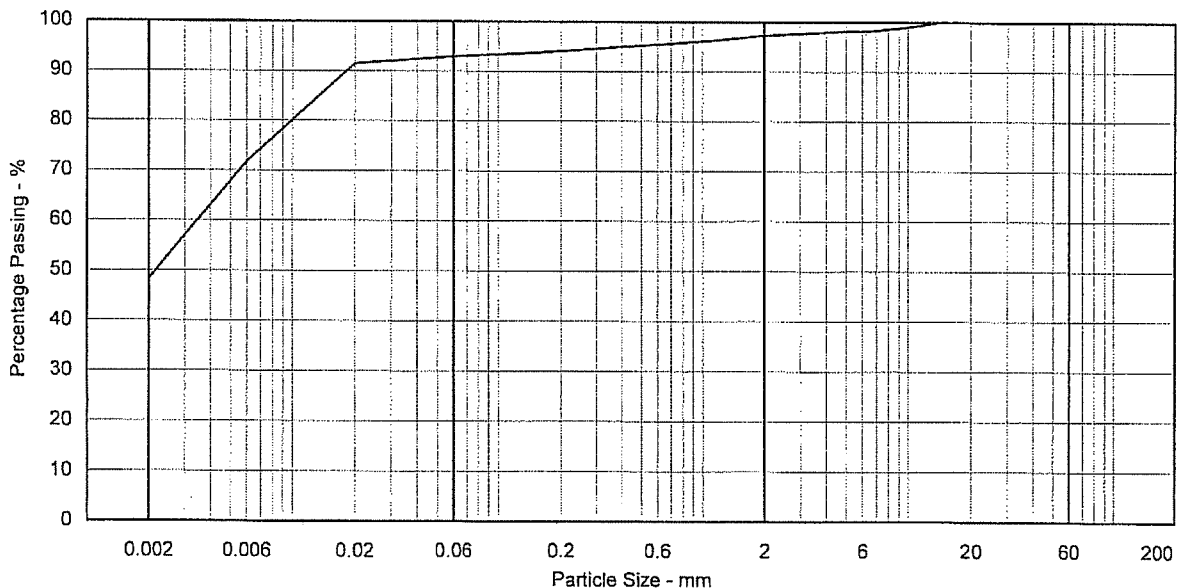
Very dark grey slightly gravelly slightly sandy CLAY with much fine to medium claystone. Gravel is fine.

Sample Proportions - %	
Cobbles	0.0
Gravel	2.6
Sand	4.4
Silt	44.6
Clay	48.4

Particle Diameter - mm	
D100	14.00
D60	0.00
D10	
Uniformity Coefficient	N/A

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
CM	<i>LSA</i> 30/5/07

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



Appendix 1

Sheet 1 of 1



Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 TRIAL PAD (2)**

Contract No **S-SL7714/004**

Date Taken **17/05/2007**

Sample **1**

Client

Engineer

Sample Type **B2**

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	99
425 µm	98
300 µm	98
212 µm	98
150 µm	97
63 µm	97
20 µm	93
6 µm	74
2 µm	50

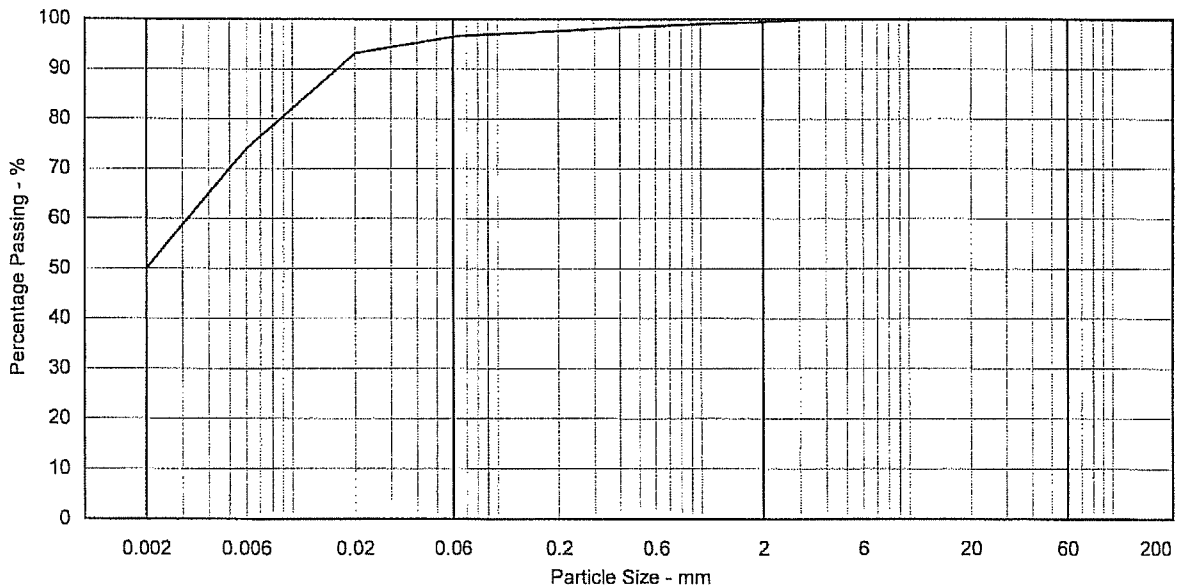
Non Engineering Description
Very dark grey slightly sandy CLAY with occasional fine claystone.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.5
Sand	3.1
Silt	46.3
Clay	50.0

Particle Diameter - mm	
D100	3.35
D60	0.00
D10	
Uniformity Coefficient	N/A

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
CM	LA 30/5/07

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

**Appendix 1**  
 Sheet 1 of 1



Site Investigation & Laboratory Services

Site	<b>LEADENHAM CELL 4 TRIAL PAD (2)</b>	Contract No	<b>S-SL7714/004</b>
Client		Date Taken	17/05/2007
Engineer		Sample	1
		Sample Type	B3

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	99
300 µm	98
212 µm	98
150 µm	98
63 µm	97
20 µm	95
6 µm	74
2 µm	49

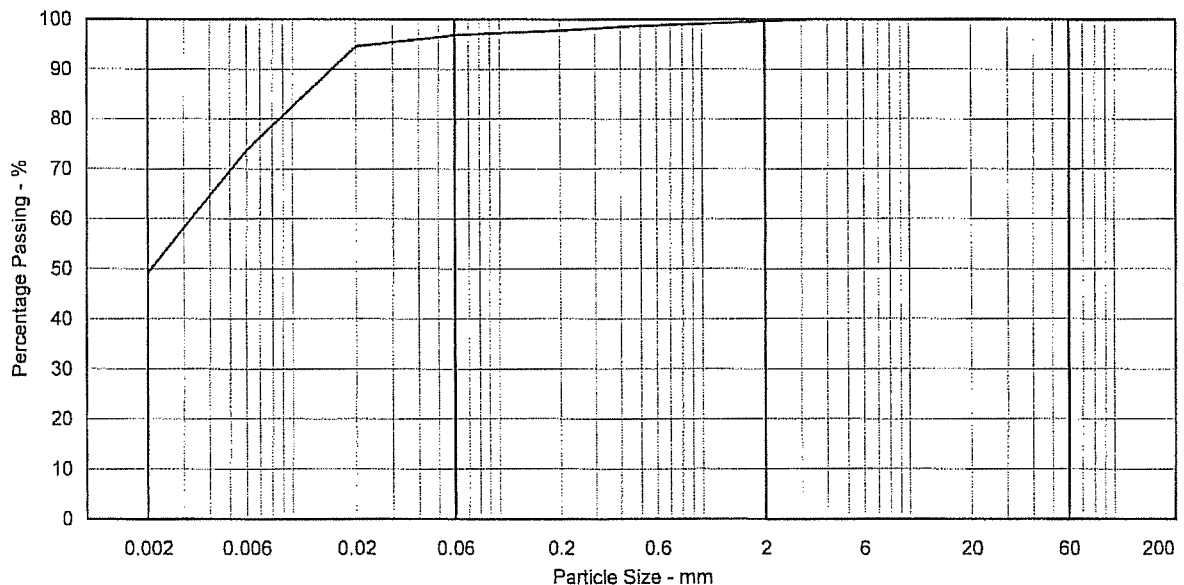
Non Engineering Description
Very dark grey slightly sandy CLAY with much claystone.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.4
Sand	2.9
Silt	47.5
Clay	49.2

Particle Diameter - mm	
D100	3.35
D60	0.00
D10	
Uniformity Coefficient	N/A

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
CM	<i>LSA</i> 30/5/07

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

**Appendix 1**  
 Sheet 1 of 1



Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 TRIAL PAD (2)**

Contract No **S-SL7714/004**

Date Taken **17/05/2007**

Sample **1**

Client

Engineer

Sample Type **B4**

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	99
600 µm	98
425 µm	98
300 µm	98
212 µm	98
150 µm	97
63 µm	97
20 µm	94
6 µm	74
2 µm	50

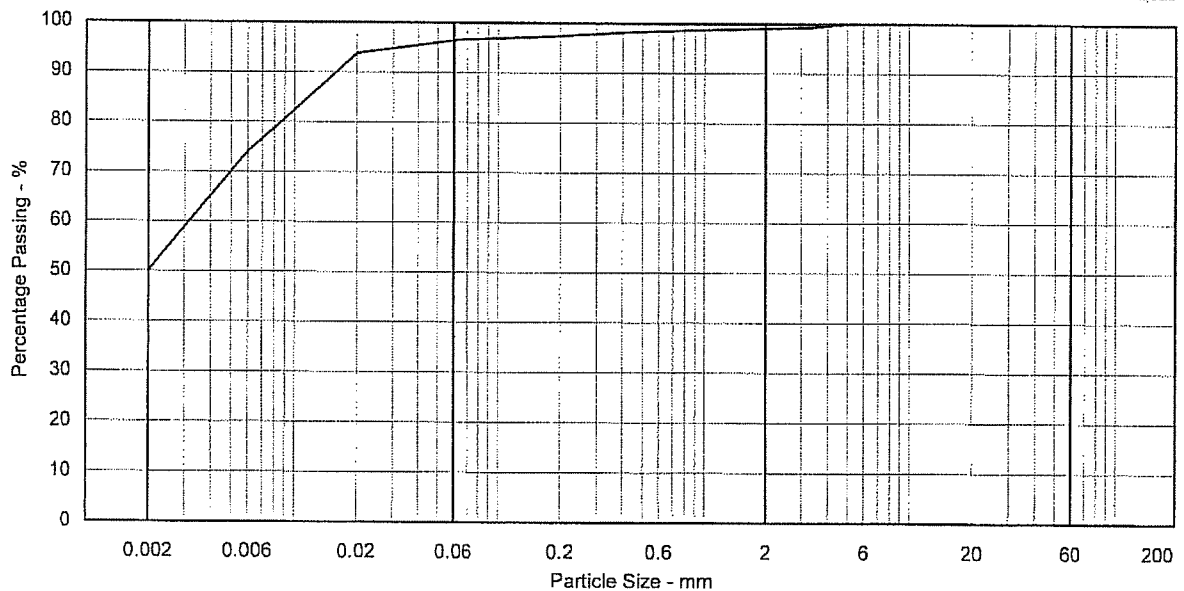
Non Engineering Description
Very dark grey slightly sandy CLAY with much claystone.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.9
Sand	2.7
Silt	46.3
Clay	50.1

Particle Diameter - mm	
D100	5.00
D60	0.00
D10	
Uniformity Coefficient	N/A

Notes

Clay	Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Medium Gravel	Coarse Gravel	Cobbles
------	-----------	-------------	-------------	-----------	-------------	-------------	-------------	---------------	---------------	---------



Originator	Checked & Approved
CM	<i>LA</i> 30/5/07

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



Appendix 1

Sheet 1 of 1



Site	<b>LEADENHAM CELL 4 TRIAL PAD (2)</b>	Contract No	<b>S-SL7714/004</b>
Client		Date Taken	17/05/2007
Engineer		Sample	1
		Sample Type	B5

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	99
6.30 mm	99
5.00 mm	99
3.35 mm	98
2.00 mm	98
1.18 mm	98
600 µm	97
425 µm	97
300 µm	97
212 µm	96
150 µm	96
63 µm	96
20 µm	93
6 µm	72
2 µm	49

**Non Engineering Description**

Very dark grey slightly sandy CLAY with occasional fine to medium claystone.

**Sample Proportions - %**

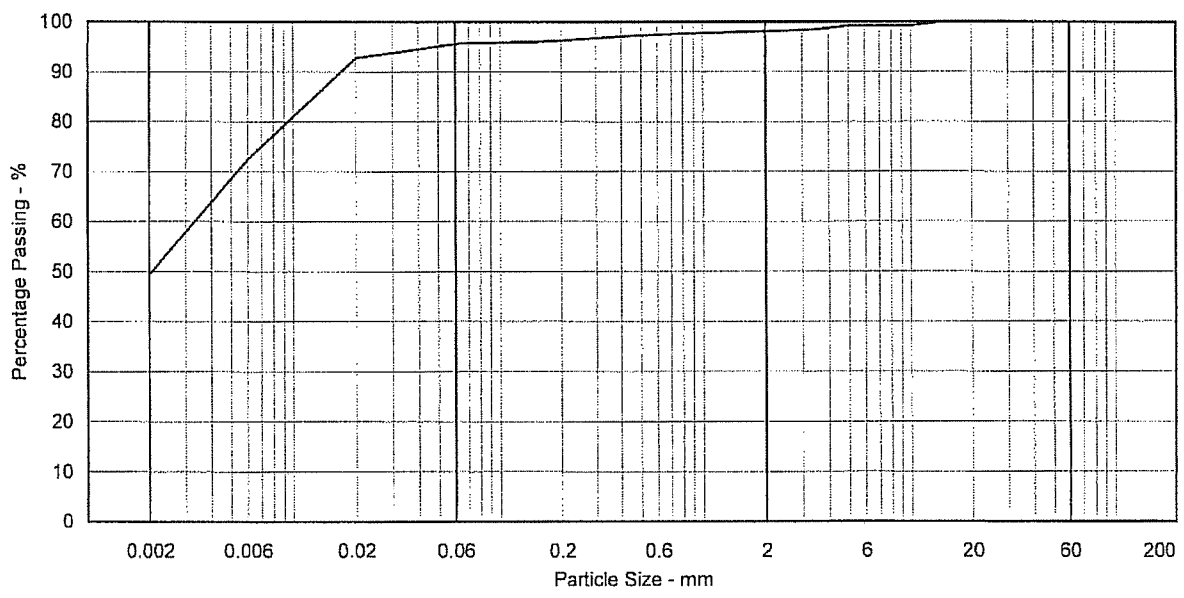
Cobbles	0.0
Gravel	1.9
Sand	2.6
Silt	46.0
Clay	49.5

**Particle Diameter - mm**

D100	14.00
D60	0.00
D10	
Uniformity Coefficient	N/A

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved	<b>PARTICLE SIZE DISTRIBUTION</b> BS1377:Part 2:1990 Clause 9.2 - Wet Sieving BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette	Appendix 1  Sheet 1 of 1
CM	<i>LSA</i> 30/5/07		



Site

LEADENHAM CELL 4 TRIAL PAD (2)

Contract No: S-SL7714/004

Client

Engineer

Sample date	Sample Ref	Layer / Passes	Description	NMC %	Bulk Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>	% Air voids
17/05/2007	C1	1/6	Very dark grey slightly gravelly slightly sandy CLAY. Gravel is fine to coarse.	19.6	2.02	1.69	4.7
17/05/2007	C2	1/8	Very dark grey slightly gravelly slightly sandy CLAY. Gravel is fine.	19.2	1.95	1.63	8.6
17/05/2007	C4	1/10	Very dark grey slightly gravelly slightly sandy CLAY. Gravel is fine.	20.0	2.02	1.69	4.2
17/05/2007	C5	1/10	Very dark grey slightly gravelly slightly sandy CLAY. Gravel is fine to medium.	17.7	2.06	1.75	4.5
17/05/2007	C6	1/10	Very dark grey slightly gravelly slightly sandy CLAY. Gravel is fine to medium.	22.4	2.03	1.66	1.8

Particle density (Mg/m<sup>3</sup>) Assumed = 2.72

Originator

Checked &amp; Approved

LA

LA  
29/5/07

## DENSITY

BS1377:Part 9:1990:Clause 4.2 - Core cutter method



Sheet 1 of 1

## CERTIFICATE OF NUCLEAR DENSITY GAUGE CALIBRATION

Certificate No.:

1

QA Plan Reference No.:

Client:  
WRG

Site:  
Leadenham

Project:  
Cell 4

**Test Method : Core Cutter Density and Moisture Content**

Test No.	TC1	TC2	TC4	TC5	TC6	
Date	17/05/2007	17/05/2007	17/05/2007	17/05/2007	17/05/2007	
Area	Layer 1	Layer 1	Layer 1	Layer 1	Layer 1	
Bulk Density (Mg/m <sup>3</sup> )	2.020	1.950	2.020	2.060	2.030	
Dry Density (Mg/m <sup>3</sup> )	1.690	1.630	1.690	1.750	1.660	
Moisture Content (%)	19.6%	19.2%	20.0%	17.7%	22.4%	
Moisture Density (Mg/m <sup>3</sup> )	0.330	0.320	0.330	0.310	0.370	

Average Core Cutter Bulk Density (Mg/m<sup>3</sup>) = 2.016

Average Core Cutter Moisture Density (Mg/m<sup>3</sup>) = 0.332

**Test Method : Nuclear Density Gauge**

Test No.	TP1	TP2	TP4	TP5	TP6	
Date	17/05/2007	17/05/2007	17/05/2007	17/05/2007	17/05/2007	
Area	Layer 1	Layer 1	Layer 1	Layer 1	Layer 1	
Bulk Density (Mg/m <sup>3</sup> )	1.955	1.898	2.034	1.991	2.018	
Moisture Content (%)	19.6%	19.5%	19.3%	17.2%	20.5%	
Moisture Density (Mg/m <sup>3</sup> )	0.321	0.309	0.329	0.292	0.343	

Average NDG Bulk Density (Mg/m<sup>3</sup>) = 1.979

Average NDG Moisture Density (Mg/m<sup>3</sup>) = 0.319

Bulk Density Correction (y) = 1.019

Moisture Density Correction (b) = 1.041

CQA Engineer:

Signature: \_\_\_\_\_

Date:

Notes:

Test Methods:

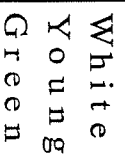
BS1377: Part 9: 1990: Clause 2.4 (Core Cutter Density)

BS1377: Part 3: 1990: Clause 3.2 (Moisture Content)

BS1377: Part 9: 1990: Clause 2.5 (NDG)

### On-Site NDG Test Results Record (% Air Voids)

CQA Engineer: **M. Holzer**  
Date: **17/05/2007**



Client: **WRG**  
Site: **Leadenham**

Project: **Cell 4 Compaction Trial Pad**  
QA Plan:

#### Test Results

Test No. / Location	Gauge Dry Density (kg/m <sup>3</sup> )	Gauge Bulk Density (kg/m <sup>3</sup> )	Gauge Moisture Density (kg/m <sup>3</sup> )	Gauge Moisture Content (%)	Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	Air Voids (%)	Notes
L1 - 6 Passes	1639.000	1961.000	321.300	19.6%	1954.500	320.500	1634.00	19.6%	5.1%	TC1
	1628.000	1948.000	319.700	19.6%						
L1 - 8 Passes	1544.000	1859.000	318.400	20.4%	1898.000	309.300	1588.70	19.5%	8.0%	TC2
	1637.000	1937.000	300.200	18.3%						
L1 - 8 Passes	1672.000	2006.000	334.200	20.0%	2001.500	331.000	1670.50	19.8%	2.7%	TC3
	1669.000	1997.000	327.800	19.6%						
L1 - 10 Passes	1718.000	2042.000	324.500	18.9%	2033.500	329.350	1704.15	19.3%	1.5%	TC4
	1691.000	2025.000	334.200	19.8%						
L1 - 10 Passes	1707.000	1986.000	279.200	16.4%	1991.000	292.150	1698.85	17.2%	5.4%	TC5
	1691.000	1996.000	305.100	18.0%						
L1 - 10 Passes	1699.000	2048.000	348.800	20.5%	2018.000	343.150	1674.85	20.5%	1.3%	TC6
	1651.000	1988.000	337.500	20.4%						
					0.000	0.000	0.00	#DIV/0!	#DIV/0!	
					0.000	0.000	0.00	#DIV/0!	#DIV/0!	
					0.000	0.000	0.00	#DIV/0!	#DIV/0!	

Correction Factors: Bulk Density  $y = 1$  Particle Density:  $SG = 2.6$   
Moisture Density  $b = 1$

Dry Density = Corrected Bulk Density - Corrected Moisture Density  
 Moisture Content = Corrected Moisture Density / Corrected Dry Density  
 Relative Compaction = Dry Density / Maximum Dry Density at the Respective Moisture Content x 100%  
 Air Voids = [ 1 - Dry Density x ( 1/Particle Density + Moisture Content/100 ) ] x 100%



**On-Site NDG Test Results Record (% Air Voids)**

CCA Engineer:

M. Holzer

Date:

17/05/2007

**White  
Young  
Green**

Client: WRG

Site: Leadenham

Project: Cell 4 Compaction Trial Pad

QA Plan:

**Test Results**

Test No. / Location	Gauge Dry Density (kg/m <sup>3</sup> )	Gauge Bulk Density (kg/m <sup>3</sup> )	Gauge Moisture Density (kg/m <sup>3</sup> )	Gauge Moisture Content (%)	Corrected Bulk Density (kg/m <sup>3</sup> )	Corrected Moisture Density (kg/m <sup>3</sup> )	Corrected Dry Density (kg/m <sup>3</sup> )	Corrected Moisture Content (%)	Air Voids (%)	Notes
L1 - 6 Passes	1639.000 1628.000	1961.000 1948.000	321.300 319.700	19.6% 19.6%	1991.636	333.641	1658.00	20.1%	4.1%	TC1
L1 - 8 Passes	1544.000 1637.000	1859.000 1937.000	318.400 300.200	20.4% 18.3%	1934.062	321.981	1612.08	20.0%	7.0%	TC2
L1 - 8 Passes	1672.000 1669.000	2006.000 1997.000	334.200 327.800	20.0% 19.6%	2039.529	344.571	1694.96	20.3%	1.6%	TC3
L1 - 10 Passes	1718.000 1691.000	2042.000 2025.000	324.500 334.200	18.9% 19.8%	2072.137	342.853	1729.28	19.8%	0.5%	TC4
L1 - 10 Passes	1707.000 1691.000	1986.000 1996.000	279.200 305.100	16.4% 18.0%	2028.829	304.128	1724.70	17.6%	4.5%	TC5
L1 - 10 Passes	1699.000 1651.000	2048.000 1988.000	348.800 337.500	20.5% 20.4%	2056.342	357.219	1699.12	21.0%	0.2%	TC6

Correction Factors: Bulk Density γ = 1.019

Moisture Density b = 1.041

Particle Density: SG = 2.65

Dry Density = Corrected Bulk Density - Corrected Moisture Density  
 Moisture Content = Corrected Moisture Density / Corrected Dry Density  
 Relative Compaction = Dry Density / Maximum Dry Density at the Respective Moisture Content x 100%  
 Air Voids = [ 1 - Dry Density x ( 1/Particle Density + Moisture Content/100 ) ] x 100%

CLIENT : May Gurney Ltd.  
 ADDRESS : Buckden Landfill Site  
 Brampton Road  
 Brampton  
 St. Neots  
 Cambridgeshire  
**PE19 5UH**

For the attention of : Mr. D. Osborne

### LABORATORY TESTING

Transmittal No: **C2558**

Report No: **2**

### TEST REPORT TRANSMITTAL NOTE

Project Name :	Leadenham Cell 4 Trial Pad (2)		
Project Number :	C2558	Date samples received :	18-May-2007
Your Ref :	S-SL7714/004	Date written instructions received :	18-May-2007
		Date testing commenced	18-May-2007
<b>Please find enclosed the results as summarised below</b>			
Item No	Quantity	Description	UKAS Accredited
2.65	5	Sieve and pipette on fine grained soil	Yes
4.11	2	2.5kg Compaction in 1 litre mould	Yes
Remarks :			
Issued by : L. Anaz		Date of Issue : 30-May-2007	
Approved Signatories :			
G Wilson (Joint Managing Director/Laboratories Director), G W Watson (Laboratory Manager), L Anaz (Supervisor)			
Note: Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.			



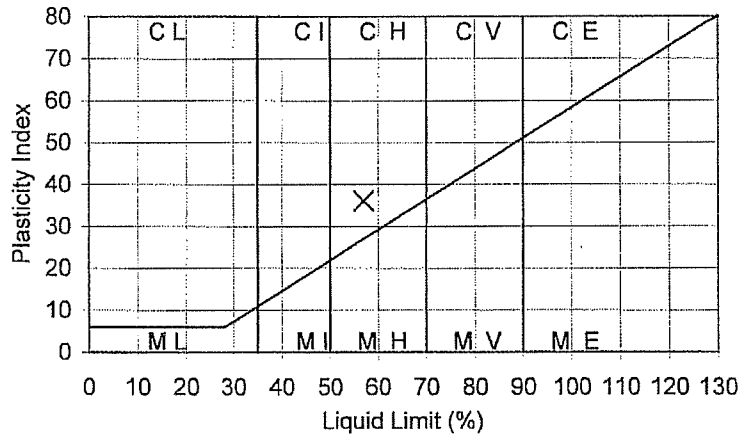
Mineral Lane, off Amersham Road, Chesham HP5 1NL, UK  
 Tel: +44 (0)1494 810 136 Fax: +44 (0)1494 784 837  
 email: chesham@terratek.co.uk  
 www.terratek.co.uk

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 Offices also at Airdrie, Belfast and Birmingham.



Site	<b>LEADENHAM CELL 4 TRIAL PAD (2)</b>	Contract No.	S-SL7714/004
Client		Date Taken:	17/05/2007
Engineer		Layer/Passes	1
		Sample Ref	B1

Description : Very dark grey slightly gravelly slightly sandy CLAY with much fine to medium claystone. Gravel is fine.  
 Preparation : Sample washed and air dried



**Results :**

Natural Moisture Content :	18 %
Percentage retained on 425µm sieve :	5 %
Liquid Limit :	57 %
Plastic Limit :	21 %
Plasticity Index :	36
Equivalent moisture content of material passing 425µm sieve :	19 %
Liquidity Index :	-0.06

Originator	Checked & Approved	<b>Liquid Limit (One Point Cone Penetrometer Method)</b> <b>Plastic Limit and Plasticity Index</b> BS 1377:Part 2:Clause 4.4:1990 BS 1377:Part 2:Clause 5:1990	
CM	LA 29/5/07		

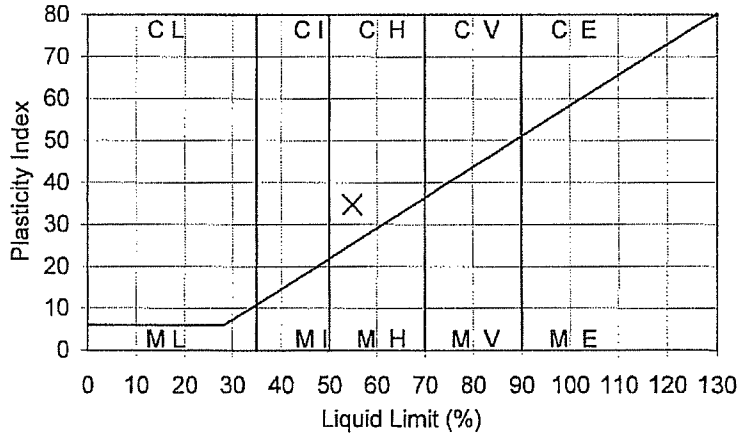


SITE INVESTIGATION AND LABORATORY SERVICES

Site <b>LEADENHAM CELL 4 TRIAL PAD (2)</b>	Contract No.    S-SL7714/004  Date Taken        17/05/2007 Layer/Passes      1  Sample Ref         B2
Client  Engineer	

Description :    Very dark grey slightly sandy CLAY with occasional fine claystone.

Preparation :    Sample washed and air dried



**Results :**

Natural Moisture Content :	20 %
Percentage retained on 425µm sieve :	2 %
Liquid Limit :	55 %
Plastic Limit :	20 %
Plasticity Index :	35
Equivalent moisture content of material passing 425µm sieve :	20 %
Liquidity Index :	0.01

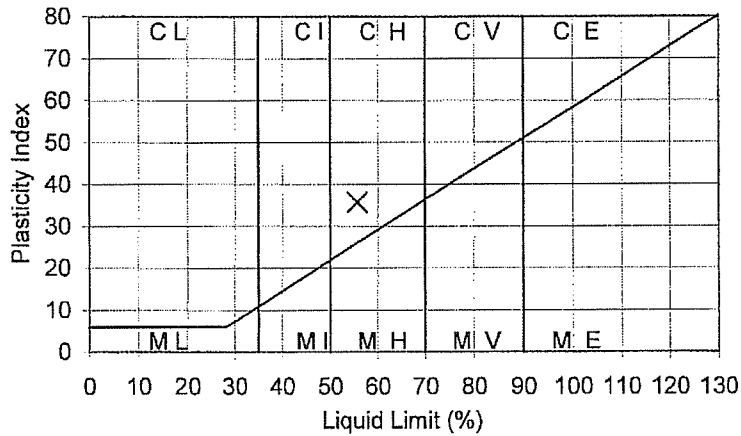
Originator	Checked & Approved	<b>Liquid Limit (One Point Cone Penetrometer Method)</b> <b>Plastic Limit and Plasticity Index</b> BS 1377:Part 2:Clause 4.4:1990 BS 1377:Part 2:Clause 5:1990	
CM	LS 29/5/07		Sheet 1 of 1



Site	LEADENHAM CELL 4 TRIAL PAD (2)	Contract No.	S-SL7714/004
Client		Date Taken	17/05/2007
Engineer		Layer/Passes	1
		Sample Ref	B3

Description : Very dark grey slightly sandy CLAY with much claystone.


Preparation : Sample washed and air dried



Results :

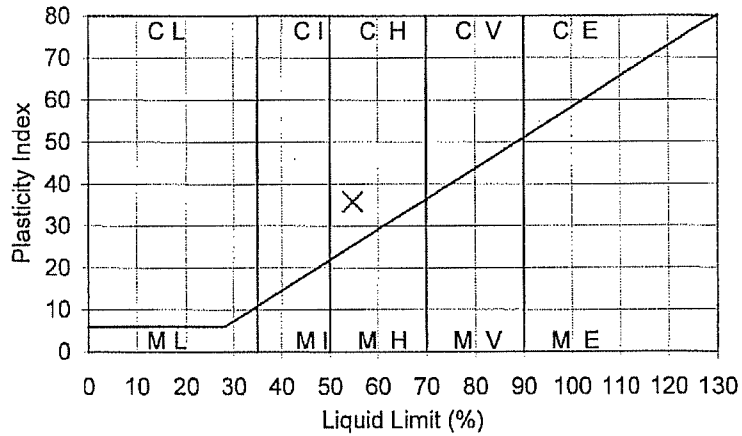
Natural Moisture Content :	19 %
Percentage retained on 425µm sieve :	1 %
Liquid Limit :	56 %
Plastic Limit :	20 %
Plasticity Index :	36
Equivalent moisture content of material passing 425µm sieve :	19 %
Liquidity Index :	-0.02

Originator	Checked & Approved	<b>Liquid Limit (One Point Cone Penetrometer Method)</b> <b>Plastic Limit and Plasticity Index</b> BS 1377:Part 2:Clause 4.4:1990 BS 1377:Part 2:Clause 5:1990	
CM	[Signature] 29/5/07		

	Site <b>LEADENHAM CELL 4 TRIAL PAD (2)</b>	Contract No. <b>S-SL7714/004</b>
	Client	Date Taken <b>17/05/2007</b>
	Engineer	Layer/Passes <b>1</b>
		Sample Ref <b>B4</b>


Description : Very dark grey slightly sandy CLAY with much claystone.

Preparation : Sample washed and air dried



Results :

Natural Moisture Content :	19 %
Percentage retained on 425µm sieve :	2 %
Liquid Limit :	55 %
Plastic Limit :	19 %
Plasticity Index :	36
Equivalent moisture content of material passing 425µm sieve :	19 %
Liquidity Index :	0.01

Originator	Checked & Approved	<b>Liquid Limit (One Point Cone Penetrometer Method)</b> <b>Plastic Limit and Plasticity Index</b> BS 1377:Part 2:Clause 4.4:1990 BS 1377:Part 2:Clause 5:1990	
CM	LA 29/5/07		Sheet 1 of 1



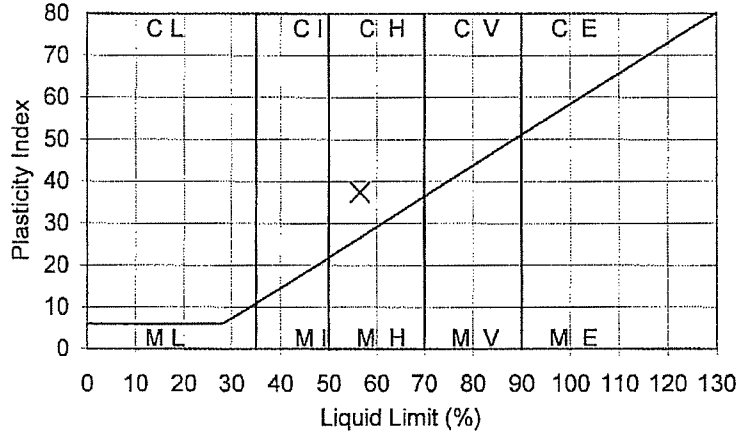
SITE INVESTIGATION AND LABORATORY SERVICES

Site	LEADENHAM CELL 4 TRIAL PAD (2)
Client	
Engineer	

Contract No.	S-SL7714/004
Date Taken	17/05/2007
Layer/Passes	1
Sample Ref	B5

Description : Very dark grey slightly sandy CLAY with much fine to medium claystone.

Preparation : Sample washed and air dried



Results :

Natural Moisture Content :	19 %
Percentage retained on 425µm sieve :	3 %
Liquid Limit :	57 %
Plastic Limit :	19 %
Plasticity Index :	38
Equivalent moisture content of material passing 425µm sieve :	20 %
Liquidity Index :	0.02

Originator	Checked & Approved
CM	Ld 29/5/07

**Liquid Limit (One Point Cone Penetrometer Method)**  
**Plastic Limit and Plasticity Index**  
 BS 1377:Part 2:Clause 4.4:1990  
 BS 1377:Part 2:Clause 5:1990





Site Investigation & Laboratory Services

Site LEADENHAM CELL 4 TRIAL PAD (2)

Contract No S-SL7714/004

Client

Engineer

Date Taken	Sample ref	Layer/ Passes	Description	Particle Density Mg/m <sup>3</sup>
17/05/2007	B1	1	Very dark grey slightly gravelly slightly sandy CLAY with much fine to medium claystone. Gravel is fine.	2.73
17/05/2007	B2	1	Very dark grey slightly sandy CLAY with occasional fine claystone.	2.71
17/05/2007	B3	1	Very dark grey slightly sandy CLAY with much claystone.	2.71
17/05/2007	B4	1	Very dark grey slightly sandy CLAY with much claystone.	2.71
17/05/2007	B5	1	Very dark grey slightly sandy CLAY with much fine to medium claystone.	2.75

Originator

Checked & Approved

JAH

*LJA*  
29/5/07

**PARTICLE DENSITY**

BS1377:Part 2:Clause 8.3:1990 - Small Pyknometer Method







Site  
**LEADENHAM CELL 4 TRIAL PAD (2)**

Client

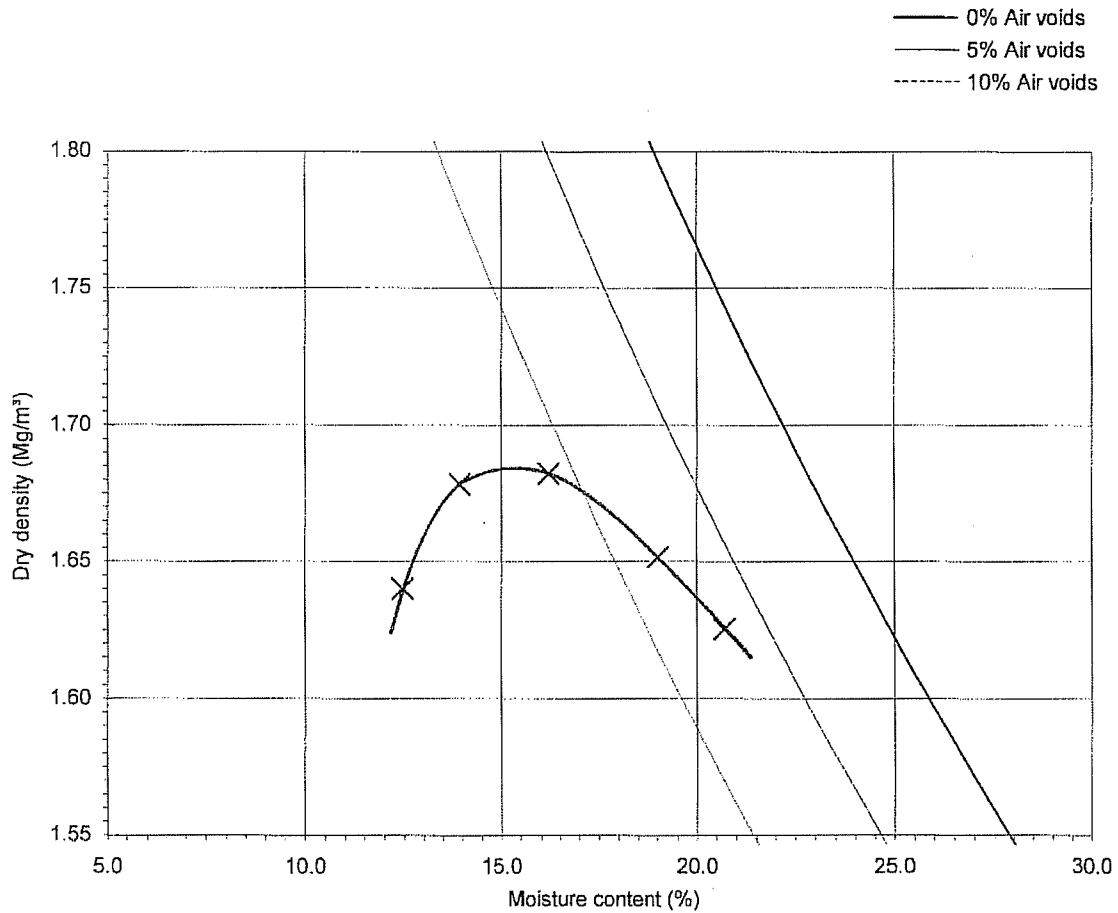
Engineer

Contract No. **S-SL7714/004**

Date Taken: 17/05/2007

Layer/Passes 1

Sample B1



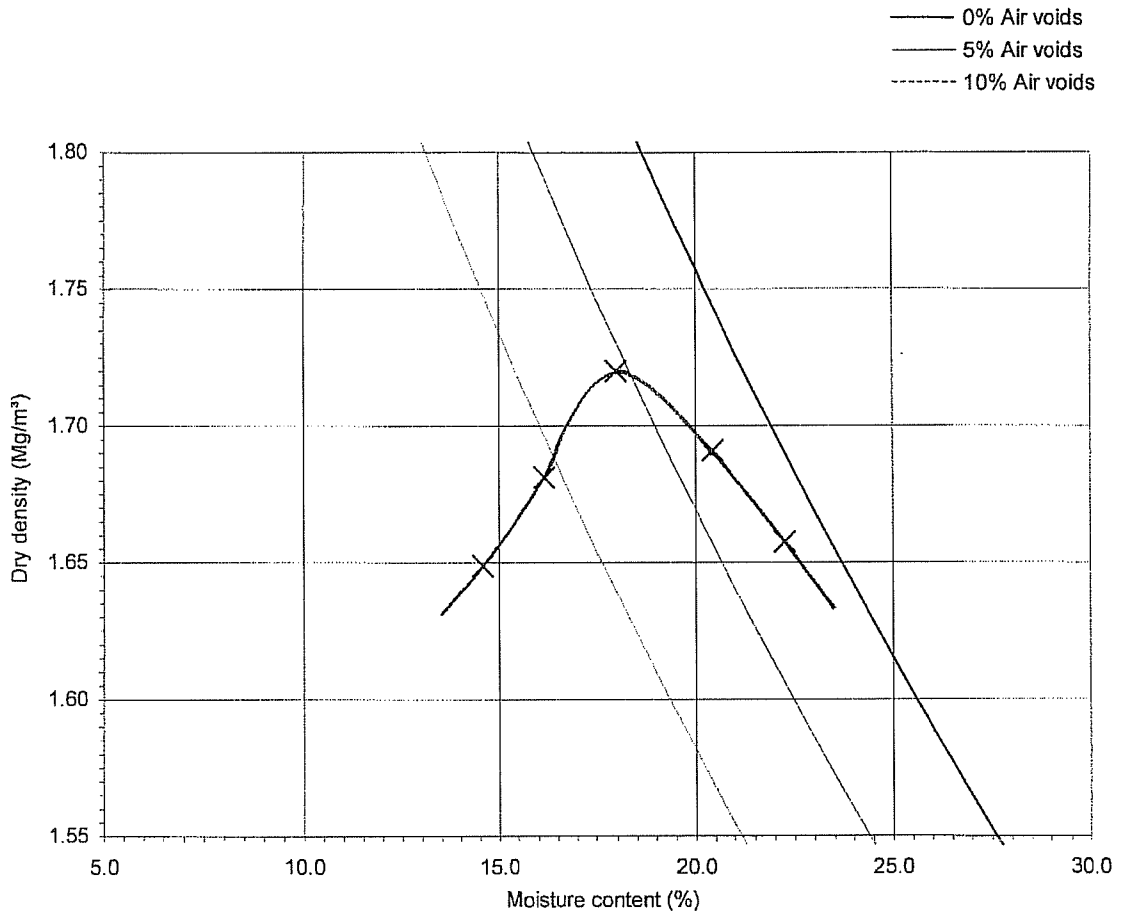
Sample Description	Very dark grey slightly gravelly slightly sandy CLAY with much fine to medium claystone. Gravel is fine.
Preparation	Sample was prepared using air drying
Test Method	2.5kg Rammer for soils with particles up to medium-gravel size
Sample Used	Single
Mass Retained on 37.5 mm Sieve %	0
Mass Retained on 20.0 mm Sieve %	0
Particle Density (Measured) Mg/m³	2.73
Natural Moisture Content %	18
Maximum Dry Density: Mg/m³	1.69
Optimum Moisture Content: %	15

Originator	Checked & Approved
JAH	<i>[Signature]</i> 30/5/07

**Moisture Content / Dry Density Relationship**  
BS1377:Part 4:Clause 3.3:1990



<b>TERRA TEK</b> <small>Site Investigation &amp; Laboratory Services</small>	Site	<b>LEADENHAM CELL 4 TRIAL PAD (2)</b>	Contract No.	S-SL7714/004
	Client		Date Taken	17/05/2007
	Engineer		Layer/Passes	1
			Sample	B4



Sample Description	Very dark grey slightly sandy CLAY with much claystone.	
Preparation	Sample was prepared using air drying	
Test Method	2.5kg Rammer for soils with particles up to medium-gravel size	
Sample Used	Single	
Mass Retained on 37.5 mm Sieve %	%	0
Mass Retained on 20.0 mm Sieve %	%	0
Particle Density (Measured)	Mg/m <sup>3</sup>	2.71
Natural Moisture Content	%	19
Maximum Dry Density:	Mg/m <sup>3</sup>	1.72
Optimum Moisture Content:	%	18

Originator	Checked & Approved	<b>Moisture Content / Dry Density Relationship</b> BS1377:Part 4:Clause 3.3:1990	
JAH	LA 30/5/07		

## CORE TEST RESULTS

**MOISTURE CONTENT &  
FIELD DENSITY**

CLIENT : May Gurney Ltd.  
 ADDRESS : Buckden Landfill Site  
 Brampton Road  
 Brampton  
 St. Neots  
 Cambridgeshire  
 PE19 5UH

For the attention of : Mr. D. Osborne

### LABORATORY TESTING

Transmittal No: C2693  
 Report No: 1

### TEST REPORT TRANSMITTAL NOTE

Project Name :		Leadenham Cell 4 Construction	
Project Number :	C2693	Date samples received :	5-Sep-2007
Your Ref :	SL7714/004	Date written instructions received :	4-Sep-2007
		Date testing commenced:	6-Sep-2007
<b>Please find enclosed the results as summarised below</b>			
Item No	Quantity	Description	UKAS Accredited
2.41	6	Linear density	Yes
Remarks :			
Issued by : L. Anaz		Date of Issue : 7-Sep-2007	
Approved Signatories :			
G Wilson (Joint Managing Director/Laboratories Director), G W Watson (Laboratory Manager), L. Anaz (Supervisor)			
Note: Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.			



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Site Investigation &amp; Laboratory Services

Site

**LEADENHAM CELL 4 CONSTRUCTION**

Contract No: SL7714/004

Client

Engineer

Sample date	Grid ref. / Layer	Sample ref.	Description	NMC %	Bulk Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>	% Air voids
03/09/2007	LCP Base/A1	C1	Greyish brown slightly sandy CLAY with fine to medium mudstone.	20.6	1.95	1.61	6.9
03/09/2007	LCP Base/A1	C2	Greyish brown slightly sandy CLAY with fine to medium mudstone.	22.9	1.99	1.62	2.8
03/09/2007	LCP Base/A1	C3	Greyish brown slightly sandy CLAY with fine to medium mudstone.	22.5	2.00	1.63	2.7
03/09/2007	LCP Base/A1	C4	Greyish brown slightly sandy CLAY with fine to medium mudstone.	24.3	1.97	1.59	2.7
03/09/2007	LCP Base/A1	C5	Greyish brown slightly sandy CLAY with fine to medium mudstone.	23.4	1.99	1.61	2.7
04/09/2007	A2/1	C6	Greyish brown slightly sandy CLAY with fine to medium mudstone.	28.8	1.90	1.48	2.7

Particle density (Mg/m<sup>3</sup>) Assumed = 2.70

Originator

Checked &amp; Approved

CM

SA  
7/9/07**DENSITY**

BS1377:Part 2:1990:Clause 7.2 - Linear density method



Sheet 1 of 1

# TERRA TEK

Site Investigation & Laboratory Services


Site  
**LEADENHAM CELL 4 CONSTRUCTION**

Contract No: SL7714/004

Client  
Engineer

Sample date	Grid ref. / Layer	Sample ref.	Description	NMC %	Bulk Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>	% Air voids
06/09/2007	B3/2	C7	Dark greyish brown slightly sandy CLAY.	23.8	1.98	1.60	2.9

Particle density (Mg/m3) Assumed = 2.70

Originator	Checked & Approved	<b>DENSITY</b> BS1377:Part 2:1990:Clause 7.2 - Linear density method	
CM	LA 13/9/07		

**TERRA TEK**

Site Investigation &amp; Laboratory Services

Site

LEADENHAM CELL 4 CONSTRUCTION

Contract No: SL7714/004

Client

Engineer

Sample date	Grid ref. / Layer	Sample ref.	Description	NMC %	Bulk Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>	% Air voids
07/09/2007	B2/3	C8	Greyish brown slightly sandy CLAY with fine to medium mudstone.	22.4	2.01	1.64	2.4
10/09/2007	C3/4	C9	Greyish brown slightly sandy CLAY with fine to medium mudstone.	20.5	1.96	1.63	6.3

Particle density (Mg/m3) Assumed = 2.70

Originator

Checked &amp; Approved

CM

LSA  
13/9/07**DENSITY**

BS1377:Part 2:1990:Clause 7.2 - Linear density method



Sheet 1 of 1



CLIENT : May Gurney Ltd.  
 ADDRESS : Buckden Landfill Site  
 Brampton Road  
 Brampton  
 St. Neots  
 Cambridgeshire  
 PE19 5UH

For the attention of : Mr. D. Osborne

### LABORATORY TESTING

Transmittal No:

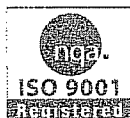
C2693

Report No:

4

### TEST REPORT TRANSMITTAL NOTE

Project Name :		Leadenham Cell 4 Construction	
Project Number :		C2693	
Your Ref :		SL7714/004	
		Date samples received :	
		Date written instructions received :	
		Date testing commenced:	18-Sep-2007
<b>Please find enclosed the results as summarised below</b>			
Item No	Quantity	Description	UKAS Accredited
2.41	1	Linear density	Yes
Remarks :			
Issued by : L. Anaz		Date of Issue : 19-Sep-2007	
Approved Signatories :			
G Wilson (Joint Managing Director/Laboratories Director), G W Watson (Laboratory Manager), L Anaz (Supervisor)			
Note: Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.			



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Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**

Contract No: SL7714/004

Client

Engineer

Sample date	Grid ref. / Layer	Sample ref.	Description	NMC %	Bulk Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>	% Air voids
12/09/2007	C2 / 5	C10	Greyish brown slightly sandy CLAY with fine to medium mudstone.	19.5	2.04	1.70	3.7

Particle density (Mg/m3) Assumed = 2.70

Originator

Checked & Approved

LA

LA  
19/9/07

**DENSITY**

BS1377:Part 2:1990:Clause 7.2 - Linear density method



**TERRA TEK**

Site Investigation &amp; Laboratory Services

Site

**LEADENHAM CELL 4 CONSTRUCTION**

Contract No: SL7714/004

Client

Engineer

Sample date	Grid ref. / Layer	Sample ref.	Description	NMC %	Bulk Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>	% Air voids
20/09/2007	B3 / 11	C13	Greyish brown slightly sandy CLAY with fine to medium mudstone.	22.3	2.02	1.65	2.1

Particle density (Mg/m<sup>3</sup>) Assumed = 2.70

Originator

Checked &amp; Approved

LA

LA  
21/9/07**DENSITY**

BS1377:Part 2:1990:Clause 7.2 - Linear density method



Sheet 1 of 1

**TERRA TEK**

Site Investigation &amp; Laboratory Services

Site

**LEADENHAM CELL 4 CONSTRUCTION**

Contract No: SL7714/004

Client

Engineer

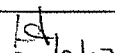
Sample date	Grid ref. / Layer	Sample ref.	Description	NMC %	Bulk Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>	% Air voids
14/09/2007	C2/7	C11	Greyish brown slightly sandy CLAY with fine to coarse mudstone.	22.2	2.01	1.64	2.6
15/09/2007	B3/10	C12	Greyish brown slightly sandy CLAY with fine to coarse mudstone.	23.9	2.00	1.61	1.6
20/09/2007	A2/3	C15	Greyish brown slightly sandy CLAY with fine to coarse mudstone.	17.5	2.08	1.77	3.7
20/09/2007	B3/11	C16	Greyish brown slightly sandy CLAY with fine to coarse mudstone.	19.8	2.09	1.74	1.1

Particle density (Mg/m3) Assumed = 2.70

Originator

Checked &amp; Approved

CM

  
 27/9/07
**DENSITY**

BS1377:Part 2:1990:Clause 7.2 - Linear density method



Sheet 1 of 1

**TERRA TEK**

Site Investigation & Laboratory Services

Site  
**LEADENHAM CELL 4 CONSTRUCTION**  
 Client  
 Engineer

Contract No: SL7714/004

Sample date	Grid ref. / Layer	Sample ref.	Description	NMC %	Bulk Density Mg/m <sup>3</sup>	Dry Density Mg/m <sup>3</sup>	% Air voids
19/09/2007		C14	Greyish brown slightly sandy CLAY with fine to medium mudstone.	22.5	2.09	1.71	-1.6

Particle density (Mg/m<sup>3</sup>) Assumed = 2.70

Originator

Checked & Approved

CM

Ld  
25/9/07

**DENSITY**

BS1377:Part 2:1990:Clause 7.2 - Linear density method



## **PARTICLE DENSITY**

### **TEST RESULTS**

CLIENT : May Gurney Ltd.  
 ADDRESS : Buckden Landfill Site  
 Brampton Road  
 Brampton  
 St. Neots  
 Cambridgeshire  
**PE19 5UH**

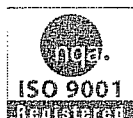
For the attention of : Mr. D. Osborne

### LABORATORY TESTING

Transmittal No: C2693  
 Report No: 6

### TEST REPORT TRANSMITTAL NOTE

Project Name :		Leadenham Cell 4 Construction	
Project Number :		C2693	
Your Ref :		SL7714/004	
		Date samples received :	
		Date written instructions received :	
		Date testing commenced:	11-Sep-2007
<b>Please find enclosed the results as summarised below</b>			
Item No	Quantity	Description	UKAS Accredited
2.41	1	Linear density	Yes
2.52	7	Particle density by small pycnometer	Yes
Remarks :			
Issued by : L. Anaz		Date of Issue : 25-Sep-2007	
Approved Signatories :			
G Wilson (Joint Managing Director/Laboratories Director), G W Watson (Laboratory Manager), L Anaz (Supervisor)			
Note: Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.			



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Site Investigation &amp; Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**Contract No **SL7714/004**

Client

Engineer

Sample date	Grid ref. / Layer	Sample ref.	Description	Particle Density Mg/m <sup>3</sup>
03/09/2007	LCF Base / A1	B1	Greyish brown slightly sandy CLAY with occasional fine to medium mudstone	2.70
04/09/2007	B3 / 1	B2	Greyish brown slightly sandy CLAY with occasional fine to medium mudstone	2.69
05/09/2007	C3 / 2	B3	Dark greyish brown slightly sandy CLAY	2.69
06/08/2007	A3 / 2	B4	Dark greyish brown slightly sandy CLAY	2.68
07/09/2007	B3 / 3	B5	Greyish brown slightly sandy CLAY with occasional fine mudstone	2.73
10/09/2007	C3 / 4	B6	Greyish brown slightly sandy CLAY with occasional fine mudstone	2.75
10/09/2007	A3 / 4	B7	Greyish brown slightly sandy CLAY with occasional fine mudstone	2.73

Originator

Checked &amp; Approved

CM

LJA  
25/9/07**PARTICLE DENSITY**

BS1377:Part 2:Clause 8.3:1990 - Small Pycnometer Method



Sheet 1 of 1



CLIENT : May Gurney Ltd.  
 ADDRESS : Buckden Landfill Site  
 Brampton Road  
 Brampton  
 St. Neots  
 Cambridgeshire  
 PE19 5UH

For the attention of : Mr. D. Osborne

### LABORATORY TESTING

Transmittal No: C2693  
 Report No: 15

### TEST REPORT TRANSMITTAL NOTE

Project Name :		Leadenham Cell 4 Construction	
Project Number :		C2693	
Your Ref :		SL7714/004	
		Date samples received :	
		Date written instructions received :	
		Date testing commenced:	29-Sep-2007
<b>Please find enclosed the results as summarised below</b>			
Item No	Quantity	Description	UKAS Accredited
2.52	1	Particle density by small pyknometer	Yes
Remarks :			
Issued by : L. Anaz		Date of Issue : 12-Oct-2007	
Approved Signatories :			
G Wilson (Joint Managing Director/Laboratories Director), G W Watson (Laboratory Manager), L Anaz (Supervisor)			
Note: Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.			



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12/10/2007 11:49

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**TERRA TEK**

Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**

Contract No **SL7714/004**

Client

Engineer

Sample Date	Grid Ref/Layer	Sample Ref	Description	Particle Density Mg/m <sup>3</sup>
19/09/2007		B12	Greyish brown slightly sandy CLAY.	2.76

Originator

CM

Checked & Approved

ist  
12/10/07

**PARTICLE DENSITY**

BS1377:Part 2:Clause 8.3:1990 - Small Pyknometer Method



Sheet 1 of 1

**PARTICLE SIZE DISTRIBUTION  
TEST RESULTS**

H:\Lab\Lab Report Data\c2693\PSD\PSD 03-09-2007 A1 B1-CS23119.xls : Sample ID CS23119



Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**

Contract No **SL7714/004**

Sample Date **03/09/2007**

Grid Ref **LCF Base**

Layer **A1**

Sample Ref **B1**

Client

Engineer

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	97
425 µm	97
300 µm	97
212 µm	96
150 µm	96
63 µm	95
20 µm	93
6 µm	82
2 µm	54

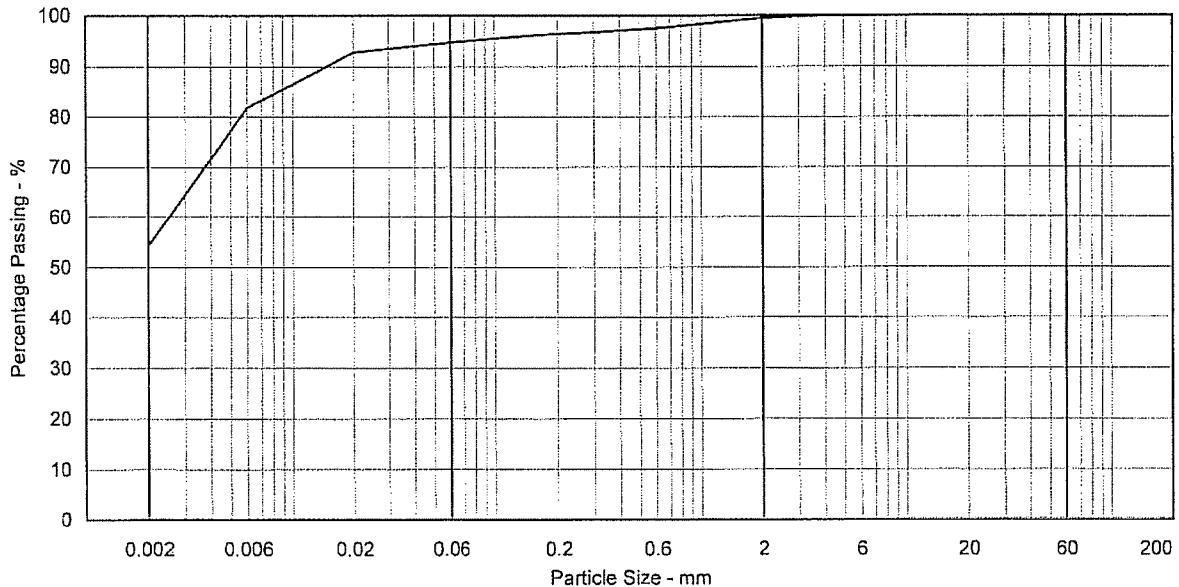
Non Engineering Description
Greyish brown slightly sandy CLAY with occasional fine to medium mudstone.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.5
Sand	4.7
Silt	40.4
Clay	54.4

Particle Diameter - mm	
D100	5.00
D60	0.00
D10	
Uniformity Coefficient	N/A

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved	<b>PARTICLE SIZE DISTRIBUTION</b> BS1377:Part 2:1990 Clause 9.2 - Wet Sieving BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette	Appendix 1 Sheet 1 of 1
CM	[Signature] 15/9/07		

Mineral Lane, Chesham, Bucks, HP51NL

Lab Project No C2693 : 15/09/2007 09:51:15

H:\Lab\Lab Report Data\c2693\PSD\PSD 04-09-2007 B3 B2-CS23122.xls : Sample ID CS23122

**TERRA TEK**

Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**

Contract No **SL7714/004**

Sample Date 04/09/2007

Grid Ref B3

Layer 1

Sample Ref B2

Client

Engineer

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	99
300 µm	99
212 µm	99
150 µm	99
63 µm	98
20 µm	96
6 µm	83
2 µm	57

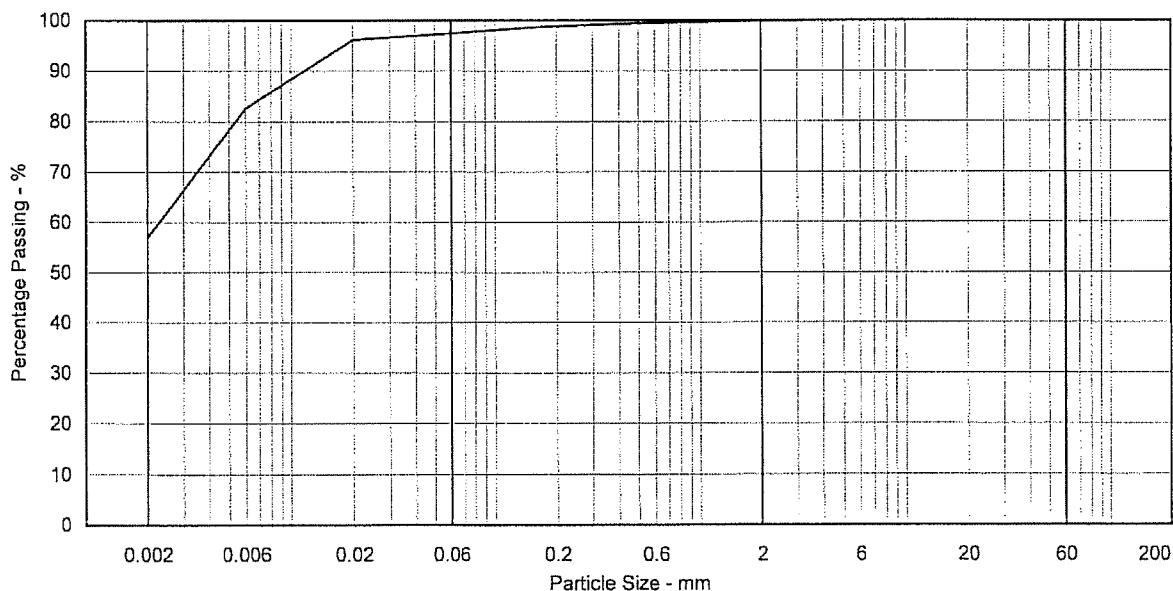
Non Engineering Description
Greyish brown slightly sandy CLAY with occasional fine to medium mudstone.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.1
Sand	2.5
Silt	40.4
Clay	57.0

Particle Diameter - mm	
D100	3.35
D60	0.00
D10	
Uniformity Coefficient	N/A

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved	<b>PARTICLE SIZE DISTRIBUTION</b> BS1377:Part 2:1990 Clause 9.2 - Wet Sieving BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette	Appendix 1  Sheet 1 of 1
CM	[Signature] 15/9/07		

Mineral Lane, Chesham, Bucks, HP51NL

Lab Project No C2693 : 14/09/2007 11:44:29



Site	LEADENHAM CELL 4 CONSTRUCTION	Contract No	SL7714/004
Client		Sample Date	05/09/2007
Engineer		Grid Ref	C3
		Layer	2
		Sample Ref	B3

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	100
425 µm	100
300 µm	100
212 µm	100
150 µm	99
63 µm	97
20 µm	96
6 µm	84
2 µm	62

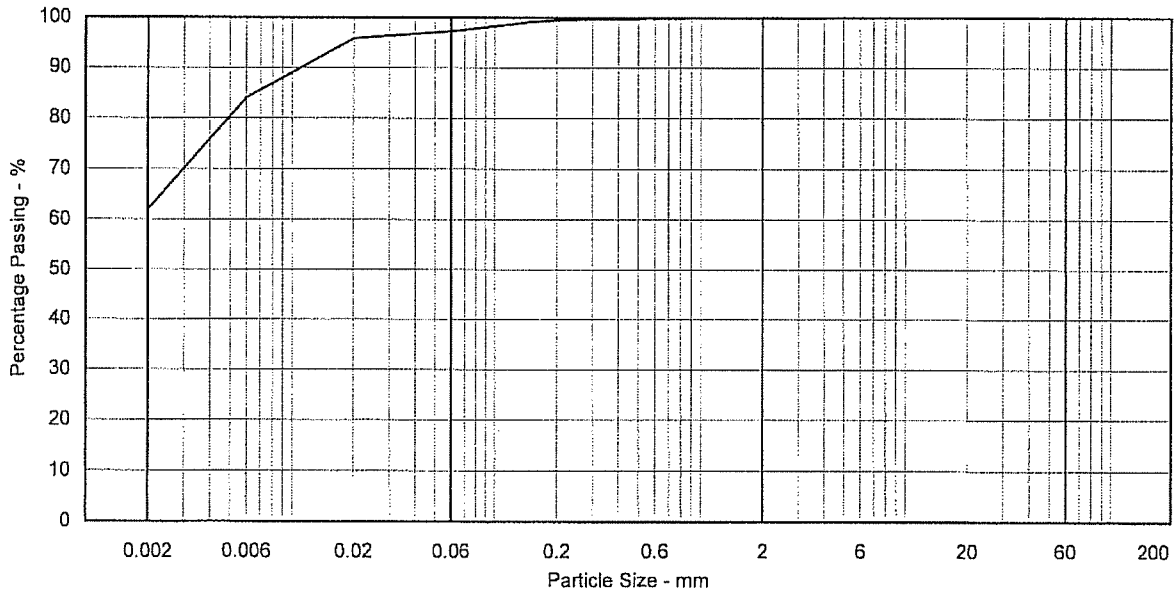
Non Engineering Description
Dark greyish brown slightly sandy CLAY

Sample Proportions - %	
Cobbles	0.0
Gravel	0.1
Sand	2.7
Silt	35.1
Clay	62.1

Particle Diameter - mm	
D100	5.00
D60	
D10	
Uniformity Coefficient	N/A

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
CM	LSA 21/9/07

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

**Appendix 1**  
 Sheet 1 of 1

# TERRA TEK

Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**

Client

Engineer

Contract No **SL7714/004**

Sample Date 06/09/2007

Grid Ref A3

Layer 2

Sample Ref B4

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	100
425 µm	100
300 µm	100
212 µm	99
150 µm	99
63 µm	99
20 µm	96
6 µm	87
2 µm	76

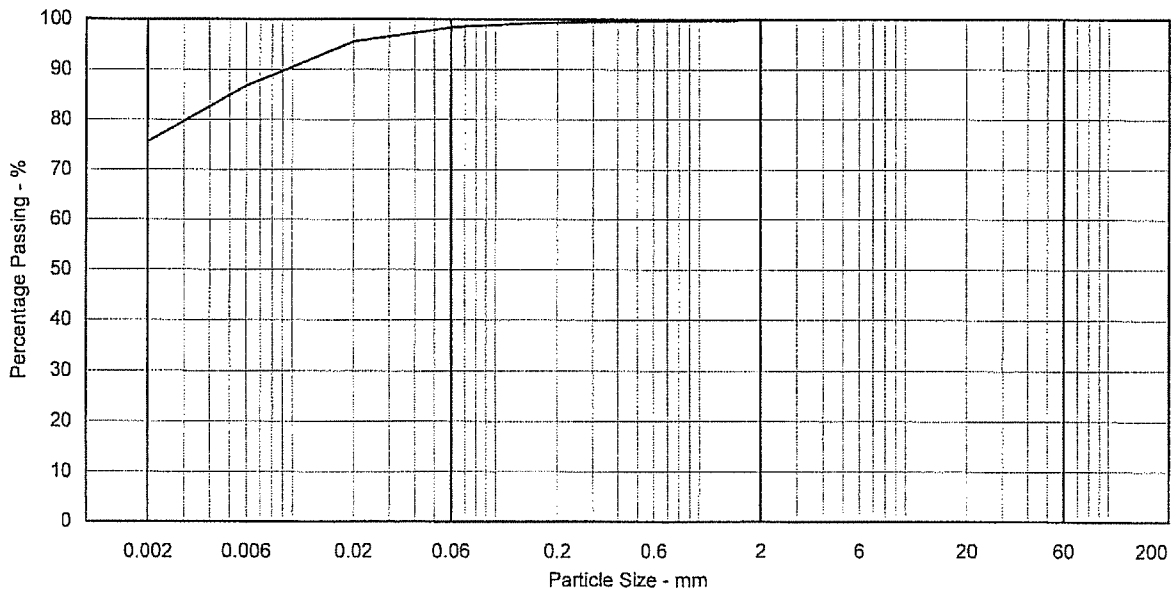
Non Engineering Description
Dark greyish brown slightly sandy CLAY

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	1.5
Silt	22.6
Clay	75.7

Particle Diameter - mm	
D100	5.00
D60	
D10	
Uniformity Coefficient	N/A

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
CM	<i>LD</i> 21/9/07

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



Appendix 1

Sheet 1 of 1

# TERRA TEK

Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**

Contract No **SL7714/004**

Sample date **07/09/2007**

Grid ref. **B3**

Layer **3**

Sample **B5**

Client

Engineer

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	99
300 µm	99
212 µm	98
150 µm	97
63 µm	96
20 µm	78
6 µm	67
2 µm	47

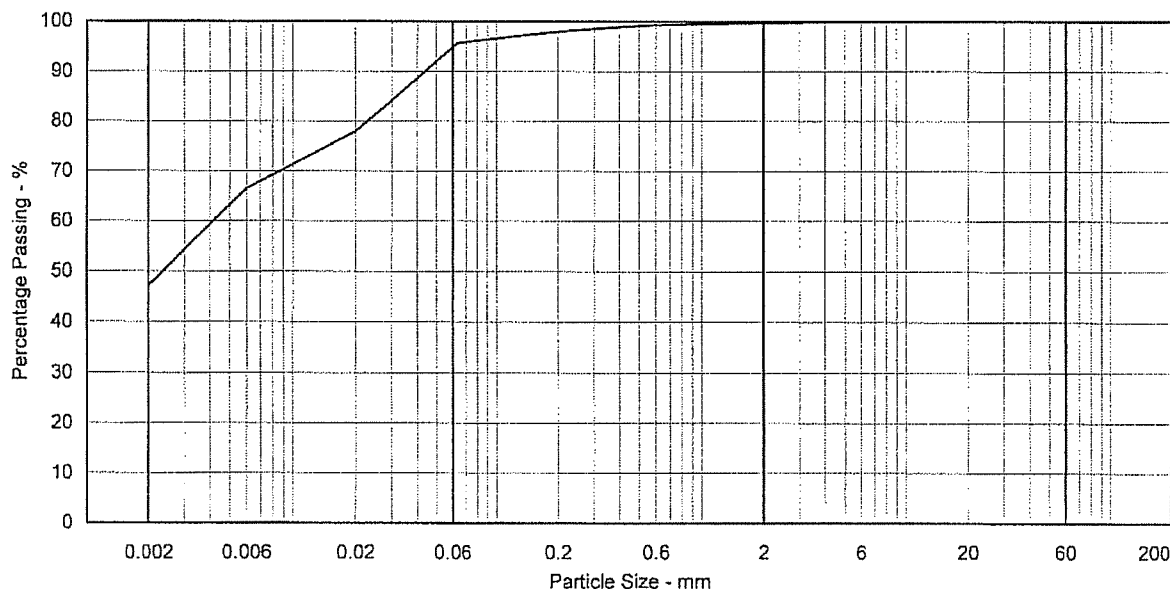
Non Engineering Description
Greyish brown slightly sandy CLAY with occasional fine mudstone.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.3
Sand	5.2
Silt	47.3
Clay	47.2

Particle Diameter - mm	
D100	5.00
D60	0.00
D10	
Uniformity Coefficient	N/A

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator

Checked & Approved

LA

LA  
21/9/07

## PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



Appendix 1

Sheet 1 of 1



# TERRA TEK

Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**

Contract No **SL7714/004**

Client

Sample date 10/09/2007

Engineer

Grid ref. C3

Grid ref. 4

Sample B6

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	99
1.18 mm	99
600 µm	98
425 µm	98
300 µm	98
212 µm	97
150 µm	96
63 µm	95
20 µm	77
6 µm	65
2 µm	46

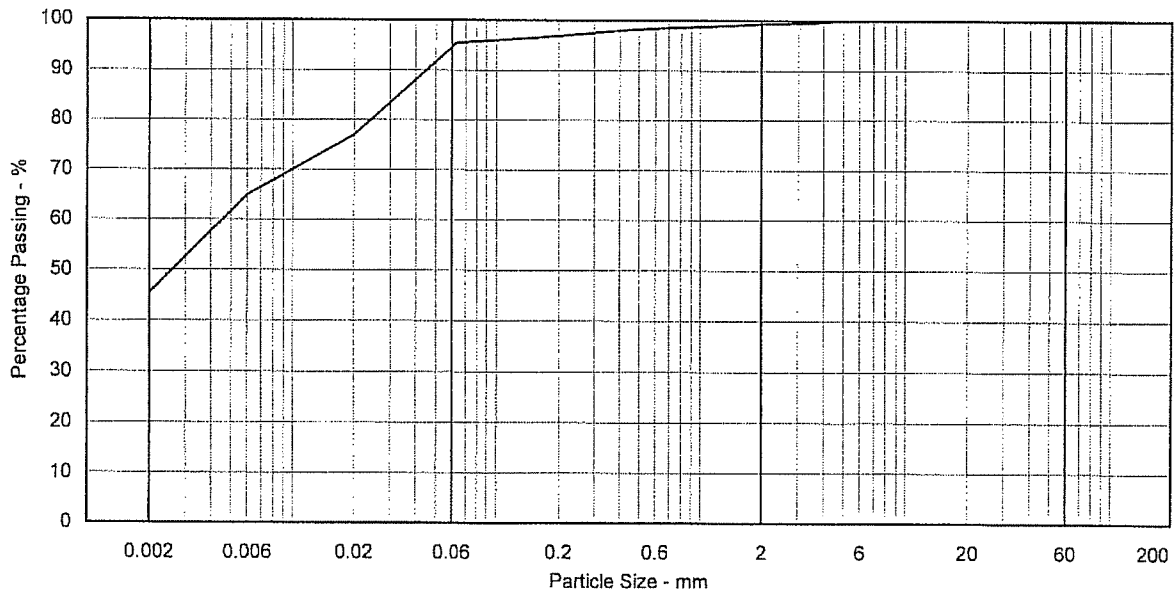
Non Engineering Description
Greyish brown slightly sandy CLAY with occasional fine mudstone.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.7
Sand	5.1
Silt	48.7
Clay	45.5

Particle Diameter - mm	
D100	5.00
D60	0.00
D10	
Uniformity Coefficient	N/A


Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
	<i>[Signature]</i> 21/9/07

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette


 Appendix 1  
 Sheet 1 of 1

**TERRA TEK**

Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**

Contract No **SL7714/004**

Sample date 10/09/2007

Grid ref. A3

Grid ref. 4

Sample B7

Client

Engineer

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	99
600 µm	99
425 µm	98
300 µm	97
212 µm	96
150 µm	95
63 µm	92
20 µm	87
6 µm	70
2 µm	48

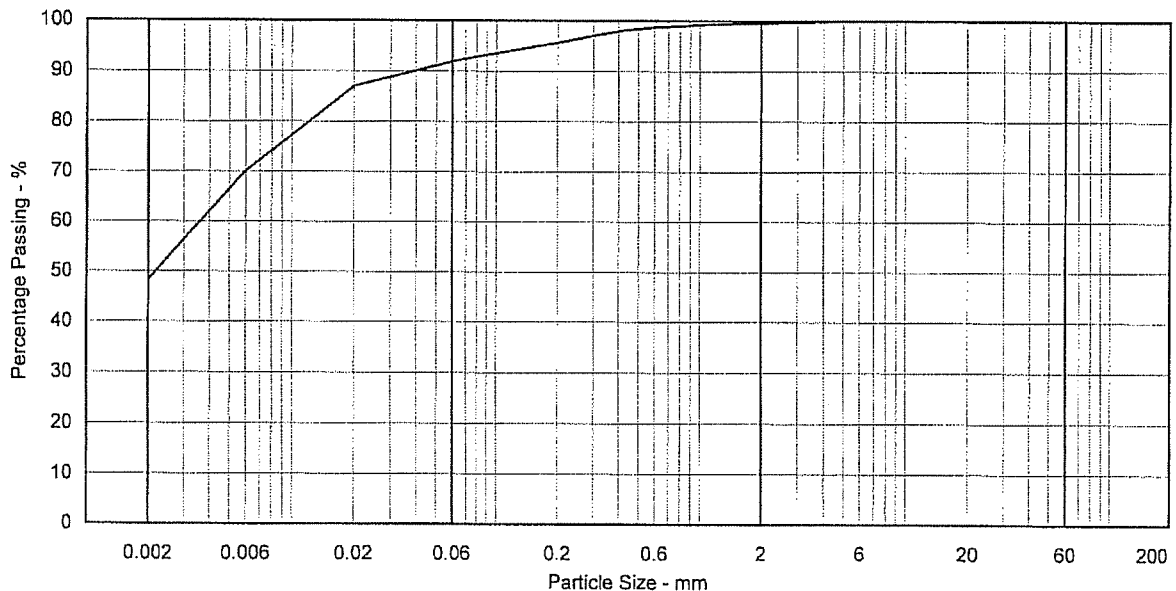
Non Engineering Description
Greyish brown slightly sandy CLAY with occasional fine mudstone.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.4
Sand	7.8
Silt	43.4
Clay	48.4

Particle Diameter - mm	
D100	5.00
D60	0.00
D10	
Uniformity Coefficient	N/A

Notes

Clay	Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Medium Gravel	Coarse Gravel	Cobbles



Originator

Checked & Approved

LA

LA  
21/9/07

**PARTICLE SIZE DISTRIBUTION**  
BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



Appendix 1

Sheet 1 of 1

CLIENT : May Gurney Ltd.  
 ADDRESS : Buckden Landfill Site  
 Brampton Road  
 Brampton  
 St. Neots  
 Cambridgeshire  
**PE19 5UH**

For the attention of : Mr. D. Osborne

### LABORATORY TESTING

Transmittal No: C2693  
 Report No: 8

### TEST REPORT TRANSMITTAL NOTE

Project Name :		Leadenham Cell 4 Construction	
Project Number :		C2693	
Your Ref :		SL7714/004	
		Date samples received :	
		Date written instructions received :	
		Date testing commenced:	20-Sep-2007
<b>Please find enclosed the results as summarised below</b>			
Item No	Quantity	Description	UKAS Accredited
2.11	2	Moisture content	Yes
2.22	2	One point liquid and plastic limit	Yes
2.65	1	Sieve and pipette passing 2mm	Yes
Remarks :			
Issued by : L. Anaz		Date of Issue : 28-Sep-2007	
Approved Signatories :			
G Wilson (Joint Managing Director/Laboratories Director), G W Watson (Laboratory Manager), L Anaz (Supervisor)			
Note: Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.			



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Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**  
 Client  
 Engineer

Contract No **SL7714/004**  
 Sample Date 15/09/2007  
 Grid Ref A2  
 Layer 9  
 Sample Ref B9

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	99
3.35 mm	99
2.00 mm	98
1.18 mm	98
600 µm	98
425 µm	98
300 µm	98
212 µm	97
150 µm	97
63 µm	96
20 µm	92
6 µm	75
2 µm	52

**Non Engineering Description**  
 Greyish brown slightly sandy CLAY

**Sample Proportions - %**

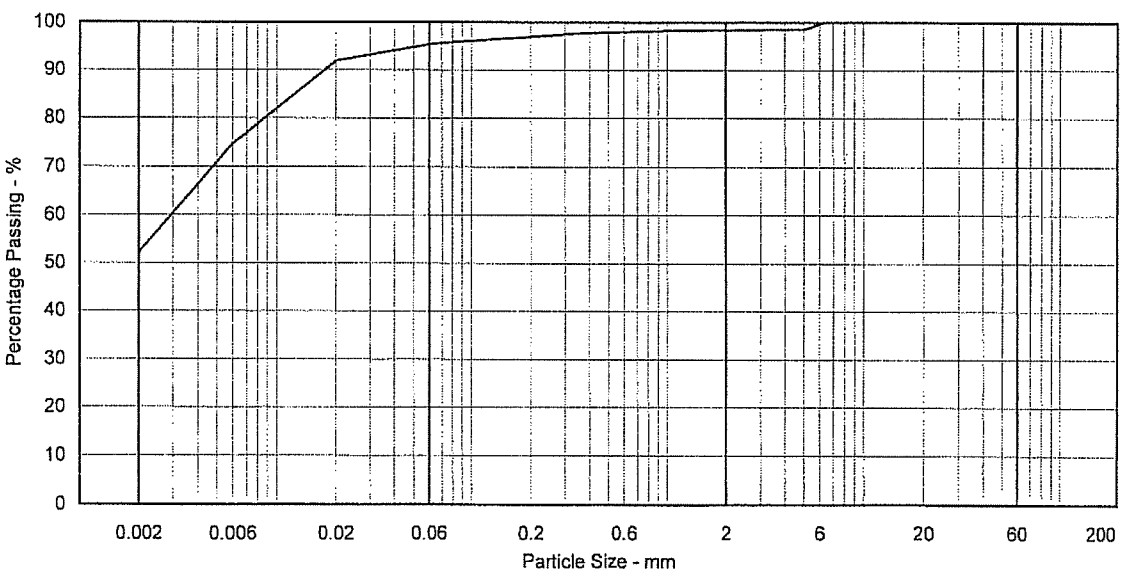
Cobbles	0.0
Gravel	1.6
Sand	3.1
Silt	43.0
Clay	52.3

**Particle Diameter - mm**

D100	6.30
D60	0.00
D10	
Uniformity Coefficient	N/A

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
CM	SA 8/10/07

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

**TTK** Appendix 1  
 Sheet 1 of 1



Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**

Contract No **SL7714/004**

Client

Sample Date 17/09/2007

Engineer

Grid Ref B1

Layer 10

Sample Ref B10

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	99
600 µm	98
425 µm	98
300 µm	97
212 µm	97
150 µm	96
63 µm	94
20 µm	90
6 µm	72
2 µm	49

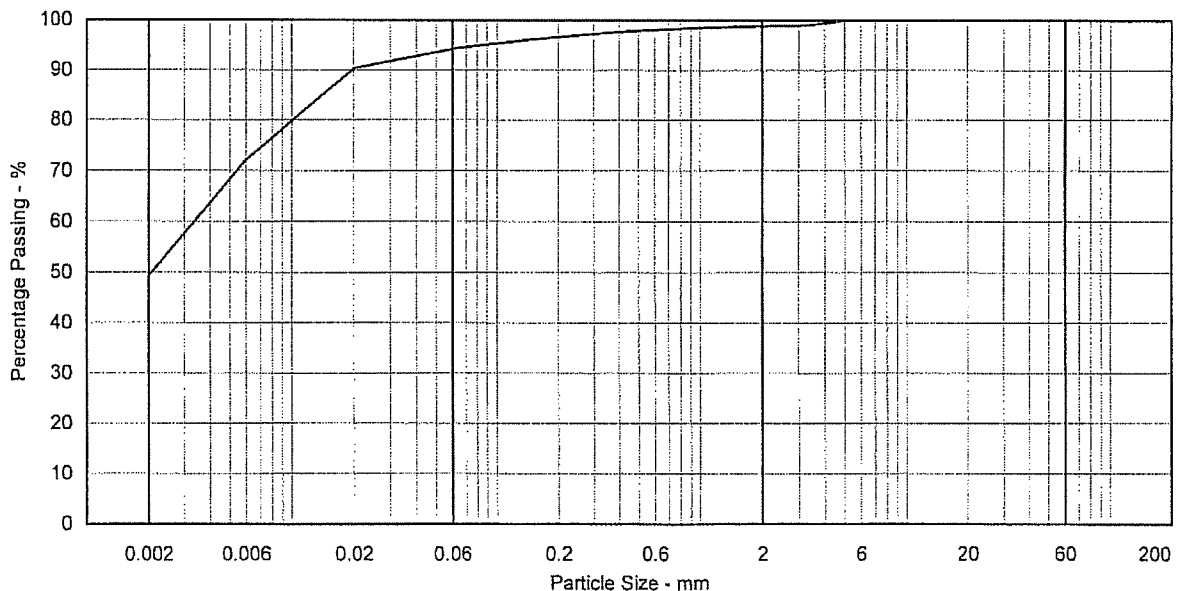
Non Engineering Description
Greyish brown slightly sandy CLAY with fine to coarse mudstone.

Sample Proportions - %	
Cobbles	0.0
Gravel	1.1
Sand	4.7
Silt	44.7
Clay	49.4

Particle Diameter - mm	
D100	5.00
D60	0.00
D10	
Uniformity Coefficient	N/A

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt				Sand			Gravel		



Originator	Checked & Approved
CM	<i>LS</i> 28/9/07

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



Appendix 1

Sheet 1 of 1



Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**

Contract No **SL7714/004**

Client

Sample Date 17/09/2007

Engineer

Grid Ref B3

Layer 11

Sample Ref B11

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	100
425 µm	99
300 µm	99
212 µm	99
150 µm	98
63 µm	97
20 µm	96
6 µm	81
2 µm	59

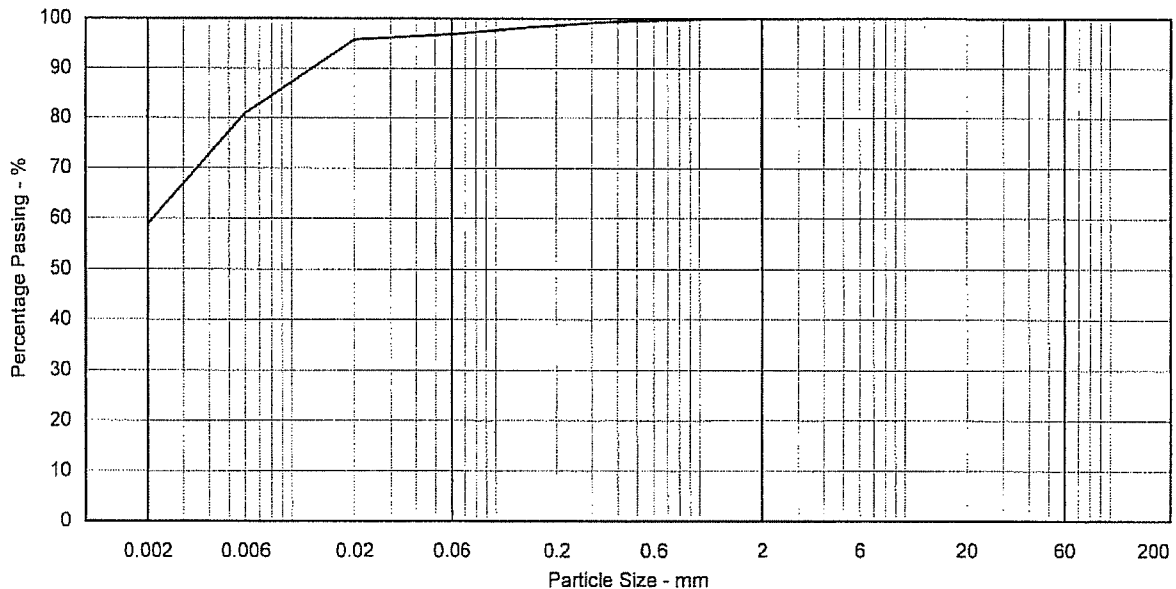
Non Engineering Description
Greyish brown slightly sandy CLAY with occasional mudstone.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.0
Sand	3.2
Silt	37.9
Clay	58.9

Particle Diameter - mm	
D100	2.00
D60	0.00
D10	
Uniformity Coefficient	N/A

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
CM	 27/9/07

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



Appendix 1

Sheet 1 of 1

H:\Lab\Lab Report Data\c2693\PSD\PSD 19-09-2007 B12-CS23450.xls : Sample ID CS23450



Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**  
 Client  
 Engineer

Contract No **SL7714/004**  
 Sample Date **19/09/2007**  
 Sample Ref **B12**

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	99
300 µm	99
212 µm	98
150 µm	98
63 µm	97
20 µm	91
6 µm	79
2 µm	56

**Non Engineering Description**  
 Greyish brown slightly sandy CLAY

**Sample Proportions - %**

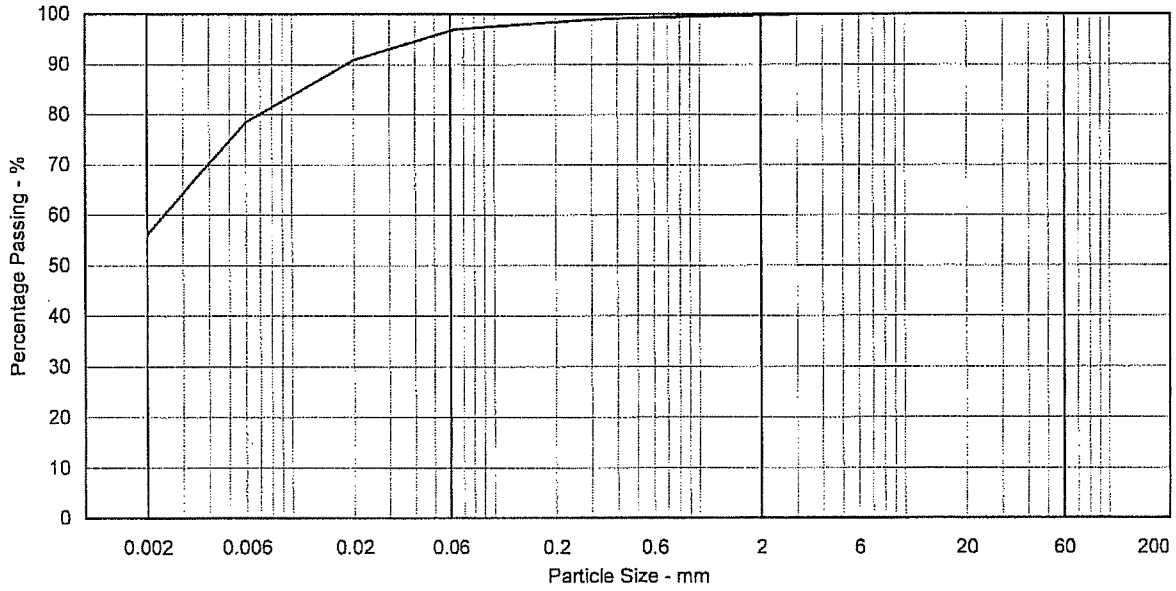
Cobbles	0.0
Gravel	0.2
Sand	3.2
Silt	40.5
Clay	56.1

**Particle Diameter - mm**

D100	3.35
D60	0.00
D10	
Uniformity Coefficient	N/A

**Notes**

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved
CM	<i>[Signature]</i> 26/9/07

**PARTICLE SIZE DISTRIBUTION**  
 BS1377:Part 2:1990 Clause 9.2 - Wet Sieving  
 BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette



Appendix 1

Sheet 1 of 1

Mineral Lane, Chesham, Bucks, HP51NL

Lab Project No C2693 : 26/09/2007 12:13:56

 <small>Site Investigation &amp; Laboratory Services</small>	Site	<b>LEADENHAM CELL 4 CONSTRUCTION</b>	Contract No	<b>SL7714/004</b>
	Client		Sample Date	20/09/2007
	Engineer		Grid Ref	A1
			Layer	3
			Sample Ref	B13

Particle Size	% Passing
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	99
425 µm	99
300 µm	99
212 µm	99
150 µm	98
63 µm	97
20 µm	93
6 µm	75
2 µm	54

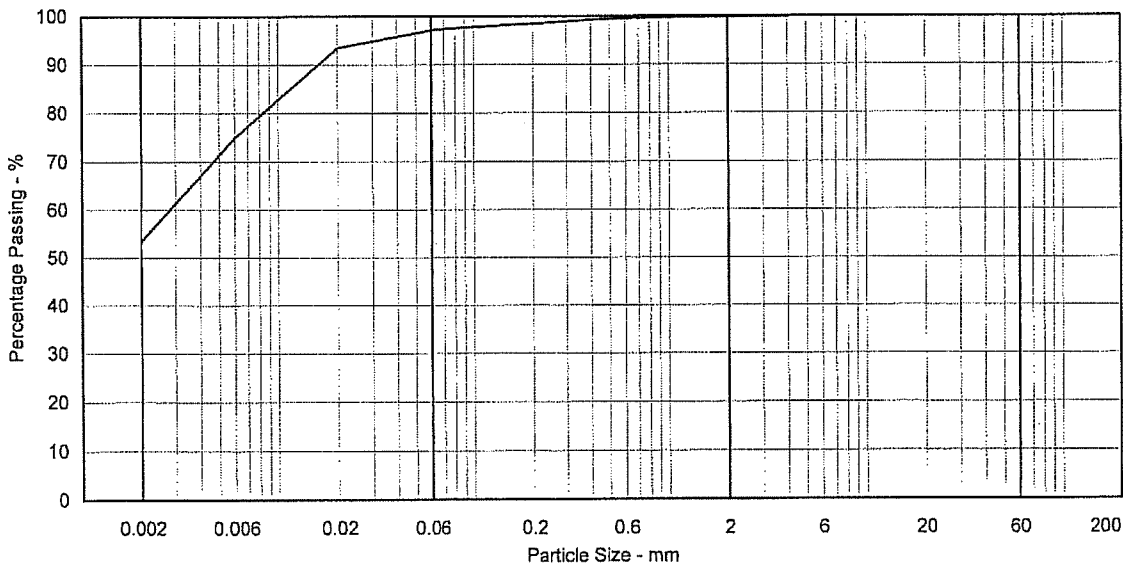
Non Engineering Description
Greyish brown slightly sandy CLAY

Sample Proportions - %	
Cobbles	0.0
Gravel	0.2
Sand	2.8
Silt	43.5
Clay	53.5

Particle Diameter - mm	
D100	5.00
D60	0.00
D10	
Uniformity Coefficient	N/A

Notes

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles
	Silt			Sand			Gravel			



Originator	Checked & Approved	<p><b>PARTICLE SIZE DISTRIBUTION</b></p> <p>BS1377:Part 2:1990 Clause 9.2 - Wet Sieving</p> <p>BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette</p>	<p>Appendix 1</p> <p>Sheet 1 of 1</p>
CM	<i>LA</i> 8/10/07		



**BULK SAMPLES  
TEST RESULTS**

## **ATTERBERG**

CLIENT : May Gurney Ltd.  
 ADDRESS : Buckden Landfill Site  
 Brampton Road  
 Brampton  
 St. Neots  
 Cambridgeshire  
 PE19 5UH

For the attention of : Mr. D. Osborne

### LABORATORY TESTING

Transmittal No: C2693  
 Report No: 2

### TEST REPORT TRANSMITTAL NOTE

Project Name :		Leadenham Cell 4 Construction	
Project Number :	C2693	Date samples received :	5-Sep-2007
Your Ref :	SL7714/004	Date written instructions received :	4-Sep-2007
		Date testing commenced:	6-Sep-2007
<b>Please find enclosed the results as summarised below</b>			
Item No	Quantity	Description	UKAS Accredited
2.11	2	Moisture content	Yes
2.22	2	One point liquid and plastic limit	Yes
2.41	3	Linear density	Yes
Remarks :			
Issued by : L. Anaz		Date of Issue : 13-Sep-2007	
Approved Signatories :			
G Wilson (Joint Managing Director/Laboratories Director), G W Watson (Laboratory Manager), L Anaz (Supervisor)			
Note: Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.			



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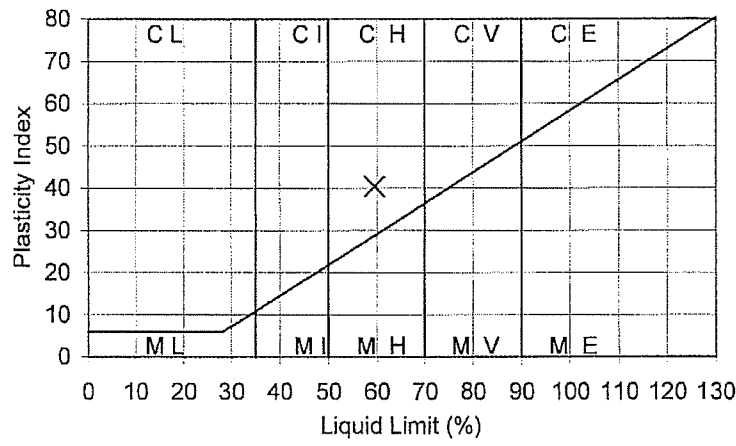


■■■■ SITE INVESTIGATION AND LABORATORY SERVICES

Site	<b>LEADENHAM CELL 4 CONSTRUCTION</b>
Client	
Engineer	

Contract No.	<b>SL7714/004</b>
Sample Date	03/09/2007
Grid Ref	LCF Base
Layer	A1
Sample Ref	B1


Description : Greyish brown slightly sandy CLAY with occasional fine to medium mudstone.  
 Preparation : Sample as received \*



**Results :**  
 Natural Moisture Content : 22 %  
 Percentage retained on 425µm sieve : 3 %  
 Liquid Limit : 60 %  
 Plastic Limit : 19 %  
 Plasticity Index : 41  
  
 Equivalent moisture content of material passing 425µm sieve : 23 %  
 Liquidity Index : 0.09

Originator	Checked & Approved
CM	LS 13/9/07

**Liquid Limit (One Point Cone Penetrometer Method)**  
**Plastic Limit and Plasticity Index**  
 BS 1377:Part 2:Clause 4.4:1990  
 BS 1377:Part 2:Clause 5:1990

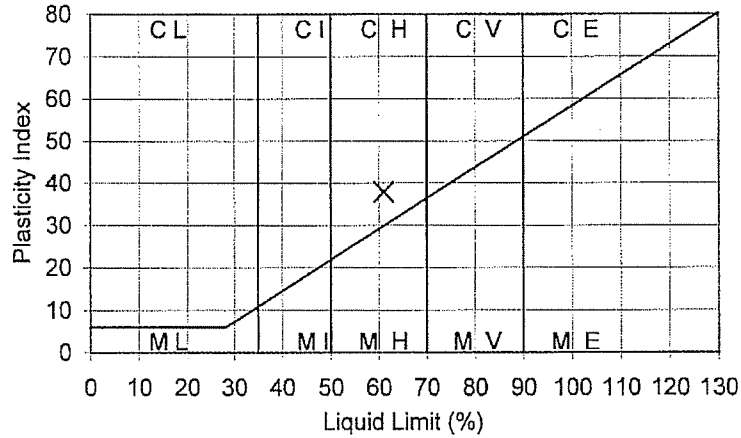


Sheet 1 of 1

<b>TERRA TEK</b> <small>SITE INVESTIGATION AND LABORATORY SERVICES</small>	Site <b>LEADENHAM CELL 4 CONSTRUCTION</b>	Contract No. <b>SL7714/004</b>
	Client	Sample Date <b>04/09/2007</b>
	Engineer	Grid Ref <b>B3</b> Layer <b>1</b> Sample Ref <b>B2</b>

Description : Greyish brown slightly sandy CLAY with occasional fine to medium mudstone.

Preparation : Sample as received \*



Results :

Natural Moisture Content :	27 %
Percentage retained on 425µm sieve :	1 %
Liquid Limit :	61 %
Plastic Limit :	23 %
Plasticity Index :	38
Equivalent moisture content of material passing 425µm sieve :	27 %
Liquidity Index :	0.11

Originator	Checked & Approved	<b>Liquid Limit (One Point Cone Penetrometer Method)</b> <b>Plastic Limit and Plasticity Index</b> BS 1377:Part 2:Clause 4.4:1990 BS 1377:Part 2:Clause 5:1990	
CM	LA 13/9/07		

CLIENT : May Gurney Ltd.  
 ADDRESS : Buckden Landfill Site  
 Brampton Road  
 Brampton  
 St. Neots  
 Cambridgeshire  
 PE19 5UH

For the attention of : Mr. D. Osborne

### LABORATORY TESTING

Transmittal No: C2693  
 Report No: 3

### TEST REPORT TRANSMITTAL NOTE

Project Name :		Leadenham Cell 4 Construction	
Project Number :	C2693	Date samples received :	5-Sep-2007
Your Ref :	SL7714/004	Date written instructions received :	4-Sep-2007
		Date testing commenced:	6-Sep-2007
<b>Please find enclosed the results as summarised below</b>			
Item No	Quantity	Description	UKAS Accredited
2.11	2	Moisture content	Yes
2.22	2	One point liquid and plastic limit	Yes
2.65	2	Sieve and pipette passing 2mm	Yes
Remarks :			
Issued by : L. Anaz		Date of Issue : 17-Sep-2007	
Approved Signatories :			
G Wilson (Joint Managing Director/Laboratories Director), G W Watson (Laboratory Manager), L Anaz (Supervisor)			
Note: Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.			



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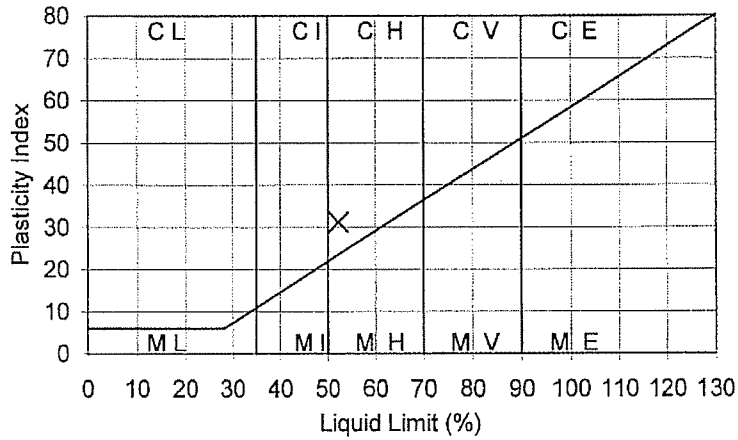
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<b>TERRA TEK</b> <small>SITE INVESTIGATION AND LABORATORY SERVICES</small>	Site <b>LEADENHAM CELL 4 CONSTRUCTION</b>	Contract No. <b>SL7714/004</b>
	Client	Sample Date <b>05/09/2007</b>
	Engineer	Grid Ref <b>C3</b> Layer <b>2</b> Sample Ref <b>B3</b>

Description : Dark greyish brown slightly sandy CLAY

Preparation : Sample as received \*



Results :

Natural Moisture Content :	24 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	52 %
Plastic Limit :	21 %
Plasticity Index :	31
Equivalent moisture content of material passing 425µm sieve :	24 %
Liquidity Index :	0.10

Originator	Checked & Approved	<b>Liquid Limit (One Point Cone Penetrometer Method)</b> <b>Plastic Limit and Plasticity Index</b> BS 1377:Part 2:Clause 4.4:1990 BS 1377:Part 2:Clause 5:1990	
CM	[Signature] 17/9/07		

# TERRA TEK

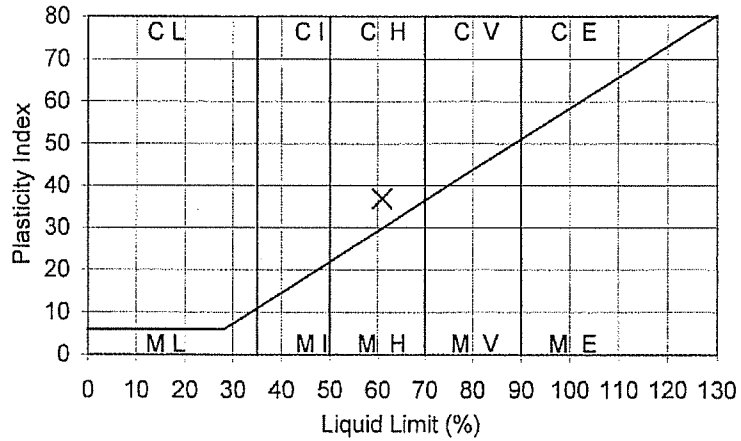
SITE INVESTIGATION AND LABORATORY SERVICES

Site **LEADENHAM CELL 4 CONSTRUCTION**  
 Client  
 Engineer

Contract No. **SL7714/004**  
 Hole ID **06/09/2007**  
 Sample Ref **A3**  
 Depth (m) **2**  
 Sample Type **B4**

Description : Dark greyish brown slightly sandy CLAY

Preparation : Sample as received \*



Results :

Natural Moisture Content :	28 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	61 %
Plastic Limit :	24 %
Plasticity Index :	37
Equivalent moisture content of material passing 425µm sieve :	28 %
Liquidity Index :	0.11

Originator	Checked & Approved
CM	 15/9/07

**Liquid Limit (One Point Cone Penetrometer Method)**  
**Plastic Limit and Plasticity Index**  
 BS 1377:Part 2:Clause 4.4:1990  
 BS 1377:Part 2:Clause 5:1990





CLIENT : May Gurney Ltd.  
 ADDRESS : Buckden Landfill Site  
 Brampton Road  
 Brampton  
 St. Neots  
 Cambridgeshire  
**PE19 5UH**

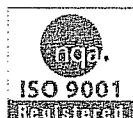
For the attention of : Mr. D. Osborne

### LABORATORY TESTING

Transmittal No: C2693  
 Report No: 5

### TEST REPORT TRANSMITTAL NOTE

Project Name :		Leadenham Cell 4 Construction	
Project Number :		C2693	
Your Ref :		SL7714/004	
		Date samples received :	
		Date written instructions received :	
		Date testing commenced:	11-Sep-2007
<b>Please find enclosed the results as summarised below</b>			
Item No	Quantity	Description	UKAS Accredited
2.11	3	Moisture content	Yes
2.22	3	One point liquid and plastic limit	Yes
2.41	1	Linear density	Yes
2.65	5	Wet sieve and pipette passing 2mm	Yes
Remarks :			
Issued by : L. Anaz		Date of Issue : 21-Sep-2007	
Approved Signatories :			
G Wilson (Joint Managing Director/Laboratories Director), G W Watson (Laboratory Manager), L Anaz (Supervisor)			
Note: Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.			



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 email: chesham@terratek.co.uk

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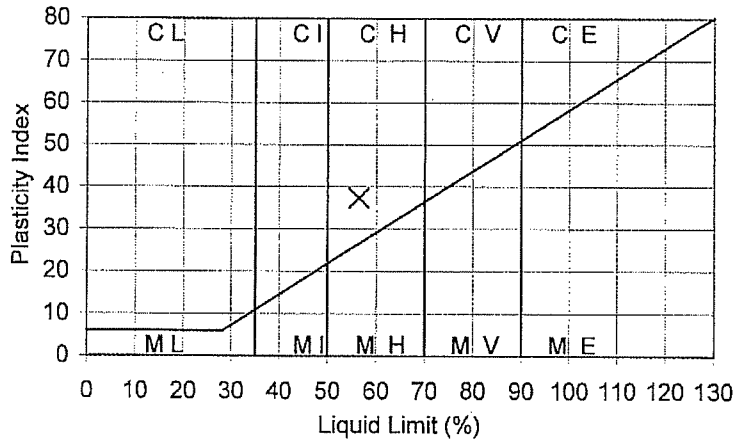
# TERRA TEK

SITE INVESTIGATION AND LABORATORY SERVICES

Site	<b>LEADENHAM CELL 4 CONSTRUCTION</b>	Contract No.	SL7714/004
Client		Sample Date	07/09/2007
Engineer		Grid Ref	B3
		Layer	3
		Sample Ref	B5

Description : Greyish brown slightly sandy CLAY with occasional fine mudstone.

Preparation : Sample as received \*



Results :

Natural Moisture Content :	25 %
Percentage retained on 425µm sieve :	1 %
Liquid Limit :	56 %
Plastic Limit :	19 %
Plasticity Index :	37
Equivalent moisture content of material passing 425µm sieve :	25 %
Liquidity Index :	0.17

Originator	Checked & Approved	<b>Liquid Limit (One Point Cone Penetrometer Method)</b> <b>Plastic Limit and Plasticity Index</b> BS 1377:Part 2:Clause 4.4:1990 BS 1377:Part 2:Clause 5:1990	
CM	LSA 20/9/07		

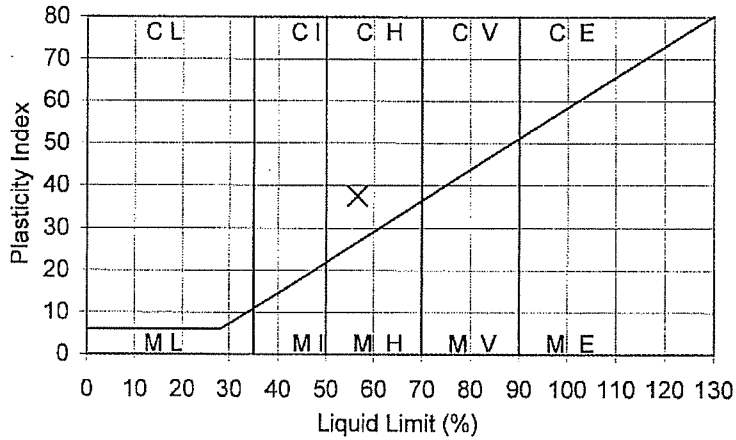


SITE INVESTIGATION AND LABORATORY SERVICES

Site	LEADENHAM CELL 4 CONSTRUCTION	Contract No.	SL7714/004
Client		Sample Date	10/09/2007
Engineer		Grid Ref	C3
		Layer	4
		Sample Ref	B6

Description : Greyish brown slightly sandy CLAY with occasional fine mudstone.

Preparation : Sample as received \*



Results :

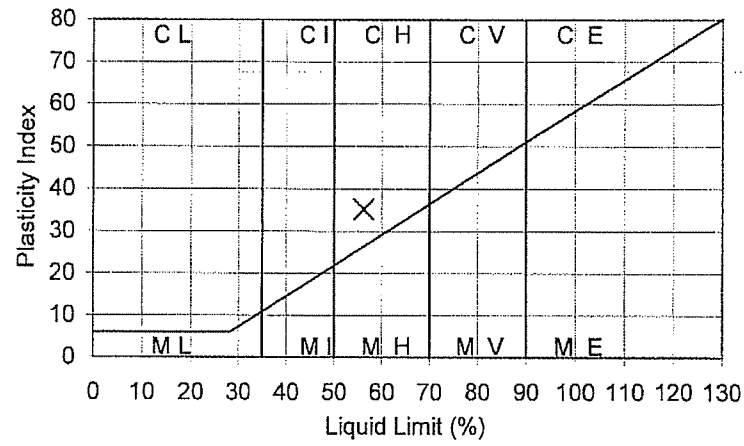
Natural Moisture Content :	22 %
Percentage retained on 425µm sieve :	2 %
Liquid Limit :	57 %
Plastic Limit :	19 %
Plasticity Index :	38
Equivalent moisture content of material passing 425µm sieve :	22 %
Liquidity Index :	0.09

Originator	Checked & Approved	<b>Liquid Limit (One Point Cone Penetrometer Method)</b> <b>Plastic Limit and Plasticity Index</b> BS 1377:Part 2:Clause 4.4:1990 BS 1377:Part 2:Clause 5:1990	
CM	LA 20/9/07		

<b>TERRA TEK</b> <small>SITE INVESTIGATION AND LABORATORY SERVICES</small>	Site <b>LEADENHAM CELL 4 CONSTRUCTION</b>	Contract No. SL7714/004
	Client	Sample Date 10/09/2007
	Engineer	Grid Ref A3 Layer 4 Sample Ref B7

Description : Greyish brown slightly sandy CLAY with occasional fine mudstone.

Preparation : Sample as received \*



Results :

Natural Moisture Content :	24 %
Percentage retained on 425µm sieve :	2 %
Liquid Limit :	56 %
Plastic Limit :	21 %
Plasticity Index :	35
Equivalent moisture content of material passing 425µm sieve :	24 %
Liquidity Index :	0.10

Originator	Checked & Approved	<b>Liquid Limit (One Point Cone Penetrometer Method)</b> <b>Plastic Limit and Plasticity Index</b> BS 1377:Part 2:Clause 4.4:1990 BS 1377:Part 2:Clause 5:1990	
CM	SA 20/9/07		

CLIENT : May Gurney Ltd.  
 ADDRESS : Buckden Landfill Site  
 Brampton Road  
 Brampton  
 St. Neots  
 Cambridgeshire  
 PE19 5UH

For the attention of : Mr. D. Osborne

### LABORATORY TESTING

Transmittal No: C2693

Report No: 7

### TEST REPORT TRANSMITTAL NOTE

Project Name :		Leadenham Cell 4 Construction	
Project Number :		C2693	
Your Ref :		SL7714/004	
		Date samples received :	
		Date written instructions received :	
		Date testing commenced:	18-Sep-2007
<b>Please find enclosed the results as summarised below</b>			
Item No	Quantity	Description	UKAS Accredited
2.11	1	Moisture content	Yes
2.22	1	One point liquid and plastic limit	Yes
2.41	4	Linear density	Yes
2.65	2	Sieve and pipette passing 2mm	Yes
6.21	3	Triaxial permeability	Yes
Remarks :			
Issued by : L. Anaz		Date of Issue : 27-Sep-2007	
Approved Signatories :			
G Wilson (Joint Managing Director/Laboratories Director), G W Watson (Laboratory Manager), L Anaz (Supervisor)			
Note: Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.			



Mineral Lane, off Amersham Road, Chesham HP5 1HL, UK

Tel: +44 (0)1494 810 136 Fax: +44 (0)1494 784 837

e-mail: chesham@terratek.co.uk

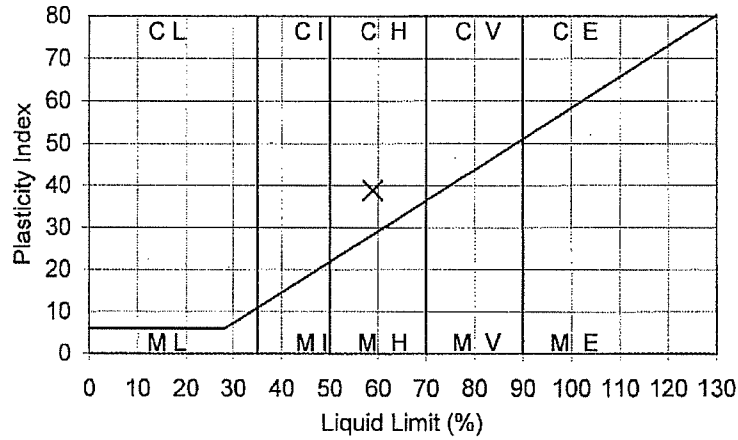
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<b>TERRA TEK</b> <small>SITE INVESTIGATION AND LABORATORY SERVICES</small>	Site <b>LEADENHAM CELL 4 CONSTRUCTION</b>	Contract No. SL7714/004
	Client	Hole ID 13/09/2007
	Engineer	Sample Ref B1 Depth (m) 6 Sample Type B8

Description : Greyish brown slightly sandy CLAY with occasional fine mudstone.

Preparation : Sample as received \*



Results :

Natural Moisture Content :	26 %
Percentage retained on 425µm sieve :	2 %
Liquid Limit :	59 %
Plastic Limit :	20 %
Plasticity Index :	39
Equivalent moisture content of material passing 425µm sieve :	27 %
Liquidity Index :	0.17

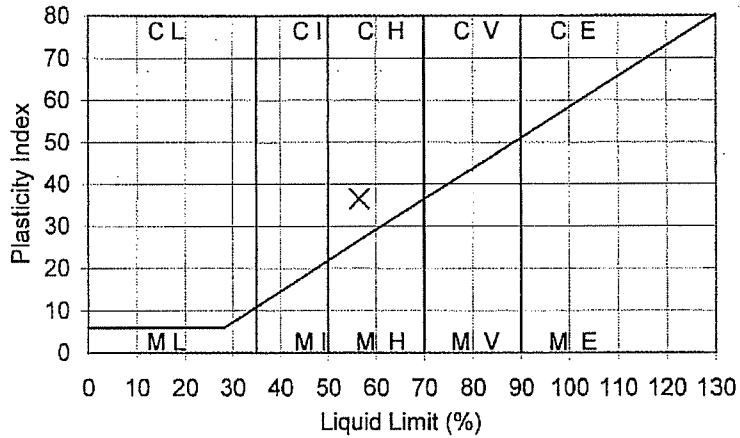
Originator	Checked & Approved	<b>Liquid Limit (One Point Cone Penetrometer Method)</b> <b>Plastic Limit and Plasticity Index</b> BS 1377:Part 2:Clause 4.4:1990 BS 1377:Part 2:Clause 5:1990	
CM	LA 27/9/07		



Site	<b>LEADENHAM CELL 4 CONSTRUCTION</b>	Contract No.	SL7714/004
Client		Sample Date	17/09/2007
Engineer		Grid Ref	B1
		Layer	10
		Sample Ref	B10

Description : Greyish brown slightly sandy CLAY with fine to coarse mudstone.

Preparation : Sample as received \*



Results :

Natural Moisture Content :	23 %
Percentage retained on 425µm sieve :	2 %
Liquid Limit :	57 %
Plastic Limit :	20 %
Plasticity Index :	37
Equivalent moisture content of material passing 425µm sieve :	23 %
Liquidity Index :	0.09

Originator	Checked & Approved	<b>Liquid Limit (One Point Cone Penetrometer Method)</b> <b>Plastic Limit and Plasticity Index</b> BS 1377:Part 2:Clause 4.4:1990 BS 1377:Part 2:Clause 5:1990	
CM	LG 28/9/07		

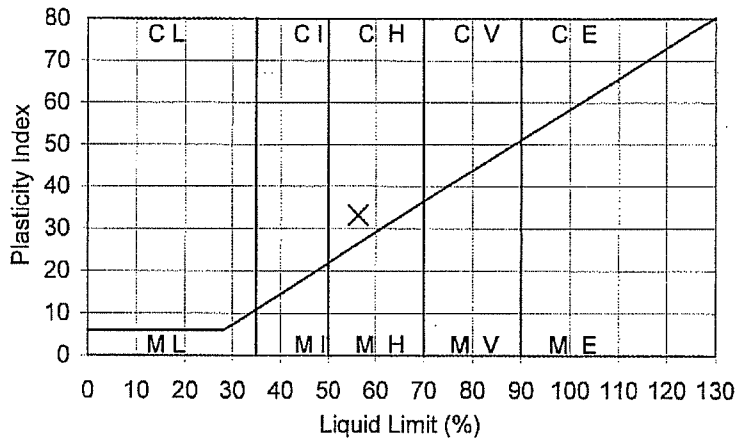


SITE INVESTIGATION AND LABORATORY SERVICES

Site	<b>LEADENHAM CELL 4 CONSTRUCTION</b>	Contract No.	SL7714/004
Client		Sample Date	17/09/2007
Engineer		Grid Ref	B3
		Layer	11
		Sample Ref	B11

Description : Greyish brown slightly sandy CLAY with occasional mudstone.

Preparation : Sample as received \*



Results :

Natural Moisture Content :	22 %
Percentage retained on 425µm sieve :	1 %
Liquid Limit :	56 %
Plastic Limit :	23 %
Plasticity Index :	33
Equivalent moisture content of material passing 425µm sieve :	22 %
Liquidity Index :	-0.02

Originator	Checked & Approved	<b>Liquid Limit (One Point Cone Penetrometer Method)</b> <b>Plastic Limit and Plasticity Index</b> BS 1377:Part 2:Clause 4.4:1990 BS 1377:Part 2:Clause 5:1990	
CM	[Signature] 28/9/07		



**PERMEABILITY**

**TEST RESULTS**



Site Investigation & Laboratory Services

Site  
**LEADENHAM CELL 4 CONSTRUCTION**  
 Client  
 Engineer

Contract No. SL7714/004  
 Date Taken 03/09/2007  
 Grid Ref LCP Base  
 Layer A1  
 Sample P1

Description: Stiff intact dark grey CLAY

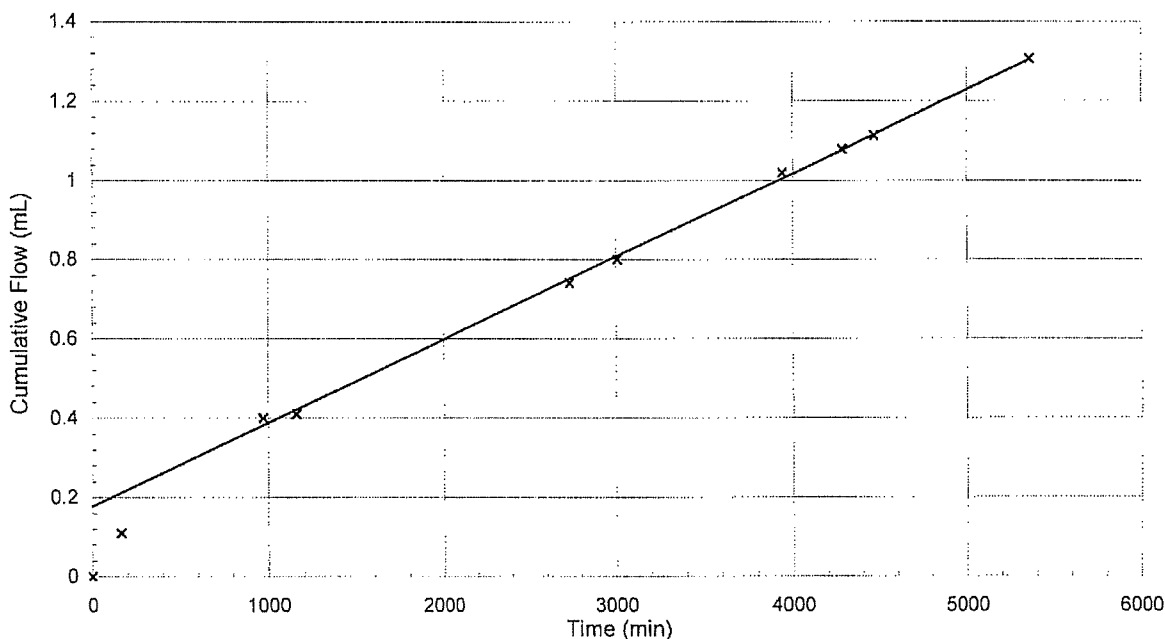
Sample Details:	Initial:	Final:
Diameter:	100.1 mm	99.1 mm
Height:	100.1 mm	99.1 mm
Moisture content:	22 %	25 %
Bulk density:	1.98 Mg/m <sup>3</sup>	2.09 Mg/m <sup>3</sup>
Dry density:	1.62 Mg/m <sup>3</sup>	1.67 Mg/m <sup>3</sup>
Sample condition:	Undisturbed	

**Saturation Stage:**  
 Initial pore pressure coefficient, B: 0.50  
 Final pore pressure coefficient, B: 0.96  
 Duration of stage: 6 days

**Consolidation stage:**  
 Effective pressure: 100 kPa  
 Duration of stage: 5 days

**Permeability stage:**  
 Pressure difference across specimen: 20 kPa  
 Mean effective stress: 100 kPa  
 Duration of stage: 4 days

Coefficient of permeability at 20°C,  $K_v: 2.1 \times 10^{-11}$  m/s



Originator	Checked & Approved	<b>PERMEABILITY IN A TRIAXIAL CELL</b> BS1377 : Part 6 : Clause 6 : 1990 Permeability under constant head conditions in a triaxial cell	Figure 1 Sheet 1 of 1
TD	LA 27/9/07		



Site Investigation & Laboratory Services

Site	<b>LEADENHAM CELL 4 CONSTRUCTION</b>	Contract No.	SL7714/004
Client		Date Taken	04/09/2007
Engineer		Grid Ref	B3
		Layer	1
		Sample	P2

Description: Firm intact dark grey CLAY

Sample Details:	Initial:	Final:
Diameter:	99.7 mm	98.5 mm
Height:	99.7 mm	98.5 mm
Moisture content:	26 %	28 %
Bulk density:	1.96 Mg/m <sup>3</sup>	2.06 Mg/m <sup>3</sup>
Dry density:	1.56 Mg/m <sup>3</sup>	1.62 Mg/m <sup>3</sup>
Sample condition:	Undisturbed	

**Saturation Stage:**

Initial pore pressure coefficient, B:	0.09
Final pore pressure coefficient, B:	0.98
Duration of stage:	5 days

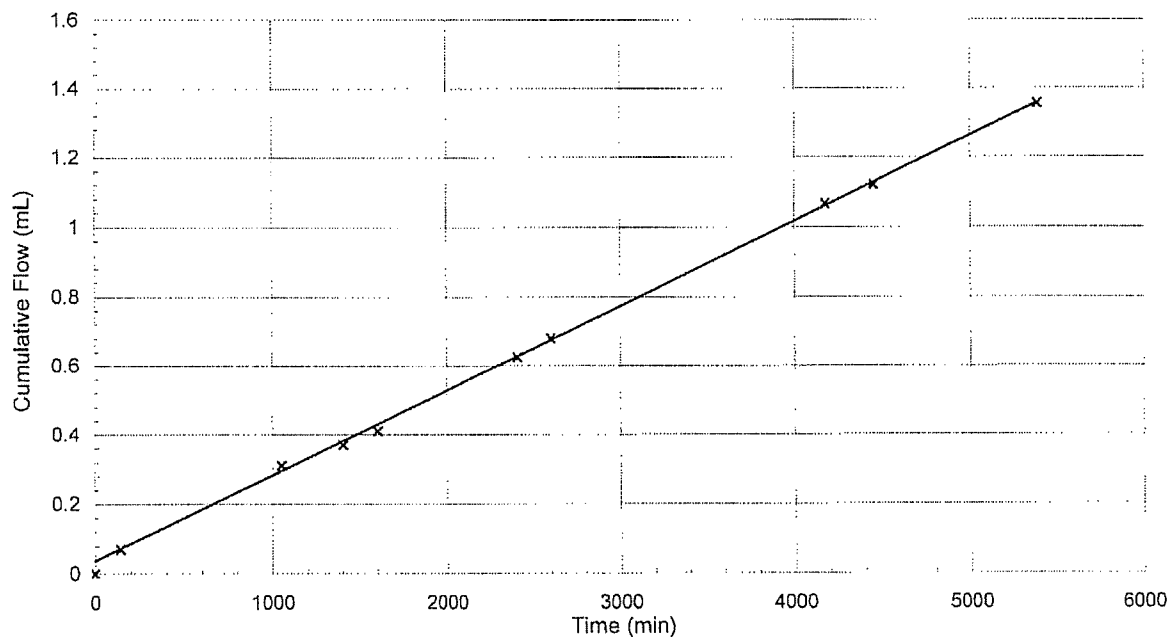
**Consolidation stage:**

Effective pressure:	100 kPa
Duration of stage:	5 days

**Permeability stage:**

Pressure difference across specimen:	20 kPa
Mean effective stress:	100 kPa
Duration of stage:	4 days

Coefficient of permeability at 20°C,  $K_v: 2.5 \times 10^{-11}$  m/s



Originator	Checked & Approved	<b>PERMEABILITY IN A TRIAXIAL CELL</b> BS1377 : Part 6 : Clause 6 : 1990 Permeability under constant head conditions in a triaxial cell	Figure 1 Sheet 1 of 1
TD	SA 27/9/07		



Site Investigation & Laboratory Services

Site	<b>LEADENHAM CELL 4 CONSTRUCTION</b>	Contract No.	SL7714/004
Client		Date Taken	05/09/2007
Engineer		Grid Ref	C3
		Layer	2
		Sample	P3

Description: Stiff intact grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium.

Sample Details:	Initial:	Final:
Diameter:	100.4 mm	100.5 mm
Height:	100.1 mm	100.2 mm
Moisture content:	23 %	26 %
Bulk density:	1.93 Mg/m <sup>3</sup>	1.98 Mg/m <sup>3</sup>
Dry density:	1.58 Mg/m <sup>3</sup>	1.57 Mg/m <sup>3</sup>
Sample condition:	Undisturbed	

**Saturation Stage:**

Initial pore pressure coefficient, B:	0.62
Final pore pressure coefficient, B:	0.97
Duration of stage:	6 days

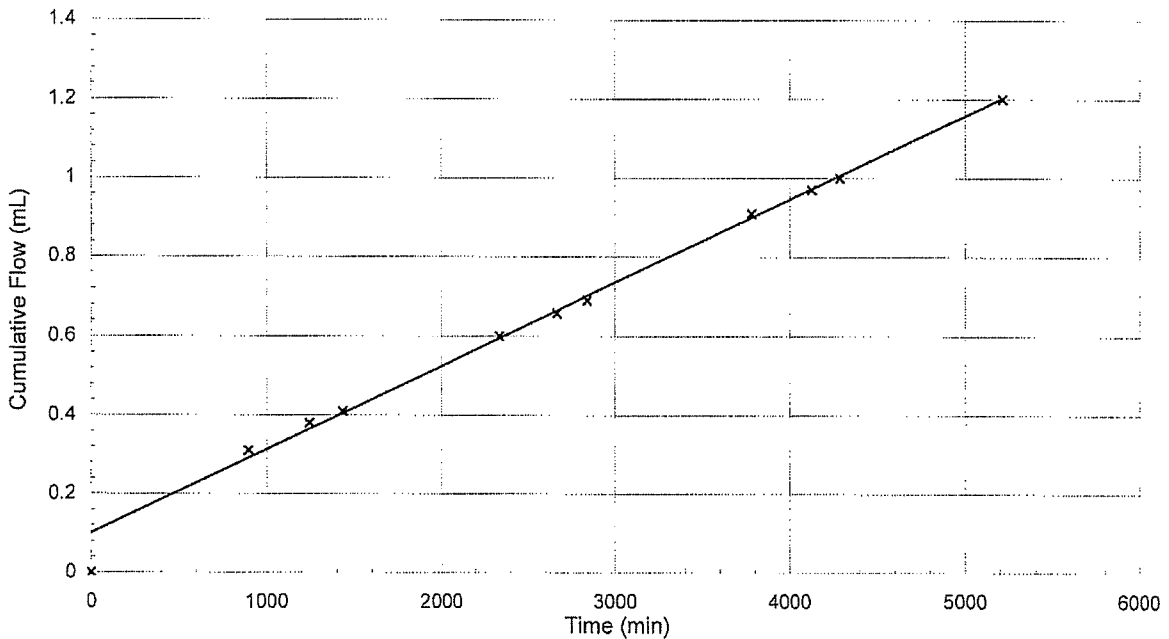
**Consolidation stage:**

Effective pressure:	100 kPa
Duration of stage:	5 days

**Permeability stage:**

Pressure difference across specimen:	20 kPa
Mean effective stress:	100 kPa
Duration of stage:	4 days

Coefficient of permeability at 20°C,  $K_v: 2.1 \times 10^{-11}$  m/s



Originator	Checked & Approved	<b>PERMEABILITY IN A TRIAXIAL CELL</b> BS1377 : Part 6 : Clause 6 : 1990 Permeability under constant head conditions in a triaxial cell	Figure 1  Sheet 1 of 1
LD	<i>GDW</i> 2/10/07		



Site Investigation & Laboratory Services

Site LEADENHAM CELL 4 CONSTRUCTION

Contract No. SL7714/004

Client  
 Engineer

Date Taken 06/09/2007  
 Grid Ref A3  
 Layer 2  
 Sample P4

Description: Stiff intact dark greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine.

Sample Details:	Initial:	Final:
Diameter:	99.2 mm	98.8 mm
Height:	100.2 mm	99.8 mm
Moisture content:	26 %	27 %
Bulk density:	1.97 Mg/m <sup>3</sup>	2.02 Mg/m <sup>3</sup>
Dry density:	1.57 Mg/m <sup>3</sup>	1.59 Mg/m <sup>3</sup>
Sample condition:	Undisturbed	

**Saturation Stage:**

Initial pore pressure coefficient, B:	0.48
Final pore pressure coefficient, B:	22.31
Duration of stage:	6 days

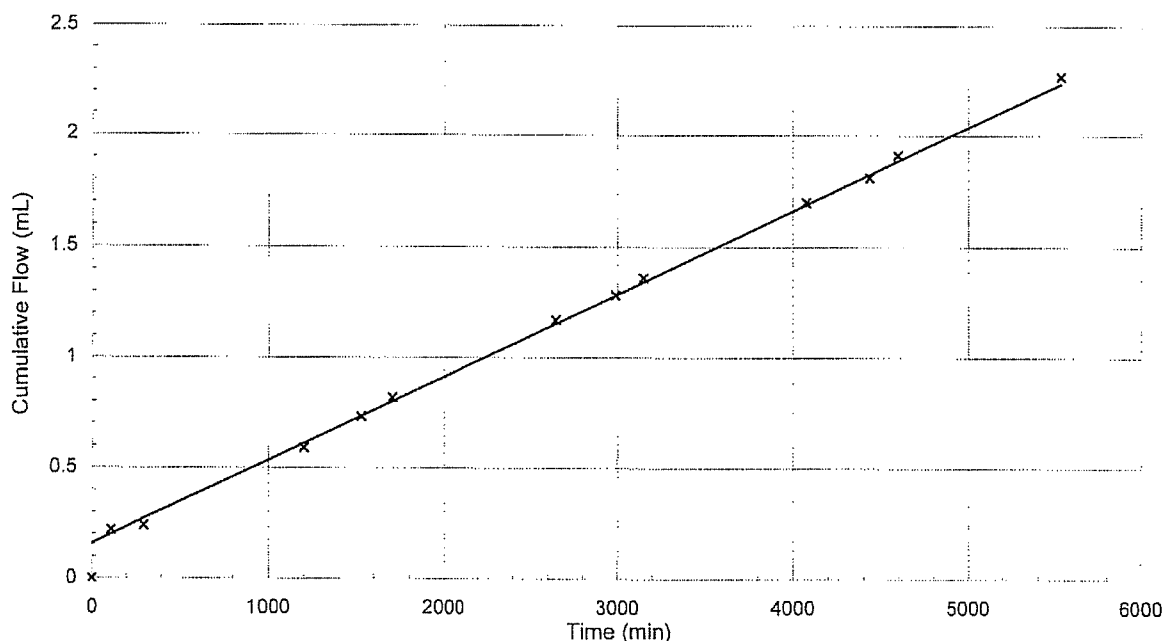
**Consolidation stage:**

Effective pressure:	100 kPa
Duration of stage:	6 days

**Permeability stage:**

Pressure difference across specimen:	20 kPa
Mean effective stress:	100 kPa
Duration of stage:	4 days

Coefficient of permeability at 20°C,  $K_v: 3.7 \times 10^{-11}$  m/s



Originator

Checked & Approved

LD

GW  
2/10/07

**PERMEABILITY IN A TRIAXIAL CELL**

BS1377 : Part 6 : Clause 6 : 1990

Permeability under constant head conditions in a triaxial cell



Figure 1

Sheet 1 of 1



Site Investigation & Laboratory Services

Site  
**LEADENHAM CELL 4 CONSTRUCTION**

Client

Engineer

Contract No. SL7714/004

Date Taken 07/09/2007

Grid Ref B3

Layer 3

Sample P5

Description: Firm intact dark greyish brown slightly sandy slightly gravelly CLAY. Gravel is fine.

Sample Details:	Initial:	Final:
Diameter:	96.6 mm	95.5 mm
Height:	100.6 mm	99.4 mm
Moisture content:	24 %	25 %
Bulk density:	2.06 Mg/m <sup>3</sup>	2.15 Mg/m <sup>3</sup>
Dry density:	1.66 Mg/m <sup>3</sup>	1.72 Mg/m <sup>3</sup>
Sample condition:	Undisturbed	

**Saturation Stage:**

Initial pore pressure coefficient, B:	0.47
Final pore pressure coefficient, B:	0.98
Duration of stage:	5 days

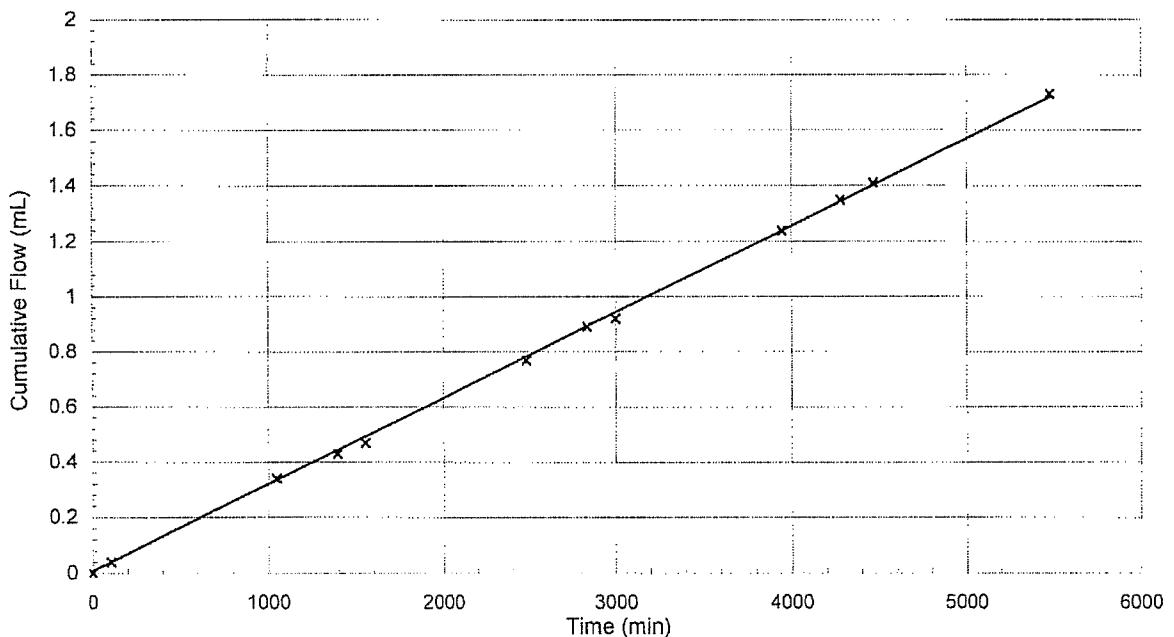
**Consolidation stage:**

Effective pressure:	100 kPa
Duration of stage:	3 days

**Permeability stage:**

Pressure difference across specimen:	20 kPa
Mean effective stress:	100 kPa
Duration of stage:	4 days

Coefficient of permeability at 20°C,  $K_v: 3.3 \times 10^{-11}$  m/s



Originator	Checked & Approved	<b>PERMEABILITY IN A TRIAXIAL CELL</b> BS1377 : Part 6 : Clause 6 : 1990 Permeability under constant head conditions in a triaxial cell	Figure 1 Sheet 1 of 1
LD	<i>GWJ</i> 2/10/07		



Site Investigation & Laboratory Services

Site  
**LEADENHAM CELL 4 CONSTRUCTION**  
 Client  
 Engineer

Contract No. SL7714/004  
 Date Taken 10/09/2007  
 Grid Ref C3  
 Layer 4  
 Sample P6

Description: Stiff dark brown slightly sandy slightly gravelly CLAY with occasional medium to coarse mudstone. Gravel is fine

Sample Details:	Initial:	Final:
Diameter:	99.9 mm	97.9 mm
Height:	100.0 mm	98.0 mm
Moisture content:	20 %	25 %
Bulk density:	1.88 Mg/m <sup>3</sup>	2.08 Mg/m <sup>3</sup>
Dry density:	1.57 Mg/m <sup>3</sup>	1.67 Mg/m <sup>3</sup>
Sample condition:	Undisturbed	

**Saturation Stage:**

Initial pore pressure coefficient, B:	0.09
Final pore pressure coefficient, B:	0.96
Duration of stage:	5 days

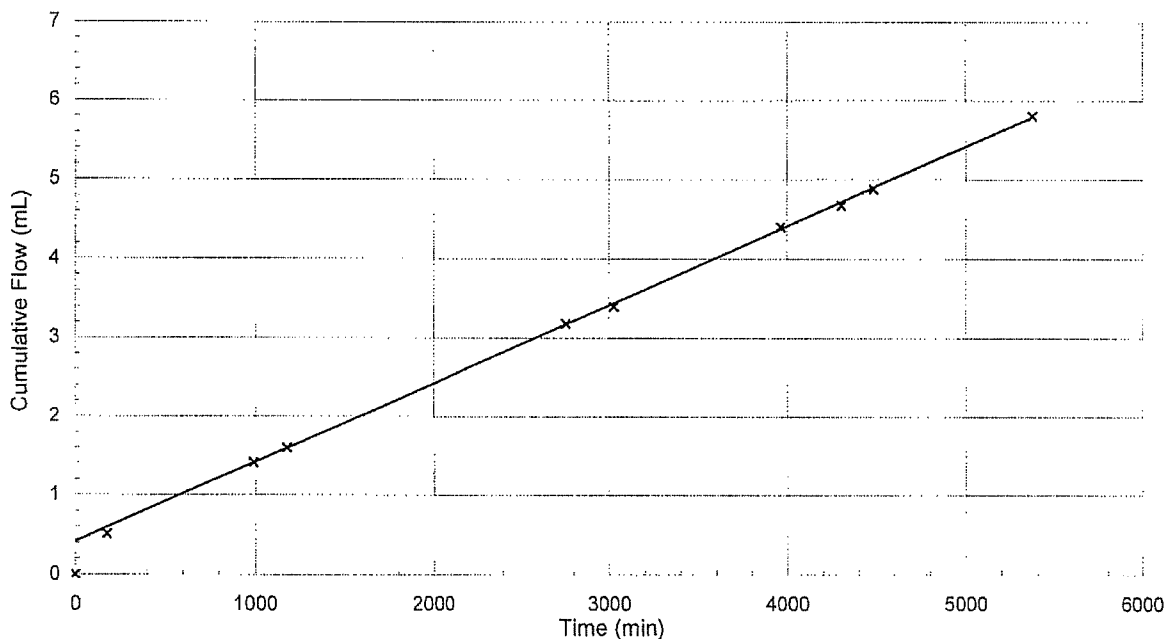
**Consolidation stage:**

Effective pressure:	100 kPa
Duration of stage:	2 days

**Permeability stage:**

Pressure difference across specimen:	20 kPa
Mean effective stress:	100 kPa
Duration of stage:	4 days

Coefficient of permeability at 20°C,  $K_v: 1.0 \times 10^{-10}$  m/s



Originator	Checked & Approved	<b>PERMEABILITY IN A TRIAXIAL CELL</b> BS1377 : Part 6 : Clause 6 : 1990 Permeability under constant head conditions in a triaxial cell	Figure 1 Sheet 1 of 1
TD	[Signature] 27/9/07		



Site Investigation & Laboratory Services

Site  
**LEADENHAM CELL 4 CONSTRUCTION**  
 Client  
 Engineer

Contract No. SL7714/004  
 Date Taken 10/09/2007  
 Grid Ref A3  
 Layer 4  
 Sample P7

Description: Stiff intact dark grey CLAY.

Sample Details:	Initial:	Final:
Diameter:	98.3 mm	97.2 mm
Height:	100.7 mm	99.6 mm
Moisture content:	22 %	24 %
Bulk density:	2.07 Mg/m <sup>3</sup>	2.18 Mg/m <sup>3</sup>
Dry density:	1.70 Mg/m <sup>3</sup>	1.76 Mg/m <sup>3</sup>
Sample condition:	Undisturbed	

**Saturation Stage:**

Initial pore pressure coefficient, B:	0.83
Final pore pressure coefficient, B:	1.00
Duration of stage:	2 days

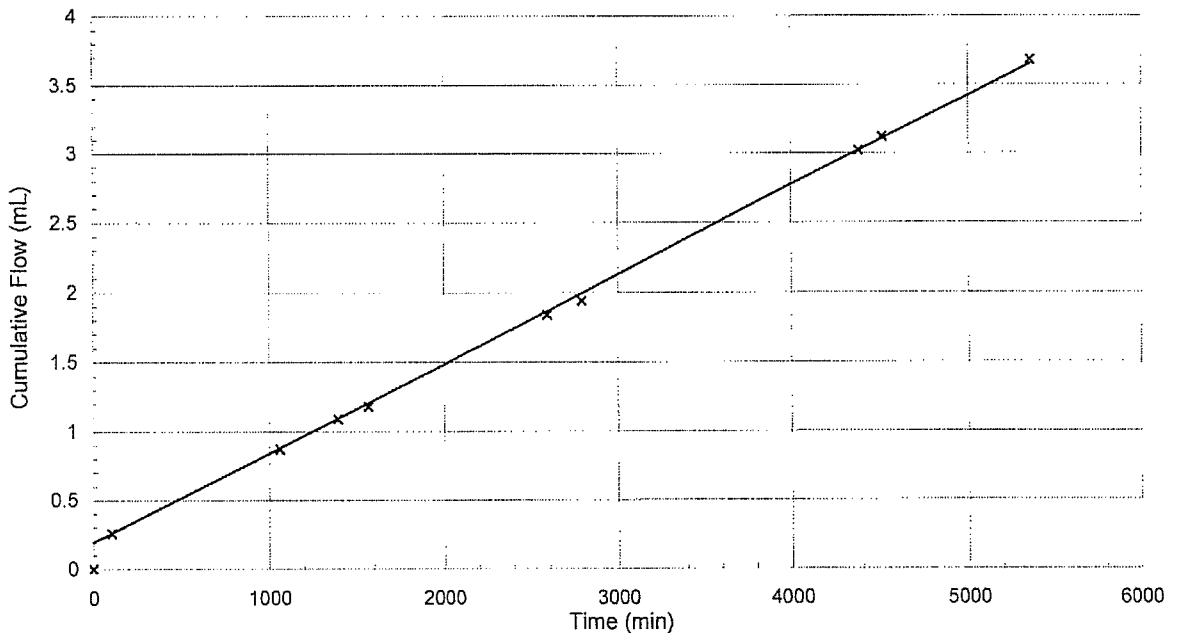
**Consolidation stage:**

Effective pressure:	100 kPa
Duration of stage:	6 days

**Permeability stage:**

Pressure difference across specimen:	20 kPa
Mean effective stress:	100 kPa
Duration of stage:	4 days

Coefficient of permeability at 20°C,  $K_v: 6.8 \times 10^{-11}$  m/s



Originator	Checked & Approved
LD	<i>GWJ</i> 2/10/07

**PERMEABILITY IN A TRIAXIAL CELL**  
 BS1377 : Part 6 : Clause 6 : 1990  
 Permeability under constant head conditions in a triaxial cell

Figure 1  
 Sheet 1 of 1





Site Investigation & Laboratory Services

Site  
**LEADENHAM CELL 4 CONSTRUCTION**

Contract No. SL7714/004

Client

Date Taken 15/09/2007

Engineer

Grid Ref A2

Layer 9

Sample P9

Description: Stiff intact very dark grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium with some claystone

Sample Details:	Initial:	Final:
Diameter:	99.3 mm	98.0 mm
Height:	100.1 mm	98.8 mm
Moisture content:	23 %	25 %
Bulk density:	2.01 Mg/m <sup>3</sup>	2.12 Mg/m <sup>3</sup>
Dry density:	1.63 Mg/m <sup>3</sup>	1.70 Mg/m <sup>3</sup>
Sample condition:	Undisturbed	

**Saturation Stage:**

Initial pore pressure coefficient, B:	0.16
Final pore pressure coefficient, B:	0.99
Duration of stage:	5 days

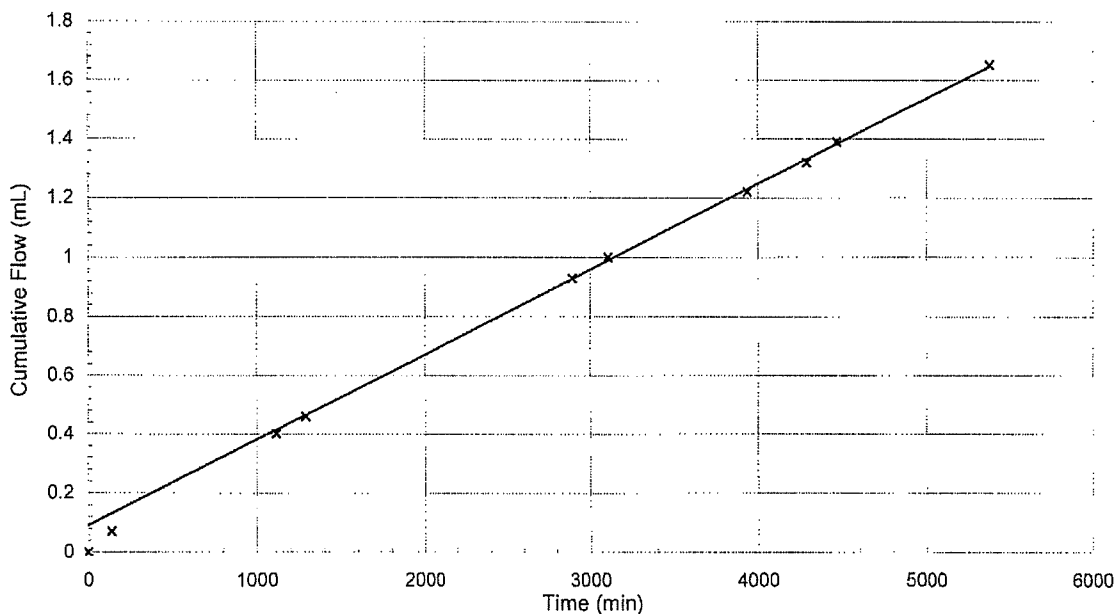
**Consolidation stage:**

Effective pressure:	100 kPa
Duration of stage:	2 days

**Permeability stage:**

Pressure difference across specimen:	20 kPa
Mean effective stress:	100 kPa
Duration of stage:	4 days

Coefficient of permeability at 20°C,  $K_v: 3.0 \times 10^{-11}$  m/s



Originator	Checked & Approved
TD	LSA 10/10/07

**PERMEABILITY IN A TRIAXIAL CELL**  
 BS1377 : Part 6 : Clause 6 : 1990  
 Permeability under constant head conditions in a triaxial cell



Figure 1

Sheet 1 of 1

Rev April 2004  
 H:\Lab\Lab Report Data\C2693\Tx\Perm\Tx\Perm 17-09-2007 B1 P10-CS23423.xls : Sample ID CS23423  
 Mineral Lane, Chesham, Bucks. HP51NL  
 Lab Project No C2693 : 08/10/2007 17:03:43



Site Investigation & Laboratory Services

Site  
**LEADENHAM CELL 4 CONSTRUCTION**  
 Client  
 Engineer

Contract No. SL7714/004  
 Date Taken 17/09/2007  
 Grid Ref B1  
 Layer 10  
 Sample P10

Description: Stiff to firm intact dark grey CLAY.

Sample Details:	Initial:	Final:
Diameter:	101.6 mm	100.7 mm
Height:	101.4 mm	100.5 mm
Moisture content:	25 %	27 %
Bulk density:	2.00 Mg/m <sup>3</sup>	2.08 Mg/m <sup>3</sup>
Dry density:	1.60 Mg/m <sup>3</sup>	1.65 Mg/m <sup>3</sup>
Sample condition:	Undisturbed	

**Saturation Stage:**

Initial pore pressure coefficient, B:	0.40
Final pore pressure coefficient, B:	0.94
Duration of stage:	5 days

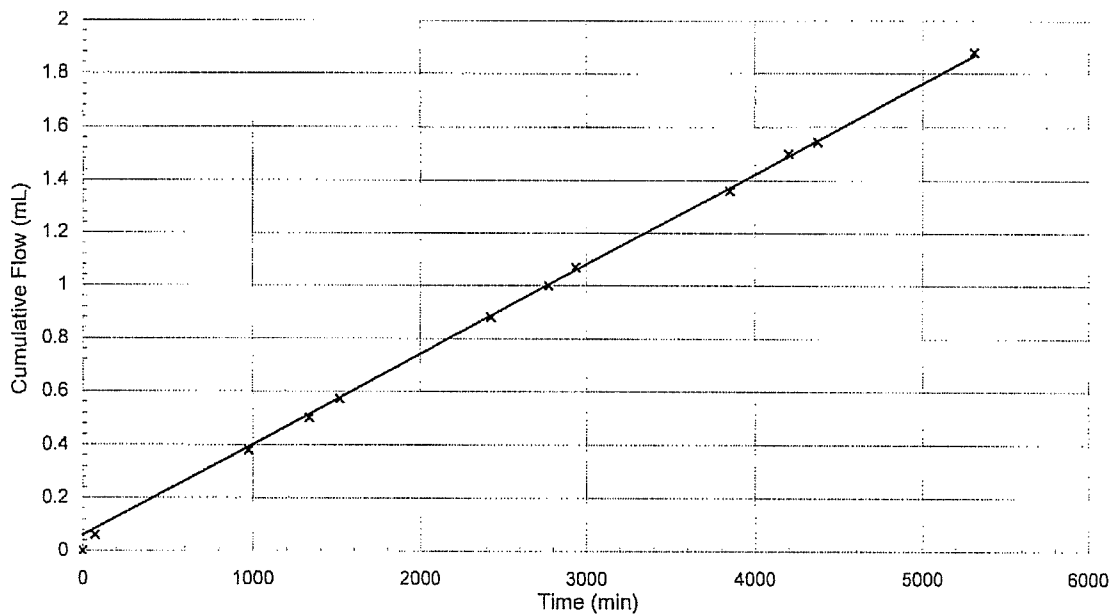
**Consolidation stage:**


Effective pressure:	100 kPa
Duration of stage:	3 days

**Permeability stage:**

Pressure difference across specimen:	20 kPa
Mean effective stress:	100 kPa
Duration of stage:	4 days

Coefficient of permeability at 20°C,  $K_v: 3.4 \times 10^{-11}$  m/s



Originator	Checked & Approved	<b>PERMEABILITY IN A TRIAXIAL CELL</b> BS1377 : Part 6 : Clause 6 : 1990 Permeability under constant head conditions in a triaxial cell	 Figure 1 Sheet 1 of 1
LD	<i>GW</i> 9/10/07		



Site Investigation & Laboratory Services

Site **LEADENHAM CELL 4 CONSTRUCTION**

Contract No. SL7714/004

Date Taken 18/09/2007

Client

Engineer

Sample P11

Description: Stiff fissured dark grey CLAY

Sample Details:	Initial:	Final:
Diameter:	101.4 mm	98.8 mm
Height:	102.0 mm	99.4 mm
Moisture content:	19 %	24 %
Bulk density:	1.94 Mg/m <sup>3</sup>	2.20 Mg/m <sup>3</sup>
Dry density:	1.63 Mg/m <sup>3</sup>	1.77 Mg/m <sup>3</sup>
Sample condition:	Undisturbed	

**Saturation Stage:**

Initial pore pressure coefficient, B:	0.13
Final pore pressure coefficient, B:	0.97
Duration of stage:	5 days

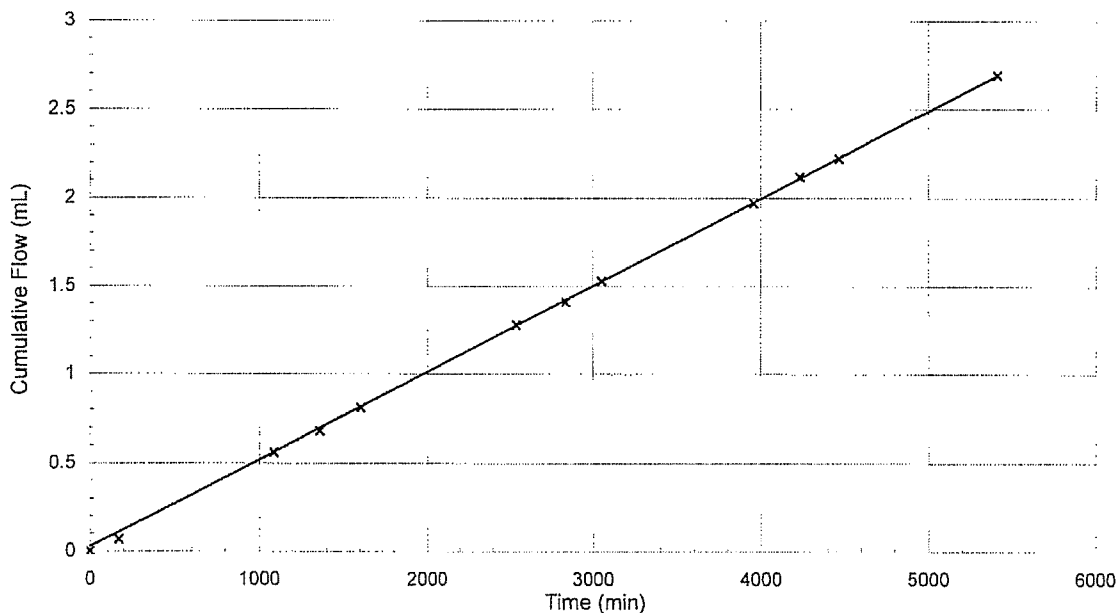
**Consolidation stage:**

Effective pressure:	100 kPa
Duration of stage:	2 days

**Permeability stage:**

Pressure difference across specimen:	20 kPa
Mean effective stress:	100 kPa
Duration of stage:	4 days

Coefficient of permeability at 20°C,  $K_v: 5.0 \times 10^{-11}$  m/s



Originator	Checked & Approved	<b>PERMEABILITY IN A TRIAXIAL CELL</b> BS1377 : Part 6 : Clause 6 : 1990 Permeability under constant head conditions in a triaxial cell	Figure 1  Sheet 1 of 1
TD	<i>GMW</i> 9/10/07		



Site Investigation & Laboratory Services

Site LEADENHAM CELL 4 CONSTRUCTION

Contract No. SL7714/004

Date Taken 19/09/2007

Client

Engineer

Sample P12

Description: Stiff intact dark grey CLAY

Sample Details:	Initial:	Final:
Diameter:	101.2 mm	100.0 mm
Height:	100.7 mm	99.6 mm
Moisture content:	20 %	23 %
Bulk density:	2.06 Mg/m <sup>3</sup>	2.17 Mg/m <sup>3</sup>
Dry density:	1.71 Mg/m <sup>3</sup>	1.77 Mg/m <sup>3</sup>
Sample condition:	Undisturbed	

**Saturation Stage:**

Initial pore pressure coefficient, B:	0.18
Final pore pressure coefficient, B:	0.98
Duration of stage:	7 days

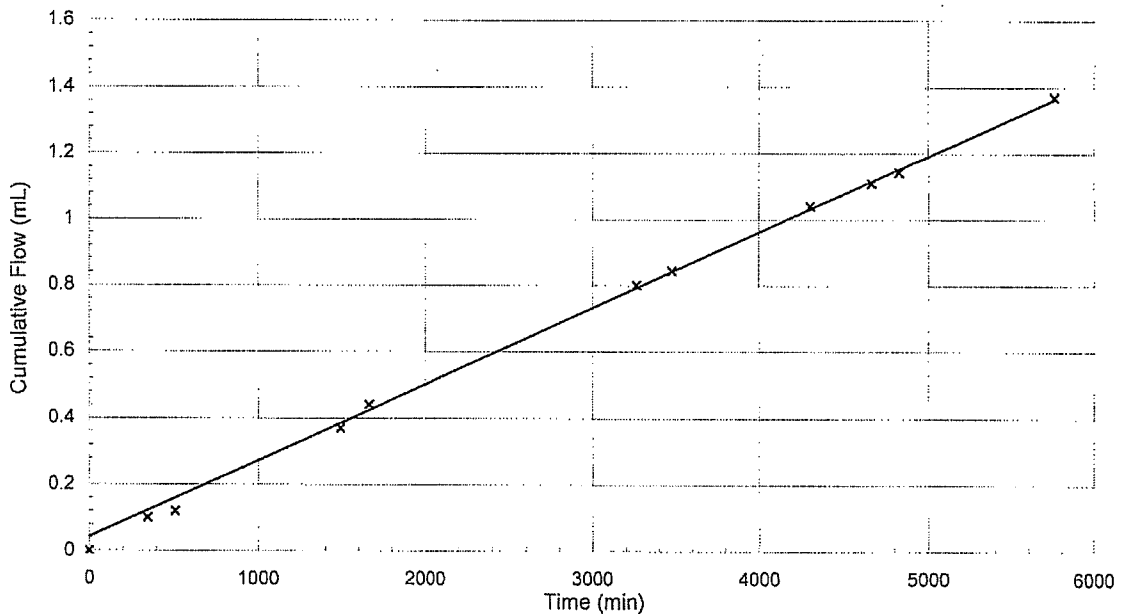
**Consolidation stage:**

Effective pressure:	100 kPa
Duration of stage:	4 days

**Permeability stage:**

Pressure difference across specimen:	20 kPa
Mean effective stress:	100 kPa
Duration of stage:	4 days

Coefficient of permeability at 20°C,  $K_v: 2.3 \times 10^{-11}$  m/s



Originator	Checked & Approved
TD	 10/10/07

**PERMEABILITY IN A TRIAXIAL CELL**

BS1377 : Part 6 : Clause 6 : 1990

Permeability under constant head conditions in a triaxial cell



Figure 1

Sheet 1 of 1



Site Investigation & Laboratory Services

Site LEADENHAM CELL 4 CONSTRUCTION

Contract No. SL7714/004

Date Taken 20/09/2007

Grid Ref A1

Layer 3

Sample P13

Client

Engineer

Description: Stiff intact very dark grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium with some claystone.

Sample Details:	Initial:	Final:
Diameter:	99.4 mm	98.5 mm
Height:	100.4 mm	99.5 mm
Moisture content:	18 %	21 %
Bulk density:	2.07 Mg/m <sup>3</sup>	2.19 Mg/m <sup>3</sup>
Dry density:	1.75 Mg/m <sup>3</sup>	1.80 Mg/m <sup>3</sup>
Sample condition:	Undisturbed	

**Saturation Stage:**

Initial pore pressure coefficient, B:	0.14
Final pore pressure coefficient, B:	0.98
Duration of stage:	4 days

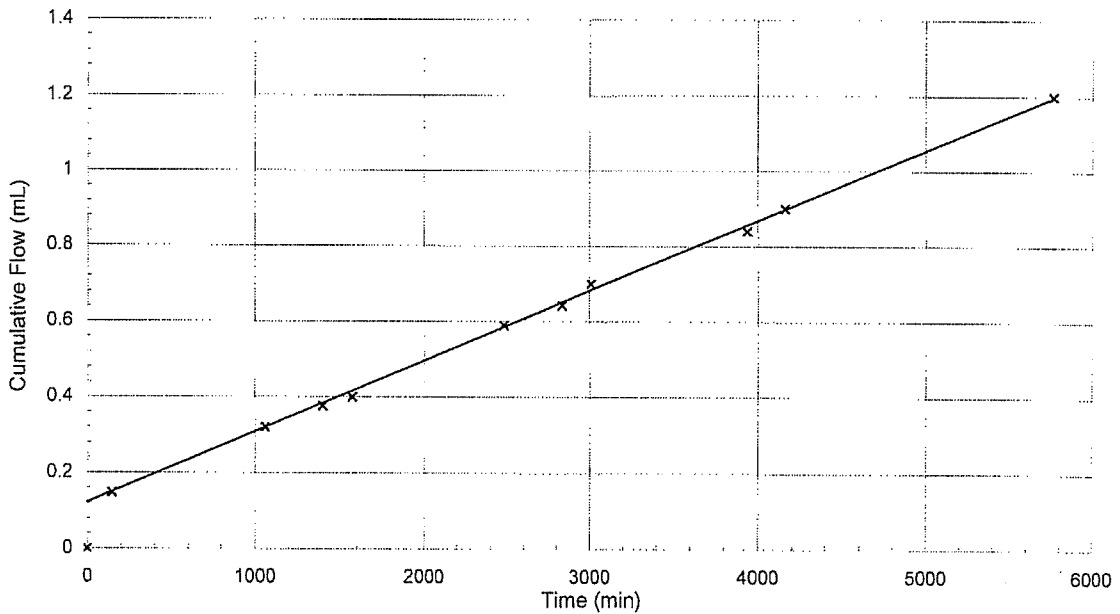
**Consolidation stage:**

Effective pressure:	100 kPa
Duration of stage:	2 days

**Permeability stage:**

Pressure difference across specimen:	20 kPa
Mean effective stress:	100 kPa
Duration of stage:	4 days

Coefficient of permeability at 20°C,  $K_v: 1.9 \times 10^{-11}$  m/s



Originator  
Checked & Approved

LD

*GDW*  
9/10/07

**PERMEABILITY IN A TRIAXIAL CELL**

BS1377 : Part 6 : Clause 6 : 1990

Permeability under constant head conditions in a triaxial cell



Figure 1

Sheet 1 of 1

**APPENDIX D**  
**SEPARATOR GEOTEXTILE DETAILS**

## GEOTEXTILE



Att: May Gurney

Date: 12<sup>th</sup> October 2007

Load No:

Order No:

Subject: Terram 1000 (4.50m x 100m).



**Terram Limited**

Mamhlad  
Pontypool  
Gwent NP4 0YR  
United Kingdom

Telephone +44 (0) 1485 757722  
Fax +44 (0) 1485 782383

Web: [www.terram.com](http://www.terram.com)  
Email: [info@terram.co.uk](mailto:info@terram.co.uk)

## CERTIFICATE OF ANALYSIS

Terram laboratory control testing for the period in which the product was manufactured is given in the following table.

Batch No.	Tensile (kN/m)		CBR (N) BS EN ISO 12236 (puncture resistance)	Mass (g/m <sup>2</sup> ) BS EN 986
	BS EN ISO 10319 L	X		
333989	9.02	8.38	1465	122
334027	8.87	8.26	1479	125
<b>T1000 Target Family mean</b>	<b>8.0</b>	<b>8.0</b>	<b>1500</b>	<b>125</b>
<b>CE Mark Tolerance</b>	<b>- 0.75</b>	<b>- 0.75</b>	<b>- 150</b>	<b>n/a</b>

All product test values quoted above are within Terram Ltd specifications.

T1000 Hydraulic Properties	PERMEABILITY BS EN ISO 11058	PERMITTIVITY EN ISO 12040	PORE SIZE BS EN ISO 12956
T1000	100 L/m <sup>2</sup> /s	2.0 s <sup>-1</sup>	150 Microns

The hydraulic values quoted in the above table are family means derived over a period of time. Pore size and Permeability are consequential properties. These also, and are controlled as a consequence of the manufacturing process, specifically Unit Mass.

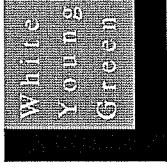
On behalf of Terram Limited

*R. Southcott*

Rob Southcott  
Laboratory Analyst.



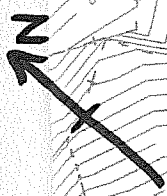
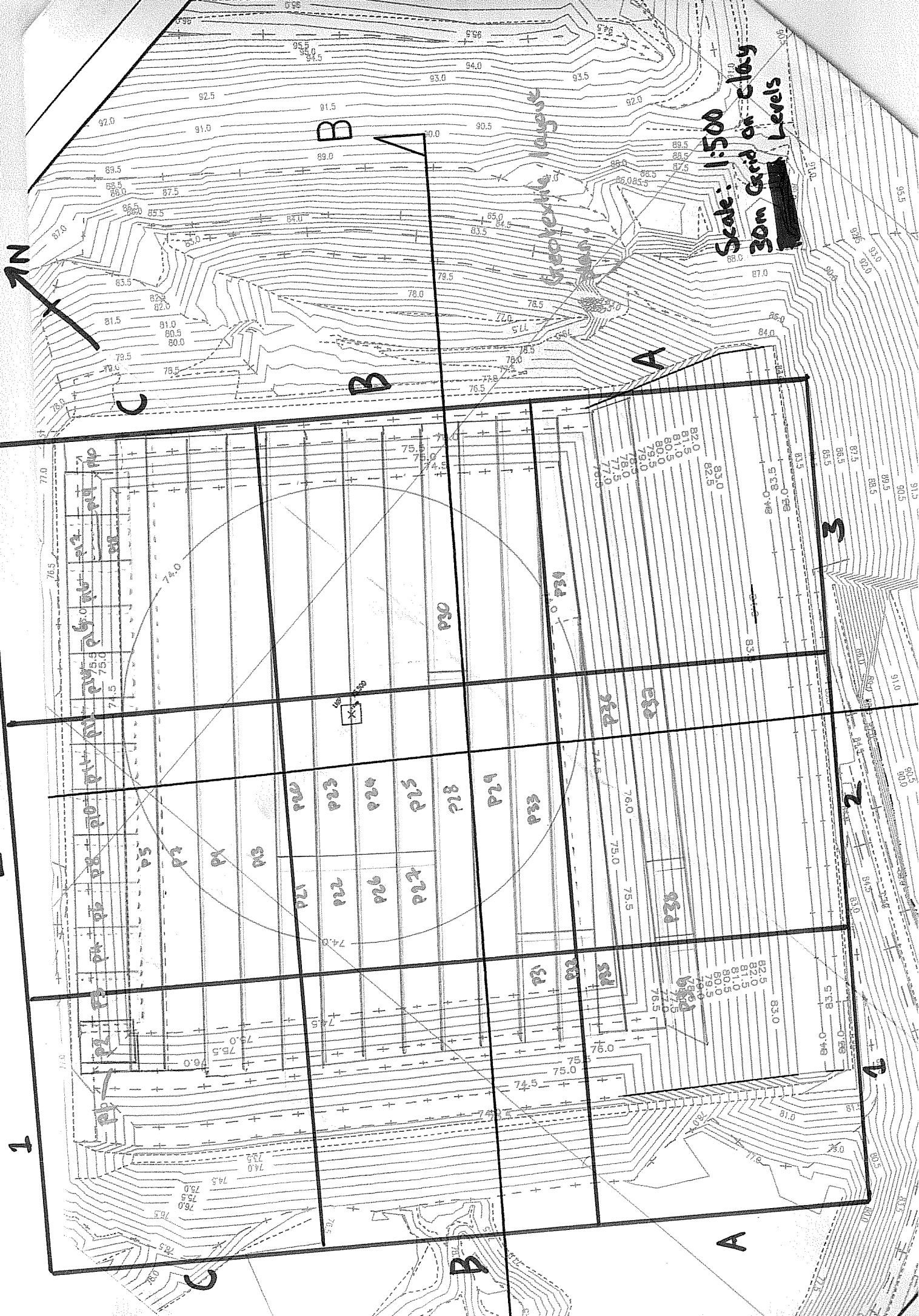




**LOG OF GEOTEXTILE RECEIVED**

Client: WRG		Site: Leadenham		Project: Cell 4		Contract: E011056	
Delivery Date	Roll No./ Batch No.	Supplier	Size (m)	Condition	Comments	Conformance Sample Reference	
Unknown	333989/033		100 x 4.5	OK		SG2	
Unknown	333989/150		100 x 4.5	OK			
Unknown	333989/057		100 x 4.5	OK		SG1	
Unknown	334027/345		100 x 4.5	OK			
Unknown	333989/177		100 x 4.5	OK			
Unknown	334027/357		100 x 4.5	OK			
Unknown	334027/349		100 x 4.5	OK			
Unknown	234010/114		100 x 4.5	OK			
Unknown	333989/235		100 x 4.5	OK			
Unknown	334027/336		100 x 4.5	OK			
Unknown	334027/337		100 x 4.5	OK			
Unknown	334027/373		100 x 4.5	OK			
Unknown	234010/115		100 x 4.5	OK			

**CQA Engineer: C Newton      Date: 02/10/2007**



Scale: 1:500  
30m Grid on Clay Levels

Dip Slope

B

B

A

1

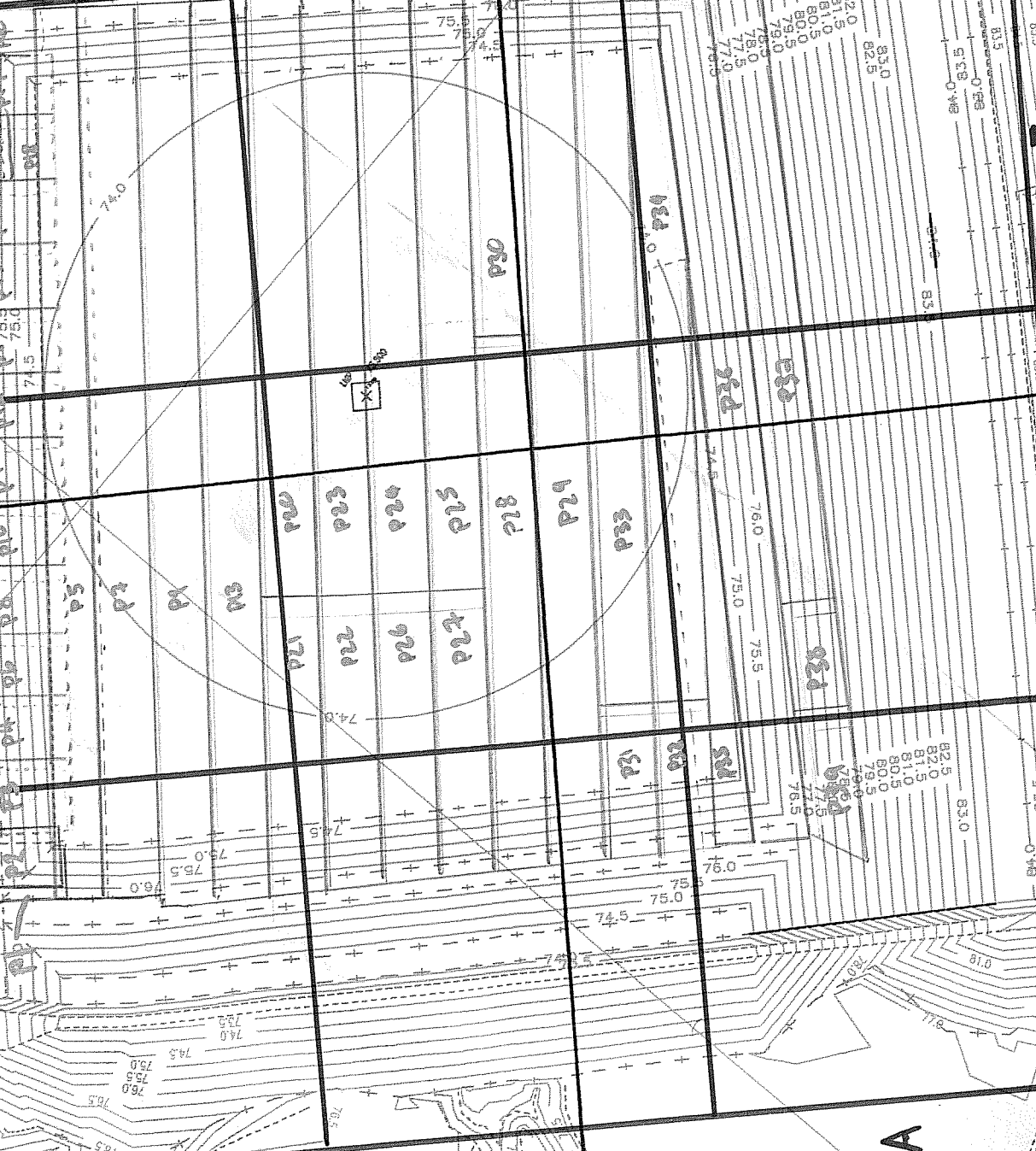
3

2

4

B

A

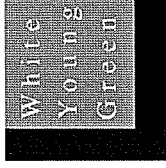


P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13 P14 P15 P16 P17 P18 P19 P20 P21 P22 P23 P24 P25 P26 P27 P28 P29 P30 P31 P32 P33

1 2 3 4 5 6 7 8 9 10

74.0 75.0 76.0 77.0 78.0 79.0 80.0 81.0 82.0 83.0 84.0 85.0 86.0 87.0 88.0 89.0 90.0 91.0 92.0 93.0 94.0 95.0

0% 30m Grid on Clay Levels 1:500



**GEOTEXTILE PANEL INSTALLATION RECORDS**

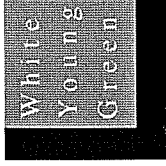
Client: WRG		Site: Leadenhham					Contract: Cell 4 construction					QA Plan:	
Panel No.		P1	P2	P3	P4	P5	P6	P7					
Geomembrane / Subgrade Accepted		✓	✓	✓	✓	✓	✓	✓					✓
Location : Grid Reference		C1	C1	C1/2	C2	C1/C2/C3	C2	C1/C2/C3	C2	C2	C2	C2	C1/C2/C3
Date of Installation		01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07
Material Specification		Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000
Material Roll No. & Batch No.		334027/337	334027/337	334027/337	334027/337	334027/337	334027/337	334027/336	334027/337	334027/337	334027/337	333989/235	
Panel Size (m) (Length / Width)		7 x 4.5	7 x 4.5	9 x 4.5	9 x 4.5	9 x 4.5	9 x 4.5	60 x 4.5	9 x 4.5	60 x 4.5	9 x 4.5	60 x 4.5	
Panel Shape		Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle
Overlap (mm)	Edge (Length)	300	300	300	300	300	300	300	300	300	300	300	300
	End (Width)	600	600	600	600	600	600	600	600	600	600	600	600
Heat Bonding Satisfactory		-	-	-	-	-	-	-	-	-	-	-	-
No. of Defects		0	0	0	0	0	0	0	0	0	0	0	0
Repair Details		-	-	-	-	-	-	-	-	-	-	-	-
Approval to Cover Y/N		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cover Material Specification		Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel
Date Covered		01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07

CQA Engineer: C Newton

Date: 02/10/2007

E011056/RT/CQA Report for the  
Development of Cell 4/Oct 2007

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Leadenham Landfill Site  
Waste Recycling Group Limited



**GEOTEXTILE PANEL INSTALLATION RECORDS**

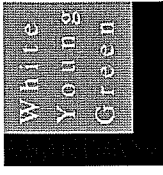
Client: WRG		Site: Leadenham				Contract: Cell 4 construction				QA Plan:			
Panel No.		P8	P9	P10	P11	P12	P13	P14					
Geomembrane / Subgrade Accepted		✓	✓	✓	✓	✓	✓	✓				✓	✓
Location : Grid Reference		C2	C1/C2/C3	C2	C2	C2/C3	C1/C2/C3	C3					
Date of Installation		01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07					
Material Specification		Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000					
Material Roll No. & Batch No.		334027/337	234010/114	334027/337	334027/337	334027/337	334027/349	334027/337					
Panel Size (m) (Length / Width)		9 x 4.5	60 x 4.5	9 x 4.5	9 x 4.5	9 x 4.5	60 x 4.5	9 x 4.5					
Panel Shape		Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle					
Overlap (mm)	Edge (Length)	300	300	300	300	300	300	300					
	End (Width)	600		600	600	600		600					
Heat Bonding Satisfactory		✓	✓	✓	✓	✓	✓	✓				✓	✓
No. of Defects		0	0	0	0	0	0	0				0	0
Repair Details		-	-	-	-	-	-	-				-	-
Approval to Cover Y/N		✓	✓	✓	✓	✓	✓	✓				✓	✓
Cover Material Specification		Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel				Gravel	Gravel
Date Covered		01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07				01/10/07	01/10/07

CQA Engineer: C Newton

Date: 02/10/2007

E011056/RT/CQA Report for the Development of Cell 4/Oct 2007

E011056/QR01  
Leadenham Landfill Site  
Waste Recycling Group Limited

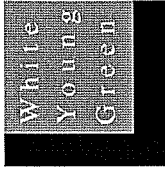


**GEOTEXTILE PANEL INSTALLATION RECORDS**

Client: WRG		Site: Leadenham					Contract: Cell 4 construction					QA Plan:				
Panel No.	P15	P16	P17	P18	P19	P20	P21									
Geomembrane / Subgrade Accepted	✓	✓	✓	✓	✓	✓	✓									
Location : Grid Reference	C3	C3	C3	C3	C3	C3	C3									1/C2/B1/B2
Date of Installation	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07									01/10/07
Material Specification	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000									Terram 1000
Material Roll No. & Batch No.	334027/337	334027/337	334027/337	334027/337	334027/337	334027/337	334027/357									334027/177
Panel Size (m) (Length / Width)	9 x 4.5	9 x 4.5	6 x 4.5	4 x 4.5	9 x 4.5	40 x 4.5	9 x 4.5									20 x 4.5
Panel Shape	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle									Rectangle
Overlap (mm)	300	300	300	300	300	300	300									300
	600	600	300	600	600	600	600									300
Heat Bonding Satisfactory	✓	✓	✓	✓	✓	✓	✓									✓
No. of Defects	0	0	0	0	0	0	0									0
Repair Details	-	-	-	-	-	-	-									-
Approval to Cover Y/N	✓	✓	✓	✓	✓	✓	✓									✓
Cover Material Specification	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel									Gravel
Date Covered	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07									01/10/07

CQA Engineer: C Newton Date: 02/10/2007

E011056/RT/CQA Report for the Development of Cell 4/Oct 2007  
 E011056/QR01 Leadenham Landfill Site  
 Waste Recycling Group Limited



**GEOTEXTILE PANEL INSTALLATION RECORDS**

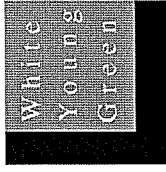
Client: WRG		Site: Leadenham				Contract: Cell 4 construction				QA Plan:			
Panel No.		P22	P23	P24	P25	P26	P27	P28					
<b>Geomembrane / Subgrade Accepted</b>													
Location : Grid Reference		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Date of Installation		B1/B2	B2/B3	B2/B3	B2/B3	B2/B3	B1/B2	B1/B2/B3	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07
Material Specification		Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000
Material Roll No. & Batch No.		333989/117	333989/235	234010/114	334027/349	333989/177	333989/177	333989/177	333989/177	333989/177	333989/177	333989/177	333989/177
Panel Size (m) (Length / Width)		20 x 4.5	40 x 4.5	40 x 4.5	40 x 4.5	20 x 4.5	20 x 4.5	20 x 4.5	20 x 4.5	20 x 4.5	20 x 4.5	20 x 4.5	30 x 4.5
Panel Shape		Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle
Overlap (mm)	Edge (Length)	300	300	300	300	300	300	300	300	300	300	300	300
	End (Width)	300	300	300	300	300	300	300	300	300	300	300	300
<b>Heat Bonding Satisfactory</b>													
No. of Defects		0	0	0	0	0	0	0	0	0	0	0	0
<b>Repair Details</b>													
Approval to Cover Y/N		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cover Material Specification		Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel
Date Covered		01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07	01/10/07

CQA Engineer: C Newton

Date: 02/10/2007

E011056/RT/CQA Report for the  
Development of Cell 4/Oct 2007

E011056/QR01  
Leadenham Landfill Site  
Waste Recycling Group Limited

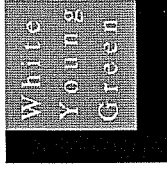


**GEOTEXTILE PANEL INSTALLATION RECORDS**

Client: WRG		Site: Leadenham					Contract: Cell 4 construction					QA Plan:				
Panel No.	P29	P30	P31	P32	P33	P34	P35	Panel No.	P29	P30	P31	P32	P33	P34	P35	
Geomembrane / Subgrade Accepted	✓	✓	✓	✓	✓	✓	✓									
Location : Grid Reference	B1/B2/B3	B3	B1/B2	B1/B2/A1/A2	B2/B3	B2/B3/A1/A3	A1/A2									
Date of Installation	02/10/07	02/10/07	02/10/07	02/10/07	02/10/07	02/10/07	02/10/07									
Material Specification	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000									
Material Roll No. & Batch No.	334027/357	334027/357	334027/357	334027/357	334027/345	334027/345	334027/357									
Panel Size (m) (Length / Width)	60 x 4.5	20 x 4.5	6 x 4.5	6 x 4.5	45 x 4.5	55 x 4.5	20 x 4.5									
Panel Shape	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle	Rectangle									
Overlap (mm)	Edge (Length)	300	300	300	300	300	300									
	End (Width)	-	300	300	300	300	300									
Heat Bonding Satisfactory	✓	✓	✓	✓	✓	✓	✓									
No. of Defects	0	0	0	0	0	0	0									
Repair Details	-	-	-	-	-	-	-									
Approval to Cover Y/N	✓	✓	✓	✓	✓	✓	✓									
Cover Material Specification	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel									
Date Covered	02/10/07	02/10/07	02/10/07	02/10/07	02/10/07	02/10/07	02/10/07									

CQA Engineer: C Newton Date: 02/10/2007

E011056/RT/CQA Report for the Development of Cell 4/Oct 2007  
 E011056/QR01 Leadenham Landfill Site  
 Waste Recycling Group Limited



**GEOTEXTILE PANEL INSTALLATION RECORDS**

Client: WRG		Site: Leadenhham				Contract: Cell 4 construction				QA Plan:
Panel No.		P36	P37	P38	P39	P40				
Geomembrane / Subgrade Accepted		✓	✓	✓	✓	✓				
Location : Grid Reference		A1/A2/A3	A2/A3	A2	A1	C3				
Date of Installation		02/10/07	02/10/07	02/10/07	02/10/07	02/10/07				
Material Specification		Terram 1000	Terram 1000	Terram 1000	Terram 1000	Terram 1000				
Material Roll No. & Batch No.		333989/057	333989/057	333989/033	333989/033	333989/033				
Panel Size (m) (Length / Width)		60 x 4.5	40 x 4.5	10 x 4.5	10 x 4.5	10 x 4.5				
Panel Shape		Rectangle	Rectangle	Rectangle	Rectangle	Rectangle				
Overlap (mm)	Edge (Length)	300	300	300	300	300				
	End (Width)	-	300	600	600	300				
Heat Bonding Satisfactory		-	-	-	-	-				
No. of Defects		0	0	0	0	0				
Repair Details		-	-	-	-	-				
Approval to Cover Y/N		✓	✓	✓	✓	✓				
Cover Material Specification		Gravel	Gravel	Gravel	Gravel	Gravel				
Date Covered		02/10/07	02/10/07	02/10/07	02/10/07	02/10/07				

CQA Engineer: C Newton

Date: 02/10/2007

E011056/RT/CQA Report for the  
Development of Cell 4/Oct 2007

E011056/QR01

Leadenham Landfill Site  
Waste Recycling Group Limited





# BICS Laboratories Ltd



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E info@bics-labs.co.uk W www.bics-labs.co.uk

14<sup>th</sup> September 2007

FAO Mr Iwan Owen  
Egniol Limited  
Tre Felin, Bangor  
Gwynedd  
North Wales  
LL57 4LH

Fax: 01248 363896

Dear Iwan,

Thank you for consulting BICS Laboratories Ltd. for your geosynthetic testing needs. We are pleased to submit this **final test report**.

Test Ref. Number:	BS-C947
Contract Reference:	Leadenham Landfill Site
Date(s) Received:	07/09/2007
Material(s) Tested:	Geotextile
Sample ID(s):	SG-1, Roll No: 333989/057 SG-2, Roll No: 333989/033
Test(s) Requested:	Mass Per Unit Area - BSEN ISO 9864 Thickness - BSEN ISO 9863-1 Tensile Strength - BSEN ISO 10319 Puncture Resistance - BSEN ISO 12236 Cone Drop - BSEN 918

If you have any questions or require additional information, please do not hesitate to contact us.

Yours Sincerely

Shazeena Iqbal  
Technical Director

Tests Marked with an asterisk (\*) in this report are not UKAS Accredited, and therefore are not included in the UKAS Accreditation Schedule for our laboratory. Any opinions and interpretations expressed within this report are outside the scope of our UKAS Accreditation. This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.



# BICS Laboratories Ltd

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 E info@bics-labs.co.uk W www.bics-labs.co.uk

## GEOSYNTHETICS TEST REPORT EGNIO LTD P.O NO: 6738/30

Contract Ref: Leadenham Landfill Site  
 Material Type: Geotextile  
 Sample ID: SG-1, Roll No: 333989/057

Report Ref. : BS-C947-01  
 Date(s) Tested: 10-13/09/07

PARAMETER	TEST SPECIMEN NUMBER										MEAN	Std Dev
	1	2	3	4	5	6	7	8	9	10		
Mass Per Unit Area (BSEN 9864) g/m <sup>2</sup>	130	121	124	130	127	118	115	128	132	121	125	6
Thickness (BSEN ISO 9863-1) mm (2kPa)	0.74	0.75	0.69	0.72	0.66	0.68	0.67	0.68	0.72	0.70	0.70	0.03
Tensile Properties (BSEN ISO 10319)												
kN/m (MD)	10.0	8.2	9.0	8.4	9.9						9.1	0.8
kN/m (TD)	9.1	12.4	10.0	11.2	8.4						10.2	1.6
Elongation												
% (MD)	28.3	26.0	26.5	26.1	25.9						26.5	1.0
% (TD)	25.7	27.9	26.9	27.4	25.9						26.8	0.9
Puncture Resistance (BSEN ISO 12236) kN	1547	1551	1488	1503	1583						1535	38
Puncture Displacement (BSEN ISO 12236) mm	36.7	39.2	40.3	39.9	44.7						40.2	2.9
Cone Drop (Perforation Resistance) (BSEN 918) mm	30	24	26	24	24	26	30	26	26	28	26	2

Atmospheric Conditions @ Test : 20 +/- 2 °C, Relative Humidity : 65 +/- 5 % RH

### CERTIFICATION:

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Date: 14 September 2007

Quality Audit:-

Shazeena Iqbal  
 Technical Director



# BICS Laboratories Ltd

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## GEOSYNTHETICS TEST REPORT EGNIOI LTD P.O NO: 6738/30

Contract Ref: Leadenham Landfill Site  
 Material Type: Geotextile  
 Sample ID: SG-2, Roll No: 333989/033

Report Ref. : BS-C947-02  
 Date(s) Tested: 10-13/09/07

PARAMETER	TEST SPECIMEN NUMBER										MEAN	Std Dev
	1	2	3	4	5	6	7	8	9	10		
Mass Per Unit Area (BSEN 9864) g/m <sup>2</sup>	134	121	129	132	127	142	131	126	133	139	131	6
Thickness (BSEN ISO 9863-1) mm (2kPa)	0.78	0.78	0.86	0.82	0.70	0.71	0.74	0.81	0.77	0.76	0.77	0.05
Tensile Properties (BSEN ISO 10319) kN/m (MD)	8.3	8.3	8.6	9.1	8.5						8.6	0.3
kN/m (TD)	9.9	9.1	10.3	9.9	10.0						9.8	0.4
Elongation % (MD)	27.2	27.4	26.9	27.5	26.4						27.1	0.6
% (TD)	28.4	27.3	27.0	27.3	27.3						27.4	0.6
Puncture Resistance (BSEN ISO 12236) kN	1514	1608	1570	1489	1576						1551	49
Puncture Displacement (BSEN ISO 12236) mm	38.9	43.4	40.3	45.2	40.9						41.7	2.5
Cone Drop (Perforation Resistance) (BSEN 918) mm	24	26	24	24	24	26	26	24	24	24	25	1

Atmospheric Conditions @ Test : 20 +/- 2 °C, Relative Humidity : 65 +/- 5 % RH

### CERTIFICATION:

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27<sup>th</sup> September 2007

FAO Mr Trevor Dilworth  
Egniol Limited  
Tre Felin, Bangor  
Gwynedd  
North Wales  
LL57 4LH

Fax: 01248 363895

Dear Trevor,

Thank you for consulting BICS Laboratories Ltd. for your geosynthetic testing needs. We are pleased to submit this **final** test report.

Test Ref. Number: BS-D103  
Contract Reference: Leadenham Landfill Site  
Date(s) Received: 25/09/2007  
Material(s) Tested: Geotextile  
Sample ID(s): SG-1, Roll No: 333989/057  
SG-2, Roll No: 333989/033  
Test(s) Requested: Tensile Strength - BSEN ISO 10319  
Puncture Resistance - BSEN ISO 12236  
Trapezoidal Tear Resistance - ASTM D4533

If you have any questions or require additional information, please do not hesitate to contact us.

Yours Sincerely

Shazeena Iqbal  
Technical Director

Tests Marked with an asterisk (\*) in this report are not UKAS Accredited, and therefore are not included in the UKAS Accreditation Schedule for our laboratory. Any opinions and interpretations expressed within this report are outside the scope of our UKAS Accreditation. This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

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Directors: Clifford Butt, Shazenn N. Iqbal Company Registration Number: 4213030



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## GEOSYNTHETICS TEST REPORT EGNIOL LTD P.O NO: 6738/30

Contract Ref: Leadenham Landfill Site  
Material Type: Geotextile  
Sample ID: SG-1, Roll No: 333989/057

Report Ref. : BS-D103-01  
Date(s) Tested: 26-27/09/07

PARAMETER	TEST SPECIMEN NUMBER										MEAN	Std Dev	
	1	2	3	4	5	6	7	8	9	10			
<b>Tensile Properties (BSEN ISO 10319)</b>													
kN/m (MD)	8.6	7.3	7.9	8.9	7.7							8.1	0.7
kN/m (TD)	8.7	10.4	10.3	9.7	9.6							9.7	0.7
<b>Elongation</b>													
% (MD)	27.6	25.1	25.5	27.4	25.8							26.2	1.2
% (TD)	26.4	28.3	27.2	27.3	28.6							27.5	0.9
<b>Puncture Resistance (BSEN ISO 12236)</b>													
kN	1463	1498	1493	1543	1572							1514	43
<b>Puncture Displacement (BSEN ISO 12236)</b>													
mm	39.1	39.2	35.3	43.5	35.6							38.5	3.3
<b>Trapezoidal Tear Resistance (ASTM D4533)</b>													
N (MD)	402	396	390	341	322	430	449	392	315	362		379	45
N (TD)	330	281	299	287	436	484	353	298	443	338		365	73

Atmospheric Conditions @ Test : 20 +/- 2 °C, Relative Humidity : 65 +/- 5 % RH

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Date: 27 September 2007

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## GEOSYNTHETICS TEST REPORT EGNIOL LTD P.O NO: 6738/30

Contract Ref: Leadenham Landfill Site  
Material Type: Geotextile  
Sample ID: SG-1, Roll No: 333989/033

Report Ref. : BS-D103-02  
Date(s) Tested: 26-27/09/07

PARAMETER	TEST SPECIMEN NUMBER										MEAN	Std Dev	
	1	2	3	4	5	6	7	8	9	10			
<b>Tensile Properties (BSEN ISO 10319)</b>													
kN/m (MD)	8.5	8.6	11.3	10.3	8.8							9.5	1.2
kN/m (TD)	8.9	8.7	8.3	8.4	10.0							8.8	0.7
<b>Elongation</b>													
% (MD)	28.9	27.0	27.4	26.8	26.9							27.4	0.9
% (TD)	27.6	26.1	26.8	26.6	27.9							27.0	0.7
<b>Puncture Resistance (BSEN ISO 12236)</b>													
kN	1442	1655	1486	1611	1438							1528	100
<b>Puncture Displacement (BSEN ISO 12236)</b>													
mm	48.1	44.6	43.5	38.7	40.8							43.1	3.6
<b>Trapezoidal Tear Resistance (ASTM D4533)</b>													
N (MD)	434	466	432	330	381	385	392	369	366	370		391	41
N (TD)	389	357	327	380	368	369	381	292	319	347		353	31

Atmospheric Conditions @ Test : 20 +/- 2 °C, Relative Humidity : 65 +/- 5 % RH

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Date: 27 September 2007

### Quality Audit:-

Shazeena Iqbal  
Technical Director

CONFIDENTIAL TEST REPORT  
Page 3 of 3

REPORT

**APPENDIX E**

**LEACHATE DRAINAGE BLANKET TEST RESULTS**

## GRAVEL RESULTS

PSD  
PERM  
TVL  
CaCO<sub>3</sub>



**Calculations to ATV-DVWK-A 127, third edition, August 2000**

Project: Leadenham Landfill site  
 250mm SDR17.6 Leachate Pipe work part Slotted 3mm

Client: May Gurney Via UGS Ltd.

Date: 15/10/2007

Contact: Mark Lackner  
 Tel: 024 7660 2323  
 Fax: 024 7660 2116  
 E-mail: mark.lackner@mgs.co.uk

**Input:**

**Safety factors**

Safety class:	A (normal case)		
Allowable deflection:	6% (normal case)		
A type predeformation:	$\delta_{v,TypeA}$	1.00	%
Local predeformation:	$\delta_{v,local}$	0.00	%

**Pipe**

Description:	Solid wall		
Inside diameter:	$d_i$	199.4	mm
Wall thickness:	$s$	14.20	mm
Perforationsart:	Partially perforated (more than 2/3 of the circumference)		
Perforation geometry:	Slitted		
Distance between apertures:	$l_1$	25.00	mm
Width of aperture:	$b_w$	3.00	mm

**Pipe material**

Material class:	Thermoplastic		
Description:	PE-HD (ATV-A 127)		
Density of pipe material	$\gamma_P$	9.40	kN/m <sup>3</sup>
Transv. contr. coeff.	$\nu$	0.38	[1]
E-Modulus, short	$E_{st}$	800.00	N/mm <sup>2</sup>
E-Modulus, long	$E_{l0}$	160.00	N/mm <sup>2</sup>
Ultimate flexural tensile stress, short-term	$\sigma_{BT,st}$	21.00	N/mm <sup>2</sup>
Ultimate flexural compressive stress, short-term	$\sigma_{BC,st}$	21.00	N/mm <sup>2</sup>
Ultimate flexural tensile stress, long-term	$\sigma_{BT,lt}$	14.00	N/mm <sup>2</sup>
Ultimate flexural compressive stress, long-term	$\sigma_{BC,lt}$	14.00	N/mm <sup>2</sup>

**Soil**

E1: Backfilling:	Soil group: G1		
Value from Table 8 in ATV A127:	$D_{PR1}$	95.0	%
E20: Pipe zone:	Soil group: G1		
Value from Table 8 in ATV A127:	$D_{PR2}$	95.0	%
E3: Native soil:	Soil group: G1		
Proctor density:	$D_{PR3}$	97.0	%

E4: Below trench

$$E4 = 10 * E1$$

Installation

Trench width:	<Bank>		
Type of bedding:	loose		
Relative projection:	a	1.00	[1]
Bedding angle:	120°		

Load case combination 1

Description:	250mm OD Leachate Pipe SDR17.6		
Cover depth:	h	25,000	mm
Soil density:	$\gamma$	12.00	kN/m <sup>3</sup>
Additional surface load:	P <sub>0</sub>	0.00	N/mm <sup>2</sup>
Maximum groundwater level above pipe bed:	h <sub>W,max</sub>	1,000	mm
Minimum groundwater level above pipe bed:	h <sub>W,min</sub>	500	mm
Internal pressure:	P <sub>I</sub>	0.00	bar
Water fill (e.g. damming channel)	Yes		
Density of medium:	$\gamma_F$	10.00	kN/m <sup>3</sup>
Traffic load:	No traffic		

**Proof for load case combination 1, Short term**

Stress proof (with minimum groundwater):

Calculated ultimate flexural tensile stress, soil/traffic load:	$\sigma_{calc,BZ}$	21.0	N/mm <sup>2</sup>		
Calculated ultimate flexural compr. stress, soil/traffic load:	$\sigma_{calc,BD}$	21.0	N/mm <sup>2</sup>		
Ultimate flexural tensile stress due to other loads:	$\sigma_{all,BZ}$	21.0	N/mm <sup>2</sup>		
Ultimate flexural compressive stress due to other loads:	$\sigma_{all,BD}$	21.0	N/mm <sup>2</sup>		
Internal:		Crown	Springline	Bottom	
Stress due to soil and traffic loads:	$\sigma_{qv,qh,qh^*,i}$	-0.171	-2.282	0.922	N/mm <sup>2</sup>
Stress due to other loads:	$\sigma_{other,i}$	-0.008	-0.093	0.020	N/mm <sup>2</sup>
Safety coefficient:	$\gamma_{BTi}$	---	---	22.28	[1]
Safety coefficient:	$\gamma_{BCi}$	117.06	8.84	---	[1]
External:		Crown	Springline	Bottom	
Stress due to soil and traffic loads:	$\sigma_{qv,qh,qh^*,a}$	-2.69	-1.09	-3.48	N/mm <sup>2</sup>
Stress due to other loads:	$\sigma_{other,a}$	-0.08	0.00	-0.08	N/mm <sup>2</sup>
Safety coefficient:	$\gamma_{BTe}$	---	---	---	[1]
Safety coefficient:	$\gamma_{BCe}$	7.58	19.21	5.90	[1]
Required flexural tensile safety coefficient:	req $\gamma_{BT}$		2.50		[1]
Required flexural compressive safety coefficient:	req $\gamma_{BC}$		2.50		[1]

The stress safety coefficients determined are sufficient.

Stress proof (with maximum groundwater):

Calculated ultimate flexural tensile stress, soil/traffic load:	$\sigma_{calc,BZ}$	21.0	N/mm <sup>2</sup>		
Calculated ultimate flexural compr. stress, soil/traffic load:	$\sigma_{calc,BD}$	21.0	N/mm <sup>2</sup>		
Ultimate flexural tensile stress due to other loads:	$\sigma_{all,BZ}$	21.0	N/mm <sup>2</sup>		
Ultimate flexural compressive stress due to other loads:	$\sigma_{all,BD}$	21.0	N/mm <sup>2</sup>		
Internal:		Crown	Springline	Bottom	
Stress due to soil and traffic loads:	$\sigma_{qv,qh,qh^*,i}$	-0.170	-2.280	0.922	N/mm <sup>2</sup>
Stress due to other loads:	$\sigma_{other,i}$	-0.057	-0.142	-0.022	N/mm <sup>2</sup>
Safety coefficient:	$\gamma_{BTi}$	---	---	23.34	[1]
Safety coefficient:	$\gamma_{BCi}$	92.73	8.67	---	[1]
External:		Crown	Springline	Bottom	
Stress due to soil and traffic loads:	$\sigma_{qv,qh,qh^*,a}$	-2.69	-1.09	-3.47	N/mm <sup>2</sup>
Stress due to other loads:	$\sigma_{other,a}$	-0.12	-0.04	-0.12	N/mm <sup>2</sup>
Safety coefficient:	$\gamma_{BTe}$	---	---	---	[1]
Safety coefficient:	$\gamma_{BCe}$	7.47	18.52	5.84	[1]
Required flexural tensile safety coefficient:	req $\gamma_{BT}$		2.50		[1]
Required flexural compressive safety coefficient:	req $\gamma_{BC}$		2.50		[1]

The stress safety coefficients determined are sufficient.

Deflection proof (with minimum groundwater):

Calculation method:		linear		
Ratio:		$l/(A_{rad} \cdot r_m^2)$	0.00147	[1]
Ratio:		$l/(A_{rad} \cdot r_m^2) \cdot K_q$	0.00177	[1]
Deflection coefficient for bending moments:	$c_v$	$q_v$	$q_h$	$q_h^*$
Deflection coefficient for axial forces:	$cN_v$	-0.0893	0.0833	0.0640 [1]
Deflection coefficient for lateral forces:	$cQ_v$	-0.683	-0.681	-0.247 [1]
Resultant deflection coefficient:	$c'_v$	-0.359	0.335	0.243 [1]
		-0.0921	0.0839	0.0648 [1]

Vertical diameter change:	$\Delta d_v$	2.3	mm
Horizontal diameter change:	$\Delta d_h$	1.0	mm
Relative vertical deformation:	$\delta_v$	1.06	%
Allowable deflection:	all $d_v$	6.00	%

The deflection determined is less than the allowable deflection.

Deflection proof (with maximum groundwater):

Calculation method:	linear		
Ratio:	$l/(A_{rad} \cdot r_m^2)$	0.00147	[1]
Ratio:	$l/(A_{rad} \cdot r_m^2) \cdot \kappa_q$	0.00177	[1]
	$q_v$	$q_h$	$q_h^*$
Deflection coefficient for bending moments: $c_v$	-0.0893	0.0833	0.0640 [1]
Deflection coefficient for axial forces: $c_{N_v}$	-0.683	-0.681	-0.247 [1]
Deflection coefficient for lateral forces: $c_{Q_v}$	-0.359	0.335	0.243 [1]
Resultant deflection coefficient: $c'_v$	-0.0921	0.0839	0.0648 [1]

Vertical diameter change:	$\Delta d_v$	2.3	mm
Horizontal diameter change:	$\Delta d_h$	1.0	mm
Relative vertical deformation:	$\delta_v$	1.05	%
Allowable deflection:	all $d_v$	6.00	%

The deflection determined is less than the allowable deflection.

Stability proof (linear) (with maximum groundwater):

Total vertical load	$q_v$	194.0	kN/m <sup>2</sup>
Reduction factor for soil/traffic load:	$\kappa_{v2}$	0.87	[1]
Critical buckling load (soil/traffic load):	crit $q_v$	2,694.0	kN/m <sup>2</sup>
Partial buckling safety coefficient (soil/traffic load):	$\gamma_{buckl,qv}$	13.89	[1]
External water pressure:	$p_e$	10.0	kN/m <sup>2</sup>
Plus vacuum in the pipe:	$p_{i-}$	0.0	kN/m <sup>2</sup>
System stiffness without traffic load correction:	$V_{RB}$	0.0087	[1]
Input value $\delta_{v2}$ for determining $\kappa_{a2}$ :	$\delta_{v2}$	2.05	%
Predeformation reduction factor for water pressure:	$\kappa_{r2}$	0.88	[1]
Local predeformation reduction factor for water pressure:	$\kappa_{r1}$	1.00	[1]
Parameter $k^*$ (substitute for $r_m/s$ ) for determining $\alpha_D$ :	$k^*$	7.521	[1]
Perforation coefficient:	$\alpha_P$	9.462	[1]
Critical buckling load (external water pressure):	crit $p_e$	1,195.7	kN/m <sup>2</sup>
Partial buckling safety coefficient (ext. water pressure):	$\gamma_{buckl,pe}$	119.57	[1]
Buckling safety coefficient:	$\gamma_{buckl}$	12.44	[1]
Required buckling safety coefficient:	req $\gamma_{buckl}$	2.00	[1]

The buckling safety coefficients determined are sufficient.

Non linear stability proof (with maximum groundwater):

- n/a -

**Proof for load case combination 1, Long term**

**Stress proof (with minimum groundwater):**

Calculated ultimate flexural tensile stress, soil/traffic load:	$\sigma_{calc,BZ}$	14.0		N/mm <sup>2</sup>	
Calculated ultimate flexural compr. stress, soil/traffic load:	$\sigma_{calc,BD}$	14.0		N/mm <sup>2</sup>	
Ultimate flexural tensile stress due to other loads:	$\sigma_{all,BZ}$	14.0		N/mm <sup>2</sup>	
Ultimate flexural compressive stress due to other loads:	$\sigma_{all,BD}$	14.0		N/mm <sup>2</sup>	
Internal:		Crown	Springline	Bottom	
Stress due to soil and traffic loads:	$\sigma_{qv,qh,qh^*,i}$	-1.260	-1.199	-0.550	N/mm <sup>2</sup>
Stress due to other loads:	$\sigma_{other,i}$	-0.015	-0.086	0.013	N/mm <sup>2</sup>
Safety coefficient:	$\gamma_{BTi}$	---	---	---	[1]
Safety coefficient:	$\gamma_{BCi}$	10.99	10.90	26.08	[1]
External:		Crown	Springline	Bottom	
Stress due to soil and traffic loads:	$\sigma_{qv,qh,qh^*,a}$	-0.88	-0.79	-1.36	N/mm <sup>2</sup>
Stress due to other loads:	$\sigma_{other,a}$	-0.07	-0.01	-0.08	N/mm <sup>2</sup>
Safety coefficient:	$\gamma_{BTe}$	---	---	---	[1]
Safety coefficient:	$\gamma_{BCe}$	14.72	17.45	9.73	[1]
Required flexural tensile safety coefficient:	req $\gamma_{BT}$		2.50		[1]
Required flexural compressive safety coefficient:	req $\gamma_{BC}$		2.50		[1]

The stress safety coefficients determined are sufficient.

**Stress proof (with maximum groundwater):**

Calculated ultimate flexural tensile stress, soil/traffic load:	$\sigma_{calc,BZ}$	14.0		N/mm <sup>2</sup>	
Calculated ultimate flexural compr. stress, soil/traffic load:	$\sigma_{calc,BD}$	14.0		N/mm <sup>2</sup>	
Ultimate flexural tensile stress due to other loads:	$\sigma_{all,BZ}$	14.0		N/mm <sup>2</sup>	
Ultimate flexural compressive stress due to other loads:	$\sigma_{all,BD}$	14.0		N/mm <sup>2</sup>	
Internal:		Crown	Springline	Bottom	
Stress due to soil and traffic loads:	$\sigma_{qv,qh,qh^*,i}$	-1.257	-1.197	-0.549	N/mm <sup>2</sup>
Stress due to other loads:	$\sigma_{other,i}$	-0.063	-0.135	-0.030	N/mm <sup>2</sup>
Safety coefficient:	$\gamma_{BTi}$	---	---	---	[1]
Safety coefficient:	$\gamma_{BCi}$	10.60	10.52	24.21	[1]
External:		Crown	Springline	Bottom	
Stress due to soil and traffic loads:	$\sigma_{qv,qh,qh^*,a}$	-0.88	-0.79	-1.36	N/mm <sup>2</sup>
Stress due to other loads:	$\sigma_{other,a}$	-0.11	-0.05	-0.11	N/mm <sup>2</sup>
Safety coefficient:	$\gamma_{BTe}$	---	---	---	[1]
Safety coefficient:	$\gamma_{BCe}$	14.10	16.58	9.49	[1]
Required flexural tensile safety coefficient:	req $\gamma_{BT}$		2.50		[1]
Required flexural compressive safety coefficient:	req $\gamma_{BC}$		2.50		[1]

The stress safety coefficients determined are sufficient.

**Deflection proof (with minimum groundwater):**

Calculation method:		linear			
Ratio:		$l/(A_{rad} \cdot r_m^2)$	0.00147	[1]	
Ratio:		$l/(A_{rad} \cdot r_m^2) \cdot K_Q$	0.00177	[1]	
Deflection coefficient for bending moments:	$c_v$	$q_v$	$q_h$	$q_h^*$	
Deflection coefficient for axial forces:	$c_{N_v}$	-0.0893	0.0833	0.0640	[1]
Deflection coefficient for lateral forces:	$c_{Q_v}$	-0.683	-0.681	-0.247	[1]
Deflection coefficient for lateral forces:	$c_{Q_v}$	-0.359	0.335	0.243	[1]
Resultant deflection coefficient:	$c'_v$	-0.0921	0.0839	0.0648	[1]

Vertical diameter change:	$\Delta d_v$	2.6	mm
Horizontal diameter change:	$\Delta d_h$	-0.4	mm
Relative vertical deformation:	$\delta_v$	1.24	%
Allowable deflection:	all $d_v$	6.00	%

The deflection determined is less than the allowable deflection.

Deflection proof (with maximum groundwater):

Calculation method:	linear		
Ratio:	$l/(A_{rad} \cdot r_m^2)$	0.00147	[1]
Ratio:	$l/(A_{rad} \cdot r_m^2) \cdot K_q$	0.00177	[1]
	$q_v$	$q_h$	$q_h^*$
Deflection coefficient for bending moments: $c_v$	-0.0893	0.0833	0.0640 [1]
Deflection coefficient for axial forces: $cN_v$	-0.683	-0.681	-0.247 [1]
Deflection coefficient for lateral forces: $cQ_v$	-0.359	0.335	0.243 [1]
Resultant deflection coefficient: $c'_v$	-0.0921	0.0839	0.0648 [1]

Vertical diameter change:	$\Delta d_v$	2.6	mm
Horizontal diameter change:	$\Delta d_h$	-0.4	mm
Relative vertical deformation:	$\delta_v$	1.24	%
Allowable deflection:	all $d_v$	6.00	%

The deflection determined is less than the allowable deflection.

Stability proof (linear) (with maximum groundwater):

Total vertical load	$q_v$	115.4	kN/m <sup>2</sup>
Reduction factor for soil/traffic load:	$\kappa_{v2}$	0.87	[1]
Critical buckling load (soil/traffic load):	crit $q_v$	1,201.0	kN/m <sup>2</sup>
Partial buckling safety coefficient (soil/traffic load):	$\gamma_{buckl,qv}$	10.41	[1]
External water pressure:	$p_e$	10.0	kN/m <sup>2</sup>
Plus vacuum in the pipe:	$p_{ }$	0.0	kN/m <sup>2</sup>
System stiffness without traffic load correction:	$V_{RB}$	0.0017	[1]
Input value $\delta_{v2}$ for determining $\kappa_{a2}$ :	$\delta_{v2}$	2.24	%
Predeformation reduction factor for water pressure:	$\kappa_{r2}$	0.90	[1]
Local predeformation reduction factor for water pressure:	$\kappa_{r1}$	1.00	[1]
Parameter $k^*$ (substitute for $r_m/s$ ) for determining $\alpha_D$ :	$k^*$	7.521	[1]
Perforation coefficient:	$\alpha_P$	12.339	[1]
Critical buckling load (external water pressure):	crit $p_e$	319.1	kN/m <sup>2</sup>
Partial buckling safety coefficient (ext. water pressure):	$\gamma_{buckl,pe}$	31.91	[1]
Buckling safety coefficient:	$\gamma_{buckl}$	7.85	[1]
Required buckling safety coefficient:	req $\gamma_{buckl}$	2.00	[1]

The buckling safety coefficients determined are sufficient.

Non linear stability proof (with maximum groundwater):

- n/a -

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Date: 26<sup>th</sup> September 2007  
Test Report Ref.: STR 106206

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Contract: Leadenham Landfill – Cell 4 Construction

## LABORATORY TEST REPORT

**TEST REQUIREMENTS:** To determine the Particle Size Distribution (PSD) of aggregate sample-washing and sieving method to **BS EN 933-1: 1997**.

### SAMPLE DETAILS:

Certificate of sampling received:	No
Laboratory Ref. No:	S20645
Client Ref. No:	GV1
Date and Time of Sampling:	07/09/2007
Date of Receipt at Lab:	13/09/2007
Date of Start of Test.:	18/09/2007
Sampling Location:	Cell 4 - Stockpile
Name of Source:	Unknown
Method of Sampling:	<del>BS 812: Pt. 102</del> /BS EN 932-1/Unknown (Delete as appropriate)
Sampled By:	White Young Green
Aggregate Type and Nominal Size:	40mm Gravel
Target Specification:	N/A

**RESULTS:** Were any unrepresentative lumps present? No

MATERIAL DESCRIPTION: 40mm Gravel		
BS TEST SIEVE NOMINAL APERTURE SIZE	CUMULATIVE PERCENTAGE PASSING	SPECIFICATION LIMITS FOR :
40 mm	100	
31.5 mm	86	
28 mm	77	
20 mm	12	
16 mm	1	
14 mm	0.3	
10 mm	0.1	

COMMENTS/ DEPARTURE FROM SPECIFIED PROCEDURE



E. N. Jones – Soils Laboratory Manager



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Date: 26<sup>th</sup> September 2007  
Test Report Ref.: STR 106207

Page 1 of 1

Contract: Leadenham Landfill – Cell 4 Construction

## LABORATORY TEST REPORT

**TEST REQUIREMENTS:** To determine the Particle Size Distribution (PSD) of aggregate sample-washing and sieving method to **BS EN 933-1: 1997**.

### SAMPLE DETAILS:

Certificate of sampling received:	No
Laboratory Ref. No:	S20645
Client Ref. No:	GV2
Date and Time of Sampling:	07/09/2007
Date of Receipt at Lab:	13/09/2007
Date of Start of Test.:	18/09/2007
Sampling Location:	Cell 4 - Stockpile
Name of Source:	Unknown
Method of Sampling:	<del>BS 812: Pt. 102/BS EN 932-1/Unknown</del> (Delete as appropriate)
Sampled By:	White Young Green
Aggregate Type and Nominal Size:	40mm Gravel
Target Specification:	N/A

**RESULTS:** Were any unrepresentative lumps present? No

MATERIAL DESCRIPTION: 40mm Gravel		
BS TEST SIEVE NOMINAL APERTURE SIZE	CUMULATIVE PERCENTAGE PASSING	SPECIFICATION LIMITS FOR :
40 mm	100	
31.5 mm	79	
28 mm	68	
20 mm	11	
16 mm	1	
14 mm	0.2	
10 mm	0.1	

COMMENTS/ DEPARTURE FROM SPECIFIED PROCEDURE



E. N. Jones – Soils Laboratory Manager

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Date: 26<sup>th</sup> September 2007  
Our Ref. STR.: 106208

Page 1 of 1

Contract: Leadenham Landfill – Cell 4

## LABORATORY TEST REPORT

**TEST REQUIREMENTS:** To determine the Ten Per Cent Fines Value (TFV) of aggregate sample 10mm and greater in accordance with **BS 812: Part 111: 1990.**

### SAMPLE DETAILS:

Certificate of sampling received:	No
Laboratory Ref. No:	S20645
Client Ref. No:	GV1
Date and Time of Sampling:	07/09/2007
Date of Receipt at Lab:	13/09/2007
Date of Start of Test.:	20/09/2007
Sampling Location:	Stockpile
Name of Source:	Unknown
Method of Sampling:	Disturbed Bulk Sample
Sampled By:	White Young Green
Aggregate Type and Nominal Size:	40mm Gravel
Target Specification:	N/A

### RESULTS:

Ten per cent fines value (SOAKED) = 220 kN

### COMMENTS/DEPARTURE FROM SPECIFIED PROCEDURE

Sample crushed to obtain 14-10mm fraction.



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Date: 26<sup>th</sup> September 2007  
Our Ref. STR.: 106209

Page 1 of 1

Contract: Leadenham Landfill – Cell 4

## LABORATORY TEST REPORT

**TEST REQUIREMENTS:** To determine the Ten Per Cent Fines Value (TFV) of aggregate sample 10mm and greater in accordance with **BS 812: Part 111: 1990.**

### SAMPLE DETAILS:

Certificate of sampling received:	No
Laboratory Ref. No:	S20645
Client Ref. No:	GV2
Date and Time of Sampling:	07/09/2007
Date of Receipt at Lab:	13/09/2007
Date of Start of Test.:	20/09/2007
Sampling Location:	Stockpile
Name of Source:	Unknown
Method of Sampling:	Disturbed Bulk Sample
Sampled By:	White Young Green
Aggregate Type and Nominal Size:	40mm Gravel
Target Specification:	N/A

### RESULTS:

**Ten per cent fines value (SOAKED) = 230 kN**

### COMMENTS/DEPARTURE FROM SPECIFIED PROCEDURE

Sample crushed to obtain 14-10mm fraction.



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Date: 26<sup>th</sup> September 2007  
Our Ref. STR: 106210

Page 1 of 1

Contract: Leadenham Landfill – Cell 4

## LABORATORY TEST REPORT

**TEST REQUIREMENTS:** To determine the Calcium Carbonate CaCO<sub>3</sub> content of aggregate samples in accordance with BS 7755 : 1995

### SAMPLE DETAILS:

Certificate of sampling received:	No
Laboratory Ref. No:	S20645
Client Ref. No:	GV1
Date and Time of Sampling:	07/09/2007
Date of Receipt at Lab:	13/09/2007
Date of Start of Test:	21/09/2007
Sampling Location:	Cell 4 - Stockpile
Name of Source:	Unknown
Method of Sampling:	Disturbed Bulk Sample
Sampled By:	White Young Green
Aggregate Type and Nominal Size:	40mm Gravel
Target Specification:	N/A

### RESULTS:

Calcium Carbonate Content = 1.78 %



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Date: 26<sup>th</sup> September 2007  
Our Ref. STR: 106211

Page 1 of 1

Contract: Leadenham Landfill – Cell 4

## LABORATORY TEST REPORT

**TEST REQUIREMENTS:** To determine the Calcium Carbonate CaCO<sub>3</sub> content of aggregate samples in accordance with BS 7755 : 1995

### SAMPLE DETAILS:

Certificate of sampling received:	No
Laboratory Ref. No:	S20645
Client Ref. No:	GV2
Date and Time of Sampling:	07/09/2007
Date of Receipt at Lab:	13/09/2007
Date of Start of Test:	21/09/2007
Sampling Location:	Cell 4 - Stockpile
Name of Source:	Unknown
Method of Sampling:	Disturbed Bulk Sample
Sampled By:	White Young Green
Aggregate Type and Nominal Size:	40mm Gravel
Target Specification:	N/A

### RESULTS:

Calcium Carbonate Content = 1.14 %



E. N. Jones – Soils Laboratory Manager

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Date: 26<sup>th</sup> September 2007  
Our Ref. STR: 106212

Page 1 of 1

Contract: Leadenham Landfill – Cell 4

## LABORATORY TEST REPORT

**TEST REQUIREMENTS:** To determine the Horizontal Permeability of an aggregate sample in accordance with **Dtp HA 41/90**

### SAMPLE DETAILS:

Certificate of sampling received:	No
Laboratory Ref. No:	S20645
Client Ref. No:	GV1
Date and Time of Sampling:	07/09/2007
Date of Receipt at Lab:	13/09/2007
Date of Start of Test.:	20/09/2007
Sampling Location:	Cell 4 - Stockpile
Name of Source:	Unknown
Method of Sampling:	Disturbed Bulk Sample
Sampled By:	White Young Green
Aggregate Type and Nominal Size:	40mm Gravel
Target Specification:	N/A

### RESULTS:

Horizontal Permeability =  $7.0 \times 10^{-2}$  m/sec

### COMMENTS/ DEPARTURE FROM SPECIFIED PROCEDURE



E. N. Jones - Soils Lab Manager

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Date: 26<sup>th</sup> September 2007  
Our Ref. STR: 106213

Page 1 of 1

Contract: Leadenham Landfill – Cell 4

## LABORATORY TEST REPORT

**TEST REQUIREMENTS:** To determine the Horizontal Permeability of an aggregate sample in accordance with **Dtp HA 41/90**

### SAMPLE DETAILS:

Certificate of sampling received:	No
Laboratory Ref. No:	S20645
Client Ref. No:	GV2
Date and Time of Sampling:	07/09/2007
Date of Receipt at Lab:	13/09/2007
Date of Start of Test.:	21/09/2007
Sampling Location:	Cell 4 - Stockpile
Name of Source:	Unknown
Method of Sampling:	Disturbed Bulk Sample
Sampled By:	White Young Green
Aggregate Type and Nominal Size:	40mm Gravel
Target Specification:	N/A

### RESULTS:

Horizontal Permeability =  $6.9 \times 10^{-2}$  m/sec

### COMMENTS/ DEPARTURE FROM SPECIFIED PROCEDURE



E. N. Jones - Soils Lab Manager



## PLATES

- Plate 1 - Watering the clay prior to conditioning
- Plate 2 - Pushing out the clay prior to rolling
- Plate 3 - Conditioning and rolling the clay
- Plate 4 - Conditioning clay to mix water and reduce particle size
- Plate 5 - Clay placement and compaction
- Plate 6 - Installing the separation geotextile
- Plate 7 - Drainage blanket and leachate collection pipe work



Plate 1 - Watering the clay prior to conditioning



Plate 2 - Pushing out the clay prior to rolling



Plate 3 - Conditioning and rolling the clay



Plate 4 - Conditioning clay to mix water and reduce particle size





Plate 5 - Clay placement and compaction

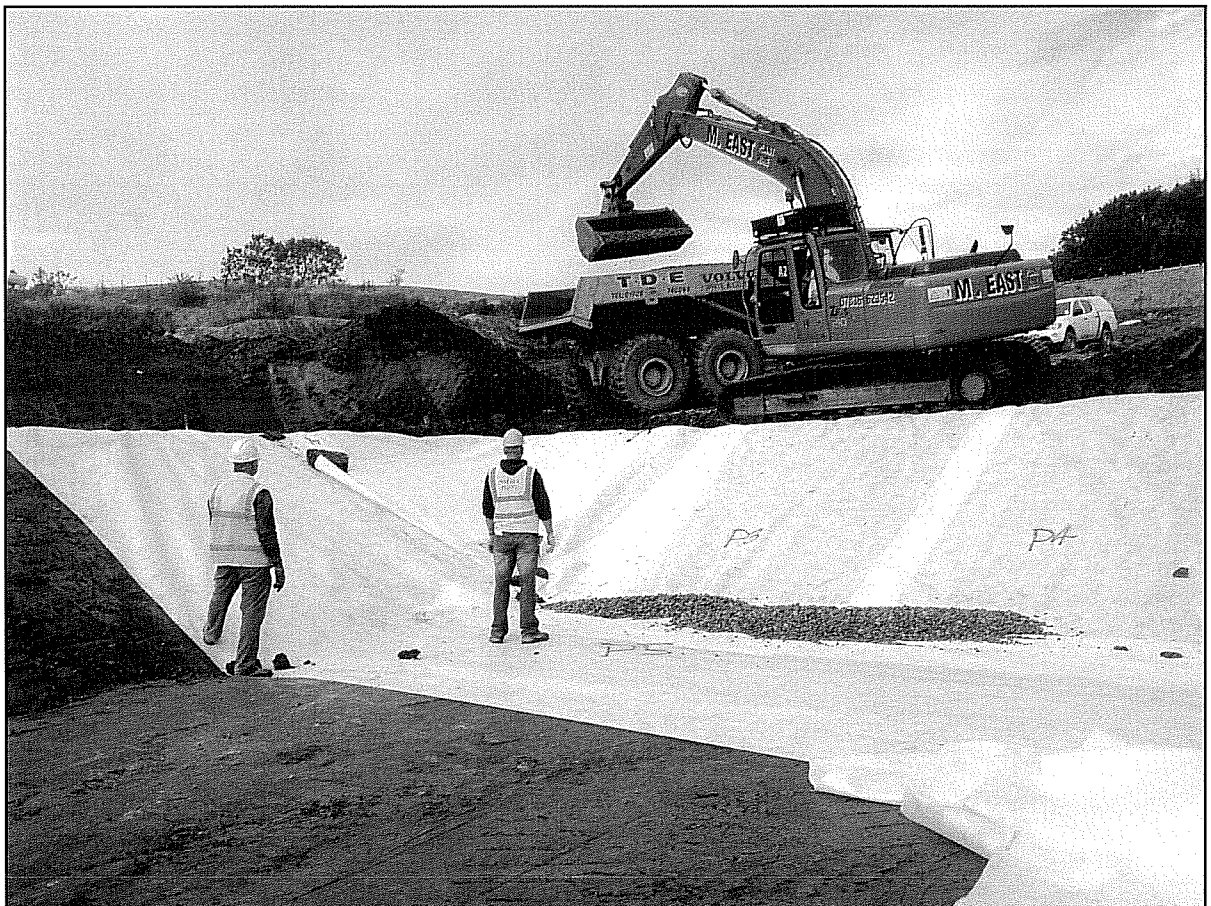


Plate 6 - Installing the separation geotextile



Plate 7 - Drainage blanket and leachate collection pipe work

## DRAWINGS

- SL-7714-04-01 - Formation Survey
- SL-7714-04-02 - Top of Engineered Clay Liner
- SL-7714-04-03 - Leachate Collection Pipework and Concrete Bases
- SL-7714-04-04 - Engineered Clay Depth Contours
- SL-7714-04-05 - Leachate Drainage Blanket Layer Survey
- SL-7714-04-06 - Leachate Drainage Blanket Depth Contours
- SL-7714-04-07 - Cross-sections Through Formation, Engineered Clay And Leachate Drainage Blanket (1 of 5)
- SL-7714-04-08 - Cross-sections Through Formation, Engineered Clay And Leachate Drainage Blanket (2 of 5)
- SL-7714-04-09 - Cross-sections Through Formation, Engineered Clay And Leachate Drainage Blanket (3 of 5)
- SL-7714-04-10 - Cross-sections Through Formation, Engineered Clay And Leachate Drainage Blanket (4 of 5)
- SL-7714-04-11 - Cross-sections Through Formation, Engineered Clay And Leachate Drainage Blanket (5 of 5)
- SL-7714-04-12 - Cross-section Location Plan
- SL-7714-04-13 - Full Size Survey Showing New Cell 4

E011056/RT/181007

18 October 2007

The Environment Agency  
Waterside House  
Waterside North  
Lincoln LN2 5HA

For the attention of Mr J Branson

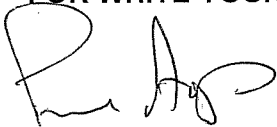
Dear Sirs

**RE: CONSTRUCTION QUALITY ASSURANCE REPORT FOR THE DEVELOPMENT  
OF CELL 4, LEADENHAM LANDFILL SITE  
WASTE RECYCLING GROUP**

Please find enclosed the Construction Quality Assurance Report for the development of Cell 4 at Leadenham Landfill site dated October 2007, Reference Number E011056.

I trust this information is suitable for your needs, but please do not hesitate to contact the undersigned if you require any further information.

Yours faithfully  
**FOR WHITE YOUNG GREEN ENVIRONMENTAL**



**PAUL AYRES**  
Associate

Enc