



NORTH WEST **cambridge**

Land Contamination

Condition 49b+c

June 2013



North West Cambridge – Phase 1 Development

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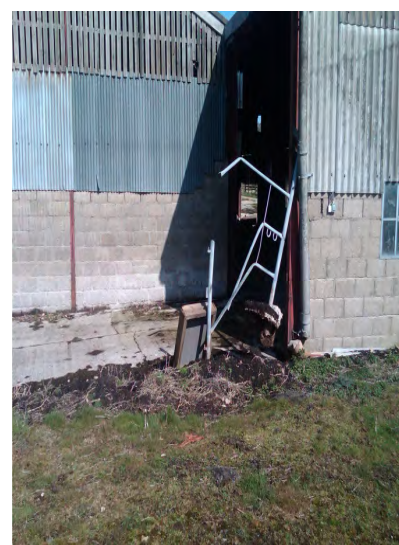
Phase II Geo-environmental
Interpretive Report

June 2013

P01
For Information

Prepared for:
University of Cambridge

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KINGDOM &
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1. INTRODUCTION

1.1 Purpose of Report

URS Infrastructure & Environment UK Limited (URS) was commissioned by the University of Cambridge (the client) to undertake a Phase II Geo-Environmental Assessment for the North West Cambridge development located at Huntingdon Road, Girton, Cambridge, CB3 0LH, in support of the Phase 1 package of development works.

The interpretative report is intended to provide a summary of the Ground Investigation works undertaken and to interpret these results in the context of the engineering and development requirements of the proposed scheme in order to discharge parts b and c of Condition 49 for the planning consent for the North West Cambridge development (reference 11/1114/OUT and S/1886/11) in relation to the Phase 1 package of development works.

URS has previously produced a desk study report for the site, in support of part a of Condition 49 for the Phase 1 package of development works, which should be read in conjunction with this report. The URS desk study report details are as follows:

- URS (April 2013). North West Cambridge Phase 1 Development – Phase I Geo-environmental Desk study Report

It should be noted that the University of Cambridge is seeking to develop the wider North West Cambridge development in several phases. This report seeks to discharge parts b and c of Condition 49 for the Phase 1 development area only. References to 'site' within this document refer to this Phase 1 development area only.

A location plan for the wider North West Cambridge development is displayed in Figure 1.

1.2 Methodology

The assessment presented in this report and the recommendations provided have been prepared in accordance with the following guidance:

- British Standards 10175 'Investigation of Potentially Contaminated Sites – Code of Practice' (2001);
- Contaminated Land Report (CLR) 11 'Model Procedures for the Management of Land Contamination' (2004);
- DEFRA Statutory Guidance 'Environment Protection Act 1990 Part 2a Contaminated Land' (2012); and
- Environment Agency (EA) GP3 'Groundwater Protection: Policy and Practice'.

1.3 Proposed Development

The Phase 1 development comprises a building and associated infrastructure development area of approximately 24 hectares.

At the time of report preparation, the outline planning application proposed building and infrastructure land-use for the Phase 1 development comprised:

- A food store and retail/shops;
- Energy centre;
- Residential– flats, duplexes, maisonettes, terraced housing, detached housing;

- Student housing;
- Health care building, community centre, police office, senior care centre;
- School and nursery;
- Car parking and basement car parking;
- Areas of open landscaping away from buildings.

1.4 Information Sources

The following information sources have been referred to and reviewed in the production of this report:

- Outline development plans;
- North West Cambridge Phase 1 Development – Phase I Geo-environmental Desk study Report, URS (April 2013);
- North West Cambridge – Preliminary Geotechnical and Geo-environmental Baseline Condition Study, Peter Brett Associates (March 2007);
- Traveller's Rest Pit, SSSI Report – UoC/NWC/AAP/B8;
- Geological mapping data from the British Geological Survey;
- The Environment Agency website (www.environment-agency.gov.uk);
- Landmark Envirocheck Report (Reference 31572446_1_1 dated 16 June 2010);
- North West Cambridge Geo-environmental Ground Conditions Report, Scott Wilson (February 2011);
- North West Cambridge Mineral Safeguarding Area Report, Scott Wilson (February 2011); and
- Site walkovers (2010 and 2012).

The most recent site walkover was undertaken by a URS representative on 13 September 2012, focussing on the Phase 1 development area.

2. ENVIRONMENTAL SETTING: DESK STUDY FINDINGS

2.1 Site Location and Description

The wider development is centred on National Grid Reference National Grid Reference 543088E 259487N, and it is located approximately 3km north west of Cambridge City Centre as shown on the Site Location Plan.

A site plan indicating the position of the Phase 1 development in relation to the wider North West Cambridge development, along with exploratory hole locations from the Scott Wilson 2011 Ground Investigation report is displayed in Figure 2.

The Phase 1 building development area of the site, and large area of proposed landscaping area by Washpit Brook comprised open land or agricultural fields for the growing of crops, primarily barley and wheat, with some tracks running through the site, and small hedgerows/wooded areas in the south of the site. No university buildings or other associated infrastructure is located within the building development area of the Phase 1 part of the development.

In addition to barley and wheat, a proportion of the farming area located within the northern part of the building development area of the Phase 1 site is used for potato research/growing.

Some buildings including the Astronomy department and 'Gravel Hill Farm' are located close to or within the landscaping areas to the east of the main development. Buildings associated with the former university applied biology field station, agronomy centre and genetics field station are located in the proposed landscaping areas to the north of the main development.

2.2 Hydrology

The Envirocheck Report shows the closest surface water feature of note to be the Washpit Brook (a tributary of the River Great Ouse), which flows to the west of the Phase 1 development site from a small area of woodland named Pheasant Plantation. No River Quality Data is available via the Environment Agency website for the brook. Several ditches are present in the fields in the development which drain into the Washpit Brook whilst Pellow's Pond is located in the east of the site.

PBA (2007) note that the nearest significant surface watercourse to the site is the River Cam which flows north approximately 2.5 km to the south east of the site. PBA (2007) also highlight Trinity Head Conduit (to the south-east of the site) which flows south-west. This forms the origin for the water supply for the fountain at Trinity Hall. PBA state that the original source was likely to have been a spring at the base of the Head Gravels.

2.3 Hydrogeology

According to the EA website, the Phase 1 part of the wider development lies over a Secondary 'undifferentiated' aquifer. This relates to the overlying Head Gravels and Observatory Gravels. The 'undifferentiated' classification is assigned in cases where it has not been possible to attribute secondary category A or B to a rock or soil type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

The deep Lower Greensand Formation is classed a Principal Aquifer, but this is confined by the Gault Clay. Chalk shown in BGS maps in the east of the wider development is also considered to comprise a Principal Aquifer.

The Soil Classification of the wider development has been determined using the EA's older Groundwater Vulnerability map presented in the Envirocheck Report. The soil classification in relation to the vast majority of the Principal Aquifer at the development is 'High Leaching

Potential (H3)'. This applies to coarse textured or moderately shallow soils which readily transmit non-absorbed pollutants and liquid discharges but which have some ability to attenuate absorbed pollutants because of their large clay or organic matter contents.

Soil Classification in relation to the Secondary Undifferentiated Aquifer is 'Intermediate Leaching Potential (I1)' – this applies to soils which can possibly transmit a wide range of pollutants. Soils are not classified in relation to Unproductive Strata.

It should be noted that, despite the various soil classifications, the eastern parts of the wider development are known from historical map data to have been extensively quarried and backfilled with imported material that might have different leaching properties.

According to the Environment Agency website, the site is not located within a groundwater Source Protection Zone (SPZ).

2.4 **Geology**

Reference to the British Geological Survey 1:50 000 scale geological map of the area, Sheet 188 (Cambridge), indicates that the site is underlain in part by Head Gravels and Observatory Gravels, in the northern two thirds of the Phase 1 site, and to the east in the areas of proposed landscaping. These overlie the Lower Beds (Chalk Marl) of the Lower Chalk and the Gault Clay Formation with the Lower Greensand at depth. Only Gault Clay is shown in the southern third of the Phase 1 development site and the landscaped areas to the west.

2.4.1 **Ground Stability**

The Envirocheck report indicates that there is no hazard on-site for potential for compressible ground stability or potential for ground dissolution, whilst a very low and low potential for ground stability hazards including running sand and landslides exists on-site.

There is a moderate potential for shrinking or swelling clays at the site, probably associated with the presence of the Gault Clay Formation which is anticipated to be near the surface in many areas of the site.

2.4.2 **Mining**

The Envirocheck Report indicates that the site is in an area which would not be affected by coal mining. The Envirocheck Report shows that Coprolite was mined off-site to the east of the Phase 1 development area, within the wider North West Cambridge site.

Coprolite diggings were a major industry in the Cambridge area during the late 1800s, being used for agriculture, and briefly, by the explosives industry. The workings were typically continued to depths of 6.00m to 8.00m beneath the overlying soils forming a worked belt up to approximately 0.80m wide. Since only a bed approximately 0.25m thick is removed and the area restored, little trace is left of the workings on the ground.

The PBA report (2007) notes how, in addition to the Coprolite workings, it is known that the Head Gravels on the eastern part of the site were excavated between the mid-1920s and about 1960 from the area known as the Traveller's Rest Pit. A report on the archaeological evaluation of Gravel Hill Farm referred to by PBA indicates that gravel workings are present to the east of the Phase 1 development area, adjacent to the pit.

The Envirocheck Report lists one BGS Recorded Mineral Site. This relates to the former opencast mining of sand and gravel outside of the Phase 1 development site, but further east in the wider North West Cambridge site (Traveller's Rest Pit).

According to PBA (2007), no record was found of natural cavities within a 2.5 km radius of the site. Although the absence of existing records does not, in itself, demonstrate that there are no

natural cavities on the site, the geological and geomorphological site setting is such that the potential presence for such features is considered to be very low.

According to the Envirocheck report, there are no shallow mining hazards at the site.

2.4.3 Mineral Safeguarding Area (MSA)

The Cambridgeshire and Peterborough Minerals and Waste Plan sets the framework for minerals development in the area over the period 2006 to 2026. Within the plan MSAs are identified and a MSA has been indicated as extending into the northern half of the Phase 1 development site.

2.4.4 Radon

According to the Envirocheck report, the site lies within a Radon affected area, as between 1 and 3% of homes are above the action level. However, the report also states that no radon protective measures are necessary in the construction of new dwellings or extensions. This is confirmed by the mapping within BRE Report BR211 *Guidance on protective measures for new buildings* (2nd edition 2007).

2.5 Waste Management Facilities

One registered landfill is recorded as being present on the site, to the east of the main Phase 1 development site, but extending into the proposed Phase 1 area landscape corridor. This relates to the deposition of approximately 50 000 m³ of excavated natural materials between 1984 and 1986.

3. SUMMARY OF PREVIOUS GROUND INVESTIGATION (2010)

An intrusive ground investigation (GI) for the wider North West Cambridge development was undertaken by URS in August 2010. The purpose of the investigation was to assess the ground conditions in support of the Master planning application for the wider development, comprising an area of 130 ha. A summary of the findings is presented in the sections below.

3.1 Scope of Investigation

The ground investigation was undertaken in two parts and comprised a mixture of trial pits, cable percussion boreholes and window sample boreholes and was undertaken by Brownfield Solutions Ltd (BSL) under the supervision of URS.

Part 1 involved GI works to gain geotechnical information on likely foundation and pavement design requirements, and contamination conditions at the development for the purpose of master plan input; and Part 2 involved GI works specific to assessing the significance (i.e. extent and nature) of the Mineral Safeguarding Area (MSA) identified within the wider development.

GI works comprised the following:

- Cable Percussion Boreholes – Parts 1 and 2
- Window Sample Boreholes – Part 1
- Infiltration Trial Pits – Part 1
- Trial Pit Scrapes – Part 2

3.2 Encountered Ground Conditions

3.2.1 Geology

Encountered ground conditions within the Phase 1 development area comprised topsoil in all locations. With the exception of WS201, WS202 and BH106 located within and adjacent to the proposed landscaping corridor to the east of the site no Made Ground was encountered.

Within BH106 and WS201, Made Ground was noted below the topsoil to 1.7m bgl and 0.9m bgl respectively. Material was logged as gravel or clay with flint brick, chalk and coarse gravel. This material was underlain by gravels indicative of the observatory gravels/head deposits.

In WS202, a similar Made Ground material was noted to 1.2m. Below this however, a separate layer of made Ground containing brick and occasional plastic polyethylene was identified to 3.4m bgl. This material is considered to be indicative of the former registered landfill area.

Sand and gravels, indicative of the shallow head deposits and observatory gravels was generally present immediately beneath the topsoil. The two lithologies could not be distinguished from borehole log information, and instead have been described as one unit. The general trend was for this layer to be thicker in the northern half of the Phase 1 development, likely associated with the MSA, with thicknesses ranging between 1 – 5m. In the southern half of the wider development, these deposits were less than 1m.

In BH105 and BH107, Chalk was identified within the superficial deposits.

Very little to no head deposits and observatory gravels were noted in boreholes within the proposed large landscape areas to the west of the development, which is consistent with the geological mapping data.

The superficial deposits were underlain by Gault Clay, which was not fully penetrated in any exploratory holes drilled to 25m below ground level (bgl). The Gault Clay typically comprised stiff to very stiff (becoming hard) grey/brown occasionally mottled orange brown desiccated clay with occasional calcareous nodules and locally occasional shell fragments.

The underlying Lower Greensand Formation was not encountered in any locations.

3.2.2 **Hydrogeology**

Groundwater was encountered during drilling within the shallow gravel deposits at two locations, WS214 at 0.9m bgl and WS217 at 2.2m bgl.

In the subsequent groundwater installation monitoring visits, groundwater was identified in BH103 in one of two occasions, and BH102 and BH103 on one occasion, but not the other locations.

Assessment within the wider North West Cambridge development indicates the inconsistent presence of shallow groundwater and variation in relative levels across the development, suggesting that encountered groundwater is largely indicative of perched water above the Gault Clay, strongly influenced by seasonal fluctuations in rainfall, and in the shorter term can be affected by antecedent weather conditions.

3.3 **Soil Sampling, Screening and Laboratory Analysis**

Soil samples were taken from a range of depths and from within different soil types. Samples were placed into laboratory supplied glass jars and tubs. These samples were labelled and then stored in a cool box prior to and during transit to an MCERTS and UKAS accredited laboratory for contamination analysis.

Within Phase 1, the following samples from each of the encountered lithologies were selected for analysis:

- 6no. Topsoil samples
- 2no. Made Ground samples
- 5no. Superficial Deposit samples
- 1 no. Chalk sample
- 6no. Gault Clay samples

Laboratory analysis was undertaken for a range of determinants comprising:

- Suite of metals;
- Speciated PAHs;
- CWG TPH;
- Phenols;
- pH, sulphur, sulphate, total organic carbon;

In addition, pesticide analysis was undertaken on two topsoil samples tested, and PCB analysis was undertaken on one sample, located adjacent to an electricity substation.

3.4 Groundwater Monitoring and Laboratory Analysis

Two rounds of groundwater level monitoring and one round of groundwater sampling was undertaken over the wider North West Cambridge development following the completion of field works, with recovered samples submitted for laboratory testing. BH101, BH102, BH103, BH104, BH105 and were dry at the time of groundwater sampling however and hence no groundwater samples were collected from these installations.

Where groundwater was present in other installations within the wider development, samples were recovered using dedicated disposable bailers for each location to avoid potential cross contamination. Prior to taking a sample the well was first purged to ensure that sampled groundwater was representative of the underlying aquifer. A sample was then decanted into two one-litre amber glass jars and transferred immediately into a cool box for storage prior to and during transit to the analytical laboratory.

3.5 Contamination Assessment

3.5.1 Soil Screening Guidance Criteria

Where available, laboratory results were compared to Soil Guideline Values (SGVs) for a 'residential with plant uptake' land-use, published by the Environment Agency (EA), which have been generated by the Contaminated Land Exposure Assessment (CLEA) model.

In addition to the above, derived Generic Assessment Criteria (GACs) for 30 compounds have recently been published by Contaminated Land Applications in Real Environments (CLAIRE).

In the absence of EA SGVs and CLAIRE GACs, URS derived GACs, also generated in accordance with the CLEA methodology in accordance with recommended EA guidance (using CLEA Software V1.06) were adopted.

3.5.2 Soil Laboratory Results

Analytical results for all soil samples tested from within the Phase 1 development were below adopted assessment criteria, consistent with the historical uses of the site and field observations.

Additionally, no hydrocarbons, PCBs or pesticides were identified above laboratory detection limits.

3.5.3 Groundwater Screening Criteria

The basis for the selection of waters screening criteria was to ensure that selected values were protective of receptors.

The maximum concentration for each determinant was initially compared against the Environmental Quality Standards (EQS) for freshwaters. Where an EQS was not published for a particular determinant reference was made, generally in order of preference, to the following:

- Surface Water Abstraction Classification (A2); and
- Drinking Water Quality Standards.

Exceedances of the DWS were viewed in the context of the resource value of groundwater i.e. groundwater is not being extracted for potable use within 1km of the wider development.

3.5.4 Groundwater Results

No groundwater samples were collected from the majority of boreholes due to installations being dry during the groundwater sampling event.

For other installations within the wider North West Cambridge development, groundwater assessment identified elevated nitrate, however, this is likely to be the result of a high background level since the wider development is located within a Nitrate Vulnerable Zone.

Selenium exceeded the EQS in one sample, but further Tier 2 (DQRA) assessment using Washpit Brook as the receptor, identified a low risk to Controlled Waters.

3.6 Gas Monitoring

Following the completion of GI drilling works, two rounds of ground-gas monitoring of the 10 cable percussion installations and one window sample installation were undertaken. The following parameters were monitored for both peak and steady readings:

- Oxygen (% volume);
- Methane (% volume);
- Carbon Dioxide (% volume);
- Gas Flow (litres/hour);
- Atmospheric Pressure (mB); and
- Groundwater Level (mbgl).

For the wider North West Cambridge development, the maximum carbon dioxide reading reported was 1.3%. No methane was detected in any installations and no gas flow was detected.

In accordance with CIRIA C655 guidance, the maximum Gas Screening Values (GSVs) across the wider development were as follows:

- Wider North West Cambridge Development: $1.3\% \times \text{Flow rate of } 0\text{L/hr} = <0.013$

Hence, in accordance with CIRIA C655 the wider development falls under a Characteristic Situation 1 (CS1), indicating that ground-gas does not pose a risk to proposed future development.

These results were consistent with the historical uses of the wider development and encountered ground conditions, namely natural gravels and head deposits directly overlying stiff clays.

4. 2013 PHASE 1 GROUND INVESTIGATION WORKS

4.1 Introduction

Brownfield Solutions Ltd (BSL) carried out the current intrusive investigation works under the direction of URS between 10th April 2013 and 18th April 2013. The scope and detail of the site works were based upon the guidance set out in BS 10175:2001 and BS 5930:1999 (amendment 2).

The ground investigation works comprised cable percussion boreholes, trial pits and borehole monitoring installations. Following on from the intrusive ground investigation, gas and groundwater monitoring has been undertaken on the standpipe installations on four occasions between 18th April and 10th June 2013. Two additional rounds of ground-gas monitoring are still to be undertaken but had not been completed at the time of report production.

BSL's factual report (dated June 2013, Report number: AJS/C2157/3764), including the locations of the exploratory hole positions, is presented in Appendix B.

4.2 Scope of the Ground Investigation

The aim of the ground investigation (GI) was to enable the geo-environmental assessment and characterisation of the natural ground deposits and groundwater at the site. The GI consisted of:

- 7no. cable percussion (BH401 to BH407) boreholes to assess groundwater at the site;
- 38no. Trial Pits (TP401 to TP438) to assess soil contamination at the site;
- Instrumentation comprising of standpipes installed on completion of the respective exploratory holes;
- Environmental testing of soil and groundwater;
- Ground Gas monitoring in accordance with CIRIA C655 recommended guidance.

Exploratory hole locations for the current investigation are shown on Figure 3 and Figure 4.

Hand-dug pits were undertaken to a depth of 1.2m at all the exploratory borehole locations to ensure no underground services were present.

Trial pits excavated within the clays largely remained stable during and after excavation. However, where sands and gravels were encountered the trial pits were highly unstable and prone to continuous collapse during excavation, particularly where groundwater was encountered. Several trial pits were terminated before the scheduled depth was reached due to instability and lack of progress when excavating through the stratum.

4.3 Chemical Analysis

The following chemical analysis was undertaken on samples taken from boreholes and trial pits at the site.

- 60no. Suite E (Soils), which included the following determinands: Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium (total), Chromium VI, Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc, pH, Sulphide, Water soluble sulphate (as SO₄), Sulphur, Total petroleum hydrocarbons Screen, Speciated polyaromatic hydrocarbons (USEPA 17), Phenol, Cyanide (total), Cyanide (free), Asbestos Screen & identification.
- 7no. Suite F (Groundwater), which included the following determinands: Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium (total), Chromium VI, Copper, Lead,

Magnesium, Mercury, Nickel, Potassium, Selenium, Sodium, Vanadium, Zinc, pH, Sulphide, Sulphate (as SO₄), Sulphur, Total petroleum hydrocarbons Screen, Speciated Polyaromatic hydrocarbons (USEPA 17), Phenol, Cyanide (total), Cyanide (free), Ammoniacal Nitrogen, Hardness, Electrical conductivity, Chloride, Nitrate.

- 5no. Organochlorine and Organophosphorus Pesticides, which included the following determinands: Azinphos, methyl Coumaphos, Demeton (O+S), Disulfoton, Fensulfothion, Fenthion, Phorate, Prothiophos, Sulprofos, Trichloronate, alpha-HCH, gamma-HCH, beta-HCH, Heptachlor, delta-HCH, Aldrin, Heptachlor epoxide, gamma-Chlordane, alpha-Chlordane, Endosulfan I 4,4'-DDE, Dieldrin, Endrin 4,4'-DDD Endosulfan II 4,4'-DDT Endrin, aldehyde, Endosulfan sulphate, Methoxychlor, Endrin, ketone, Hexachlorobutadiene

4.4 Groundwater and Gas Monitoring

To monitor soil gas emissions and groundwater levels, standpipes (50mm diameter) were installed within all 7no boreholes (BH401 to BH407) to depths of between 2.00m bgl and 5.00m bgl.

Details of the standpipe installations are presented on the borehole records within the Contractor's factual report (Appendix B).

At the time of report preparation the installations had been monitored for ground-gas by Brownfield Solutions Limited on four occasions between 18th April 2013 and 10th June 2013 using a GA2000 gas meter with integral electronic flow analyser.

Groundwater levels were measured and groundwater samples taken in accordance with industry practice.

The borehole installation monitoring results are included in the Contractor's factual report (Appendix B).

5. RESULTS OF GROUND INVESTIGATION WORKS

5.1 Summary of Encountered Strata

The records of the boreholes and trial pits present profile of strata across the site, and this shows significant variations in thickness of the strata. This comprises of Topsoil, Made Ground, Clay, Sand and Gravel. Table 1 shows the summary of the strata encountered across the site.

Table 1 Encountered Strata

Strata	Top of Strata (m bgl)		Depth to Base ¹ (m bgl)		Thickness (m)	
	Min	Max	Min	Max	Min	Max
Topsoil	0.00	0.00	0.20	0.65	0.20	0.65
Made Ground	0.00	0.00	0.10	1.00	0.10	1.00
Head deposits	0.00	2.90	0.20	5.00	0.20	4.60
Gault Clay	0.20	3.30	1.00	5.00	0.50	4.60

¹ Base not proven in any locations

5.2 Topsoil

Topsoil was encountered at 32no. locations across the site at depths ranging from 0.0m to 0.65m bgl. It comprised mainly of dark brown clayey topsoil locally sandy and gravelly.

5.1 Made Ground

Made Ground was identified by the GI Contractor at 8no. locations. From a review of the borehole logs, the Made Ground can be divided into three distinct types based on location and description.

In the main part of the Phase 1 development (TP408, TP410, TP411 and TP429) Made Ground consisted of reworked natural deposits, described as brown clayey gravelly clay, locally cobbly or silty.

In one location, TP433, brick fragments were identified in shallow soils and evidence of scrap vehicle materials were noted at 0.7m. This suggests a localised area of burial here.

Made Ground was identified in four trial pits (TP434 – TP437) to the east of main Phase 1 development area, in the proposed landscaping corridor. Material here included brick, concrete and rare coal fragments. This material is considered to be associated with the registered former landfill summarised in Section 2.5.

5.2 Superficial Deposits

The GI identified superficial (predominantly Head) deposits. These are associated with reworking of the underlying strata by natural geomorphological processes and this was confirmed by the existing borehole information and also by the additional ground investigation works reported here.

The depth of the superficial deposits ranged from 0m to 5m. The Head Deposits mainly comprise sand and gravel, locally with lenses of silt, clay or peat or organic material.

The Head Deposits were often encountered above the Gault Clay. They were however absent in few locations where the Gault Clay directly underlies topsoil.

5.3 Gault Clay (Bedrock)

The Gault Clay Bedrock was encountered in most of the exploratory holes across the site at depths ranging from 0.20m to 5.0m. It typically comprised stiff to very stiff (becoming hard) grey/brown occasionally mottled orange brown desiccated clay with occasional calcareous nodules and locally occasional shell fragments. It was not fully penetrated in any of the exploratory holes, as the maximum depth reached was 5.0m. However, it has been proven to a maximum depth of at least 25.00m in the previous ground investigation undertaken by Scott Wilson in 2010.

5.3.1 Groundwater Strikes and Monitoring

Groundwater was struck in 18no. exploratory locations. Groundwater was encountered in BH402 at 1.7m bgl and BH405 at 1.8m bgl, with the remaining strikes in the trial pits. Where encountered, groundwater levels in trial pits ranged between 0.95m and 2.8m bgl. The majority of groundwater strikes occur generally within sand and gravel strata, and within clays on very few occasions.

A complete table of depths for groundwater strikes at each exploratory location is presented within Appendix E.

Groundwater monitoring was carried out on 23rd April 2003. Field parameters were measured during purging and sampling comprising: pH, Dissolved Oxygen, Conductivity, Redox Potential and Temperature.

Groundwater was present in all wells prior to well development, however BH407 at the time of sampling, BH407 had only partially recharged and hence only a grab sample could be collected from this location.

A summary of groundwater monitoring field measurements is presented in Table 2.

Table 2 Summary of Groundwater Monitoring Field Measured Results

Location	pH	Dissolved Oxygen (mg/l)	Conductivity (u/S)	Redox Potential (mV)	Temperature (°C)	Groundwater Levels (m AOD)
BH401	5.97	1.9	818	79	9.9	0.86
BH402	6.02	3.6	849	92	10.2	1.76
BH403	6.11	4.1	994	88	9.4	0.81
BH404	5.99	3.9	879	83	9.9	1.76
BH405	6.13	6.2	841	152	10.5	1.11
BH406	5.73	4.3	819	97	9.7	1.59
BH407	5.62	3.7	2,970	72	10.6	Dry – Grab Sample Only

Groundwater observations indicated slightly acidic groundwater across the site, and aerobic conditions with relatively high dissolved oxygen and redox potential recorded. Groundwater levels showed no appreciable groundwater flow direction indicating that shallow groundwater was likely to be discontinuous and perched to some degree, consistent with the 2010 GI.

5.4 Field Observations of Contamination

A possible localised impact with mineral oil and scrap metal was identified in TP433 at a depth of 0.7m.

No other visual or olfactory evidence of contamination was identified in soils or groundwater.

5.5 Ground Gas

The results of gas monitoring at the site are provided in the Contractor's factual report (Appendix A) and are summarised as in Table 3.

These results have been used to undertake a ground gas risk assessment in Section 8 of this report.

Table 3 Summary of Ground Gas Monitoring Results

Location	Carbon Dioxide (% v/v)	Methane (% v/v)	Oxygen (% v/v)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	Flow (l/hr)
BH401	<0.1 - 0.1	ND	20.2 – 20.8	ND	ND	0.0
BH402	ND	ND	20.2 – 20.8	ND	ND	0.0
BH403	ND	ND	20.4 – 20.7	ND	ND	0.0
BH404	<0.1 - 0.1	ND	20.3 – 20.8	ND	ND	0.0
BH405	ND	ND	19.8 – 20.9	ND	ND	0.0
BH406	<0.1 - 0.1	ND	19.8 – 21.0	ND	ND	0.0
BH407	0.7 - 6.0	ND	15.1 – 19.9	ND	ND	0.0

ND or <0.1 indicates no concentration detected during monitoring

The monitoring visits recorded the maximum concentrations of carbon dioxide and minimum concentration of oxygen in BH407. The concentrations of carbon dioxide and oxygen in other locations are either close to the detection limits (for CO₂) or within the acceptable limits (for O₂).

No methane was detected at any locations during monitoring. The recorded flow rates in all boreholes on each monitoring visit was 0.0 l/h.

6. HUMAN HEALTH RISK ASSESSMENT

6.1 Assessment Approach

The following sections present an evaluation of the risks to human health (e.g. future site users following redevelopment of the site) associated with any potential contamination present within the Head deposits present at the site. This evaluation has been based on the chemical analysis results obtained during the ground investigation undertaken at the site, with regard to the proposed end use.

Prior to presenting an interpretation of the chemical analytical results, it is necessary to present the rationale/regulatory framework to which the data will be compared and subsequently assessed.

The EA / DEFRA have issued the following science reports to provide the technical framework to the new approach:

- Science Report SR2: Human Health Toxicological Assessment of Contaminants in Soil, January 2009.
- Science Report SR3: Updated Technical Background to the CLEA Model, January 2009.

The EA have published the following Soil Guideline Value (SGV) reports and associated TOX reports for eleven substances under the new framework approach:

- | | |
|----------------|--|
| • Benzene | • Arsenic |
| • Toluene | • Nickel |
| • Ethylbenzene | • Cadmium |
| • Xylenes | • Phenol |
| • Mercury | • Dioxins, furans and dioxin-like PCBs |
| • Selenium | |

Land Quality Management (LQM) and The Chartered Institute of Environmental Health (CIEH), and CL:AIRE (Contaminated Land Applications in Real Environments) have published generic assessment criteria values for human health risk assessment for determinands for which the EA has not yet published SGV or TOX reports based on the new framework approach.

URS has derived in-house Generic Assessment Criteria (GAC) using the CLEA v1.06 software (utilising toxicological and chemical parameter information from various sources including the EA, LQM/CIEH and CLAIRE) to provide a conservative Tier 1 screening assessment against which to compare the levels of contaminants recorded.

These GAC constitute Tier 1 quantitative risk assessment criteria are based upon the series of standard default assumptions as to ground conditions, the duration and frequency of exposure of the end-use receptor group as defined in the EA/DEFRA science reports and are based on a sandy loam soil type, with a Soil Organic Matter of 1% and a pH of 7.0. They are also based on available data on contaminants' physico-chemical and toxicological properties and are considered suitable for screening the potential risks at the site

A number of various end-uses have been identified within the proposed development area. These include:

- A foodstore and retail/shops;
- Energy centre;
- Residential– flats, duplexes, maisonettes, terraced housing, detached housing;
- Student housing;
- Health care building, community centre, police office, senior care centre;
- School and nursery;
- Car parking and basement car parking;
- Areas of open landscaping away from buildings.

It is considered based on the proposed end use of the development, that the GAC for a “Residential development with plant intake” is the most appropriate criteria to assess the potential risks to human health.

6.2 Generic Quantitative Risk Assessment (GQRA)

Statistical analysis was carried out on the sample datasets following guidance detailed in the CL:AIRE report Guidance on Comparing Soil Contamination Data with a Critical concentration, 2008. The UCL95 was calculated where appropriate which provides a 95% confidence level for the sample population mean, which can be compared against the GAC (the critical concentration) to determine the likelihood that the soils will present a significant risk to human health.

Laboratory chemical analysis data from the URS ground investigation has been used in the analysis of risk.

Sample numbers for the various laboratory chemical analyses are presented in Section 4.3. All samples have been reported as the same geological unit, with no differentiation between topsoil, Made Ground and natural deposits. The laboratory analytical data for the site from the recent ground investigation is presented within the Structural Soils Factual Report.

No free product hydrocarbons were recorded in exploratory hole logs and therefore the soil saturation limit has not been used in the assessment of risks to human health.

The datasets were analysed in order to determine whether the highest concentrations were part of the sample population or statistical outliers.

The sections below detail the assessment of the laboratory test results against the GAC for residential (with plant intake) end use. A summary of the concentrations of metals, inorganics and organic determinands detected in soils at the site are presented in Appendix C.

6.3 Metals and Inorganics

The result of the Tier 1 screening assessment for the metal and inorganic determinands is presented in Appendix C. The results show that the maximum concentrations of Arsenic detected in sample TP434 (0.4m bgl) was slightly greater than the corresponding GAC.

This exceedance was marginal however and further statistics shows that the Upper Confidence Limit (UCL95) value is lower than the GAC value. No other exceedances for metals and inorganic determinands were recorded.

6.4 Total Petroleum Hydrocarbons

The result of the Tier 1 screening assessment for Total Petroleum Hydrocarbons is presented in Appendix C. Concentrations of petroleum hydrocarbons were recorded below the method detection limit of the analysis in the majority of samples. Where petroleum hydrocarbons were detected, the maximum concentrations were significantly below the GAC for a residential (with plant intake) end use in all samples tested. Therefore, based on the data obtained the risk to human health from petroleum hydrocarbons is considered to be negligible.

6.4.1 Hazard Quotient for TPH Risk Assessment

The TPH results indicate that the detected concentrations in the soil are lower than the generic assessment criteria used, and are therefore unlikely to present a significant risk to human health.

The Environment Agency Report “The UK Approach for Evaluating Human Health Risk from Petroleum Hydrocarbons in Soils” (SR:P5-080/TR3, 2005) states that even where guideline values for the individual TPH fractions are not exceeded potential additive toxicological effects between the fractions may result in a potential risk to human health.

The suggested approach to address this issue is to calculate Hazard Quotients (HQs) for each fraction by dividing the recorded concentration of the fraction by the corresponding guideline value (SGV/GAC). These HQs are then summed to form an overall Hazard Index (HI). Where the HI exceeds 1, further risk assessment or an appraisal of remedial works should be undertaken; where the HI is less than 1 no further action is required.

The calculated Hazard Quotients and Hazard Index are detailed in Table 4. The calculated Hazard Index 0.0366 for this development is significantly lower than 1, which suggests the risks to human health from additive effects of hydrocarbons are negligible.

Table 4 Calculation of Hazard Quotient and Hazard Index

Hydrocarbon Fraction	GAC (mg/kg)	Maximum Detected Concentration (mg/kg)	Hazard Quotient
Ali >C5-C6	3.00E+01	<0.01	0.00033
Ali >C6-C8	7.30E+01	<0.01	0.00014
Ali >C8-C10	1.90E+01	<0.01	0.00053
Ali >C10-C12	9.30E+01	<0.01	0.00011
Ali >C12-C16	7.40E+02	<0.01	0.00001
Ali >C16-C21	4.50E+04	1.6	0.00004
Ali >C21-C35	4.50E+04	16	0.00036
Ali >C35-C44	4.50E+04	15	0.00033
Aro >C5-C7	6.50E+01	<0.01	0.00015
Aro >C7-C8	1.20E+02	<0.01	0.00008
Aro >C8-C10	2.70E+01	<0.01	0.00037
Aro >C10-C12	6.90E+01	<0.01	0.00014

Hydrocarbon Fraction	GAC (mg/kg)	Maximum Detected Concentration (mg/kg)	Hazard Quotient
Aro >C12-C16	1.40E+02	<0.01	0.00007
Aro >C16-C21	2.50E+02	5.4	0.02160
Aro >C21-C35	8.90E+02	11	0.01236
Aro >C35-C44	8.90E+02	<0.01	0.00001
Hazard Index			0.0366

6.5 Polycyclic Aromatic Hydrocarbons (PAH)

The result of the Tier 1 screening assessment for the PAH determinands is presented in Appendix C. The results show that the maximum concentration of PAHs were below the corresponding SGV/GAC in the majority of the samples analysed.

TP402 (0.7m bgl) and BH407 (3m bgl) recorded slightly elevated concentrations for Benzo(a)pyrene of 0.87mg/kg and 1.3mg/kg in comparison to the GAC of 0.83mg/kg.

The magnitude of exceedances are low however and when factoring in the number of samples collected across the site and field observations, these exceedances are not considered to be significant.

6.6 Asbestos

60 no. samples were sent for laboratory screening for the presence of Asbestos. No Asbestos was recorded in the test results.

7. CONTROLLED WATERS RISK ASSESSMENT

7.1 Basis of Assessment

Two distinct major controlled water receptors were identified at the site. These are the surface water courses and the underlying aquifer. The significant water courses are the River Cam approximately 2.5 km to the south east of the site and the Washpit Brook which flows to the west of the development site. The underlying aquifer has been classified by the EA as follows:

- Secondary Undifferentiated Aquifer beneath the Phase 1 area, associated with superficial deposits
- Principal Aquifer immediately to the east of the Phase 1 area associated with the presence of Chalk Marl

There are no active groundwater abstractions within 500m of the site. The maximum concentration for each determinand was initially compared against the Environmental Quality Standards (EQS) for freshwaters. Where no criteria were detailed for specific determinands in the various sources listed above then the recorded concentrations were compared to; Water Framework Directive – Groundwater Target Values and US Environmental Protection Agency (USEPA) Regional Screening Levels (RSL).

The results have been interpreted in order to assess potential risks to controlled waters. . It should be noted that for a risk to be present then a viable pollutant linkage should be identified between the source and receptor. For example, an on-site source of free-product hydrocarbons (e.g. diesel) migrates via a horizon of sand and gravel (pathway) to a surface water stream (receptor).

The concentrations of metals, inorganics and organic determinands detected in groundwater at the site are presented in Appendix C.

7.2 Groundwater Analysis Results

7.2.1 *Metals, Metalloids and other Inorganics*

The result of the Tier 1 screening assessment for metal, metalloid and inorganic determinands is presented in Appendix C.

The result of the metal analysis shows the concentrations of selenium detected in BH401 and BH404 were greater than the associated screening criterion. The concentrations of calcium in BH404 and BH407 were found to be elevated in comparison to the corresponding screening criterion. Also in locations BH403, BH404, BH405 and BH407, potassium concentrations detected were higher than the Freshwater EQS.

The analysis of other inorganics shows elevated concentration of nitrate in BH402, BH403 and BH407. The elevated nitrate concentration is not unexpected as the area is in the Environment Agency's Nitrate Vulnerability Zone.

In location BH404, the sulphate concentration recorded higher than the associated screening criteria. Since Gault Clay formations are known to contain pyrites, the elevated sulphate concentration may as a result of the underlying bedrock.

These results, while elevated above screening criteria, are not considered to be indicative of contamination at the site, but rather indicative of background conditions in regional groundwater, as evidenced from the history of the wider development area, borehole log descriptions, soil results, and the magnitude of the groundwater exceedances.

7.2.2 *Organics*

The results of the Tier 1 screening assessment for organic determinands are presented in Appendix C. The results show that all organic compounds analysed in the groundwater samples were below the detection limits.

8. GROUND GAS RISK ASSESSMENT

8.1 Summary

8.2 General

The generation or migration of ground gases from natural sources can pose a major hazard to structures, if the gases are able to accumulate within them. In terms of the proposed development, the main risks are that ground gases may accumulate within any enclosed structures or beneath any pavements.

For this study, the borehole gas concentration and flow rate results for carbon dioxide (CO₂) and methane (CH₄) have been compared to guidance values given in CIRIA Report C665 "Assessing Risks Posed by Hazardous Ground Gases to Buildings", 2007.

8.3 Ground Gas Monitoring Results

Gas measurements monitored for carbon dioxide (CO₂), methane (CH₄), oxygen (O₂), carbon monoxide (CO), hydrogen sulphide (H₂S) and flow rate.

Four monitoring rounds were undertaken on 18th April 2013, 9th May 2013, 29th May 2013 and 10th June 2013. All seven boreholes were monitored for each monitoring round.

Based on the monitoring data from all four rounds (Appendix D) an assessment of risks has been undertaken. The range of gas concentrations and flow rate were summarised in Section 5.

Only carbon dioxide was reported at an appreciable concentration in one location, BH407. This borehole is located in the vicinity of the registered former landfill.

8.4 Classification of Gas Regime

Although carbon dioxide was measured in BH407, no flow rate was detected. Consequently, the Gas Screening Value (GSV), calculated as the concentration multiplied by the flow rate was 0:

$$\text{GSV} = 6.0\% \text{ (in BH407)} \times 0.0 \text{ L/hr} = 0$$

The corresponding Characteristic Situation (CS) for the site is based on comparison of the generated GSVs to the levels given in Table 5, taken from CIRIA report C665. These Characteristic Situations relate to all proposed development end-uses with the exception of traditional low rise residential housing with gardens.

Table 5 Classification Scheme for Gas Risk (Modified Wilson and Card Classification)

Characteristic Situation	Risk Classification	Gas Screening Value (CH ₄ /CO ₂) l/hr	Additional Factors	Typical Source of Generation
1	Very Low	<0.07	Typically CH ₄ <1% and CO ₂ <5%. Otherwise consider increase to CS2.	Natural Soil with low organic content. "Typical" Made Ground.
2	Low	<0.7	Borehole air flow rate not to exceed 70l/hr. Otherwise consider increase to CS3.	Natural Soil with high peat / organic content. "Typical" Made Ground.
3	Moderate	<3.5		Old landfill; Inert waste; Mineworking (flooded)

Characteristic Situation	Risk Classification	Gas Screening Value (CH ₄ /CO ₂) l/hr	Additional Factors	Typical Source of Generation
4	Moderate to High	<15	Quantitative Risk Assessment required to evaluate scope of protective measures.	Mineworking susceptible to flooding. Completed Landfill (WMP 26b criteria)
5	High	<70		Mineworking unflooded inactive with shallow workings near the surface.
6	Very High	>70		Recent Landfill site

A comparison of the GSVs for each borehole against the guidance in Table 21 indicates that the calculated results for all boreholes are consistent with Characteristic Situation 1 (CS1 <0.07).

The classification of the site as CS1 indicates that no/very low risk from ground gas is present at the site, based on the rounds of gas monitoring undertaken at the site. Given that the site has been classified as a Characteristic Situation 1, no gas protection measures are required at the site.

8.5 Additional Gas Risk Assessment

8.5.1 Oxygen

Oxygen levels ranged from 15.1% v/v to 21.0% v/v across the site. The concentration range within each standpipe is summarised in Appendix D.

Table 6 summarises the physiological effects of an oxygen deficient atmosphere.

The monitoring results show that the lowest oxygen concentration recorded at BH407 during the second monitoring round was lower than the normal range of oxygen concentration in the atmosphere. The lowest oxygen concentration recorded was 15.1% v/v and according to CIRIA Report 149, the physiological effects that may occur as a result include abnormal fatigue upon exertion and initial signs of anoxia leading to emotional upsets.

Table 6 Effect of Reduced Oxygen Concentration (CIRIA Report 149)

Oxygen % (v/v)	Physiological Effects
19-21	Normal range of concentration in the atmosphere.
17	Faster, deeper breathing, slight impairment of judgement.
10-16	Initial signs of anoxia leading to emotional upsets, abnormal fatigue upon exertion.
6-10	Nausea, vomiting, unconsciousness; collapse may occur.
<6	Convulsions, gasping respiration, death.

8.5.2 Carbon Dioxide

For carbon dioxide there is no risk of flammability. However, there is a risk of asphyxiation and as such there are toxicity limits of 0.5% (v/v) for an 8 hour long term Occupational Exposure Limit (OEL) and 1.5% (v/v) for a 10 minute Occupational Exposure Limit (OEL).

Concentrations of carbon dioxide were reported in the range of <0.1% to 6.0% v/v during monitoring across the site. The concentrations of carbon dioxide recorded at BH407 (6.0% v/v) were sufficient to exceed both the 8 hour long term OEL and 10 minute OEL. However the proposed development in this part of the site comprises cycle ways and associated land corridors only, with no buildings proposed. Therefore the likelihood of entry into excavations is very low.

8.5.3 *Summary*

Calculation of GSVs for the site indicated that the ground gas generated in the areas monitored was consistent with Characteristic Situation 1 for both methane and carbon dioxide. This indicates no risk from ground gas is present at the site and that no gas protection measures would be required for the structures within the development.

A ground gas assessment of potential acute (short term) risks completed at the site indicated that the risk from explosion or asphyxiation by methane was negligible.

Oxygen levels ranged from 15.1% to 21.0% v/v across the site. Slightly depleted oxygen was encountered in one of the seven boreholes across the site, BH407, however no buildings are proposed in this part of the site.

Concentrations of carbon dioxide were reported in the range of <0.1% to 6.0% v/v during the ground gas monitoring. All elevating readings were recorded in BH407, and 6.0% exceeds both the 8 hour long term OEL and 10 minute OEL. No buildings are proposed in the part of the site however and consequently this is not considered to pose a risk to development.

Hydrogen sulphide was not recorded above the limit of detection (1ppm) during the monitoring undertaken. Therefore, the risk of asphyxiation due to hydrogen sulphide is negligible.

Based on these findings, it was concluded that the risk posed by ground gas is very low.

9. UPDATED CONCEPTUAL SITE MODEL

9.1 General

Current legislation relating to contaminated land in the UK is contained within Part 2A of the Environmental Protection Act 1990, which was inserted by section 57 of the Environment Act 1995, and by section 86 of the Water Act 2003.

The “suitable for use” approach is adopted for the assessment of contaminated land where remedial measures are only undertaken where unacceptable risks to human health or the environment are realised taking into account the use (or proposed use) of the land in question and the environmental setting.

Current best practice recommends that the determination of health hazards due to contaminated land is based on the principle of risk assessment, as outlined in Part 2A of the Environmental Protection Act 1990.

The risk assessment methodology used to determine the nature and level of risk from contaminated land on the site is based on the risk management framework provided in Contaminated Land Report 11 (CLR 11) – “Model Procedures for the Management of Land Contamination”, by the Environment Agency.

The risk assessment process for the geo-environmental contaminants is based on a source-pathway-receptor analysis. These terms can be defined as follows:

- Source: Hazardous substance that has the potential to cause adverse impacts;
- Pathway: Route whereby a hazardous substance may come into contact with the receptor: examples include ingestion of contaminated soil and leaching of contaminants from soil into watercourses;
- Receptor: Target that may be affected by contamination: examples include human occupants/users of site, water resources (surface waters or groundwater), or structures.

For a risk to be present, there must be a viable pollutant linkage; i.e. a mechanism whereby a source impacts on a sensitive receptor via a pathway.

The following sections detail the updated conceptual site model which has been developed for the site taking into account the results of the ground investigation works to assess the potential risks during construction and upon completion of the proposed new development.

The potential sources of contamination, potential receptors and potential pollutant pathways are identified (and are presented in Tables 7 to 9) for the site. The associated pollutant linkages between these sources, pathways and receptors are presented in Table 10.

9.2 Sources of Potential Contamination

The following table lists considered sources of potential contamination at the site of the proposed development.

Table 7 Description of Potential Sources

Potential Source	Description
Made Ground	Found to be present in the vicinity of the former registered landfill. Evidence of waste materials having been previously deposited here No elevated concentrations of determinants were identified in soil samples; therefore the likelihood of this being a significant source of contaminant is very low. However, due to the potentially heterogeneity of waste materials, the potential may exist for contaminants to be present above human-health criteria in this part of the site.
Natural Strata	The natural strata consist of Head deposit overlying Gault Clay. The ground investigation results showed minor exceedances of GACs for arsenic and benzo(a)pyrene on occasion.
Soil Leachate	Potential contaminants may be leached from made ground sources at the site. No leachate test was conducted
Groundwater	Groundwater was found to contain Chromium, Nitrate, Calcium, Potassium, Sulphate and Selenium at concentrations above the screening criteria.
Ground Gas	No elevated concentration of methane was recorded. The Carbon dioxide concentrations (6.0% v/v maximum) recorded were above the 8 hour OEL and 10 minute OEL. Oxygen level (15.1% v/v minimum) was found to be slightly lower than the normal range of concentration in the atmosphere.
Offsite Sources	Leaks, spills and emissions from surrounding sources

9.3 Potential Receptors

Table 8 below indicates the potential receptors that may be affected by sources of contamination.

Table 8 Description of Potential Receptors

Potential Receptor	Description
Flora and Fauna	The proposed development will include landscaped areas and vegetation.
Development Infrastructure	Concrete is a receptor of chemical aggressivity in contaminated soils with a low pH and high sulphate concentrations. Plastic piped services can be adversely affected by the presence of hydrocarbons, where the integrity of the pipes can be compromised. This can lead to penetration of the pipes by mobile contaminants.
Future Site Users	Future users Includes staff, workers, students and visitors of University of Cambridge. Pupils and staff of the Nursery.
Construction workers	Exposures experienced by construction workers are much less than for future site users due to the limited period of exposure. Construction workers are therefore not considered as sensitive receptors.
Off-site receptors	This includes residents and visitors of near-by properties and possibly workers at the offices in the vicinity of the site.
Controlled Waters	Washpit Brook to the south of the site and the underlying Principal aquifer.

9.4 Potential Pathways

Table 9 provides a summary of the potential pathways by which the identified sources may come into contact with identified receptors that are considered most appropriate to the site in its developed condition.

Table 9 Description of Potential Pathways

Potential Pathway		Description
Soil Pathway Including the following sources: <ul style="list-style-type: none"> Made Ground Soil Derived Leachate 	Dermal Contact	Dermal contact with contaminated soils, soil derived dust, soil leachate and perched groundwater.
	Direct Contact	Direct contact of building materials with contaminated soils, soil leachate and perched groundwater.
	Ingestion	Direct or indirect ingestion of soil and soil derived dust.
	Inhalation	Inhalation of soil derived dust, organic vapours or ground generated gas.
Groundwater Pathways Including the following sources: <ul style="list-style-type: none"> Soil Leachate Perched Groundwater 	Rainfall Infiltration & Vertical / Lateral migration via permeable strata and service conduits	Rainfall infiltration can generate and mobilise soil-derived leachate impacting on surface waters and groundwater. Perched groundwater within the site will flow towards Washpit Brook.
	Lateral Migration through Aquifer	As well as being a receptor, aquifers allow transportation of contaminants through the permeable strata.
Gas Pathways Including the following sources: <ul style="list-style-type: none"> Ground gas 	Vertical / Lateral Migration via permeable strata.	Permeable strata and service trenches may allow transportation of ground gases.

9.5

Pollutant Linkages

The potential pollutant linkages and associated risks identified for the site in its proposed use as a residential development with associated infrastructure and landscaping are summarised in Table 10.

Table 10 Potential Pollutant linkages

Source		Pathway		Receptor
Diffuse metal, inorganic and organic contamination within the Made Ground	➡	Ingestion of contaminated soil Inhalation/ingestion of soil derived dust Inhalation of organic vapours Direct contact with soils/dusts	➡	Future Site Users Construction Workers Development Infrastructure Off-Site Receptors
Generated leachate from Made Ground	➡	Leaching into groundwater and migration to surface watercourses Plant uptake	➡	Surface Watercourses Perched Groundwater Offsite Flora and Fauna
Contaminants in groundwater	➡	Migration and diffusion	➡	Washpit Brook Deeper Groundwater (in Principal Aquifer)
Ground Gases	➡	Migration and diffusion via permeable strata	➡	Future Site Users Construction Workers Development Infrastructure

10. ENVIRONMENTAL RISK ASSESSMENT

10.1 General

From information obtained for the desk study and ground investigation, a conceptual site model was developed for the site, as detailed in Section 9. Based on the subsequent risk assessment, the various components of the model are discussed in the following sections and take into account the site in its current condition and the outline development proposal. An assessment of the various pollutant linkages is presented in Table 14.

10.2 Risk Assessment Principles

Current best practice recommends that the determination of hazards due to contaminated land is based on the principle of risk assessment, as outlined in Part 2a of the Environmental Protection Act 1990.

For a risk to be present, there must be a viable pollutant linkage; i.e. a mechanism whereby a source impacts on a sensitive receptor via a pathway.

Assessments of risks associated with each of these pollutant linkages, following review of chemical analysis and monitoring data are discussed in the following sections.

Using criteria broadly based on those presented in Section 6.3 of the CIRIA Report “Contaminated Land Risk Assessment: A Guide to Good Practice” (CIRIA Report C552) the magnitude of the risk associated with potential contamination at the site has been assessed.

To do this an estimate is made of:

- The potential severity of the risk; and
- The likelihood of the risk occurring.

The severity of the risk is classified according to the criteria in Table 11 below.

Table 11 Severity of risk

Severity	Description
Severe	Acute risks to human health likely to result in “significant harm” (e.g. very high concentrations of contaminants / ground gases) Catastrophic damage to buildings/property (e.g. by explosion, sites with high gassing potential, extensive VOC contamination) Major pollution of controlled waters (e.g. surface watercourses or Principal aquifers/source protection zones) Short term risk to a particular ecosystem
Medium	Chronic (long-term) risk to human health likely to result in “significant harm” (e.g. elevated concentration of contaminants/ground gases) Pollution of sensitive controlled waters (e.g. surface watercourses or Principal / Secondary aquifers) Significant effects on sensitive ecosystems or species
Mild	Pollution of non-sensitive waters (e.g. smaller surface watercourses or Unproductive Strata) Significant damage to crops, buildings, structures or services (e.g. by explosion, sites with medium gassing potential, elevated concentrations of contaminants)
Minor	Non-permanent human health effects (requirement for protective equipment during site works to mitigate health effects) Damage to non-sensitive ecosystems or species Minor (easily repairable) damage to buildings, structures or services (e.g. by explosion, sites with low gassing potential)

The probability of the risk occurring is classified according to criteria given in Table 12 below.

Table 12 Probability of Risk Occurring

Probability	Description
High likelihood	Pollutant linkage may be present that appears very likely in the short-term and risk is almost certain to occur in the long term, or there is evidence of harm to the receptor
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term
Low likelihood	Pollutant linkage may be present and there is a possibility of the risk occurring, although there is no certainty that it will do so.
Unlikely	Pollutant linkage may be present but the circumstances under which harm would occur even in the long-term are improbable.

An overall evaluation of the level of risk is gained from a comparison of the severity and probability, as shown in Table 13 below.

Table 13 Comparison of Severity and Probability

		Severity			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High	High	Moderate	Moderate/Low
	Likely	High	Moderate	Moderate/Low	Low
	Low Likelihood	Moderate	Moderate/Low	Low	Very Low
	Unlikely	Moderate/Low	Low	Very Low	Very Low

10.3 Evaluation of Risk

10.3.1 General Risk Assessment

An evaluation of the potential risks associated with the identified sources at the site to the various receptors is discussed and presented in the following section. The level of risk is determined based on the current condition of the site (i.e. the effects of mitigation measures are not included) and takes into account the outline development proposals.

The evaluation includes an assessment of the significance of the potential pollutant linkages. Where it is considered that a particular pollutant linkage is not plausible in the context of the site and the proposed development, the overall risk is determined as very low.

Table 14 Risk Evaluation of Potential Pollutant Linkages

Source	Pathway	Receptor	Risk Evaluation		
			Severity	Source	Pathway
Contaminants in Made Ground / Natural Strata	Direct contact/ ingestion / inhalation	Future Site Users	Mild	Low	Low
	Direct contact/ ingestion / inhalation	Construction Workers	Minor	Likely	Low
	Infiltration/ Migration	Controlled Waters	Mild	Low likelihood	Low
	Direct contact	Development Infrastructure	Minor	Likely	Low
	Inhalation of vapours/ dusts	Off-Site Receptors	Minor	Unlikely	Very Low
	Direct contact / uptake	Flora & Fauna	Mild	Low likelihood	Low
Contaminants in Groundwater	Direct contact/ ingestion / inhalation	Future Site Users	Mild	Low likelihood	Low
	Direct contact/ ingestion / inhalation	Construction Workers	Minor	Likely	Low
	Infiltration/ Migration	Controlled Waters	Medium	Low likelihood	Low
	Direct contact	Development Infrastructure	Mild	Low likelihood	Low
	Infiltration/ Off-Site Migration	Off-Site Receptors	Medium	Unlikely	Low
	Direct contact / uptake	Flora & Fauna	Mild	Low likelihood	Low
Ground Gases	Migration & Inhalation / Explosion	Future Site Users	Mild	Low likelihood	Low
	Migration & Inhalation / Explosion	Construction Workers	Mild	Low likelihood	Low
	Migration & Explosion	Development Infrastructure	Minor	Low likelihood	Very Low
	Migration & Inhalation / Explosion	Off-Site Receptors	Minor	Low likelihood	Very Low
	Direct contact/ uptake	Flora & Fauna	Minor	Low likelihood	Very Low

10.4 Evaluation of Risks to Future Site Users

The potential risk to future site users from direct contact with the underlying soils is considered low given the test results and the historical land use. There were no elevated concentrations in the Topsoil and Made Ground samples analysed. Also the presence of any hard standing post development reduces direct interaction between general site users and the soils and groundwater at the site. The main areas of risk to human health are in residential gardens and communal areas of landscaping and planting.

Oxygen appeared to be slightly depleted at one of the monitoring locations and the concentration of carbon dioxide at the same location was above the 8-hour and 10-minute Occupational Exposure Limits (OEL). However, the proposed development in this part of the site does not include the construction of buildings, where ground gases could collect.

It is considered that the risk to maintenance workers accessing underground utilities will also be low as it is assumed they will be undertaking works in accordance with task specific OH&S risk assessments.

10.5 Evaluation of Risks to Construction Workers

The assessment has identified a low risk to construction workers at the site based on the contamination assessment.

Regardless it is recommended that a health and safety risk assessment is carried out by the groundworks contractor in accordance with current health and safety regulations prior to development work commencing. This assessment should cover potential risks to both construction staff and the local population. Based on the findings of this risk assessment, appropriate mitigation measures should be implemented during the course of the earthworks.

Also, the use of appropriate personal protective equipment should be a pre-requisite to site workers being on site. Also, where entry into excavations is unavoidable, the activity should comply with confined space legislation, and be assessed prior to site workers entering.

Waste materials arising from excavations and/or from piling should be disposed of at an appropriately licensed waste management facility. Chemical analysis data contained within this report should be provided to the operators of the waste management facility for them to determine whether they would be able to accept such materials.

10.6 Evaluation of Risks to Off Site Receptors

The potential risk to off-site receptors is considered to be low to very low.

Any risks to local off-site receptors would be associated with off-site migration of contamination, for instance, in the form of wind-blown dust and organic vapours. Exposure via inhalation of dust is considered to be negligible for off-site receptors following development works, and as such there is not considered to be plausible pollutant linkage. The greatest potential for generation will be during the construction phase.

Dust generation should be kept to a minimum in accordance with general best practice, as outlined in, for example, "Environmental Good Practice on Site", 3rd Edition, CIRIA Publication C692. Overall the risks to off-site receptors from on-site soil derived dusts are considered to be Very Low.

The potential risk to off-site receptors by contaminants within groundwater is considered to be a low risk.

10.7 Evaluation of Risks to Controlled Waters

The potential risk to controlled waters is considered to be Low. Monitoring data for the site has indicated elevated concentrations of inorganic determinands were present in groundwater. However these results, while elevated above screening criteria, are not considered to be indicative of contamination at the site, but rather indicative of background conditions in regional groundwater, as evidenced from site history information, borehole log descriptions, soil results, and the magnitude of the groundwater exceedances.

In terms of groundwater, the risk is considered to be Low as the Gault Clay underlying the wider development acts as an impermeable barrier to the underlying Principal Aquifer of the Lower Greensand Formation, and also as there are no SPZs within 5km of the wider development.

Additionally, there are no active groundwater abstractions within 500m of the wider development.

With respect to surface water, as concentrations observed in groundwater are considered to be indicative of regional concentrations, rather than from site derived sources, the risks are considered to be low.

10.8 Evaluation of Risks to Development Infrastructure

The risks to the development infrastructure from soil, leachate and groundwater contaminants have been classed as low to very low.

An assessment of aggressive ground conditions with respect to concrete attack from sulphates in soils and groundwater has been addressed in a separate geotechnical report prepared by URS.

The risks to the development from ground gases are considered to be low to very low based on the underlying Made Ground, Gault Clay and ground gas monitoring data and assessment. Gas protection measures are not necessary for the proposed development.

10.9 Evaluation of Risks to Onsite Flora and Fauna

The proposed development includes areas of landscaping and vegetation. The presence of contaminants in the near surface soils can influence the ability of plants and areas of landscaping to establish. A very low risk has been identified based on measured site data.

11. CONCLUSIONS AND RECOMMENDATIONS

11.1 Conclusions

A range of chemical testing was completed on soils and groundwater as indicated in the Sections above. Soil data was compared against SGVs and URS in-house GACs. It was considered, based on the proposed end use of the development, that the SGV/GAC for a residential (with plant intake) development is the most appropriate criteria to assess the potential risk to human health.

The risk to human health from potential contaminants in soil is considered to be low. The concentrations of Arsenic and Benzo(a)pyrene were found to be slightly elevated in one and two samples each of the 60 soil samples analysed. However the magnitude of SGV/GAC exceedances is considered to be sufficiently low so as not to pose a risk to future site users.

Groundwater analysis results were compared against Environmental Quality Standards (EQS). Following the controlled water risk assessment, the risks to controlled waters are considered to be low. Few inorganic contaminants were recorded at elevated concentrations and no organic contaminant was elevated.

The site has been classed as a Characteristic Situation 1 (CIRIA C665) based on the recorded concentrations of carbon dioxide. Methane, carbon monoxide and hydrogen sulphide were not detected in any of the wells.

The ground gas risk assessment also looked at short term (acute) risks to construction workers. Elevated carbon dioxide concentrations exceeding the 8 hour long term OEL were reported in BH407. Also oxygen levels were slightly below the normal concentration in the atmosphere at this location. However, as these exceedances were restricted to BH407 in an area where no buildings are proposed short-term risks are considered to be low.

In conclusion, this document is considered sufficient to enable discharge of Condition 49 part C of the Phase 1 work package, and that no requirement for remediation has been identified for the Phase 1 development.

11.2 Recommendations

In the event of excavation of the made ground materials within the site, it is recommended that all surplus materials be further characterised via additional chemical analysis prior to re-use on another part of the wider development (subject to Environmental Permitting requirements, appropriate Waste Exemption or The Development Industry Code of Practice: Definition of Waste procedures) or disposal.

It may also be prudent to undertake further trial pitting in the location of TP433, where evidence of oil and metal scrap was identified. Note however that contamination testing taken from here did not record concentration above SGVs/GACs.

Additionally, it should be acknowledged that Made Ground indicative of a registered former landfill was identified in the proposed cycleways and land corridors in the east of the Phase 1 site (TP434-TP437), and while contaminant concentrations reported did not indicate unacceptable risks, regard should be made to minimising the movement of this material where possible.

It is recommended that the risk from dust generation be controlled through the implementation of dust control techniques during the construction phase as outlined in, for example, 'Environmental Good Practice on-site', CIRIA Publication C502.

No gas protection measures for the buildings are required based on the ground gas monitoring results. Two additional rounds of monitoring are to be undertaken at the site, and ground-gas risks will be reviewed once completed, and submitted separately to the Planning Authority as an addendum letter.

A detailed health and safety risk assessment should be carried out, in accordance with current guidance, before works commence on site and appropriate level of personal protective equipment should be worn by all construction workers. And during site works, it is recommended that confined space legislation be adhered to where entry into excavations by site workers is unavoidable.

12. REFERENCES

- BRE (2005) Construction Division, Concrete in Aggressive Ground, Special Digest 1
- BRE (2007) Radon: Guidance on protective measures for new buildings
- British Standards (2007) Code of practice for the characterization and remediation from ground gas in affected developments (BS 8485:2007)
- British Geological Survey website (www.bgs.ac.uk)
- BSL(2013) Ground Investigation Factual Geo-Environmental Report – North West Cambridge Development
- CIRIA (2007) Assessing Risks Posed by Hazardous Ground Gases to Buildings. Ref No C665
- CIRIA (2010) Contaminated Land Risk Assessment: A Guide to Good Practice. 3rd Edition, CIRIA Report C692
- CL:AIRE (2008) Guidance on Comparing Soil Contamination Data with a Critical Concentration
- Environment Agency (2004). Model Procedures for the Management of Land Contamination - Contaminated Land Report 11
- Environment Agency (2005) The UK Approach for Evaluating Human Health Risk from Petroleum Hydrocarbons in Soils (SR:P5-080/TR3)
- Environment Agency Website (www.environment-agency.gov.uk)
- Landmark Group Ltd (2012) Envirocheck Report 16th June 2010, Order No. 31572446_1_1
- Online aerial photography resources (e.g. Google Maps, Bing.com)
- Surface Water (Abstraction for Drinking Water) (Classification) Regulations (1996).
- UKWIR (2011) Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (Ref 10/WM/03/21)
- URS (April 2013). North West Cambridge Phase 1 Development – Phase I Geo-environmental Desk study Report
- Water Supply (Water Quality) Regulations, 2001 (DWQS)
- World Health Organisation Drinking Water Guideline Values
- BS 10175: Code of Practice for the Investigation of Potentially Contaminated Sites, BSI 2011.
- BS 5930: Code of Practice for Site Investigations, British Standards Institution, 1999 (amendment 2): 2010.

APPENDIX A FIGURES

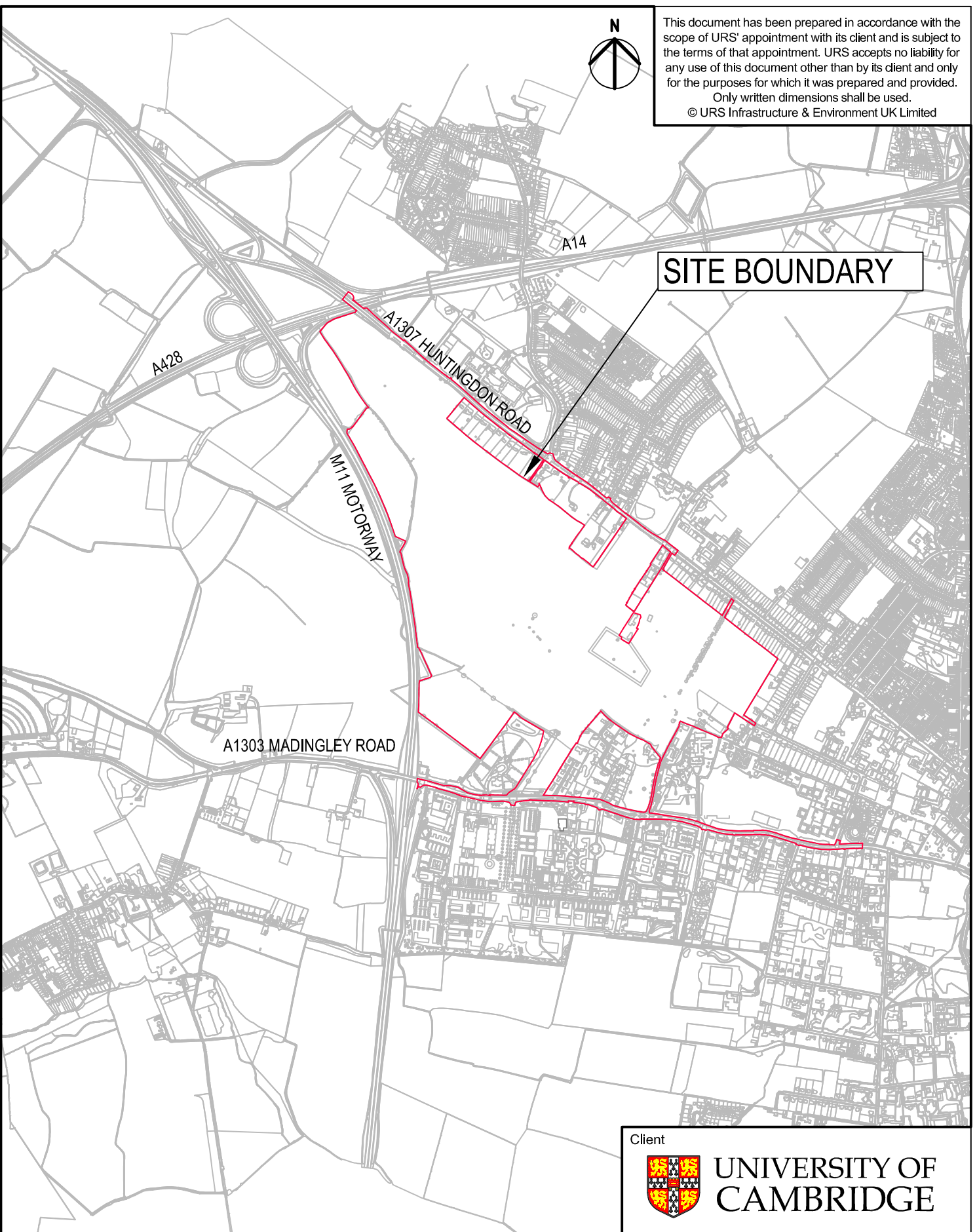


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SITE BOUNDARY



Client



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Drawing Title

**SITE LOCATION
PLAN**

Scale @ A4
1:20000

Drawn SH	Checked SES	Approved SES
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Date
24.09.12

Drawing Number
FIGURE 1

Rev
-

URS

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BH REF	EASTING	NORTHING
BH101	542135.41	260734.77
BH102	542420.73	260411.90
BH103	542643.06	260135.99
BH104	542334.90	259853.17
BH105	542654.37	259607.21
BH106	543040.46	259777.89
BH107	543272.17	259757.58
BH108	543520.42	259843.11
BH109	542658.49	260484.79
BH110	Borehole relocated to BH110A	
BH110A	542098.70	261042.48
BH301	542132.59	260847.61
BH302	542258.09	260755.00
BH303	542425.81	260623.76
BH304	542504.92	260483.05
BH305	542737.09	260347.99
BH306	542776.43	260235.14
BH307	542593.55	260402.62
BH308	542676.51	260009.12
BH309	542582.62	260103.72
BH310	542590.16	260308.41

TABLE 1
BOREHOLE CO-ORDINATES

WS REF	EASTING	NORTHING
WS201	543128.91	259549.83
WS202	543149.37	259764.13
WS203	543126.60	260145.60
WS204	543050.05	260356.46
WS205	542202.57	260911.50
WS206	Not undertaken	
WS207	542023.16	260939.08
WS208	541955.85	260685.73
WS209	542310.60	260700.82
WS210	542245.06	260561.81
WS211	542338.55	260280.59
WS212	542194.01	260136.95
WS213	542397.14	260068.23
WS214	542635.70	260276.91
WS215	542611.70	259876.86
WS216	542360.71	259543.52
WS217	542861.37	260136.42
WS218	542840.05	259871.17
WS219	543248.21	259952.88
WS220	543364.51	259802.89

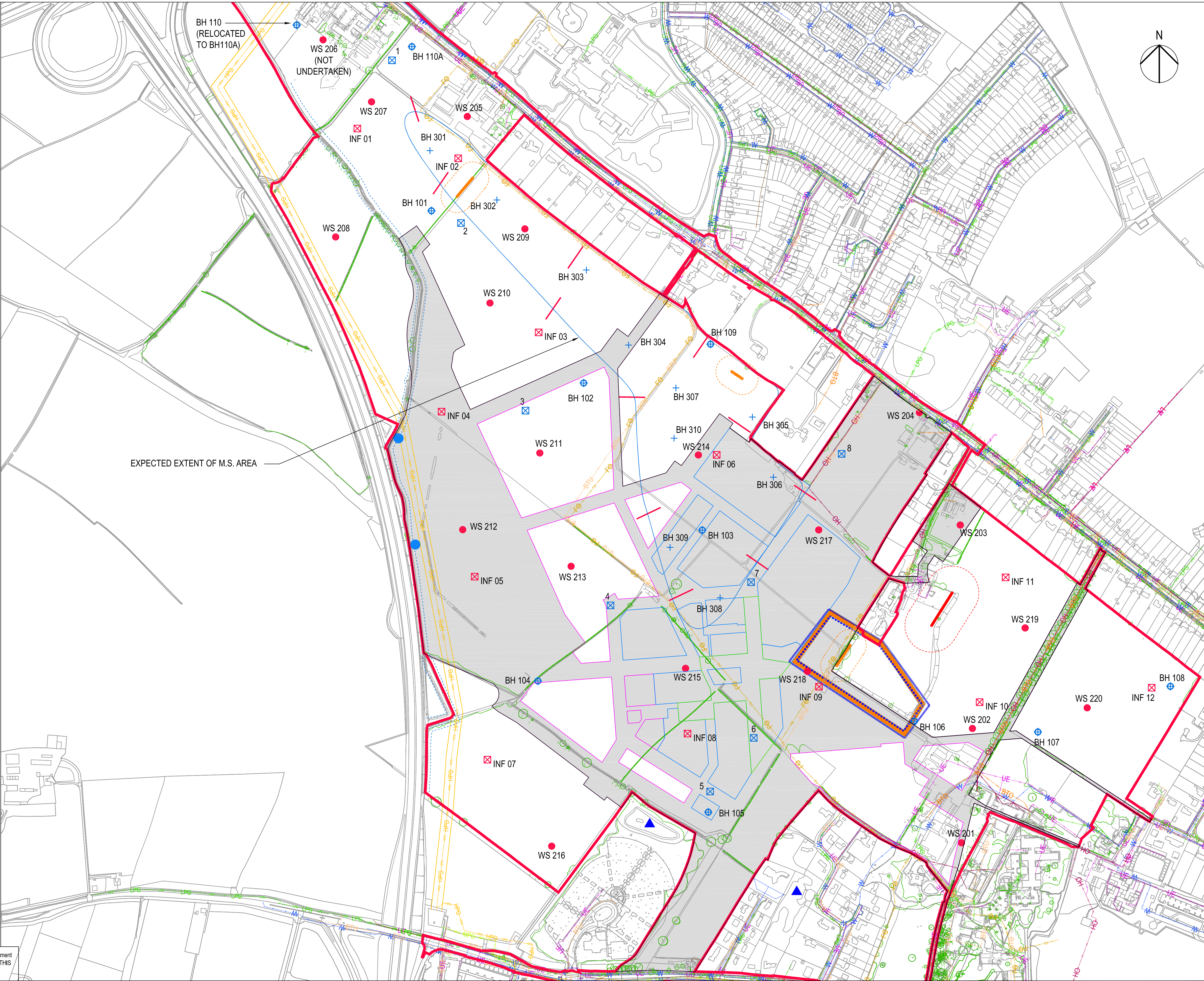
TABLE 2
WINDOW SAMPLE CO-ORDINATES

CBR REF	EASTING	NORTHING
CBR1	542061.50	261016.93
CBR2	542190.72	260711.82
CBR3	542311.71	260360.15
CBR4	542471.09	259994.94
CBR5	542657.83	259646.00
CBR6	542739.52	259746.45
CBR7	542734.54	260038.40
CBR8	542904.22	260279.07

TABLE 3
CBR TEST CO-ORDINATES

CBR REF	EASTING	NORTHING
INF1	541996.50	260889.02
INF2	542185.53	260833.11
INF3	542336.33	260506.81
INF4	542154.41	260358.17
INF5	542216.42	260048.87
INF6	542670.01	260277.13
INF7	542240.33	259705.62
INF8	542615.44	259754.57
INF9	542861.77	259842.55
INF10	543162.93	259813.49
INF11	543211.70	260047.52
INF12	543485.57	259840.66

TABLE 4
INFILTRATION TEST CO-ORDINATES



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- KEY:
- GROUND INVESTIGATION WORKS
- BH 101 - BH 107 25m CABLE PERCUSSION BOREHOLES FROM MAIN G.I. (REFER TO TABLE 1 FOR CO-ORDINATES)
 - BH 108 - BH 110 10m CABLE PERCUSSION BOREHOLES FROM MAIN G.I. (REFER TO TABLE 2 FOR CO-ORDINATES)
 - WS 201 - WS 220 3.5m WINDOW SAMPLE (REFER TO TABLE 3 FOR COORDINATES)

- 1 - 8 CBR TEST LOCATIONS
- TRIAL PIT SCRAPES
- BH 301 - BH 310 6m MSA CABLE PERCUSSION BOREHOLES (REFER TO TABLE 1 FOR CO-ORDINATES)
- INF 1 - INF 12 INFILTRATION TEST TO BRE DIGEST 365 (REFER TO TABLE 4 FOR CO-ORDINATES)

- CONSTRAINTS
- SITE BOUNDARY
 - EXISTING TREES TO BE RETAINED
 - RIPARIAN ZONE TO EXISTING WATERCOURSE
 - 10m EASEMENT TO AREA OF GEOLOGICAL INTEREST
 - SITE OF SPECIAL SCIENTIFIC INTEREST
 - EXISTING BT OVERHEAD
 - EXISTING HIGH PRESSURE GAS MAIN
 - EXISTING MEDIUM PRESSURE GAS MAIN
 - EXISTING GAS RESTRICTION ZONE
 - EXISTING ELECTRICITY OVERHEAD
 - EXISTING ELECTRICITY 11kV / 33kV
 - EXISTING FIBRE OPTIC CABLE
 - EXISTING WATER DISTRIBUTION MAIN
 - EXISTING SURFACE DRAIN
 - EXISTING FOUL WATER DRAIN

- MAIN BADGER SETT & 50m PROTECTION ZONE
- SUBSIDIARY BADGER SETT & 30m PROTECTION ZONE
- WATERVOLE HABITAT
- GREAT CRESTED NEWT HABITAT
- PHASE 1

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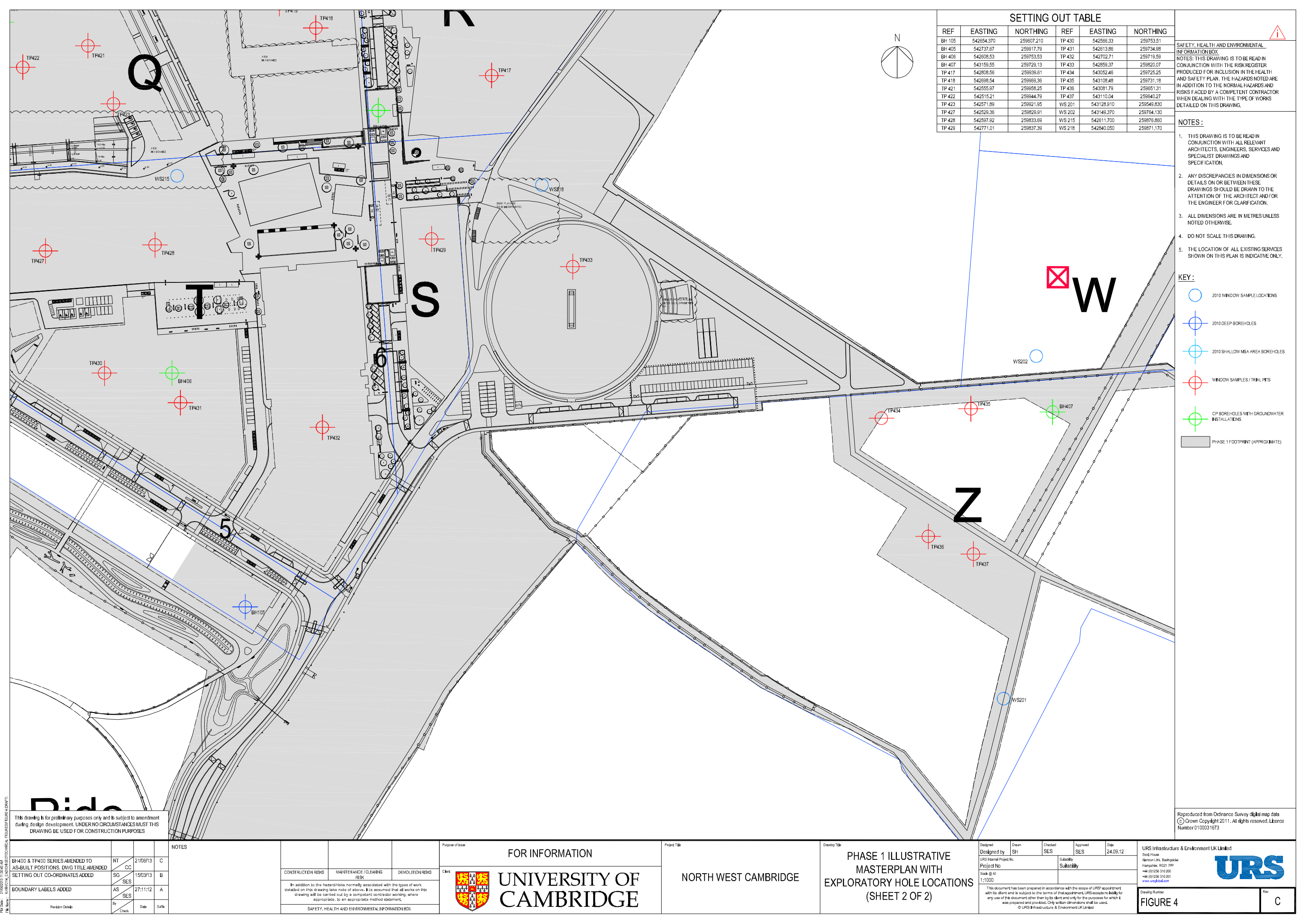
NORTH WEST CAMBRIDGE

Drawing Title

EXPLORATORY HOLE
LOCATION PLAN

Designed by	Drawn	Checked	Approved	Date
Designed by SH	SH	SES	SES	24.09.12
URS Internal Project No.			Sustainability	
Project No			Sustainability	
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1:5000				
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FIGURE 2		
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		0



SETTING OUT TABLE					
REF	EASTING	NORTHING	REF	EASTING	NORTHING
BH 105	542654.370	259607.210	TP 430	542596.33	259753.51
BH 405	542737.67	259917.79	TP 431	542613.86	259734.98
BH 406	542608.53	259753.53	TP 432	542702.71	259719.59
BH 407	543159.55	259729.13	TP 433	542859.37	259820.07
TP 417	542808.56	259939.61	TP 434	543052.46	259725.25
TP 418	542898.54	259989.36	TP 435	543108.48	259731.18
TP 421	542555.97	259958.25	TP 436	543081.79	259651.31
TP 422	542515.21	259944.79	TP 437	543110.04	259640.27
TP 423	542671.89	259921.95	WS 201	543128.910	259549.830
TP 427	542529.36	259829.91	WS 202	543149.370	259764.130
TP 428	542597.82	259833.69	WS 215	542611.700	259876.860
TP 429	542771.01	259837.39	WS 218	542840.050	259871.170

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- KEY:**
- 2010 WINDOW SAMPLE LOCATIONS
 - 2010 DEEP BOREHOLES
 - 2010 SHALLOW MSA AREA BOREHOLES
 - WINDOW SAMPLES / TRAIL PITS
 - CP BOREHOLES WITH GROUNDWATER INSTALLATIONS
 - PHASE 1 FOOTPRINT (APPROXIMATE)

Dido

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BH400 & TP400 SERIES AMENDED TO AS-BUILT POSITIONS. DWG TITLE AMENDED	NT	21/06/13	C
SETTING OUT CO-ORDINATES ADDED	CC		
	SG	15/03/13	B
	SES		
BOUNDARY LABELS ADDED	AS	27/11/12	A
	SES		
Revision Details	By	Date	Suffix
	Check		

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Project Title

NORTH WEST CAMBRIDGE

Drawing Title

PHASE 1 ILLUSTRATIVE MASTERPLAN WITH EXPLORATORY HOLE LOCATIONS (SHEET 2 OF 2)

Designed	Drawn	Checked	Approved	Date
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Project No		Subsidiary		
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FIGURE 4

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C

APPENDIX B CONTRACTORS FACTUAL REPORT (AJS/C2157/3764) – BROWNFIELD SOLUTIONS LIMITED (JUNE 2013)

UNIVERSITY OF CAMBRIDGE

**North West Cambridge
Development**

**Factual Geo-Environmental
Report**

June 2013

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Northwich
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CW9 5JL
Tel: 01606 334844
Fax: 01606 334843
www.brownfield-solutions.com**

AJS/C2157/3764

PROJECT QUALITY CONTROL DATA SHEET

Site Name:	North West Cambridge Development
Report Title:	Factual Geo-Environmental Report
Report Number:	AJS/C2157/3764

Client: University of Cambridge	Engineer: URS
The Old Schools Trinity Lane Cambridge CB2 1TS	URS Infrastructure & Environment UK Limited 6-8 Greencoat Place London SW1P 1PL
Contact: Mr Gavin Heaphy	Contact: Mr Carlo Castello

Revision	Date	Status
-	03 June 2013	Draft for Comment

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3.4	LABORATORY TESTING.....	4
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4.1	GROUND CONDITIONS	6
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4.3	OBSERVATIONS	6
5.0	REFERENCES	7

DRAWINGS

Drawing Number	Rev	Title
C2191 - C2157/01	-	Site Location Plan
C2191 - C2157/02	-	Surveyed Exploratory Hole Location Plan

APPENDICES

APPENDIX A	Trial Pit Exploratory Hole Logs
APPENDIX B	Cable Percussive Borehole Exploratory Hole Logs
APPENDIX C	Chemical Laboratory Testing Certificates
APPENDIX D	Gas Monitoring Results
APPENDIX E	In Situ Groundwater Testing Results
APPENDIX F	Limitations

**FACTUAL GEO-ENVIRONMENTAL REPORT
FOR
THE NORTH WEST CAMBRIDGE DEVELOPMENT**

1.0 INTRODUCTION

- 1.1 This report describes a factual geo-environmental investigation carried out for The University of Cambridge under the instruction of URS Infrastructure & Environment UK (Engineer) at the North West Cambridge Development in Cambridge.
- 1.2 The objectives of the investigation as defined by the Engineer were to:
- Assess the Geo-environmental properties at the site
- 1.3 The investigation utilised trial pitting and cable percussive boreholes as well as carrying out suitable in-situ and laboratory chemical testing.

2.0 THE SITE

2.1 Location & Access

- 2.1.1 The site is situated approximately 3km north west of Cambridge City Centre.
- 2.1.2 The site is centred on National Grid Reference TL 426 603 as shown on the Site Location Plan C2157/01.
- 2.1.3 Access to the site is gained at several points off Huntingdon Road, which is to the north east of the site.

2.2 Site Description

- 2.2.1 The site is approximately 141 hectares in area. It is a triangular area on the edge of Cambridge, bounded by Huntingdon Road (A1307) to the north east, Madingley Road (A1303) to the south and the M11 to the west.
- 2.2.2 The site comprises predominantly gently sloping farmland, the site slopes gently down from Huntingdon Road in the north east towards a water course close to the M11 on the western side of the water course the fields are generally flat.
- 2.2.3 There are numerous buildings on the site, including 3 farmsteads and university buildings.
- 2.2.4 At the time of the works an archaeological investigation was taking place and a substantial part of the site had topsoil and subsoil removed from it and stockpiled in large mounds around the site.
- 2.2.5 The layout of the site is shown on the Exploratory Hole Location Plan C2191 - C2157/02.

3.0 METHOD OF INVESTIGATION

3.1 Objectives

3.1.1 The aim of the fieldwork was to:

- Investigate ground conditions on the site;
- Obtain samples for contamination screening;
- Install standpipes to allow future monitoring.

3.2 Site Works

3.2.1 The site works were carried out between 10th and 18th April 2013.

3.2.2 Seven cable percussive boreholes (BH401 to BH407) were drilled to a depth of 5.0m bgl between 10th and 12th April 2013 using a Dando 2000 drilling rig.

3.2.3 A total of thirty eight trial pits (TP401 to TP438) were excavated using wheeled and tracked excavators to depths between 1.5m bgl and 3.2m bgl. Several trial pits were terminated short of the scheduled depth due to continuous collapse, instability of the strata and upon instruction of the supervising engineer.

3.2.4 The exploratory holes were positioned using coordinates provided on URS drawing NW Cambridge "Phase I Illustrative Master plan with Proposed Exploratory Hole Locations Fig. 3 Revision B". On completion of the site works the locations and elevations were surveyed.

3.2.5 The holes were logged by experienced geo-environmental engineers in general accordance with BS 5930 'Code of Practice for Site Investigations' 1999 and BS EN 1997-2:2007 Eurocode 7. "Geotechnical Design, Ground Investigation and Testing".

3.2.6 The locations of the exploratory holes are indicated on the Exploratory Hole Location Plan C2191 - C2157/02.

3.2.7 The exploratory hole logs are presented in Appendices A and B.

3.3 Sampling

3.3.1 During the drilling of the exploratory holes, representative samples were taken at regular intervals in general accordance with the URS GI Specification "North West Cambridge Phase I Development Area – Main Investigation Specification & Contract Documents 22 NON 2012". A summary of the samples obtained is presented in the table below:

Type of Sample	Number of Samples Obtained
Environmental Samples	165
Groundwater Samples	7

3.3.2 Samples of soil for chemical testing were placed in containers in accordance with the specification.

3.4 Laboratory Testing

3.4.1 The laboratory testing was scheduled by URS, the testing scheduled is summarised in the table below:

Test Description	No. of Tests	Determinands
Suite E (Soils)	60	Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium (total), Chromium VI, Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc, pH, Sulphide, Water soluble sulphate (as SO ₄), Sulphur, Total petroleum hydrocarbons Screen, Speciated polyaromatic hydrocarbons (USEPA 17), Phenol, Cyanide (total), Cyanide (free), Asbestos Screen & identification.
Suite F (Groundwater)	7	Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium (total), Chromium VI, Copper, Lead, Magnesium, Mercury, Nickel, Potassium, Selenium, Sodium, Vanadium, Zinc, pH, Sulphide, Sulphate (as SO ₄), Sulphur, Total petroleum hydrocarbons Screen, Speciated polyaromatic hydrocarbons (USEPA 17), Phenol, Cyanide (total), Cyanide (free), Ammoniacal Nitrogen, Hardness, Electrical conductivity, Chloride, Nitrate.
Organochlorine and Organophosphorous Pesticides	5	Azinphos, methyl Coumaphos, Demeton (O+S), Disulfoton, Fensulfothion, Fenthion, Phorate, Prothiophos, Sulprofos, Trichloronate, alpha-HCH, gamma-HCH, beta-HCH, Heptachlor, delta-HCH, Aldrin, Heptachlor epoxide, gamma-Chlordane, alpha-Chlordane, Endosulfan I 4,4'-DDE, Dieldrin, Endrin 4,4'-DDD Endosulfan II 4,4'-DDT Endrin, aldehyde, Endosulfan sulphate, Methoxychlor, Endrin, ketone, Hexachlorobutadiene

3.4.2 In addition, a total of five samples were tested for Organochlorine and Organophosphorous Pesticides.

3.5 Installations

3.5.1 Installations were placed in seven of the exploratory holes as detailed below:

Location	Total depth of install (m bgl)	Response Zone (m bgl)
BH401	2.00	0.00 – 2.00
BH402	5.00	0.50 – 5.00
BH403	2.00	0.50 – 2.00
BH404	4.00	1.00 – 4.00
BH405	3.50	0.50 – 3.50
BH406	4.00	1.00 – 4.00
BH407	5.00	4.00 – 5.00

3.6 Monitoring

- 3.6.1 All gas monitoring was undertaken using a Geotechnical Instruments GA2000 gas meter with integral electronic flow analyser.
- 3.6.2 Measurements of the percentage volume in air (%v/v) of oxygen (O₂), carbon dioxide (CO₂) and methane (CH₄) were recorded in addition to the percentage Lower Explosive Limit (%LEL) of methane and the atmospheric pressure. Flow measurements on each standpipe (l/hr) were also taken on at least two occasions. (Note: 100% LEL equates to 5% by volume).
- 3.6.3 The standpipes consisted of 50mm internal diameter plain high-density polyethylene (HDPE) pipe from ground level to the start of the response zone, with slotted HDPE pipe the length of the varying response zones. A bentonite seal was made around the plain pipe. A clean gravel pack was placed around the slotted pipe.
- 3.6.4 The results monitored peak and steady state conditions. Peak results are those that occur on opening the valve on the borehole tap. Steady state conditions are those that occur a period of time afterwards when the initial (accumulated) gases have been purged from the borehole.
- 3.6.5 Groundwater samples were also obtained from the installations using the methodology specified by the URS GI Specification "North West Cambridge Phase I Development Area – Main Investigation Specification & Contract Documents 22 NON 2012".. Groundwater samples were tested on site for the following parameters:

Test Description	Units
pH	pH units
Dissolved Oxygen	mg/l
Temperature of Sample	°C
Electrical Conductivity	uS
Redox Potential	mV

- 3.6.6 Gas monitoring results and In Situ Groundwater Testing Results are presented in Appendix D and E of this report respectively.

4.0 INVESTIGATION FINDINGS

4.1 Ground Conditions

- 4.1.1 The ground conditions encountered during the investigation are summarised in the table below:

Strata Encountered	Depth encountered (m)	No. of Locations
MADE GROUND: Brown slightly gravelly clay, locally cobbly.	0.00 – 0.80	4
MADE GROUND: Clayey gravelly sand locally silty.	0.50 – 2.30	2
MADE GROUND: Turf over brown very gravelly sand / slightly silty sand and gravel.	0.00 – 0.50	2
Dark brown clayey TOPSOIL locally sandy and gravelly.	0.00 – 0.80	33
Light brown yellow SAND & GRAVEL locally clayey or sandy GRAVEL (Head).	0.00 – 5.00	31
Firm becoming stiff brown sandy CLAY locally soft to firm (Head).	0.30 – 2.30	11
Soft to firm cream light grey gravelly CLAY (Head).	0.40 – 2.90	3
Light grey fine silty SAND (Head).	1.40 – 3.00	3
Stiff very stiff grey mottled brown silty CLAY locally gravelly (Gault Clay).	0.20 – 5.00	27

4.2 Groundwater

- 4.2.1 Groundwater was encountered during site works within BH402 at 1.7m bgl and within BH405 at 1.8m bgl. Where encountered within the trial pits, groundwater levels ranged between 0.95m and 2.8m bgl.

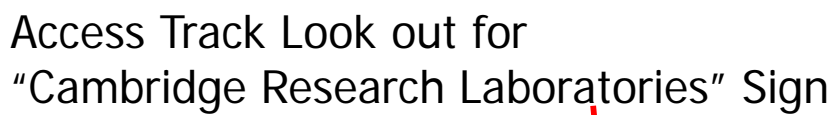
4.3 Observations

- 4.3.1 During the drilling works undertaken by BSL observations for both visual and olfactory evidence of contamination were made.
- 4.3.2 Other than the presence of a localised possible mineral oil excavated alongside a small burned piece of machinery within TP433 at a depth of 0.7m bgl, no other visual or olfactory evidence of contamination were identified.
- 4.3.3 Trial pits excavated within the clays largely remained stable during and after excavation. However, where sands and gravels were encountered the trial pits were highly unstable and prone to continuous collapse during excavation, particularly where groundwater was encountered. Several trial pits were terminated before the scheduled depth was reached due to instability and lack of progress when excavating through the stratum.

5.0 REFERENCES

1. British Standards Institution '*Code of Practice for Site Investigations*' BS 5930:1999
2. British Standards Institute, '*Method of Test for Soil for Civil engineering Purposes*' BS1377:1990.
3. British Standards Institution "*Geotechnical investigation and testing – Identification and classification of soil*" BS EN ISO 14688:2002.
4. British Standards Institution "*Geotechnical investigation and testing – Identification and classification of rock*" BS EN ISO 14689:2002.

DRAWINGS



Gravel Hill Farm,
Huntingdon Road,
Cambridge, CB3 0DJ

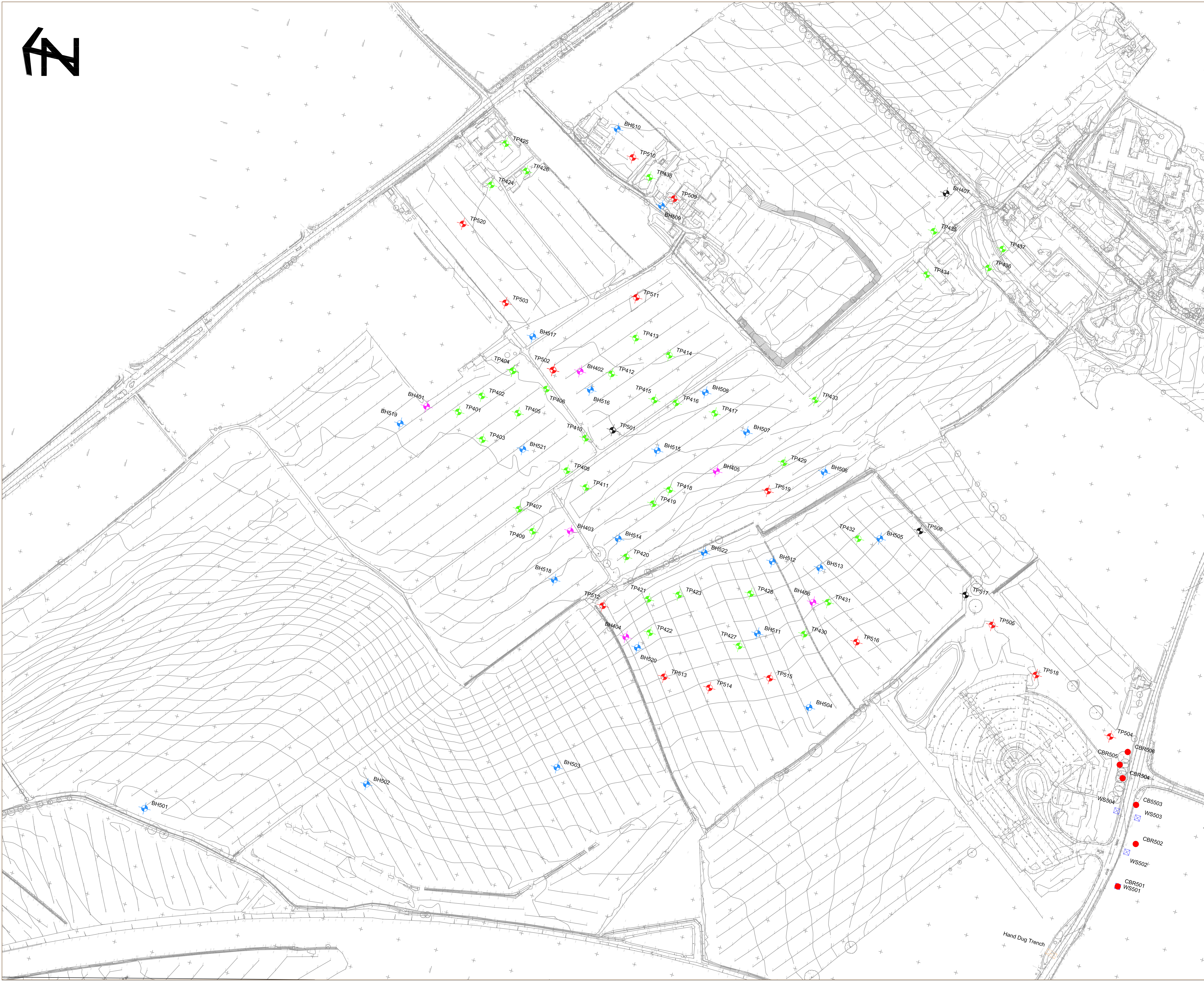
Site Location Plan

Drawing Number C2191/01

Scale: NTS

Drawn By: DG

Checked By:



KEY

- 500 SERIES CABLE PERCUSSIVE BOREHOLE
- 500 SERIES TRIAL PIT
- 400 SERIES CABLE PERCUSSIVE BOREHOLE
- 400 SERIES TRIAL PIT
- 500 SERIES WINDOW SAMPLE BOREHOLE
- 500 SERIES CBR LOCATION

		REV	May 2013
DESCRIPTION		DATE	
<div><div>BSL</div><div>BROWNFIELD SOLUTIONS LTD GEO-ENVIRONMENTAL ENGINEERS</div></div>			
CLIENT UNIVERSITY OF CAMBRIDGE / URS			
PROJECT TITLE NW CAMBRIDGE DEVELOPMENT			
DRAWING DETAIL SURVEYED EXPLORATORY HOLE LOCATION PLAN			
DRAWN	AJS	CHECKED	AJH
DATE	MAY 2013	SCALE	1:2500 @ A1
DRAWING NUMBER C2191 - C2157/02			REVISION -

APPENDIX A

Cable Percussive Borehole Exploratory Hole Logs

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157

Co-ords: 542718E - 260298N

Hole Type
Cable

Location: CAMBRIDGE

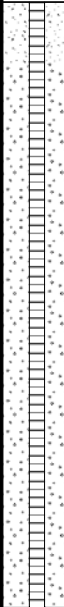



Level: 23.37 m AOD

Scale
1:25

Client: UNIVERSITY OF CAMBRIDGE

Dates: 11/04/2013

Checked by
AJHLogged By
AJS

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description				
		Depth (m)	Type	Results								
		0.20	ES		0.40	22.97		Brown clayey TOPSOIL.				
		0.50	ES					Firm becoming stiff brown sandy CLAY				
		1.00	ES		0.80	22.57		Stiff to very stiff grey mottled brown silty desiccated CLAY.	1			
		2.00	ES					2				
		3.00	ES		3							
		4.00	ES		4							
		End of Borehole at 5.00 m										

Remarks: 1. Position scanned for services prior to drilling by BSL engineer.
 2. Hand dug service inspection pit to 1.2m bgl.
 3. Casing: 150mm to 1.7m bgl.
 4. No groundwater encountered.
 5. Installation: GL to 2.0m bgl slotted pipe with gravel pack filter; bentonite seal to 3.0m bgl; backfilled with arisinas to 5.0m bgl.



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Borehole No

BH402

Sheet 1 of 1

Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 542814E - 260120N

Hole Type
Cable

Location: CAMBRIDGE

Level: 23.75 m AOD

Scale
1:25

Client: UNIVERSITY OF CAMBRIDGE

Dates: 11/04/2013

Checked by
AJH

Logged By
AJS

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.40	23.35		Brown slightly sandy clayey TOPSOIL with occasional rootlets.	
		0.50	ES					Light brown yellow SAND and GRAVEL. Gravel is of subangular to subrounded fine to coarse flint.	
		1.00	ES						1
		2.00	ES						2
		3.00	ES						3
		4.00	ES						4
End of Borehole at 5.00 m									

Remarks: 1. Position scanned for services prior to drilling by BSL engineer.
2. Hand dug service inspection pit to 1.2m bgl.
3. Casing: 150mm to 5.0m bgl.
4. No groundwater encountered.
5. Installation: 0.5m plain pipe with bentonite seal; slotted pipe to 5.0m bgl.



Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157

Co-ords: 542614E - 260078N

Hole Type
Cable

Location: CAMBRIDGE

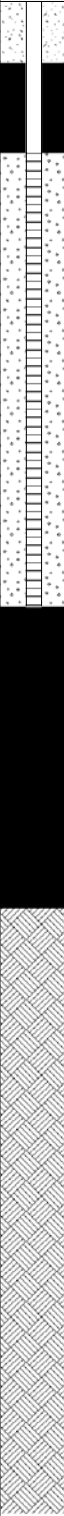







Level: 22.48 m AOD

Scale
1:25

Client: UNIVERSITY OF CAMBRIDGE

Dates: 12/04/2013

Checked by
AJHLogged By
AJS

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.30	22.18		Light brown yellow slightly clayey SAND and GRAVEL. Gravel is of subangular to subrounded fine to coarse flint.	
		0.50	ES					Light brown slightly clayey sandy GRAVEL. Gravel is of subangular to subrounded fine to coarse flint.	
		1.00	ES						
		2.00	ES		1.90	20.58		Stiff to very stiff grey mottled brown silty desiccated CLAY.	
		3.00	ES						
		4.00	ES						
End of Borehole at 5.00 m									

Remarks:

1. Position scanned for services prior to drilling by BSL engineer.
2. Hand dug service inspection pit to 1.2m bgl.
3. Casing: 150mm to 3.0m bgl.
4. No groundwater encountered.
5. Installation: 0.5m plain pipe with bentonite seal; slotted pipe to 2.0m bgl; bentonite seal to 3.0m bgl; backfilled with arisings to 5.0m bgl.
6. 30 mins standing time awaiting for installation details.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157

Co-ords: 542502E - 259973N

Hole Type
Cable

Location: CAMBRIDGE

Level: 18.72 m AOD

Scale
1:25

Client: UNIVERSITY OF CAMBRIDGE

Dates: 10/04/2013

Checked by
AJHLogged By
AJS

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES					Brown clayey TOPSOIL with occasional gravel of subangular fine to coarse flint.	
		0.50	ES		0.40	18.32		Firm to stiff light brown silty CLAY.	
		1.00	ES		1.00	17.72		Stiff to very stiff grey mottled brown silty desiccated CLAY.	1
		2.00	ES						2
		3.00	ES						3
		4.00	ES					Becoming grey from 3.5m bgl.	4
								End of Borehole at 5.00 m	

Remarks:

- Position scanned for services prior to drilling by BSL engineer.
- Hand dug service inspection pit to 1.2m bgl.
- Casing: 150mm to 1.5m bgl.
- No groundwater encountered.
- Installation: 1.0m plain pipe with bentonite seal; slotted pipe to 4.0m bgl; bentonite seal to 5.0m bgl.
- 60 mins standing time awaiting installation details.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157

Co-ords: 542738E - 259918N

Hole Type
Cable

Location: CAMBRIDGE

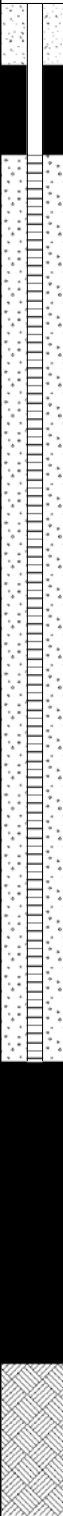



Level: 22.01 m AOD

Scale
1:25

Client: UNIVERSITY OF CAMBRIDGE

Dates: 10/04/2013

Checked by
AJHLogged By
AJS

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.20	ES					Light brown yellow SAND and GRAVEL. Gravel is of subangular to subrounded fine to coarse flint.	1	
		0.50	ES							
		1.00	ES							
		2.00	ES						2	
		3.00	ES						3	
		3.30	ES		3.30	18.71		Stiff to very stiff grey mottled brown silty desiccated CLAY.		
		4.00	ES						4	
End of Borehole at 5.00 m										

Remarks:

1. Position scanned for services prior to drilling by BSL engineer.
2. Hand dug service inspection pit to 1.2m bgl.
3. Casing: 150mm to 1.7m bgl.
4. No groundwater encountered.
5. Installation: 0.5m plain pipe with bentonite seal; slotted to 3.5m bgl; bentonite seal to 4.5m bgl; backfilled with arisings to 5.0m bgl.
6. 45 mins standing time awaiting installation details.



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Borehole No

BH406

Sheet 1 of 1

Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 542609E - 259754N

Hole Type
Cable

Location: CAMBRIDGE

Level: 17.66 m AOD

Scale
1:25

Client: UNIVERSITY OF CAMBRIDGE

Dates: 11/04/2013

Checked by
AJH

Logged By
AJS

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.40	17.26		Brown clayey TOPSOIL with occasional fine rootlets.	
		0.50	ES					Stiff to very stiff grey mottled brown silty desiccated CLAY.	
		1.00	ES						
		2.00	ES						
		3.00	ES						
		4.00	ES						
		End of Borehole at 5.00 m							

Remarks: 1. Position scanned for services prior to drilling by BSL engineer.
2. Hand dug service inspection pit to 1.2m bgl.
3. Casing: 150mm to 1.7m bgl.
4. No groundwater encountered.
5. Installation: 1.0m plain pipe with bentonite seal; slotted pipe with gravel pack filter to 4.0m bgl; bentonite seal to 5.0m bgl.



Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157

Co-ords: 543160E - 259729N

Hole Type
Cable

Location: CAMBRIDGE

Level: 25.49 m AOD





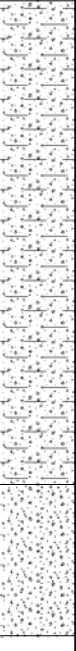
Scale
1:25

Client: UNIVERSITY OF CAMBRIDGE

Dates: 11/04/2013

Checked by

Logged By
AJS

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.40	25.09		Brown TOPSOIL with occasional gravel of subrounded to subangular fine to coarse flint and chalk.	
		0.50	ES					Soft to firm cream light grey gravelly CLAY. Gravel is of subangular fine to coarse highly weathered chalk.	
		1.00	ES						1
		2.00	ES		2.90	22.59			2
		3.00	ES					Brown slightly clayey sandy GRAVEL. Gravel is of subangular to subrounded fine to coarse flint.	3
		4.00	ES						4
		4.50			4.50	20.99		Light brown yellow SAND and GRAVEL. Gravel is of subangular to subrounded fine to coarse flint.	
End of Borehole at 5.00 m									

Remarks:

1. Position scanned for services prior to drilling by BSL engineer.
2. Hand dug service inspection pit to 1.2m bgl.
3. Casing: 150mm to 1.7m bgl.
4. No groundwater encountered.
5. Installation: 4.0m plain pipe with bentonite seal; slotted pipe with gravel pack filter to 5.0m bgl.
6. 45 mins standing awaiting installation details.

APPENDIX B Trial Pit Exploratory Hole Logs

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542722E - 260257N
Level: 23.34 m AODDate
15/04/2013

Location: CAMBRIDGE

Dimensions: 2.70m


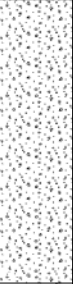

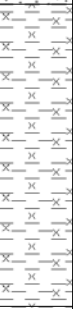
Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
2.90m

0.60m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.70 0.70	PID ES	0.0	0.45	22.89		Dark brown gravelly very sandy clay TOPSOIL. Gravel is angular to subangular fine to coarse of flint.	
						Yellow brown fine to medium SAND and fine to medium GRAVEL. Gravel is angular to subangular of flint.	1
1.60 1.60	PID ES	0.0	1.20	22.14		Firm to stiff light blue grey slightly gravelly CLAY. Gravel is angular to subangular of flint.	
						Very stiff grey silty CLAY with occasional fibrous plant matter. Becoming friable from 2.4m bgl.	2
2.70 2.70	PID ES	0.0	2.10	21.24			
			2.90	20.44		Trialpit Complete at 2.90 m	3
Remarks: 1. Position scanned for serviced prior to excavation by BSL Engineer. 2. Trial pit unstable below 0.5m bgl. 3. Excavated through land drain at 0.65m bgl with slight seepages.							
Groundwater: No groundwater encountered.							



Trialpit No
TP402
Sheet 1 of 1

Project No.
C2157

Co-ords: 542750E - 260233N
Level: 23.29 m AOD

Date
15/04/2013

Location: CAMBRIDGE

Dimensions: 2.50m



Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
1.50m

0.60m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.70 0.70	PID ES	0.0	0.40	22.89		Dark brown slightly sandy gravelly clay TOPSOIL. Gravel is angular to subangular fine to coarse of flint.
						Yellow brown fine to medium SAND and fine to medium GRAVEL. Gravel is angular to subangular of flint.
			1.50	21.79	Trialpit Complete at 1.50 m	

Remarks:	1. Position scanned for serviced prior to excavation by BSL Engineer. 2. Trial pit terminated at 1.5m bgl due to continuous collapse. 3. Trial pit backfilled with arisings upon completion.
----------	--

Groundwater: Groundwater encountered at 1.4m bgl.





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Trialpit No

TP403

Sheet 1 of 1

Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 542696E - 260218N
Level: 23.01 m AOD

Date
15/04/2013

Location: CAMBRIDGE

Dimensions: 2.50m



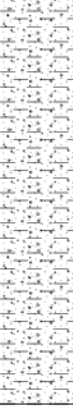
Depth
3.10m

0.60m

Scale
1:20

Logged By
DMG

Client: UNIVERSITY OF CAMBRIDGE

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.30 0.30	PID ES	0.0	0.60	22.41		Dark brown slitghtly sandy very silty TOPSOIL	
0.70 0.70	PID ES	0.0				Firm to stiff blue grey slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of flint.	1
						Becoming friable gravelly clay from 1.4m bgl.	
						No gravel from 1.7m bgl.	2
2.10 2.10	PID ES	0.0	3.10	19.91			
3.00 3.00	PID ES	0.0					3
						Trialpit Complete at 3.10 m	

Remarks: 1. Position scanned for serviced prior to excavation by BSL Engineer.
2. Trial pit backfilled with arisings upon completion.

Groundwater: No groundwater encountered.





Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542741E - 260183N
Level: 23.32 m AODDate
15/04/2013

Location: CAMBRIDGE

Dimensions: 2.60m



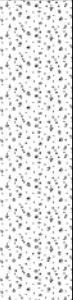

Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
2.50m

0.60m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.60 0.60	PID ES	0.0	0.45	22.87		Dark brown sandy gravelly clay TOPSOIL. Gravel is angular to subangular fine to coarse of flint.	
1.50 1.50	PID ES	0.0	1.40	21.92		Firm brown mottled orange slightly gravelly sandy CLAY. Gravel is subangular fine to coarse of flint.	1
2.30 2.30	PID ES	0.0	2.20	21.12		Yellow brown fine to medium SAND and fine to medium GRAVEL. Gravel is angular to subangular of flint.	2
			2.50	20.82		Dark grey stiff to very stiff CLAY.	
Trialpit Complete at 2.50 m							3

Remarks:

1. Position scanned for serviced prior to excavation by BSL Engineer.
2. Trial pit terminated at 2.5m bgl due to continuous collapse.
3. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater encountered at 1.6m bgl.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542781E - 260156N
Level: 23.51 m AODDate
11/04/2013

Location: CAMBRIDGE

Dimensions: 2.50m



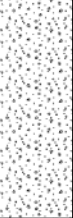


Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00m

0.60m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.70 0.70	PID ES	0.0	0.60	22.91		Dark brown slightly clayey sandy gravelly TOPSOIL. Gravel is sub-angular to sub-rounded of flint.	
1.10 1.10	PID ES	0.0	1.00	22.51		Dark brown gravelly very clayey SAND. Gravel is angular to sub-rounded of flint.	1
1.80 1.80	PID ES	0.0	1.60	21.91		Light brown yellow SAND and GRAVEL. Gravel is fine to medium sub-angular to sub-rounded.	
2.90 2.90	PID ES	0.0	2.30	21.21		Firm light grey slightly gravelly CLAY. Gravel is sub-angular to sub-rounded of flint.	2
			2.90	20.51		Stiff to very stiff blueish grey CLAY.	
			3.00	20.51		Trialpit Complete at 3.00 m	3

Remarks: 1. Position scanned for services prior to excavation by BSL Engineer.
2. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater encountered at 1.60m bgl.



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Trialpit No

TP407

Sheet 1 of 1

Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 542623E - 260149N
Level: 23.12 m AOD

Date
17/04/2013

Location: CAMBRIDGE

Dimensions: 2.60m





Depth
3.00m

0.60m

Scale
1:20

Logged By
AJS

Client: UNIVERSITY OF CAMBRIDGE

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.20 0.20	PID ES	0.0	0.20	22.92		Light brown slightly clayey sandy GRAVEL. Gravel is of subangular to subrounded fine to coarse flint.	
1.20 1.20	PID ES	0.0				Firm to stiff grey mottled brown occasionally orange slightly sandy gravelly CLAY. Gravel is of subangular to subrounded fine to coarse flint.	1
1.80 1.80	PID ES	0.0	1.80	21.32		Stiff to very stiff grey mottled brown silty desiccated CLAY with occasional light grey fine to coarse subrounded calcareous nodules.	2
2.80 2.80	PID ES	0.0	3.00	20.12		Trialpit Complete at 3.00 m	3

Remarks: 1. Position scanned for services prior to excavation by BSL engineer.
2. Trial pit backfilled with arisings upon completion.

Groundwater: Slight seepage encountered at 1.6m bgl.



Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542687E - 260103N
Level: 23.27 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.50m


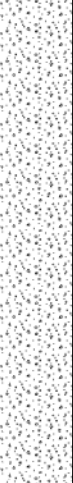



Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
2.70m

1.00m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.30 0.30	PID ES	0.0	0.10	23.17		MADE GROUND: Reworked slightly sandy gravelly clay.	
						Light brown yellow SAND and GRAVEL. Gravel is sub-angular to sub-rounded of flint. Rare gravel of chalk.	1
1.60 1.60	PID ES	0.0	1.40	21.87		Light grey fine silty SAND.	2
2.50 2.50	PID ES	0.0	2.20	21.07		Dark grey blue stiff to very stiff slightly gravelly CLAY. Gravel is sub-rounded and of flint.	
			2.70	20.57		Trialpit Complete at 2.70 m	3

Remarks:

1. Position scanned for services by BSL engineer prior to excavation
2. Trial pit terminated at 2.7m bgl due to continuous collapse.
3. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater encountered at 1.2m bgl.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542600E - 260124N
Level: 23.14 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.60m


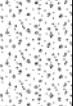


Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.20m

1.00m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.40 0.40	PID ES	0.1	0.30	22.84		Dark brown slightly clayey sandy gravelly TOPSOIL. Gravel is angular to sub-rounded of flint.	
			0.60	22.54		Red brown damp SAND and GRAVEL. Gravel is angular to sub-angular of flint.	
1.20 1.20	PID ES	0.0				Stiff to very stiff grey blue slightly gravelly CLAY. Gravel is fine sub-angular to sub-rounded.	1
						Occasional plant matter and no gravel from 2.0m bgl.	2
3.00 3.00	PID ES	0.0	3.20	19.94		Trialpit Complete at 3.20 m	3
Remarks: 1. Position scanned for services by BSL engineer prior to excavation. 2. Trial pit backfilled with arisings upon completion.							
Groundwater: Groundwater not encountered.							

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542734E - 260091N
Level: 23.20 m AODDate
16/04/2013



Location: CAMBRIDGE

Dimensions: -

Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
1.70mLogged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.35 0.35	PID ES	0.1	0.30	22.90		MADE GROUND of reworked gravelly CLAY.	
0.50 0.50	PID ES	0.0	0.45	22.75		Made Ground: Dark brown gravelly very clayey sand. Gravel is angular to sub-rounded of flint.	
						MADE GROUND: Light brown yellow sand and gravel. Gravel is sub-angular to sub-rounded of flint.	
1.60 1.60	PID ES	0.0	1.00	22.20		Light brown yellow SAND and GRAVEL. Gravel is sub-angular to sub-rounded of flint. Brick wall encountered at 1.0m bgl. Gravel becoming predominantly medium.	1
			1.70	21.50		Trialpit Complete at 1.70 m	2
							3

Remarks:

1. Position scanned for services by BSL engineer prior to excavation
2. Land drain encountered at 0.8m bgl.
3. Trial pit terminated at 1.7m bgl due to continuous collapse.

Groundwater: Groundwater encountered at 1.2m bgl.



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Trialpit No
TP411
Sheet 1 of 1

Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 542673E - 260073N
Level: 23.16 m AOD

Date
17/04/2013

Location: CAMBRIDGE

Dimensions: 2.60m

Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
2.30m

1.10m

Logged By
AJS

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.40 0.40	PID ES	0.1	0.40	22.76		Brown clayey TOPSOIL with occasional gravel of subangular to subrounded fine to coarse of flint.	
						Brown slightly clayey gravelly SAND. Gravel is of subangular to subrounded fine to coarse flint.	1
1.20 1.20	PID ES	0.0	1.20	21.96		Light brown yellow SAND and GRAVEL. Gravel is of subangular to subrounded fine to coarse flint.	2
2.20 2.20	PID ES	0.0	2.30	20.86		Trialpit Complete at 2.30 m	3

Remarks: 1. Position scanned for services prior to drilling by BSL engineer.
2. Terminated at 2.3m bgl due to continuous collapse.
3. Trial pit backfilled with arisings upon completion.

Groundwater: Moderate seepage encountered at 1.2m bgl.





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Trialpit No
TP412
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Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 542822E - 260081N
Level: 23.83 m AOD

Date
11/04/2013

Location: CAMBRIDGE

Dimensions: 3.40m

Depth
2.70m

1.00m

Scale
1:20

Logged By
DMG

Client: UNIVERSITY OF CAMBRIDGE

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.45 0.45	PID ES	0.2	0.40	23.43		Dark brown sandy gravelly TOPSOIL. Gravel is angular to sub-rounded of flint.	
						Dark brown gravelly very clayey SAND. Gravel is angular to sub-rounded of flint.	
0.90 0.90	PID ES	0.0	0.80	23.03		Light brown yellow SAND and GRAVEL. Gravel is angular to sub-rounded of flint.	1
2.00 2.00	PID ES	0.0				Occasional cobbles of flint from 2.4m bgl.	2
2.60 2.60	PID ES	0.0	2.70	21.13		Trialpit Complete at 2.70 m	3

Remarks: 1. Position scanned for services by BSL engineer prior to excavation
2. Trial pit terminated at 2.7m bgl due to continuous collapse.
3. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater encountered at 2.0m bgl.





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Trialpit No
TP413
Sheet 1 of 1

Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 542874E - 260063N
Level: 24.14 m AOD

Date
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.80m

Depth
3.20m

1.00m

Scale
1:20

Logged By
DMG

Client: UNIVERSITY OF CAMBRIDGE

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.60 0.60	PID ES	0.1	0.45	23.69		Dark brown slightly clayey sandy gravelly TOPSOIL. Gravel is angular to sub-rounded of flint.	
						Dark brown gravelly very clayey SAND. Gravel is angular to sub-rounded of flint.	
1.10 1.10	PID ES	0.0	0.90	23.24		Light brown yellow SAND and GRAVEL. Gravel is fine to medium angular to sub-rounded of flint.	1
						Becoming predominantly gravel from 1.5m bgl.	2
2.30 2.30	PID ES	0.0					3
3.20 3.20	PID ES	0.0	3.20	20.94		Trialpit Complete at 3.20 m	

Remarks: 1. Position scanned for services by BSL engineer prior to excavation.
2. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater encountered at 2.2m bgl.



Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542865E - 260016N
Level: 24.03 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.50m




Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
2.80m

1.00m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.50 0.50	PID ES	0.0	0.45	23.58		Dark brown slightly clayey sandy gravelly TOPSOIL. Gravel is angular to sub-rounded of flint.	
			0.65	23.38		Dark brown gravelly very clayey SAND. Gravel is angular to sub-rounded of flint.	
1.00 1.00	PID ES	0.0				Light brown yellow SAND and GRAVEL. Gravel is sub-angular to sub-rounded of flint.	1
2.20 2.20	PID ES	0.0				From 2.0m bgl sand component is coarse to very coarse.	2
						Rare coarse gravel from 2.4m bgl.	
2.80 2.80	PID ES	0.0	2.80	21.23		Trialpit Complete at 2.80 m	3

Remarks:

1. Position scanned for services by BSL engineer prior to excavation
2. Trial pit terminated at 2.8m bgl due to continuous collapse.
3. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater encountered at 2.0m bgl.



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Trialpit No
TP415
Sheet 1 of 1

Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 542804E - 260019N
Level: 23.79 m AOD

Date
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.40m

Depth
3.20m

1.00m

Scale
1:20

Logged By
DMG

Client: UNIVERSITY OF CAMBRIDGE

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.60 0.60	PID ES	0.0	0.45	23.34		Dark brown slightly clayey sandy gravelly TOPSOIL. Gravel is angular to sub-rounded of flint.	
						Dark brown gravelly very clayey SAND. Gravel is angular to sub-rounded of flint.	
1.10 1.10	PID ES	0.0	1.00	22.79		Stiff light grey slightly gravelly friable CLAY. Fine sub-rounded gravel of flint.	1
			1.40	22.39		Stiff to very stiff grey blue friable CLAY.	
1.80 1.80	PID ES	0.0					2
3.00 3.00	PID ES	0.0					3
			3.20	20.59			
Trialpit Complete at 3.20 m							

Remarks: 1. Position scanned for services by BSL engineer prior to excavation
2. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater encountered at 0.95m





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Trialpit No

TP416

Sheet 1 of 1

Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 542808E - 259991N
Level: 23.78 m AOD

Date
17/04/2013

Location: CAMBRIDGE

Dimensions: 2.50m

Depth
2.60m

1.00m

Scale
1:20

Logged By
AJS

Client: UNIVERSITY OF CAMBRIDGE

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.50 0.50	PID ES	0.0	0.50	23.28		Brown sandy TOPSOIL with occasional gravel of subrounded to subangular fine to coarse flint.	
1.00 1.00	PID ES	0.0	1.00	22.78		Firm brown very sandy CLAY.	
1.00 1.00	PID ES	0.0	1.00	22.78		Light brown yellow SAND and GRAVEL. Gravel is of subrounded to subangular fine to coarse flint.	1
2.60 2.60	PID ES	0.0	2.60	21.18		Trialpit Complete at 2.60 m	2
							3

Remarks: 1. Position scanned for services prior to excavation by BSL engineer.
2. Terminated at 2.6m bgl due to continuous collapse.
3. Trial pit backfilled with arisings upon completion.

Groundwater: Moderate seepage encountered at 1.5m bgl.





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Trialpit No
TP417
Sheet 1 of 1

Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 542809E - 259940N
Level: 22.97 m AOD

Date
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.50m

Depth
3.00m

1.00m

Scale
1:20

Logged By
DMG

Client: UNIVERSITY OF CAMBRIDGE

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.60 0.60	PID ES	0.0	0.40	22.57		Dark brown slightly sandy gravelly clay TOPSOIL.	
1.70 1.70	PID ES	0.0				Stiff grey slightly gravelly CLAY. Gravel is fine and sub-angular of calcareous nodules. Rare plant matter.	1
2.90 2.90	PID ES	0.0	3.00	19.97		Trialpit Complete at 3.00 m	2 3

Remarks: 1. Position scanned for services by BSL engineer prior to excavation.
3. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater not encountered.



Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542699E - 259969N
Level: 21.89 m AODDate
17/04/2013

Location: CAMBRIDGE

Dimensions: 2.60m

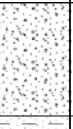

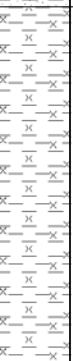
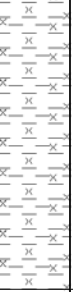

Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00m

0.60m

Logged By
AJS

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.20 0.20 0.30 0.30	PID ES PID ES	0.0 0.0	0.30	21.59		Brown gravelly fine to coarse SAND. Gravel is of subangular to subrounded fine to coarse flint.	
						Firm grey mottled light brown occasionally orange sandy CLAY.	1
1.30 1.30	PID ES	0.0	1.30	20.59		Stiff to very stiff grey mottled brown silty desiccated CLAY.	2
2.30 2.30	PID ES	0.0					
3.00 3.00	PID ES	0.0	3.00	18.89		----- Trialpit Complete at 3.00 m	3
Remarks: 1. Position scanned for services prior to excavation by BSL engineer. 2. Trial pit backfilled with arisings upon completion.							
Groundwater: Slight seepage at 2.8m bgl.							

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542676E - 259985N
Level: 22.04 m AODDate
17/04/2013

Location: CAMBRIDGE

Dimensions: 2.20m

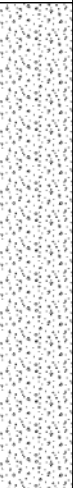

Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00m

0.60m

Logged By
AJS

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.10 0.10	PID ES	0.1				Light brown orange SAND and GRAVEL. Gravel is of subangular to subrounded fine to coarse flint and rare chalk.	1
1.30 1.30	PID ES	0.0	1.30	20.74		Stiff to very stiff grey mottled brown occasionally orange silty desiccated CLAY.	2
2.00 2.00	PID ES	0.0					
3.00 3.00	PID ES	0.0	3.00	19.04		----- Trialpit Complete at 3.00 m	3

Remarks: 1. Position scanned for services prior to excavation by BSL engineer.
2. Trial pit backfilled with arisings upon completion.

Groundwater: No groundwater encountered.



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Trialpit No

TP420

Sheet 1 of 1

Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 542601E - 260000N
Level: 21.79 m AOD

Date
17/04/2013

Location: CAMBRIDGE

Dimensions: 2.60m

Depth
1.80m

1.60m

Scale
1:20

Logged By
AJS

Client: UNIVERSITY OF CAMBRIDGE

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.40 0.40	PID ES	0.1	0.40	21.39		Brown sandy TOPSOIL with occasional gravel of subangular to subrounded fine to coarse flint.	
1.40 1.40	PID ES	0.0				Orange brown garvelly SAND. Gravel of subangular to subrounded fine to coarse flint.	1
1.80 1.80	PID ES	0.0	1.80	19.99			2
Trialpit Complete at 1.80 m							3

Remarks: 1. Position scanned for services prior to excavation by BSL engineer.
2. Terminated at 1.8m bgl due to continuous collapse.
3. Trial pit backfilled with arisings upon completion.

Groundwater: Moderate seepage encountered at 1.0m bgl.



Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542556E - 259958N
Level: 19.49 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.50m

Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00m

1.00m

Logged By
DMG

Samples & In Situ Testing

Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
0.50 0.50	PID ES	0.0	0.45	19.04		Dark brown slightly sandy gravelly clay TOPSOIL.
			0.65	18.84		Firm light brown grey slightly gravelly CLAY. Gravel is sub-angular to sub-rounded of flint and calcareous nodules.
1.60 1.60	PID ES	0.0				Stiff light grey slightly gravelly CLAY. Gravel is sub-rounded of calcareous nodules.
						Very stiff from 2.0m bgl.
2.90 2.90	PID ES	0.0	3.00	16.49		Trialpit Complete at 3.00 m

Remarks: 1. Position scanned for services by BSL engineer prior to excavation
2. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater not encountered.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542515E - 259945N
Level: 18.31 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.60m






Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.20m

1.00m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.50 0.50	PID ES	0.1	0.40	17.91		Dark brown slightly sandy gravelly clay TOPSOIL.	
			0.85	17.46		Firm light brown grey slightly gravelly CLAY. Gravel is sub-angular to sub-rounded of flint and calcareous nodules.	
						Stiff light grey slightly gravelly CLAY.	1
1.60 1.60	PID ES	0.0	2.00	16.31		Very stiff blueish grey CLAY with occasional fibrous plant matter.	2
2.90 2.90	PID ES	0.0	3.20	15.11		Trialpit Complete at 3.20 m	3

Remarks: 1. Position scanned for services by BSL engineer prior to excavation.
2. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater not encountered.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542572E - 259922N
Level: 19.05 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.50m

Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00m

1.00m

Logged By
DMG

Samples & In Situ Testing

Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description	
0.50 0.50	PID ES	0.0	0.40	18.65		Dark brown slightly sandy gravelly clay TOPSOIL.	
						Friable soft to firm light brown grey slightly gravelly CLAY. Gravel of sub-angular to sub-rounded flint and calcareous nodules.	
			1.00	18.05		Stiff light grey slightly gravelly CLAY. Gravel of sub-rounded calcareous nodules.	1
1.60 1.60	PID ES	0.0				Very stiff blueish grey CLAY.	2
			2.00	17.05		Occasional fibrous plant matter from 2.2m bgl.	
2.80 2.80	PID ES	0.0				Trialpit Complete at 3.00 m	3
			3.00	16.05			

Remarks: 1. Position scanned for services by BSL engineer prior to excavation
2. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater not encountered.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 543014E - 260294N
Level: 24.08 m AODDate
15/04/2013

Location: CAMBRIDGE

Dimensions: 2.70m



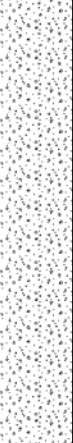

Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
2.30m

0.60m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
1.10 1.10	PID ES	0.0	0.35	23.73		Dark brown sandy gravelly clay TOPSOIL. Gravel is angular to subangular fine to coarse of flint.	
						Firm dark brown slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of flint.	
			1.00	23.08		Yellow brown medium to coarse SAND and fine to medium GRAVEL. Gravel is angular to subangular of flint.	1
1.90 1.90	PID ES	0.0					2
2.25 2.25	PID ES	0.0	2.20 2.30	21.88 21.78		Stiff light grey slightly gravelly CLAY. Gravel is angular to subrounded of flint.	
Trialpit Complete at 2.30 m							3

Remarks:

1. Position scanned for serviced prior to excavation by BSL Engineer.
2. Trial pit terminated at 2.3m bgl due to continuous collapse.
3. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater encountered at 1.5m bgl.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 543070E - 260290N
Level: 23.80 m AODDate
15/04/2013

Location: CAMBRIDGE

Dimensions: 2.80m




Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00m

0.60m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.60 0.60	PID ES	0.0	0.40	23.40		Dark brown sandy gravelly clay TOPSOIL. Gravel is angular to subangular fine to coarse of flint.	
						Soft to firm grey mottled brown slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of flint.	1
1.70 1.70	PID ES	0.0	1.55	22.25		Stiff grey mottled brown slightly gravelly CLAY. Gravel is angular to sub-rounded fine to coarse of flint.	2
						Becoming very stiff from 2.4m bgl.	
			3.00	20.80		----- Trialpit Complete at 3.00 m	3

Remarks: 1. Position scanned for serviced prior to excavation by BSL Engineer.
2. Trial pit backfilled with arisings upon completion.

Groundwater: No groundwater encountered.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 543043E - 260255N
Level: 24.28 m AODDate
15/04/2013

Location: CAMBRIDGE

Dimensions: 2.70m



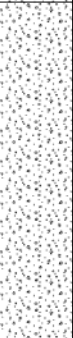

Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
2.40m

0.60m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.80 0.80	PID ES	0.0	0.65	23.63		Dark brown sandy gravelly clay TOPSOIL. Gravel is angular to subangular fine to coarse of flint. Many rootlets.	
1.30 1.30	PID ES	0.0	1.20	23.08		Firm dark brown orange slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of flint	1
2.25 2.25	PID ES	0.0	2.10	22.18		Yellow brown fine to medium SAND and fine to medium GRAVEL. Gravel is angular to subrounded of flint.	2
			2.40	21.88		Firm to stiff light grey slightly sandy very gravelly CLAY. Gravel is angular to subrounded fine to coarse of flint.	
Trialpit Complete at 2.40 m							3

Remarks:

1. Position scanned for serviced prior to excavation by BSL Engineer.
2. Trial pit terminated at 2.4m bgl due to continuous collapse.
3. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater encountered at 1.6m bgl.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542529E - 259830N
Level: 17.39 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.50m





Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.20m

1.00m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.50 0.50	PID ES	0.1	0.40	16.99		Slightly sandy gravelly clay TOPSOIL. Gravel of angular to sub-rounded flint.	
						Light grey brown firm slightly gravelly slightly sandy CLAY. Gravel is sub-angular of calcareous nodules and flint. With rare fibrous plant matter.	1
1.60 1.60	PID ES	0.0	1.20	16.19		Stiff to very stiff light grey friable CLAY.	2
						Very stiff from 2.2m bgl.	3
3.10 3.10	PID ES	0.0	3.20	14.19		Trialpit Complete at 3.20 m	

Remarks: 1. Position scanned for services by BSL engineer prior to excavation.
2. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater not encountered.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542598E - 259834N
Level: 18.54 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.50m








Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.50m

1.00m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.30 0.30	PID ES	0.0	0.20	18.34		Dark brown slightly sandy gravelly TOPSOIL.	
			0.50	18.04		Friable soft to firm light brown grey slightly gravelly CLAY. Gravel is of sub-angular to sub-rounded flint and calcareous nodules.	
1.40 1.40	PID ES	0.0				Firm light grey gravelly CLAY. Gravel is sub-rounded of calcareous nodules.	
						Stiff from 1.5m bgl	1
						Very stiff from 2.3m bgl.	2
						Occasional fibrous plant matter from 2.5m bgl.	3
3.30	ES		3.50	15.04		Trialpit Complete at 3.50 m	

Remarks: 1. Position scanned for services by BSL engineer prior to excavation
2. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater not encountered.



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Trialpit No
TP429
Sheet 1 of 1

Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 542771E - 259837N
Level: 21.72 m AOD

Date
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.70m


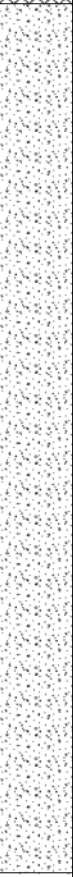
Depth
2.70m

1.00m

Scale
1:20

Logged By
DMG

Client: UNIVERSITY OF CAMBRIDGE

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.55	PID	0.0	0.40	21.32		MADE GROUND: Dark brown slightly clayey gravelly sand.	
1.60	PID	0.0				Orange brown slightly gravelly SAND. Gravel is angular of flint.	1
						Becoming wet and gravelly from 1.9m bgl.	2
						Dark brown and slightly gravelly from 2.3m bgl.	
2.70	PID	0.0	2.70	19.02		Trialpit Complete at 2.70 m	3

Remarks: 1. Position scanned for services by BSL engineer prior to excavation
2. Trial pit terminated at 2.7m bgl due to continuous collapse.
3. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater encountered at 2.0m bgl.



Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542566E - 259754N
Level: 17.01 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.70m







Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00m

1.00m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.60 0.60	PID ES	0.0	0.55	16.46		Dark brown very sandy clay TOPSOIL.	
						Soft to firm light grey brown slightly sandy slightly gravelly CLAY. Gravel is angular to sub-rounded of flint. Rare fibrous plant matter.	1
			1.05	15.96		Stiff light grey CLAY.	
1.60 1.60	PID ES	0.0				Occasional fibrous plant matter from 1.7m bgl	2
						Becoming very stiff from 2.1m bgl.	
2.80 2.80	PID ES	0.0	3.00	14.01		Trialpit Complete at 3.00 m	3

Remarks: 1. Position scanned for services by BSL engineer prior to excavation
2. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater not encountered.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542614E - 259735N
Level: 17.52 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.40m






Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00m

1.00m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.60 0.60	PID ES	0.0	0.50	17.02		Dark brown very sandy clay TOPSOIL.	
			1.00	16.52		Firm friable light grey slightly gravelly CLAY. Gravel is sub-angular of calcareous nodules.	
1.50 1.50	PID ES	0.0				Stiff to very stiff light grey slightly gravelly CLAY. Gravel is sub-angular of calcareous nodules.	1
						Occasional fibrous plant matter of 2.0m bgl.	2
2.70 2.70	PID ES	0.0	3.00	14.52		Trialpit Complete at 3.00 m	3

Remarks: 1. Position scanned for services by BSL engineer prior to excavation
2. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater not encountered.



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Trialpit No
TP432
Sheet 1 of 1

Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 542703E - 259720N
Level: 18.35 m AOD

Date
16/04/2013

Location: CAMBRIDGE

Dimensions: 3.60m

Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00m

1.00m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.45 0.45	PID ES	0.0	0.30	18.05		Dark brown very sandy clay TOPSOIL.
						Soft light brown slightly gravelly sandy CLAY.
1.30 1.30	PID ES	0.0	1.10	17.25		Firm light grey gravelly friable CLAY. Gravel is sub-angular of calcareous nodules.
						Stiff from 1.6m bgl.
2.90 2.90	PID ES	0.0	3.00	15.35		Trialpit Complete at 3.00 m

Remarks: 1. Position scanned for services by BSL engineer prior to excavation.
2. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater encountered at 1.00m bgl.



Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 542859E - 259820N
Level: 23.61 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 2.50m


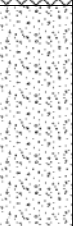



Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00m

0.60m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.70 0.70	PID ES	0.0	0.50	23.11		MADE GROUND: Slightly sandy slightly cobbly gravelly clay. Gravel and cobbles of brick and flint.	
						Reddish dark brown brown gravelly SAND. Gravel is angular to rounded of flint. Motor vehicle scrap found at 0.7m bgl including axle and traces of possible mineral oil.	1
			1.10	22.51		Stiff blue grey mottled light brown slightly gravelly sandy CLAY.	
1.80 1.80	PID ES	0.0	2.00	21.61		Dark grey blue stiff CLAY with occasional fibrous plant matter.	2
2.80 2.80	PID ES	0.0	3.00	20.61			
						----- Trialpit Complete at 3.00 m	3

Remarks:

1. Position scanned for services by BSL engineer prior to excavation.
2. Trial pit backfilled with arisings upon completion.
3. Pit excavated laterally at 0.7m following initial trial pit, oil traces found to be locally confined.

Groundwater:

Groundwater strike at 1.4m bgl. Slight seepage at 1.1m bgl, black with slight sheen.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 543052E - 259725N
Level: 24.76 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 2.70m


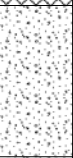



Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
2.90m

0.60m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.40 0.40	PID ES	0.0	0.50	24.26		Turf over MADE GROUND of dark brown very gravelly sand. Gravel of brick, concrete and rare coal.	
			0.90	23.86		Yellow brown very gravelly SAND. Gravel is angular to rounded of flint.	
1.00 1.00	PID ES	0.0	1.30	23.46		Orangey brown medium to coarse slightly gravelly clayey SAND. Gravel is angular to sub-angular of flint.	1
						Medium to coarse slightly gravelly SAND. Gravel is angular to sub-angular of flint.	
2.00 2.00	PID ES	0.0					2
			2.70	22.06		White to light brown silty SAND.	
2.80 2.80	PID ES	0.0	2.90	21.86		Trialpit Complete at 2.90 m	3

Remarks:

1. Position scanned for services by BSL engineer prior to excavation
2. Defunct water pipe encountered and broken at 0.7m bgl.
3. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater not encountered.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 543108E - 259731N
Level: 25.28 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 2.50m

Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00m

0.60m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
1.00 1.00	PID ES	0.0	0.80	24.48		MADE GROUND: Dark brown slightly sandy clay. Also buried wooden post.	
						Yellow brown very gravelly SAND. Angular to rounded gravel of flint.	1
1.80 1.80	PID ES	0.0	1.70	23.58		Orange brown very gravelly SAND. Gravel is sub-angular to sub-rounded of flint.	
			1.90	23.38		Damp white to light brown very silty SAND.	2
2.50 2.50	PID ES	0.0					
			3.00	22.28		Trialpit Complete at 3.00 m	3

Remarks: 1. Position scanned for services by BSL engineer prior to excavation.
2. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater not encountered.



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Trialpit No
TP436
Sheet 1 of 1

Project Name
NW CAMBRIDGE DEVELOPMENT

Project No.
C2157

Co-ords: 543082E - 259651N
Level: 22.70 m AOD

Date
16/04/2013

Location: CAMBRIDGE

Dimensions: 2.60m


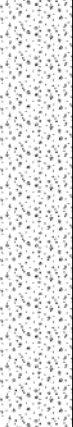
Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00m

0.60m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.15 0.15	PID ES	2.0	0.15	22.55		MADE GROUND: Turf over dark brown slightly silty sand & gravel. Gravel is angular of brick, flint and chalk.
0.90 0.90	PID ES	0.3				White to light brown SAND and GRAVEL. Gravel is angular to rounded of flint.
1.80 1.80	PID ES	0.0				Angular to rounded band of flint gravel at 1.3m bgl.
3.00 3.00	PID ES	0.0	3.00	19.70		Trialpit Complete at 3.00 m

Remarks: 1. Position scanned for services by BSL engineer prior to excavation.
3. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater not encountered.



Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 543110E - 259640N
Level: 22.91 m AODDate
16/04/2013

Location: CAMBRIDGE

Dimensions: 2.80m

Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00m

0.60m

Logged By
DMG

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.30 0.30	PID ES	7.0				MADE GROUND: Silty gravelly cobbly sand. Gravel and cobbles are angular to sub-angular of brick, concrete and flint.	
			0.60	22.31			
0.90 0.90	PID ES	2.1				Light brown slightly silty gravelly SAND. Gravel is angular of flint.	1
			1.30	21.61			
1.50 1.50	PID ES	0.0				White to light brown very gravelly SAND.	2
			2.30	20.61			
						Damp white to light brown slightly clayey silty SAND.	
2.80 2.80	PID ES	0.0					
			3.00	19.91			
						----- Trialpit Complete at 3.00 m	3

Remarks: 1. Position scanned for services by BSL engineer prior to excavation
2. Trial pit backfilled with arisings upon completion.

Groundwater: Groundwater encountered at 2.9m bgl.

Project Name
NW CAMBRIDGE DEVELOPMENTProject No.
C2157Co-ords: 543078E - 260101N
Level: 24.05 m AODDate
16/04/2013


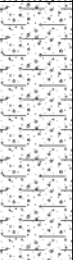


Location: CAMBRIDGE

Dimensions: -

Scale
1:20

Client: UNIVERSITY OF CAMBRIDGE

Depth
3.00mLogged By
AJS

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.50 0.50	PID ES	0.1	0.50	23.55		Brown clayey TOPSOIL with many roots and rootlets.	
1.20 1.20	PID ES	0.0	1.20	22.85		Light brown slightly clayey sandy GRAVEL. Gravel is of subangular to subrounded fine to coarse flint.	1
1.90 1.90	PID2 ES	0.0	1.90	22.15		Firm brown sandy CLAY.	
2.90 2.90	PID1 ES	0.0	3.00	21.05		Stiff to very stiff grey mottled brown silty desiccated CLAY.	2
						----- Trialpit Complete at 3.00 m -----	3
Remarks: 1. Position scanned for services prior to excavation by BSL engineer. 2. Some collapse within sandy gravels. 3. Trial pit backfilled with arisings upon completion.							
Groundwater: Moderate seepage encountered at 1.2m bgl.							

APPENDIX C

Chemical Laboratory Testing Certifiicates

Brownfield Solutions Limited
Wychwood House
1 Queen Street
Northwich, Cheshire
CW9 5JL

FAO Aaron Stokoe
03 May 2013

Dear Aaron Stokoe

Test Report Number **228942**
Your Project Reference **C2157 NW CAMBRIDGE**

Please find enclosed the results of analysis for the samples received 29 April 2013.

All soil samples will be retained for a period of one month and all water samples will be retained for 7 days following the date of the test report. Should you require an extended retention period then please detail your requirements in an email to customerservices@chemtest.co.uk. Please be aware that charges may be applicable for extended sample storage.

If you require any further assistance, please do not hesitate to contact the Customer Services team.

Yours sincerely



Darrell Hall, Director



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Notes to accompany report:

- The sign < means 'less than'
- Tests marked 'U' hold UKAS accreditation
- Tests marked 'M' hold MCertS (and UKAS) accreditation
- Tests marked 'N' do not currently hold UKAS accreditation
- Tests marked 'S' were subcontracted to an approved laboratory
- n/e means 'not evaluated'
- i/s means 'insufficient sample'
- u/s means 'unsuitable sample'
- Comments or interpretations are beyond the scope of UKAS accreditation
- The results relate only to the items tested
- All results are expressed on a dry weight basis
- The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, phenols
- For all other tests the samples were dried at < 37°C prior to analysis
- Uncertainties of measurement for the determinands tested are available upon request
- None of the test results included in this report have been recovery corrected

Test Report 228942 Cover Sheet

LABORATORY TEST REPORT

Results of analysis of 6 samples
received 29 April 2013

Report Date
03 May 2013

FAO Aaron Stokoe

C2157 NW CAMBRIDGE

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓ Determinand↓

CAS No↓

Units↓

*

					228942					
					AI61687	AI61688	AI61689	AI61690	AI61691	AI61692
					BH401	BH402	BH403	BH404	BH405	BH407
					23/4/2013	23/4/2013	23/4/2013	23/4/2013	23/4/2013	23/4/2013
					WATER	WATER	WATER	WATER	WATER	WATER
1010	pH	PH		U	7.7	7.7	7.6	7.8	7.6	7.3
1020	Electrical Conductivity	EC	µS cm ⁻¹	U	1000	950	1300	2200	1000	1900
1180	Sulfur	7704349	mg l ⁻¹	N	60	23	107	367	22	107
1220	Chloride	16887006	mg l ⁻¹	U	18	13	28	91	16	26
	Ammoniacal Nitrogen	AMM_NITROG	mg l ⁻¹	U	0.07	0.12	0.11	0.28	0.56	0.14
	Nitrate	14797558	mg l ⁻¹	U	29	140	130	6.4	26	130
1300	Cyanide (total)	57125	mg l ⁻¹	U	< 0.05	<0.050	<0.050	<0.050	<0.050	<0.050
	Cyanide (free)	57125	mg l ⁻¹	U	< 0.05	<0.050	<0.050	<0.050	<0.050	<0.050
1325	Sulfide	18496258	mg l ⁻¹	U	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1270	Hardness	HARD_TOT	mg CaCO ₃ l ⁻¹	U	280	340	380	890	340	850
1415	Calcium	7440702	mg l ⁻¹	U	110	130	140	300	120	310
	Potassium	7440097	mg l ⁻¹	U	1.4	<0.50	27	34	37	87
	Magnesium	7439954	mg l ⁻¹	U	4.1	3.7	6.7	37	9.1	18
	Sodium	7440235	mg l ⁻¹	U	38	12	27	160	25	41
1220	Sulfate	14808798	mg l ⁻¹	U	180	69	320	1100	66	320
1450	Arsenic	7440382	µg l ⁻¹	U	3.1	<1.0	<1.0	1.7	<1.0	4.1
	Boron	7440428	µg l ⁻¹	U	540	1000	840	660	590	1300
	Barium	7440393	µg l ⁻¹	U	29	34	43	40	50	53
	Beryllium	7440417	µg l ⁻¹	U	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Cadmium	7440439	µg l ⁻¹	U	<0.080	<0.080	<0.080	<0.080	<0.080	<0.080
	Chromium	7440473	µg l ⁻¹	U	<1.0	<1.0	<1.0	12	<1.0	2.4
	Copper	7440508	µg l ⁻¹	U	1.6	1.2	1.6	4.0	4.8	3.9
	Mercury	7439976	µg l ⁻¹	U	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	Nickel	7440020	µg l ⁻¹	U	1.3	<1.0	1.3	2.0	2.3	3.6

LABORATORY TEST REPORT

Results of analysis of 6 samples
received 29 April 2013

Report Date
03 May 2013

FAO Aaron Stokoe

C2157 NW CAMBRIDGE

					228942					
					AI61687	AI61688	AI61689	AI61690	AI61691	AI61692
					BH401	BH402	BH403	BH404	BH405	BH407
					23/4/2013	23/4/2013	23/4/2013	23/4/2013	23/4/2013	23/4/2013
					WATER	WATER	WATER	WATER	WATER	WATER
1450	Lead	7439921	µg l ⁻¹	U	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Selenium	7782492	µg l ⁻¹	U	26	4.4	13	29	5.5	4.1
	Vanadium	7440622	µg l ⁻¹	U	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
	Zinc	7440666	µg l ⁻¹	U	7.5	3.6	4.4	12	3.4	12
1490	Chromium (hexavalent)	18540299	µg l ⁻¹	U	<20	<20	<20	<20	<20	<20
1670	TPH (Aqueous Phase)		µg l ⁻¹	U	<10	<10	<10	<10	<10	<10
1700	Total (of 17) PAHs		µg l ⁻¹		<2	<2	<2	<2	<2	<2
	Naphthalene	91203	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Acenaphthylene	208968	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Acenaphthene	83329	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Fluorene	86737	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Phenanthrene	85018	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Anthracene	120127	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Fluoranthene	206440	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Pyrene	129000	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Benzo[a]anthracene	56553	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Chrysene	218019	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Benzo[b]fluoranthene	205992	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Benzo[k]fluoranthene	207089	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Benzo[a]pyrene	50328	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Dibenzo[a,h]anthracene	53703	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Indeno[1,2,3-cd]pyrene	193395	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Benzo[g,h,i]perylene	191242	µg l ⁻¹	U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	Coronene	191071	µg l ⁻¹	N	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1920	Phenols (total)		mg l ⁻¹	N	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03

Brownfield Solutions Limited
Wychwood House
1 Queen Street
Northwich, Cheshire
CW9 5JL

FAO Aaron Stokoe
02 May 2013

Dear Aaron Stokoe

Test Report Number **228798**
Your Project Reference **C2157 NW Cambridge**

Please find enclosed the results of analysis for the samples received 26 April 2013.

If you require any further assistance, please do not hesitate to contact the Customer Services team.

Yours sincerely



Keith Jones, Technical Manager



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Notes to accompany report:

- The in-house procedure is employed to identify materials and fibres in soils
- The sample is examined by stereo-binocular and polarised light microscopy
- Sample size is reduced by coning and quartering to obtain a representative sub-sample if necessary
- The bulk identification is in accordance with the requirements of the analyst guide (HSG 248)
- Samples associated with asbestos are retained for six months
- The results relate only to the items tested as supplied by the client
- Comments or interpretations are beyond the scope of UKAS accreditation



Test Report **228798** **Cover Sheet**

INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
received 26 April 2013

Report Date
02 May 2013

FAO Aaron Stokoe

C2157 NW Cambridge

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓ Determinand↓

CAS No↓

Units↓

*

				228798					
				AI60724	AI60725	AI60726	AI60727	AI60728	AI60729
				TP406	TP407	TP407	TP408	TP408	TP409
				16/4/2013	17/4/2013	17/4/2013	16/4/2013	16/4/2013	16/4/2013
				0.70m	0.20m	1.80m	0.30m	1.60m	0.40m
				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2010	pH		M	7.8	8.2	8.1	8.5	8.5	7.5
2625	Organic matter		%	0.95	< 0.40	0.97	< 0.40	< 0.40	0.50
2120	Boron (hot water soluble)	7440428	mg kg ⁻¹	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
2490	Chromium (hexavalent)	18540299	mg kg ⁻¹	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2450	Arsenic	7440382	mg kg ⁻¹	9.1	20	9.1	9.9	9.8	13
	Cadmium	7440439	mg kg ⁻¹	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Chromium	7440473	mg kg ⁻¹	22	16	21	8.4	5.4	19
	Copper	7440508	mg kg ⁻¹	7.9	12	18	<5.0	5.1	8.7
	Mercury	7439976	mg kg ⁻¹	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Nickel	7440020	mg kg ⁻¹	21	26	36	14	7.3	26
	Lead	7439921	mg kg ⁻¹	14	11	16	7.6	<5.0	9.9
	Selenium	7782492	mg kg ⁻¹	<0.20	<0.20	0.33	<0.20	<0.20	<0.20
	Zinc	7440666	mg kg ⁻¹	32	23	34	12	15	38
2675	TPH aliphatic >C5-C6		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C6-C8		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C8-C10		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C10-C12		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C12-C16		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C16-C21		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C21-C35		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C35-C44		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C5-C7		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C7-C8		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C8-C10		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
received 26 April 2013

Report Date
02 May 2013

FAO Aaron Stokoe

C2157 NW Cambridge

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓ Determinand↓

CAS No↓

Units↓

*

228798

				AI60730	AI60731	AI60732	AI60733	AI60734	AI60735
				TP410	TP411	TP411	TP412	TP413	TP414
				16/4/2013	17/4/2013	17/4/2013	16/4/2013	16/4/2013	16/4/2013
				0.35m	0.40m	1.20m	0.45m	0.60m	0.50m
				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2010	pH		M	8.1	8.0	8.6	7.2	7.3	7.0
2625	Organic matter		%	1.4	0.48	< 0.40	0.83	0.66	0.93
2120	Boron (hot water soluble)	7440428	mg kg ⁻¹	1.7	0.6	<0.4	0.6	0.5	1.0
2490	Chromium (hexavalent)	18540299	mg kg ⁻¹	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2450	Arsenic	7440382	mg kg ⁻¹	11	20	17	27	18	22
	Cadmium	7440439	mg kg ⁻¹	<0.10	<0.10	<0.10	0.49	0.24	0.27
	Chromium	7440473	mg kg ⁻¹	23	21	13	16	9.2	12
	Copper	7440508	mg kg ⁻¹	8.4	12	5.8	13	9.8	14
	Mercury	7439976	mg kg ⁻¹	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Nickel	7440020	mg kg ⁻¹	21	37	17	27	28	24
	Lead	7439921	mg kg ⁻¹	32	14	5.3	18	12	13
	Selenium	7782492	mg kg ⁻¹	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Zinc	7440666	mg kg ⁻¹	33	38	18	43	28	33
2675	TPH aliphatic >C5-C6		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C6-C8		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C8-C10		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C10-C12		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C12-C16		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C16-C21		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C21-C35		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C35-C44		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C5-C7		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C7-C8		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C8-C10		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
received 26 April 2013

Report Date
02 May 2013

FAO Aaron Stokoe

C2157 NW Cambridge

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓ Determinand↓

CAS No↓

Units↓

*

228798

				AI60736	AI60737	AI60738	AI60739	AI60740	AI60741
				TP414	TP415	TP416	TP417	TP418	TP419
				16/4/2013	16/4/2013	17/4/2013	17/4/2013	17/4/2013	17/4/2013
				1.00m	0.60m	0.50m	0.60m	0.20m	0.10m
				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2010	pH		M	8.4	7.9	7.8	7.9	7.8	7.6
2625	Organic matter		%	< 0.40	1.1	1.2	0.91	1.1	0.59
2120	Boron (hot water soluble)	7440428	mg kg ⁻¹	<0.4	1.0	1.2	0.5	1.1	0.5
2490	Chromium (hexavalent)	18540299	mg kg ⁻¹	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5
2450	Arsenic	7440382	mg kg ⁻¹	21	19	21	13	12	9.6
	Cadmium	7440439	mg kg ⁻¹	0.21	<0.10	<0.10	<0.10	<0.10	<0.10
	Chromium	7440473	mg kg ⁻¹	9.0	29	28	24	26	14
	Copper	7440508	mg kg ⁻¹	9.3	13	14	18	9.7	5.1
	Mercury	7439976	mg kg ⁻¹	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Nickel	7440020	mg kg ⁻¹	25	34	38	42	26	17
	Lead	7439921	mg kg ⁻¹	9.8	19	18	15	14	6.6
	Selenium	7782492	mg kg ⁻¹	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Zinc	7440666	mg kg ⁻¹	28	45	46	34	38	21
2675	TPH aliphatic >C5-C6		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C6-C8		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C8-C10		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C10-C12		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C12-C16		mg kg ⁻¹	< 1 ¹	< 1 ¹	1.6 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C16-C21		mg kg ⁻¹	< 1 ¹	< 1 ¹	16 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C21-C35		mg kg ⁻¹	< 1 ¹	< 1 ¹	15 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C35-C44		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C5-C7		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C7-C8		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C8-C10		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
received 26 April 2013

C2157 NW Cambridge

Report Date
02 May 2013

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓ Determinand↓

CAS No↓

Units↓

*

228798

				AI60742	AI60743	AI60744	AI60745	AI60746	AI60747
				TP419	TP420	TP421	TP422	TP423	TP427
				17/4/2013	17/4/2013	17/4/2013	17/4/2013	17/4/2013	17/4/2013
				1.30m	0.40m	0.50m	0.50m	0.50m	0.50m
				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2010	pH		M	7.7	7.9	8.1	8.0	8.2	8.1
2625	Organic matter		%	4.0	0.47	1.4	2.1	1.4	1.4
2120	Boron (hot water soluble)	7440428	mg kg ⁻¹	<0.4	<0.4	1.5	<0.4	1.5	1.3
2490	Chromium (hexavalent)	18540299	mg kg ⁻¹	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2450	Arsenic	7440382	mg kg ⁻¹	14	19	8.6	12	12	8.6
	Cadmium	7440439	mg kg ⁻¹	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Chromium	7440473	mg kg ⁻¹	16	18	24	34	32	32
	Copper	7440508	mg kg ⁻¹	9.2	8.5	12	17	12	16
	Mercury	7439976	mg kg ⁻¹	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Nickel	7440020	mg kg ⁻¹	25	25	24	34	30	32
	Lead	7439921	mg kg ⁻¹	7.8	9.5	24	35	18	19
	Selenium	7782492	mg kg ⁻¹	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Zinc	7440666	mg kg ⁻¹	23	27	28	47	38	38
2675	TPH aliphatic >C5-C6		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C6-C8		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C8-C10		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C10-C12		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C12-C16		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C16-C21		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C21-C35		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C35-C44		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C5-C7		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C7-C8		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C8-C10		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
received 26 April 2013

Report Date
02 May 2013

FAO Aaron Stokoe

C2157 NW Cambridge

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓ Determinand↓

CAS No↓

Units↓

*

228798

				AI60748	AI60749	AI60750	AI60751	AI60752	AI60753
				TP428	TP428	TP430	TP431	TP432	TP433
				17/4/2013	17/4/2013	17/4/2013	17/4/2013	17/4/2013	18/4/2013
				0.30m	1.40m	0.60m	0.60m	0.45m	0.70m
				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2010	pH		M	8.1	7.8	8.2	8.1	8.2	8.3
2625	Organic matter		%	1.3	0.69	1.2	1.0	0.81	2.2
2120	Boron (hot water soluble)	7440428	mg kg ⁻¹	0.4	0.5	0.8	0.6	0.5	1.7
2490	Chromium (hexavalent)	18540299	mg kg ⁻¹	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2450	Arsenic	7440382	mg kg ⁻¹	11	14	7.8	12	17	18
	Cadmium	7440439	mg kg ⁻¹	<0.10	<0.10	<0.10	<0.10	<0.10	9.6
	Chromium	7440473	mg kg ⁻¹	28	23	25	34	22	34
	Copper	7440508	mg kg ⁻¹	12	17	12	16	8.3	92
	Mercury	7439976	mg kg ⁻¹	<0.10	<0.10	<0.10	<0.10	<0.10	0.13
	Nickel	7440020	mg kg ⁻¹	28	38	24	44	29	44
	Lead	7439921	mg kg ⁻¹	18	16	18	18	11	95
	Selenium	7782492	mg kg ⁻¹	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Zinc	7440666	mg kg ⁻¹	34	31	26	38	22	210
2675	TPH aliphatic >C5-C6		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C6-C8		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C8-C10		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C10-C12		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C12-C16		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C16-C21		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C21-C35		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C35-C44		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C5-C7		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C7-C8		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C8-C10		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
received 26 April 2013

Report Date
02 May 2013

FAO Aaron Stokoe

C2157 NW Cambridge

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓ Determinand↓

CAS No↓

Units↓

*

228798

				AI60754	AI60755	AI60756	AI60757	AI60758	AI60759
				TP433	TP434	TP434	TP435	TP436	TP436
				18/4/2013	18/4/2013	18/4/2013	18/4/2013	18/4/2013	18/4/2013
				1.80m	0.40m	1.00m	1.00m	0.15m	0.90m
				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2010	pH		M	8.5	8.3	8.0	8.3	7.8	8.7
2625	Organic matter		%	< 0.40	0.43	< 0.40	0.52	2.1	< 0.40
2120	Boron (hot water soluble)	7440428	mg kg ⁻¹	<0.4	<0.4	0.5	<0.4	1.0	<0.4
2490	Chromium (hexavalent)	18540299	mg kg ⁻¹	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2450	Arsenic	7440382	mg kg ⁻¹	15	33	23	29	22	23
	Cadmium	7440439	mg kg ⁻¹	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Chromium	7440473	mg kg ⁻¹	21	28	37	22	24	16
	Copper	7440508	mg kg ⁻¹	17	18	21	12	26	9.6
	Mercury	7439976	mg kg ⁻¹	<0.10	<0.10	<0.10	<0.10	0.21	<0.10
	Nickel	7440020	mg kg ⁻¹	29	44	47	34	29	24
	Lead	7439921	mg kg ⁻¹	13	20	12	13	83	7.9
	Selenium	7782492	mg kg ⁻¹	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
	Zinc	7440666	mg kg ⁻¹	25	68	51	40	160	31
2675	TPH aliphatic >C5-C6		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C6-C8		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C8-C10		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C10-C12		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C12-C16		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C16-C21		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C21-C35		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C35-C44		mg kg ⁻¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C5-C7		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C7-C8		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C8-C10		mg kg ⁻¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹

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INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
received 26 April 2013

Report Date
02 May 2013

FAO Aaron Stokoe

C2157 NW Cambridge

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓ Determinand↓

CAS No↓

Units↓

*

228798

AI60760

AI60761

AI60762

TP437

TP437

TP438

18/4/2013

18/4/2013

16/4/2013

0.30m

0.90m

0.50m

SOIL

SOIL

SOIL

2010	pH			M	8.0	8.2	8.2
2625	Organic matter		%	M	2.1	0.67	0.72
2120	Boron (hot water soluble)	7440428	mg kg ⁻¹	M	0.7	<0.4	0.5
2490	Chromium (hexavalent)	18540299	mg kg ⁻¹	N	<0.5	<0.5	<0.5
2450	Arsenic	7440382	mg kg ⁻¹	M	19	21	18
	Cadmium	7440439	mg kg ⁻¹	M	<0.10	<0.10	<0.10
	Chromium	7440473	mg kg ⁻¹	M	16	21	21
	Copper	7440508	mg kg ⁻¹	M	40	19	11
	Mercury	7439976	mg kg ⁻¹	M	<0.10	<0.10	<0.10
	Nickel	7440020	mg kg ⁻¹	M	27	31	24
	Lead	7439921	mg kg ⁻¹	M	29	17	13
	Selenium	7782492	mg kg ⁻¹	M	<0.20	<0.20	<0.20
	Zinc	7440666	mg kg ⁻¹	M	59	49	37
2675	TPH aliphatic >C5-C6		mg kg ⁻¹	N	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C6-C8		mg kg ⁻¹	N	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C8-C10		mg kg ⁻¹	N	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aliphatic >C10-C12		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C12-C16		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C16-C21		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C21-C35		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aliphatic >C35-C44		mg kg ⁻¹	N	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C5-C7		mg kg ⁻¹	N	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C7-C8		mg kg ⁻¹	N	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹
	TPH aromatic >C8-C10		mg kg ⁻¹	N	< 0.1 ¹	< 0.1 ¹	< 0.1 ¹

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

Column page 7

Report page 1 of 2

LIMS sample ID range AI60724 to AI60762

INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
received 26 April 2013

C2157 NW Cambridge

Report Date
02 May 2013

					228798					
					AI60724	AI60725	AI60726	AI60727	AI60728	AI60729
					TP406	TP407	TP407	TP408	TP408	TP409
					16/4/2013	17/4/2013	17/4/2013	16/4/2013	16/4/2013	16/4/2013
					0.70m	0.20m	1.80m	0.30m	1.60m	0.40m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2675	TPH aromatic >C10-C12		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C12-C16		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C16-C21		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C21-C35		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C35-C44		mg kg ⁻¹	N	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	Total Petroleum Hydrocarbons		mg kg ⁻¹	N	< 10 ¹	< 10 ¹	< 10 ¹	< 10 ¹	< 10 ¹	< 10 ¹
2800	Naphthalene	91203	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Acenaphthylene	208968	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Acenaphthene	83329	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Fluorene	86737	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Phenanthrene	85018	mg kg ⁻¹	M	0.042	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Anthracene	120127	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Fluoranthene	206440	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Pyrene	129000	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[a]anthracene	56553	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Chrysene	218019	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[b]fluoranthene	205992	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[k]fluoranthene	207089	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[a]pyrene	50328	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
	Dibenzo[a,h]anthracene	53703	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Indeno[1,2,3-cd]pyrene	193395	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[g,h,i]perylene	191242	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Total (of 16) PAHs		mg kg ⁻¹	N	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
received 26 April 2013

C2157 NW Cambridge

Report Date
02 May 2013

					228798					
					AI60730	AI60731	AI60732	AI60733	AI60734	AI60735
					TP410	TP411	TP411	TP412	TP413	TP414
					16/4/2013	17/4/2013	17/4/2013	16/4/2013	16/4/2013	16/4/2013
					0.35m	0.40m	1.20m	0.45m	0.60m	0.50m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2675	TPH aromatic >C10-C12		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C12-C16		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C16-C21		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C21-C35		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C35-C44		mg kg ⁻¹	N	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	Total Petroleum Hydrocarbons		mg kg ⁻¹	N	< 10 ¹	< 10 ¹	< 10 ¹	< 10 ¹	< 10 ¹	< 10 ¹
2800	Naphthalene	91203	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Acenaphthylene	208968	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Acenaphthene	83329	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Fluorene	86737	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Phenanthrene	85018	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Anthracene	120127	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Fluoranthene	206440	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Pyrene	129000	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[a]anthracene	56553	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Chrysene	218019	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[b]fluoranthene	205992	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[k]fluoranthene	207089	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[a]pyrene	50328	mg kg ⁻¹	M	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Dibenzo[a,h]anthracene	53703	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Indeno[1,2,3-cd]pyrene	193395	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[g,h,i]perylene	191242	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Total (of 16) PAHs		mg kg ⁻¹	N	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
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C2157 NW Cambridge

Report Date
02 May 2013

					228798					
					AI60736	AI60737	AI60738	AI60739	AI60740	AI60741
					TP414	TP415	TP416	TP417	TP418	TP419
					16/4/2013	16/4/2013	17/4/2013	17/4/2013	17/4/2013	17/4/2013
					1.00m	0.60m	0.50m	0.60m	0.20m	0.10m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2675	TPH aromatic >C10-C12		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C12-C16		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C16-C21		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	1.6 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C21-C35		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	3.6 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C35-C44		mg kg ⁻¹	N	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	Total Petroleum Hydrocarbons		mg kg ⁻¹	N	< 10 ¹	< 10 ¹	39 ¹	< 10 ¹	< 10 ¹	< 10 ¹
2800	Naphthalene	91203	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Acenaphthylene	208968	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Acenaphthene	83329	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Fluorene	86737	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Phenanthrene	85018	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Anthracene	120127	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Fluoranthene	206440	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Pyrene	129000	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[a]anthracene	56553	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Chrysene	218019	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[b]fluoranthene	205992	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[k]fluoranthene	207089	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[a]pyrene	50328	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Dibenzo[a,h]anthracene	53703	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Indeno[1,2,3-cd]pyrene	193395	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[g,h,i]perylene	191242	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Total (of 16) PAHs		mg kg ⁻¹	N	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
received 26 April 2013

C2157 NW Cambridge

Report Date
02 May 2013

					228798					
					AI60742	AI60743	AI60744	AI60745	AI60746	AI60747
					TP419	TP420	TP421	TP422	TP423	TP427
					17/4/2013	17/4/2013	17/4/2013	17/4/2013	17/4/2013	17/4/2013
					1.30m	0.40m	0.50m	0.50m	0.50m	0.50m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2675	TPH aromatic >C10-C12		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C12-C16		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C16-C21		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C21-C35		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C35-C44		mg kg ⁻¹	N	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	Total Petroleum Hydrocarbons		mg kg ⁻¹	N	< 10 ¹	< 10 ¹	< 10 ¹	< 10 ¹	< 10 ¹	< 10 ¹
2800	Naphthalene	91203	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Acenaphthylene	208968	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Acenaphthene	83329	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Fluorene	86737	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Phenanthrene	85018	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Anthracene	120127	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Fluoranthene	206440	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Pyrene	129000	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[a]anthracene	56553	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Chrysene	218019	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[b]fluoranthene	205992	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[k]fluoranthene	207089	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[a]pyrene	50328	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Dibenzo[a,h]anthracene	53703	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Indeno[1,2,3-cd]pyrene	193395	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[g,h,i]perylene	191242	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Total (of 16) PAHs		mg kg ⁻¹	N	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2

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INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
received 26 April 2013

Report Date
02 May 2013

FAO Aaron Stokoe

C2157 NW Cambridge

					228798					
					AI60748	AI60749	AI60750	AI60751	AI60752	AI60753
					TP428	TP428	TP430	TP431	TP432	TP433
					17/4/2013	17/4/2013	17/4/2013	17/4/2013	17/4/2013	18/4/2013
					0.30m	1.40m	0.60m	0.60m	0.45m	0.70m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2675	TPH aromatic >C10-C12		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C12-C16		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C16-C21		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C21-C35		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C35-C44		mg kg ⁻¹	N	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	Total Petroleum Hydrocarbons		mg kg ⁻¹	N	< 10 ¹	< 10 ¹	< 10 ¹	< 10 ¹	< 10 ¹	< 10 ¹
2800	Naphthalene	91203	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	1
	Acenaphthylene	208968	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.032
	Acenaphthene	83329	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.057
	Fluorene	86737	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.21
	Phenanthrene	85018	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	1.4
	Anthracene	120127	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.43
	Fluoranthene	206440	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	1.4
	Pyrene	129000	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	1
	Benzo[a]anthracene	56553	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.3
	Chrysene	218019	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.36
	Benzo[b]fluoranthene	205992	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.27
	Benzo[k]fluoranthene	207089	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.059
	Benzo[a]pyrene	50328	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.072
	Dibenzo[a,h]anthracene	53703	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Indeno[1,2,3-cd]pyrene	193395	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[g,h,i]perylene	191242	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Total (of 16) PAHs		mg kg ⁻¹	N	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	6.6

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INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
received 26 April 2013

C2157 NW Cambridge

Report Date
02 May 2013

					228798					
					AI60754	AI60755	AI60756	AI60757	AI60758	AI60759
					TP433	TP434	TP434	TP435	TP436	TP436
					18/4/2013	18/4/2013	18/4/2013	18/4/2013	18/4/2013	18/4/2013
					1.80m	0.40m	1.00m	1.00m	0.15m	0.90m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2675	TPH aromatic >C10-C12		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C12-C16		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C16-C21		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	5.4 ¹	< 1 ¹
	TPH aromatic >C21-C35		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	11 ¹	< 1 ¹
	TPH aromatic >C35-C44		mg kg ⁻¹	N	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹	< 1 ¹
	Total Petroleum Hydrocarbons		mg kg ⁻¹	N	< 10 ¹	< 10 ¹	< 10 ¹	< 10 ¹	18 ¹	< 10 ¹
2800	Naphthalene	91203	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Acenaphthylene	208968	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	0.16	< 0.01
	Acenaphthene	83329	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Fluorene	86737	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Phenanthrene	85018	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	0.17	< 0.01
	Anthracene	120127	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	0.15	< 0.01
	Fluoranthene	206440	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	0.56	< 0.01
	Pyrene	129000	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	0.75	< 0.01
	Benzo[a]anthracene	56553	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	0.26	< 0.01
	Chrysene	218019	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	0.28	< 0.01
	Benzo[b]fluoranthene	205992	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	0.34	< 0.01
	Benzo[k]fluoranthene	207089	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	0.14	< 0.01
	Benzo[a]pyrene	50328	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	0.23	< 0.01
	Dibenzo[a,h]anthracene	53703	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Indeno[1,2,3-cd]pyrene	193395	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo[g,h,i]perylene	191242	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total (of 16) PAHs			mg kg ⁻¹	N	< 0.2	< 0.2	< 0.2	< 0.2	3	< 0.2

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

INTERIM LABORATORY TEST REPORT

Results of analysis of 39 samples
received 26 April 2013

C2157 NW Cambridge

Report Date
02 May 2013

					228798		
					AI60760	AI60761	AI60762
					TP437	TP437	TP438
					18/4/2013	18/4/2013	16/4/2013
					0.30m	0.90m	0.50m
					SOIL	SOIL	SOIL
2675	TPH aromatic >C10-C12		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C12-C16		mg kg ⁻¹	M	< 1 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C16-C21		mg kg ⁻¹	M	2.8 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C21-C35		mg kg ⁻¹	M	6.8 ¹	< 1 ¹	< 1 ¹
	TPH aromatic >C35-C44		mg kg ⁻¹	N	< 1 ¹	< 1 ¹	< 1 ¹
	Total Petroleum Hydrocarbons		mg kg ⁻¹	N	< 10 ¹	< 10 ¹	< 10 ¹
2800	Naphthalene	91203	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01
	Acenaphthylene	208968	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01
	Acenaphthene	83329	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01
	Fluorene	86737	mg kg ⁻¹	M	< 0.01	< 0.01	< 0.01
	Phenanthrene	85018	mg kg ⁻¹	M	0.6	< 0.01	< 0.01
	Anthracene	120127	mg kg ⁻¹	M	0.042	< 0.01	< 0.01
	Fluoranthene	206440	mg kg ⁻¹	M	0.94	< 0.01	< 0.01
	Pyrene	129000	mg kg ⁻¹	M	0.74	< 0.01	< 0.01
	Benzo[a]anthracene	56553	mg kg ⁻¹	M	0.28	< 0.01	< 0.01
	Chrysene	218019	mg kg ⁻¹	M	0.38	< 0.01	< 0.01
	Benzo[b]fluoranthene	205992	mg kg ⁻¹	M	0.58	< 0.01	< 0.01
	Benzo[k]fluoranthene	207089	mg kg ⁻¹	N	0.14	< 0.01	< 0.01
	Benzo[a]pyrene	50328	mg kg ⁻¹	M	0.27	< 0.01	< 0.01
	Dibenzo[a,h]anthracene	53703	mg kg ⁻¹	N	< 0.01	< 0.01	< 0.01
	Indeno[1,2,3-cd]pyrene	193395	mg kg ⁻¹	M	0.08	< 0.01	< 0.01
	Benzo[g,h,i]perylene	191242	mg kg ⁻¹	M	0.13	< 0.01	< 0.01
	Total (of 16) PAHs		mg kg ⁻¹	N	4.2	< 0.2	< 0.2

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

Brownfield Solutions Limited
Wychwood House
1 Queen Street
Northwich, Cheshire
CW9 5JL

FAO Aaron Stokoe
26 April 2013

Dear Aaron Stokoe

Test Report Number 228395
Your Project Reference C2157 - NW Cambridge

Please find enclosed the results of analysis for the samples received 22 April 2013.

All soil samples will be retained for a period of one month and all water samples will be retained for 7 days following the date of the test report. Should you require an extended retention period then please detail your requirements in an email to customerservices@chemtest.co.uk. Please be aware that charges may be applicable for extended sample storage.

If you require any further assistance, please do not hesitate to contact the Customer Services team.

Yours sincerely



Darrell Hall, Director



Notes to accompany report:

- The sign < means 'less than'
- Tests marked 'U' hold UKAS accreditation
- Tests marked 'M' hold MCertS (and UKAS) accreditation
- Tests marked 'N' do not currently hold UKAS accreditation
- Tests marked 'S' were subcontracted to an approved laboratory
- n/e means 'not evaluated'
- i/s means 'insufficient sample'
- u/s means 'unsuitable sample'
- Comments or interpretations are outside of the scope of UKAS accreditation
- The results relate only to the items tested
- Stones represent the quantity of material removed prior to analysis
- All results are expressed on a dry weight basis
- The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, phenols
- For all other tests the samples were dried at < 37°C prior to analysis
- Uncertainties of measurement for the determinands tested are available upon request
- Soil descriptions, including colour and texture, are beyond the scope of MCertS accreditation
- None of the test results included in this report have been recovery corrected

Test Report 228395 Cover Sheet

Brownfield Solutions Limited
Wychwood House
1 Queen Street
Northwich, Cheshire
CW9 5JL

FAO Aaron Stokoe

LABORATORY TEST REPORT

Results of analysis of 8 samples
received 22 April 2013

C2157 - NW Cambridge



Report Date
26 April 2013

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓ Determinand↓

CAS No↓

Units↓

*

					228395					
					AI58233	AI58234	AI58235	AI58236	AI58237	AI58238
					TP402	TP402	TP403	TP404	TP405	TP424
					15/4/2013	15/4/2013	15/4/2013	15/4/2013	15/4/2013	15/4/2013
					0.70m	0.70m	0.70m	1.40m	0.60m	1.10m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2030	Moisture		%	n/a	16.6	9.66	17.7	9	16.4	9.95
	Stones content (>50mm)		%	n/a	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
2040	Soil colour			M	brown	brown	brown	brown	brown	brown
	Soil texture			M	clay	sand	clay	sand	sand	sand
	Other material			M	stones	stones	stones	stones	stones	stones
2010	pH			M	8.3	8.8	8.3	8.5	7.8	8.3
2625	Organic matter		%	M	0.72	< 0.40	0.57	< 0.40	0.59	0.41
2120	Boron (hot water soluble)	7440428	mg kg ⁻¹	M	<0.4	<0.4	<0.4	<0.4	0.5	0.4
	Sulfate (2:1 water soluble) as SO ₄	14808798	g l ⁻¹	M	0.04	<0.01	0.01	0.04	0.18	0.07
2450	Arsenic	7440382	mg kg ⁻¹	M	17	21	6.5	21	14	34
	Cadmium	7440439	mg kg ⁻¹	M	<0.10	0.14	<0.10	0.20	0.15	0.13
	Chromium	7440473	mg kg ⁻¹	M	22	13	11	20	30	17
	Copper	7440508	mg kg ⁻¹	M	21	6.6	11	17	10	16
	Mercury	7439976	mg kg ⁻¹	M	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Nickel	7440020	mg kg ⁻¹	M	50	16	20	42	27	26
	Lead	7439921	mg kg ⁻¹	M	17	9.5	9.0	12	13	10
	Zinc	7440666	mg kg ⁻¹	M	55	31	23	62	38	100
2675	TPH aliphatic >C5-C6		mg kg ⁻¹	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH aliphatic >C6-C8		mg kg ⁻¹	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH aliphatic >C8-C10		mg kg ⁻¹	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH aliphatic >C10-C12		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1
	TPH aliphatic >C12-C16		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1
	TPH aliphatic >C16-C21		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1
	TPH aliphatic >C21-C35		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1

All tests undertaken between 22/04/2013 and 26/04/2013

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

Column page 1

Report page 1 of 4

LIMS sample ID range AI58233 to AI58240

Brownfield Solutions Limited
Wychwood House
1 Queen Street
Northwich, Cheshire
CW9 5JL

FAO Aaron Stokoe

LABORATORY TEST REPORT

Results of analysis of 8 samples
received 22 April 2013

C2157 - NW Cambridge



Report Date
26 April 2013

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓ Determinand↓

CAS No↓

Units↓

*

228395

AI58239

AI58240

TP425

TP426

15/4/2013

15/4/2013

1.70m

0.80m

SOIL

SOIL

2030	Moisture		%	n/a	18.3	7.08
	Stones content (>50mm)		%	n/a	<0.02	<0.02
2040	Soil colour			M	brown	brown
	Soil texture			M	clay	clay
	Other material			M	stones	stones
2010	pH			M	8.2	8.2
2625	Organic matter		%	M	< 0.40	1.1
2120	Boron (hot water soluble)	7440428	mg kg ⁻¹	M	0.4	0.5
	Sulfate (2:1 water soluble) as SO4	14808798	g l ⁻¹	M	0.07	0.14
2450	Arsenic	7440382	mg kg ⁻¹	M	18	17
	Cadmium	7440439	mg kg ⁻¹	M	<0.10	0.15
	Chromium	7440473	mg kg ⁻¹	M	23	25
	Copper	7440508	mg kg ⁻¹	M	16	12
	Mercury	7439976	mg kg ⁻¹	M	<0.10	0.12
	Nickel	7440020	mg kg ⁻¹	M	39	27
	Lead	7439921	mg kg ⁻¹	M	14	22
	Zinc	7440666	mg kg ⁻¹	M	38	53
2675	TPH aliphatic >C5-C6		mg kg ⁻¹	N	< 0.1	< 0.1
	TPH aliphatic >C6-C8		mg kg ⁻¹	N	< 0.1	< 0.1
	TPH aliphatic >C8-C10		mg kg ⁻¹	N	< 0.1	< 0.1
	TPH aliphatic >C10-C12		mg kg ⁻¹	M	< 1	< 1
	TPH aliphatic >C12-C16		mg kg ⁻¹	M	< 1	< 1
	TPH aliphatic >C16-C21		mg kg ⁻¹	M	< 1	< 1
	TPH aliphatic >C21-C35		mg kg ⁻¹	M	< 1	< 1

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

Column page 2

Report page 1 of 4

LIMS sample ID range AI58233 to AI58240

LABORATORY TEST REPORT

Results of analysis of 8 samples
received 22 April 2013

Report Date
26 April 2013

FAO Aaron Stokoe

C2157 - NW Cambridge

					228395					
					AI58233	AI58234	AI58235	AI58236	AI58237	AI58238
					TP402	TP402	TP403	TP404	TP405	TP424
					15/4/2013	15/4/2013	15/4/2013	15/4/2013	15/4/2013	15/4/2013
					0.70m	0.70m	0.70m	1.40m	0.60m	1.10m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2675	TPH aliphatic >C35-C44		mg kg ⁻¹	N	< 1	< 1	< 1	< 1	< 1	< 1
	TPH aromatic >C5-C7		mg kg ⁻¹	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH aromatic >C7-C8		mg kg ⁻¹	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH aromatic >C8-C10		mg kg ⁻¹	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH aromatic >C10-C12		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1
	TPH aromatic >C12-C16		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1
	TPH aromatic >C16-C21		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1
	TPH aromatic >C21-C35		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1
	TPH aromatic >C35-C44		mg kg ⁻¹	N	< 1	< 1	< 1	< 1	< 1	< 1
	Total Petroleum Hydrocarbons		mg kg ⁻¹	N	< 10	< 10	< 10	< 10	< 10	< 10
2700	Naphthalene	91203	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Acenaphthylene	208968	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Acenaphthene	83329	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Fluorene	86737	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Phenanthrene	85018	mg kg ⁻¹	M	< 0.1	0.26	< 0.1	< 0.1	< 0.1	< 0.1
	Anthracene	120127	mg kg ⁻¹	M	< 0.1	0.15	< 0.1	< 0.1	< 0.1	< 0.1
	Fluoranthene	206440	mg kg ⁻¹	M	< 0.1	1.7	< 0.1	< 0.1	< 0.1	< 0.1
	Pyrene	129000	mg kg ⁻¹	M	< 0.1	1.1	< 0.1	< 0.1	< 0.1	< 0.1
	Benzo[a]anthracene	56553	mg kg ⁻¹	M	< 0.1	0.82	< 0.1	< 0.1	< 0.1	< 0.1
	Chrysene	218019	mg kg ⁻¹	M	< 0.1	0.9	< 0.1	< 0.1	< 0.1	< 0.1
	Benzo[b]fluoranthene	205992	mg kg ⁻¹	M	< 0.1	0.99	< 0.1	< 0.1	< 0.1	< 0.1
	Benzo[k]fluoranthene	207089	mg kg ⁻¹	M	< 0.1	0.3	< 0.1	< 0.1	< 0.1	< 0.1
	Benzo[a]pyrene	50328	mg kg ⁻¹	M	< 0.1	0.87	< 0.1	< 0.1	< 0.1	< 0.1
	Dibenzo[a,h]anthracene	53703	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Indeno[1,2,3-cd]pyrene	193395	mg kg ⁻¹	M	< 0.1	0.57	< 0.1	< 0.1	< 0.1	< 0.1

LABORATORY TEST REPORT

Results of analysis of 8 samples
received 22 April 2013

Report Date
26 April 2013

FAO Aaron Stokoe

C2157 - NW Cambridge

					228395	
					AI58239	AI58240
					TP425	TP426
					15/4/2013	15/4/2013
					1.70m	0.80m
					SO/L	SO/L
2675	TPH aliphatic >C35-C44		mg kg ⁻¹	N	< 1	< 1
	TPH aromatic >C5-C7		mg kg ⁻¹	N	< 0.1	< 0.1
	TPH aromatic >C7-C8		mg kg ⁻¹	N	< 0.1	< 0.1
	TPH aromatic >C8-C10		mg kg ⁻¹	N	< 0.1	< 0.1
	TPH aromatic >C10-C12		mg kg ⁻¹	M	< 1	< 1
	TPH aromatic >C12-C16		mg kg ⁻¹	M	< 1	< 1
	TPH aromatic >C16-C21		mg kg ⁻¹	M	< 1	< 1
	TPH aromatic >C21-C35		mg kg ⁻¹	M	< 1	< 1
	TPH aromatic >C35-C44		mg kg ⁻¹	N	< 1	< 1
Total Petroleum Hydrocarbons			mg kg ⁻¹	N	< 10	< 10
2700	Naphthalene	91203	mg kg ⁻¹	M	0.1	< 0.1
	Acenaphthylene	208968	mg kg ⁻¹	M	0.26	< 0.1
	Acenaphthene	83329	mg kg ⁻¹	M	0.3	< 0.1
	Fluorene	86737	mg kg ⁻¹	M	0.25	< 0.1
	Phenanthrene	85018	mg kg ⁻¹	M	0.15	< 0.1
	Anthracene	120127	mg kg ⁻¹	M	0.11	< 0.1
	Fluoranthene	206440	mg kg ⁻¹	M	0.96	< 0.1
	Pyrene	129000	mg kg ⁻¹	M	0.77	< 0.1
	Benzo[a]anthracene	56553	mg kg ⁻¹	M	0.45	< 0.1
	Chrysene	218019	mg kg ⁻¹	M	0.53	< 0.1
	Benzo[b]fluoranthene	205992	mg kg ⁻¹	M	< 0.1	< 0.1
	Benzo[k]fluoranthene	207089	mg kg ⁻¹	M	< 0.1	< 0.1
	Benzo[a]pyrene	50328	mg kg ⁻¹	M	< 0.1	< 0.1
	Dibenzo[a,h]anthracene	53703	mg kg ⁻¹	M	< 0.1	< 0.1
	Indeno[1,2,3-cd]pyrene	193395	mg kg ⁻¹	M	< 0.1	< 0.1

LABORATORY TEST REPORT

Results of analysis of 8 samples
received 22 April 2013

C2157 - NW Cambridge

Report Date
26 April 2013

					228395					
					AI58233	AI58234	AI58235	AI58236	AI58237	AI58238
					TP402	TP402	TP403	TP404	TP405	TP424
					15/4/2013	15/4/2013	15/4/2013	15/4/2013	15/4/2013	15/4/2013
					0.70m	0.70m	0.70m	1.40m	0.60m	1.10m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2700	Benzo[g,h,i]perylene	191242	mg kg ⁻¹	M	< 0.1	0.3	< 0.1	< 0.1	< 0.1	< 0.1
	Total (of 16) PAHs		mg kg ⁻¹	M	< 2	8	< 2	< 2	< 2	< 2
2820	Azinphos methyl	86500	mg kg ⁻¹	N						
	Coumaphos	56724	mg kg ⁻¹	N						
	Demeton (O+S)	8065483	mg kg ⁻¹	N						
	Disulfoton	298044	mg kg ⁻¹	N						
	Fensulfothion	115902	mg kg ⁻¹	N						
	Fenthion	55389	mg kg ⁻¹	N						
	Phorate	298022	mg kg ⁻¹	N						
	Prothiophos	34643464	mg kg ⁻¹	N						
	Sulprofos	35400432	mg kg ⁻¹	N						
	Trichloronate	327980	mg kg ⁻¹	N						
2840	alpha-HCH	319846	mg kg ⁻¹	N						
	gamma-HCH	58899	mg kg ⁻¹	N						
	beta-HCH	319857	mg kg ⁻¹	N						
	Heptachlor	76448	mg kg ⁻¹	N						
	delta-HCH	319868	mg kg ⁻¹	N						
	Aldrin	309002	mg kg ⁻¹	N						
	Heptachlor epoxide	1024573	mg kg ⁻¹	N						
	gamma-Chlordane	5103742	mg kg ⁻¹	N						
	alpha-Chlordane	5103719	mg kg ⁻¹	N						
	Endosulfan I	959988	mg kg ⁻¹	N						
	4,4'-DDE	72559	mg kg ⁻¹	N						
	Dieldrin	60571	mg kg ⁻¹	N						
	Endrin	72208	mg kg ⁻¹	N						

LABORATORY TEST REPORT

Results of analysis of 8 samples
received 22 April 2013

C2157 - NW Cambridge

Report Date
26 April 2013

					228395	
					AI58239	AI58240
					TP425	TP426
					15/4/2013	15/4/2013
					1.70m	0.80m
					SOIL	SOIL
2700	Benzo[g,h,i]perylene	191242	mg kg ⁻¹	M	< 0.1	< 0.1
	Total (of 16) PAHs		mg kg ⁻¹	M	3.9	< 2
2820	Azinphos methyl	86500	mg kg ⁻¹	N		< 0.2
	Coumaphos	56724	mg kg ⁻¹	N		< 0.2
	Demeton (O+S)	8065483	mg kg ⁻¹	N		< 0.2
	Disulfoton	298044	mg kg ⁻¹	N		< 0.2
	Fensulfothion	115902	mg kg ⁻¹	N		< 0.2
	Fenthion	55389	mg kg ⁻¹	N		< 0.2
	Phorate	298022	mg kg ⁻¹	N		< 0.2
	Prothiophos	34643464	mg kg ⁻¹	N		< 0.2
	Sulprofos	35400432	mg kg ⁻¹	N		< 0.2
	Trichloronate	327980	mg kg ⁻¹	N		< 0.2
2840	alpha-HCH	319846	mg kg ⁻¹	N		< 0.2
	gamma-HCH	58899	mg kg ⁻¹	N		< 0.2
	beta-HCH	319857	mg kg ⁻¹	N		< 0.2
	Heptachlor	76448	mg kg ⁻¹	N		< 0.2
	delta-HCH	319868	mg kg ⁻¹	N		< 0.2
	Aldrin	309002	mg kg ⁻¹	N		< 0.2
	Heptachlor epoxide	1024573	mg kg ⁻¹	N		< 0.2
	gamma-Chlordane	5103742	mg kg ⁻¹	N		< 0.2
	alpha-Chlordane	5103719	mg kg ⁻¹	N		< 0.2
	Endosulfan I	959988	mg kg ⁻¹	N		< 0.2
	4,4'-DDE	72559	mg kg ⁻¹	N		< 0.2
	Dieldrin	60571	mg kg ⁻¹	N		< 0.2
	Endrin	72208	mg kg ⁻¹	N		< 0.2

LABORATORY TEST REPORT

Results of analysis of 8 samples
received 22 April 2013

C2157 - NW Cambridge

Report Date
26 April 2013

					228395					
					AI58233	AI58234	AI58235	AI58236	AI58237	AI58238
					TP402	TP402	TP403	TP404	TP405	TP424
					15/4/2013	15/4/2013	15/4/2013	15/4/2013	15/4/2013	15/4/2013
					0.70m	0.70m	0.70m	1.40m	0.60m	1.10m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2840	4,4'-DDD	72548	mg kg ⁻¹	N						
	Endosulfan II	33213659	mg kg ⁻¹	N						
	4,4'-DDT	50293	mg kg ⁻¹	N						
	Endrin aldehyde	7421934	mg kg ⁻¹	N						
	Endosulfan sulfate	1031078	mg kg ⁻¹	N						
	Methoxychlor	72435	mg kg ⁻¹	N						
	Endrin ketone	53494705	mg kg ⁻¹	N						
	Hexachlorobutadiene	87683	mg kg ⁻¹	N						

LABORATORY TEST REPORT

Results of analysis of 8 samples
received 22 April 2013

C2157 - NW Cambridge

Report Date
26 April 2013

					228395	
					AI58239	AI58240
					TP425	TP426
					15/4/2013	15/4/2013
					1.70m	0.80m
					SOIL	SOIL
2840	4,4'-DDD	72548	mg kg ⁻¹	N		< 0.2
	Endosulfan II	33213659	mg kg ⁻¹	N		< 0.2
	4,4'-DDT	50293	mg kg ⁻¹	N		< 0.2
	Endrin aldehyde	7421934	mg kg ⁻¹	N		< 0.2
	Endosulfan sulfate	1031078	mg kg ⁻¹	N		< 0.2
	Methoxychlor	72435	mg kg ⁻¹	N		< 0.2
	Endrin ketone	53494705	mg kg ⁻¹	N		< 0.2
	Hexachlorobutadiene	87683	mg kg ⁻¹	N		< 0.2

Brownfield Solutions Limited
Wychwood House
1 Queen Street
Northwich, Cheshire
CW9 5JL

FAO Aaron Stokoe
24 April 2013

Dear Aaron Stokoe

Test Report Number 228232
Your Project Reference C2157 - NW Cambridge

Please find enclosed the results of analysis for the samples received 18 April 2013.

All soil samples will be retained for a period of one month and all water samples will be retained for 7 days following the date of the test report. Should you require an extended retention period then please detail your requirements in an email to customerservices@chemtest.co.uk. Please be aware that charges may be applicable for extended sample storage.

If you require any further assistance, please do not hesitate to contact the Customer Services team.

Yours sincerely



Darrell Hall, Director



Notes to accompany report:

- The sign < means 'less than'
- Tests marked 'U' hold UKAS accreditation
- Tests marked 'M' hold MCertS (and UKAS) accreditation
- Tests marked 'N' do not currently hold UKAS accreditation
- Tests marked 'S' were subcontracted to an approved laboratory
- n/e means 'not evaluated'
- i/s means 'insufficient sample'
- u/s means 'unsuitable sample'
- Comments or interpretations are outside of the scope of UKAS accreditation
- The results relate only to the items tested
- Stones represent the quantity of material removed prior to analysis
- All results are expressed on a dry weight basis
- The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, phenols
- For all other tests the samples were dried at < 37°C prior to analysis
- Uncertainties of measurement for the determinands tested are available upon request
- Soil descriptions, including colour and texture, are beyond the scope of MCertS accreditation
- None of the test results included in this report have been recovery corrected

Test Report 228232 Cover Sheet

Brownfield Solutions Limited
Wychwood House
1 Queen Street
Northwich, Cheshire
CW9 5JL

FAO Aaron Stokoe

LABORATORY TEST REPORT

Results of analysis of 13 samples
received 18 April 2013

C2157 - NW Cambridge



Report Date
24 April 2013

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓ Determinand↓

CAS No↓

Units↓

*

2030	Moisture		%	n/a	13.1	19.1	11.7	9.24	8.92	22.4
	Stones content (>50mm)		%	n/a	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
2040	Soil colour			M	brown	brown	brown	brown	brown	brown
	Soil texture			M	clay	clay	clay	clay	clay	clay
	Other material			M	stones	stones	stones	stones	stones	stones
2010	pH			M	7.8	8.3	8.4	8.5	8.7	8.4
2625	Organic matter		%	M	1.4	1.1	0.67	0.72	0.47	3.8
2120	Boron (hot water soluble)	7440428	mg kg ⁻¹	M	0.6	0.4	0.4	<0.4	<0.4	2.1
	Sulfate (2:1 water soluble) as SO4	14808798	g l ⁻¹	M	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2450	Arsenic	7440382	mg kg ⁻¹	M	23	13	17	20	20	15
	Cadmium	7440439	mg kg ⁻¹	M	0.26	<0.10	<0.10	0.13	0.13	0.22
	Chromium	7440473	mg kg ⁻¹	M	29	25	21	17	13	36
	Copper	7440508	mg kg ⁻¹	M	20	18	11	9.4	11	24
	Mercury	7439976	mg kg ⁻¹	M	<0.10	<0.10	<0.10	<0.10	<0.10	0.11
	Nickel	7440020	mg kg ⁻¹	M	38	30	23	21	25	37
	Lead	7439921	mg kg ⁻¹	M	24	16	10	8.7	7.3	36
	Zinc	7440666	mg kg ⁻¹	M	87	47	34	30	38	75
2675	TPH aliphatic >C5-C6		mg kg ⁻¹	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1 ¹
	TPH aliphatic >C6-C8		mg kg ⁻¹	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1 ¹
	TPH aliphatic >C8-C10		mg kg ⁻¹	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1 ¹
	TPH aliphatic >C10-C12		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1 ¹
	TPH aliphatic >C12-C16		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1 ¹
	TPH aliphatic >C16-C21		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1 ¹
	TPH aliphatic >C21-C35		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1 ¹

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

All tests undertaken between 18/04/2013 and 24/04/2013

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

Column page 1

Report page 1 of 4

LIMS sample ID range AI57023 to AI57073

LABORATORY TEST REPORT

Results of analysis of 13 samples
received 18 April 2013

C2157 - NW Cambridge

Report Date
24 April 2013

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓ Determinand↓

CAS No↓

Units↓

*

228232

Login Batch No					228232					
Chemtest LIMS ID					AI57047	AI57052	AI57054	AI57061	AI57063	AI57067
Sample ID					BH404	BH405	BH405	BH406	BH406	BH407
Sample No										
Sampling Date					10/4/2013	11/4/2013	11/4/2013	11/4/2013	11/4/2013	12/4/2013
Depth					2.00m	0.50m	2.00m	1.00m	3.00m	0.50m
Matrix					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SOP↓	Determinand↓	CAS No↓	Units↓	*						
2030	Moisture		%	n/a	24	5.4	10.5	20.4	20	16.3
	Stones content (>50mm)		%	n/a	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
2040	Soil colour			M	brown	brown	brown	brown	brown	brown
	Soil texture			M	clay	clay	clay	clay	clay	clay
	Other material			M	stones	stones	stones	stones	stones	stones
2010	pH			M	8.1	8.3	9.0	8.3	8.0	8.3
2625	Organic matter		%	M	1.1	< 0.40	0.59	1.1	0.76	0.71
2120	Boron (hot water soluble)	7440428	mg kg ⁻¹	M	<0.4	<0.4	<0.4	0.6	0.4	<0.4
	Sulfate (2:1 water soluble) as SO4	14808798	g l ⁻¹	M	0.24	<0.01	<0.01	0.15	1.5	0.09
2450	Arsenic	7440382	mg kg ⁻¹	M	9.1	11	11	9.0	7.8	8.4
	Cadmium	7440439	mg kg ⁻¹	M	<0.10	0.12	<0.10	<0.10	<0.10	<0.10
	Chromium	7440473	mg kg ⁻¹	M	16	14	7.1	16	14	5.2
	Copper	7440508	mg kg ⁻¹	M	15	9.1	6.9	13	14	7.4
	Mercury	7439976	mg kg ⁻¹	M	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Nickel	7440020	mg kg ⁻¹	M	27	21	14	25	26	12
	Lead	7439921	mg kg ⁻¹	M	11	7.2	<5.0	10	9.9	9.7
	Zinc	7440666	mg kg ⁻¹	M	34	31	20	26	27	16
2675	TPH aliphatic >C5-C6		mg kg ⁻¹	N	< 0.1 ¹	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH aliphatic >C6-C8		mg kg ⁻¹	N	< 0.1 ¹	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH aliphatic >C8-C10		mg kg ⁻¹	N	< 0.1 ¹	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	TPH aliphatic >C10-C12		mg kg ⁻¹	M	< 1 ¹	< 1	< 1	< 1	< 1	< 1
	TPH aliphatic >C12-C16		mg kg ⁻¹	M	< 1 ¹	< 1	< 1	< 1	< 1	< 1
	TPH aliphatic >C16-C21		mg kg ⁻¹	M	< 1 ¹	< 1	< 1	< 1	< 1	< 1
	TPH aliphatic >C21-C35		mg kg ⁻¹	M	< 1 ¹	< 1	< 1	< 1	< 1	< 1

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

LABORATORY TEST REPORT

Results of analysis of 13 samples
received 18 April 2013

C2157 - NW Cambridge

Report Date
24 April 2013

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓ Determinand↓

CAS No↓

Units↓

*

228232

AI57070

BH407

12/4/2013

3.00m

SOIL

2030	Moisture		%	n/a	15.7
	Stones content (>50mm)		%	n/a	<0.02
2040	Soil colour			M	brown
	Soil texture			M	clay
	Other material			M	stones
2010	pH			M	9.2
2625	Organic matter		%	M	1.7
2120	Boron (hot water soluble)	7440428	mg kg ⁻¹	M	0.8
	Sulfate (2:1 water soluble) as SO ₄	14808798	g l ⁻¹	M	0.11
2450	Arsenic	7440382	mg kg ⁻¹	M	20
	Cadmium	7440439	mg kg ⁻¹	M	0.52
	Chromium	7440473	mg kg ⁻¹	M	21
	Copper	7440508	mg kg ⁻¹	M	26
	Mercury	7439976	mg kg ⁻¹	M	0.15
	Nickel	7440020	mg kg ⁻¹	M	26
	Lead	7439921	mg kg ⁻¹	M	96
	Zinc	7440666	mg kg ⁻¹	M	730
2675	TPH aliphatic >C5-C6		mg kg ⁻¹	N	< 0.1
	TPH aliphatic >C6-C8		mg kg ⁻¹	N	< 0.1
	TPH aliphatic >C8-C10		mg kg ⁻¹	N	< 0.1
	TPH aliphatic >C10-C12		mg kg ⁻¹	M	< 1
	TPH aliphatic >C12-C16		mg kg ⁻¹	M	< 1
	TPH aliphatic >C16-C21		mg kg ⁻¹	M	< 1
	TPH aliphatic >C21-C35		mg kg ⁻¹	M	< 1

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LABORATORY TEST REPORT

Results of analysis of 13 samples
received 18 April 2013

Report Date
24 April 2013

FAO Aaron Stokoe

C2157 - NW Cambridge

					228232					
					AI57023	AI57025	AI57031	AI57033	AI57038	AI57044
					BH401	BH401	BH402	BH402	BH403	BH404
					11/4/2013	11/4/2013	11/4/2013	11/4/2013	12/4/2013	10/4/2013
					0.20m	1.00m	0.50m	2.00m	0.50m	0.20m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2675	TPH aliphatic >C35-C44		mg kg ⁻¹	N	< 1	< 1	< 1	< 1	< 1	< 1 ¹
	TPH aromatic >C5-C7		mg kg ⁻¹	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1 ¹
	TPH aromatic >C7-C8		mg kg ⁻¹	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1 ¹
	TPH aromatic >C8-C10		mg kg ⁻¹	N	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1 ¹
	TPH aromatic >C10-C12		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1 ¹
	TPH aromatic >C12-C16		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1 ¹
	TPH aromatic >C16-C21		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1 ¹
	TPH aromatic >C21-C35		mg kg ⁻¹	M	< 1	< 1	< 1	< 1	< 1	< 1 ¹
	TPH aromatic >C35-C44		mg kg ⁻¹	N	< 1	< 1	< 1	< 1	< 1	< 1 ¹
	Total Petroleum Hydrocarbons		mg kg ⁻¹	N	< 10	< 10	< 10	< 10	< 10	< 10 ¹
2700	Naphthalene	91203	mg kg ⁻¹	M	0.33	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Acenaphthylene	208968	mg kg ⁻¹	M	0.18	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Acenaphthene	83329	mg kg ⁻¹	M	0.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Fluorene	86737	mg kg ⁻¹	M	0.16	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Phenanthrene	85018	mg kg ⁻¹	M	0.24	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Anthracene	120127	mg kg ⁻¹	M	0.11	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Fluoranthene	206440	mg kg ⁻¹	M	0.57	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Pyrene	129000	mg kg ⁻¹	M	0.45	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Benzo[a]anthracene	56553	mg kg ⁻¹	M	0.29	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Chrysene	218019	mg kg ⁻¹	M	0.31	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Benzo[b]fluoranthene	205992	mg kg ⁻¹	M	0.14	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Benzo[k]fluoranthene	207089	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Benzo[a]pyrene	50328	mg kg ⁻¹	M	0.23	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Dibenzo[a,h]anthracene	53703	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Indeno[1,2,3-cd]pyrene	193395	mg kg ⁻¹	M	0.15	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

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LABORATORY TEST REPORT

Results of analysis of 13 samples
received 18 April 2013

Report Date
24 April 2013

FAO Aaron Stokoe

C2157 - NW Cambridge

				228232					
				AI57047	AI57052	AI57054	AI57061	AI57063	AI57067
				BH404	BH405	BH405	BH406	BH406	BH407
				10/4/2013	11/4/2013	11/4/2013	11/4/2013	11/4/2013	12/4/2013
				2.00m	0.50m	2.00m	1.00m	3.00m	0.50m
				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2675	TPH aliphatic >C35-C44		mg kg ⁻¹	N	< 1 ¹	< 1	< 1	< 1	< 1
	TPH aromatic >C5-C7		mg kg ⁻¹	N	< 0.1 ¹	< 0.1	< 0.1	< 0.1	< 0.1
	TPH aromatic >C7-C8		mg kg ⁻¹	N	< 0.1 ¹	< 0.1	< 0.1	< 0.1	< 0.1
	TPH aromatic >C8-C10		mg kg ⁻¹	N	< 0.1 ¹	< 0.1	< 0.1	< 0.1	< 0.1
	TPH aromatic >C10-C12		mg kg ⁻¹	M	< 1 ¹	< 1	< 1	< 1	< 1
	TPH aromatic >C12-C16		mg kg ⁻¹	M	< 1 ¹	< 1	< 1	< 1	< 1
	TPH aromatic >C16-C21		mg kg ⁻¹	M	< 1 ¹	< 1	< 1	< 1	< 1
	TPH aromatic >C21-C35		mg kg ⁻¹	M	< 1 ¹	< 1	< 1	< 1	< 1
	TPH aromatic >C35-C44		mg kg ⁻¹	N	< 1 ¹	< 1	< 1	< 1	< 1
	Total Petroleum Hydrocarbons		mg kg ⁻¹	N	< 10 ¹	< 10	< 10	< 10	< 10
2700	Naphthalene	91203	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Acenaphthylene	208968	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Acenaphthene	83329	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	0.34
	Fluorene	86737	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Phenanthrene	85018	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	0.57
	Anthracene	120127	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	0.22
	Fluoranthene	206440	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	0.82
	Pyrene	129000	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	0.63
	Benzo[a]anthracene	56553	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	0.21
	Chrysene	218019	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	0.28
	Benzo[b]fluoranthene	205992	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	0.24
	Benzo[k]fluoranthene	207089	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	0.15
	Benzo[a]pyrene	50328	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Dibenzo[a,h]anthracene	53703	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Indeno[1,2,3-cd]pyrene	193395	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

¹The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

LABORATORY TEST REPORT

Results of analysis of 13 samples
received 18 April 2013

Report Date
24 April 2013

FAO Aaron Stokoe

C2157 - NW Cambridge

					228232
					AI57070
					BH407
					12/4/2013
					3.00m
					SOIL
2675	TPH aliphatic >C35-C44		mg kg ⁻¹	N	< 1
	TPH aromatic >C5-C7		mg kg ⁻¹	N	< 0.1
	TPH aromatic >C7-C8		mg kg ⁻¹	N	< 0.1
	TPH aromatic >C8-C10		mg kg ⁻¹	N	< 0.1
	TPH aromatic >C10-C12		mg kg ⁻¹	M	< 1
	TPH aromatic >C12-C16		mg kg ⁻¹	M	< 1
	TPH aromatic >C16-C21		mg kg ⁻¹	M	< 1
	TPH aromatic >C21-C35		mg kg ⁻¹	M	< 1
	TPH aromatic >C35-C44		mg kg ⁻¹	N	< 1
	Total Petroleum Hydrocarbons		mg kg ⁻¹	N	< 10
2700	Naphthalene	91203	mg kg ⁻¹	M	< 0.1
	Acenaphthylene	208968	mg kg ⁻¹	M	0.26
	Acenaphthene	83329	mg kg ⁻¹	M	0.15
	Fluorene	86737	mg kg ⁻¹	M	< 0.1
	Phenanthrene	85018	mg kg ⁻¹	M	0.65
	Anthracene	120127	mg kg ⁻¹	M	0.36
	Fluoranthene	206440	mg kg ⁻¹	M	1.8
	Pyrene	129000	mg kg ⁻¹	M	1.5
	Benzo[a]anthracene	56553	mg kg ⁻¹	M	1.2
	Chrysene	218019	mg kg ⁻¹	M	1.3
	Benzo[b]fluoranthene	205992	mg kg ⁻¹	M	1.1
	Benzo[k]fluoranthene	207089	mg kg ⁻¹	M	< 0.1
	Benzo[a]pyrene	50328	mg kg ⁻¹	M	1.3
	Dibenzo[a,h]anthracene	53703	mg kg ⁻¹	M	0.42
	Indeno[1,2,3-cd]pyrene	193395	mg kg ⁻¹	M	0.65

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LABORATORY TEST REPORT

Results of analysis of 13 samples
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Report Date
24 April 2013

FAO Aaron Stokoe

C2157 - NW Cambridge

					228232					
					AI57023	AI57025	AI57031	AI57033	AI57038	AI57044
					BH401	BH401	BH402	BH402	BH403	BH404
					11/4/2013	11/4/2013	11/4/2013	11/4/2013	12/4/2013	10/4/2013
					0.20m	1.00m	0.50m	2.00m	0.50m	0.20m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2700	Benzo[g,h,i]perylene	191242	mg kg ⁻¹	M	0.13	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Total (of 16) PAHs		mg kg ⁻¹	M	3.6	< 2	< 2	< 2	< 2	< 2
2820	Azinphos methyl	86500	mg kg ⁻¹	N	< 0.2					< 0.2
	Coumaphos	56724	mg kg ⁻¹	N	< 0.2					< 0.2
	Demeton (O+S)	8065483	mg kg ⁻¹	N	< 0.2					< 0.2
	Disulfoton	298044	mg kg ⁻¹	N	< 0.2					< 0.2
	Fensulfothion	115902	mg kg ⁻¹	N	< 0.2					< 0.2
	Fenthion	55389	mg kg ⁻¹	N	< 0.2					< 0.2
	Phorate	298022	mg kg ⁻¹	N	< 0.2					< 0.2
	Prothiophos	34643464	mg kg ⁻¹	N	< 0.2					< 0.2
	Sulprofos	35400432	mg kg ⁻¹	N	< 0.2					< 0.2
	Trichloronate	327980	mg kg ⁻¹	N	< 0.2					< 0.2
2840	alpha-HCH	319846	mg kg ⁻¹	N	< 0.2					< 0.2
	gamma-HCH	58899	mg kg ⁻¹	N	< 0.2					< 0.2
	beta-HCH	319857	mg kg ⁻¹	N	< 0.2					< 0.2
	Heptachlor	76448	mg kg ⁻¹	N	< 0.2					< 0.2
	delta-HCH	319868	mg kg ⁻¹	N	< 0.2					< 0.2
	Aldrin	309002	mg kg ⁻¹	N	< 0.2					< 0.2
	Heptachlor epoxide	1024573	mg kg ⁻¹	N	< 0.2					< 0.2
	gamma-Chlordane	5103742	mg kg ⁻¹	N	< 0.2					< 0.2
	alpha-Chlordane	5103719	mg kg ⁻¹	N	< 0.2					< 0.2
	Endosulfan I	959988	mg kg ⁻¹	N	< 0.2					< 0.2
	4,4'-DDE	72559	mg kg ⁻¹	N	< 0.2					< 0.2
	Dieldrin	60571	mg kg ⁻¹	N	< 0.2					< 0.2
	Endrin	72208	mg kg ⁻¹	N	< 0.2					< 0.2

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LABORATORY TEST REPORT

Results of analysis of 13 samples
received 18 April 2013

C2157 - NW Cambridge

Report Date
24 April 2013

					228232					
					AI57047	AI57052	AI57054	AI57061	AI57063	AI57067
					BH404	BH405	BH405	BH406	BH406	BH407
					10/4/2013	11/4/2013	11/4/2013	11/4/2013	11/4/2013	12/4/2013
					2.00m	0.50m	2.00m	1.00m	3.00m	0.50m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2700	Benzo[g,h,i]perylene	191242	mg kg ⁻¹	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Total (of 16) PAHs		mg kg ⁻¹	M	< 2	< 2	< 2	< 2	< 2	3.5
2820	Azinphos methyl	86500	mg kg ⁻¹	N		< 0.2				< 0.2
	Coumaphos	56724	mg kg ⁻¹	N		< 0.2				< 0.2
	Demeton (O+S)	8065483	mg kg ⁻¹	N		< 0.2				< 0.2
	Disulfoton	298044	mg kg ⁻¹	N		< 0.2				< 0.2
	Fensulfothion	115902	mg kg ⁻¹	N		< 0.2				< 0.2
	Fenthion	55389	mg kg ⁻¹	N		< 0.2				< 0.2
	Phorate	298022	mg kg ⁻¹	N		< 0.2				< 0.2
	Prothiophos	34643464	mg kg ⁻¹	N		< 0.2				< 0.2
	Sulprofos	35400432	mg kg ⁻¹	N		< 0.2				< 0.2
	Trichloronate	327980	mg kg ⁻¹	N		< 0.2				< 0.2
2840	alpha-HCH	319846	mg kg ⁻¹	N		< 0.2				< 0.2
	gamma-HCH	58899	mg kg ⁻¹	N		< 0.2				< 0.2
	beta-HCH	319857	mg kg ⁻¹	N		< 0.2				< 0.2
	Heptachlor	76448	mg kg ⁻¹	N		< 0.2				< 0.2
	delta-HCH	319868	mg kg ⁻¹	N		< 0.2				< 0.2
	Aldrin	309002	mg kg ⁻¹	N		< 0.2				< 0.2
	Heptachlor epoxide	1024573	mg kg ⁻¹	N		< 0.2				< 0.2
	gamma-Chlordane	5103742	mg kg ⁻¹	N		< 0.2				< 0.2
	alpha-Chlordane	5103719	mg kg ⁻¹	N		< 0.2				< 0.2
	Endosulfan I	959988	mg kg ⁻¹	N		< 0.2				< 0.2
	4,4'-DDE	72559	mg kg ⁻¹	N		< 0.2				< 0.2
	Dieldrin	60571	mg kg ⁻¹	N		< 0.2				< 0.2
	Endrin	72208	mg kg ⁻¹	N		< 0.2				< 0.2

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LABORATORY TEST REPORT

Results of analysis of 13 samples
received 18 April 2013

C2157 - NW Cambridge

Report Date
24 April 2013

					228232
					AI57070
					BH407
					12/4/2013
					3.00m
					SOIL
2700	Benzo[g,h,i]perylene	191242	mg kg ⁻¹	M	0.41
	Total (of 16) PAHs		mg kg ⁻¹	M	11
2820	Azinphos methyl	86500	mg kg ⁻¹	N	
	Coumaphos	56724	mg kg ⁻¹	N	
	Demeton (O+S)	8065483	mg kg ⁻¹	N	
	Disulfoton	298044	mg kg ⁻¹	N	
	Fensulfothion	115902	mg kg ⁻¹	N	
	Fenthion	55389	mg kg ⁻¹	N	
	Phorate	298022	mg kg ⁻¹	N	
	Prothiophos	34643464	mg kg ⁻¹	N	
	Sulprofos	35400432	mg kg ⁻¹	N	
	Trichloronate	327980	mg kg ⁻¹	N	
2840	alpha-HCH	319846	mg kg ⁻¹	N	
	gamma-HCH	58899	mg kg ⁻¹	N	
	beta-HCH	319857	mg kg ⁻¹	N	
	Heptachlor	76448	mg kg ⁻¹	N	
	delta-HCH	319868	mg kg ⁻¹	N	
	Aldrin	309002	mg kg ⁻¹	N	
	Heptachlor epoxide	1024573	mg kg ⁻¹	N	
	gamma-Chlordane	5103742	mg kg ⁻¹	N	
	alpha-Chlordane	5103719	mg kg ⁻¹	N	
	Endosulfan I	959988	mg kg ⁻¹	N	
	4,4'-DDE	72559	mg kg ⁻¹	N	
	Dieldrin	60571	mg kg ⁻¹	N	
	Endrin	72208	mg kg ⁻¹	N	

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LABORATORY TEST REPORT

Results of analysis of 13 samples
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Report Date
24 April 2013

FAO Aaron Stokoe

C2157 - NW Cambridge

					228232					
					AI57023	AI57025	AI57031	AI57033	AI57038	AI57044
					BH401	BH401	BH402	BH402	BH403	BH404
					11/4/2013	11/4/2013	11/4/2013	11/4/2013	12/4/2013	10/4/2013
					0.20m	1.00m	0.50m	2.00m	0.50m	0.20m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2840	4,4'-DDD	72548	mg kg ⁻¹	N	< 0.2					< 0.2
	Endosulfan II	33213659	mg kg ⁻¹	N	< 0.2					< 0.2
	4,4'-DDT	50293	mg kg ⁻¹	N	< 0.2					< 0.2
	Endrin aldehyde	7421934	mg kg ⁻¹	N	< 0.2					< 0.2
	Endosulfan sulfate	1031078	mg kg ⁻¹	N	< 0.2					< 0.2
	Methoxychlor	72435	mg kg ⁻¹	N	< 0.2					< 0.2
	Endrin ketone	53494705	mg kg ⁻¹	N	< 0.2					< 0.2
	Hexachlorobutadiene	87683	mg kg ⁻¹	N	< 0.2					< 0.2

*The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

LABORATORY TEST REPORT

Results of analysis of 13 samples
received 18 April 2013

C2157 - NW Cambridge

Report Date
24 April 2013

					228232					
					AI57047	AI57052	AI57054	AI57061	AI57063	AI57067
					BH404	BH405	BH405	BH406	BH406	BH407
					10/4/2013	11/4/2013	11/4/2013	11/4/2013	11/4/2013	12/4/2013
					2.00m	0.50m	2.00m	1.00m	3.00m	0.50m
					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2840	4,4'-DDD	72548	mg kg ⁻¹	N		< 0.2				< 0.2
	Endosulfan II	33213659	mg kg ⁻¹	N		< 0.2				< 0.2
	4,4'-DDT	50293	mg kg ⁻¹	N		< 0.2				< 0.2
	Endrin aldehyde	7421934	mg kg ⁻¹	N		< 0.2				< 0.2
	Endosulfan sulfate	1031078	mg kg ⁻¹	N		< 0.2				< 0.2
	Methoxychlor	72435	mg kg ⁻¹	N		< 0.2				< 0.2
	Endrin ketone	53494705	mg kg ⁻¹	N		< 0.2				< 0.2
	Hexachlorobutadiene	87683	mg kg ⁻¹	N		< 0.2				< 0.2

*The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

LABORATORY TEST REPORT

Results of analysis of 13 samples
received 18 April 2013

C2157 - NW Cambridge

Report Date
24 April 2013

					228232
					AI57070
					BH407
					12/4/2013
					3.00m
					SOIL
2840	4,4'-DDD	72548	mg kg ⁻¹	N	
	Endosulfan II	33213659	mg kg ⁻¹	N	
	4,4'-DDT	50293	mg kg ⁻¹	N	
	Endrin aldehyde	7421934	mg kg ⁻¹	N	
	Endosulfan sulfate	1031078	mg kg ⁻¹	N	
	Methoxychlor	72435	mg kg ⁻¹	N	
	Endrin ketone	53494705	mg kg ⁻¹	N	
	Hexachlorobutadiene	87683	mg kg ⁻¹	N	

*The stability time for this analyte has been exceeded - these results may be compromised. The accreditation for these results remains unaffected.

Brownfield Solutions Limited
Wychwood House
1 Queen Street
Northwich, Cheshire
CW9 5JL

FAO Aaron Stokoe
17 May 2013

Dear Aaron Stokoe

Test Report Number **229901**
Your Project Reference **C2157 - NW Cambridge**

Please find enclosed the results of analysis for the samples received 13 May 2013.

All soil samples will be retained for a period of one month and all water samples will be retained for 7 days following the date of the test report. Should you require an extended retention period then please detail your requirements in an email to customerservices@chemtest.co.uk. Please be aware that charges may be applicable for extended sample storage.

If you require any further assistance, please do not hesitate to contact the Customer Services team.

Yours sincerely



Keith Jones, Technical Manager



2183



Notes to accompany report:

- The sign < means 'less than'
- Tests marked 'U' hold UKAS accreditation
- Tests marked 'M' hold MCertS (and UKAS) accreditation
- Tests marked 'N' do not currently hold UKAS accreditation
- Tests marked 'S' were subcontracted to an approved laboratory
- n/e means 'not evaluated'
- i/s means 'insufficient sample'
- u/s means 'unsuitable sample'
- Comments or interpretations are beyond the scope of UKAS accreditation
- The results relate only to the items tested
- All results are expressed on a dry weight basis
- The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, phenols
- For all other tests the samples were dried at < 37°C prior to analysis
- Uncertainties of measurement for the determinands tested are available upon request
- None of the test results included in this report have been recovery corrected

Test Report **229901** **Cover Sheet**

Brownfield Solutions Limited
Wychwood House
1 Queen Street
Northwich, Cheshire
CW9 5JL

FAO Aaron Stokoe

LABORATORY TEST REPORT

Results of analysis of 1 sample
received 13 May 2013

C2157 - NW Cambridge



Report Date
17 May 2013

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP↓	Determinand↓	CAS No↓	Units↓	*	
1010	pH	PH		U	7.7
1220	Ammoniacal Nitrogen	AMM_NITROG	mg l ⁻¹	U	0.26
1270	Hardness	HARD_TOT	mg CaCO ₃ l ⁻¹	U	2100
1220	Sulfate	14808798	mg l ⁻¹	U	1700
1450	Arsenic	7440382	µg l ⁻¹	U	1.7
	Boron	7440428	µg l ⁻¹	U	970
	Cadmium	7440439	µg l ⁻¹	U	0.12
	Chromium (total)	7440473	µg l ⁻¹	U	<1.0
	Copper	7440508	µg l ⁻¹	U	5.4
	Mercury	7439976	µg l ⁻¹	U	<0.50
	Nickel	7440020	µg l ⁻¹	U	6.5
	Lead	7439921	µg l ⁻¹	U	<1.0
	Zinc	7440666	µg l ⁻¹	U	56
1675	TPH aliphatic >C5-C6		µg l ⁻¹	N	< 0.1
	TPH aliphatic >C6-C8		µg l ⁻¹	N	< 0.1
	TPH aliphatic >C8-C10		µg l ⁻¹	N	< 0.1
	TPH aliphatic >C10-C12		µg l ⁻¹	N	< 0.1
	TPH aliphatic >C12-C16		µg l ⁻¹	N	< 0.1
	TPH aliphatic >C16-C21		µg l ⁻¹	N	< 0.1
	TPH aliphatic >C21-C35		µg l ⁻¹	N	< 0.1
	TPH aliphatic >C35-C44		µg l ⁻¹	N	< 0.1
	TPH aromatic >C5-C7		µg l ⁻¹	N	< 0.1
	TPH aromatic >C7-C8		µg l ⁻¹	N	< 0.1
	TPH aromatic >C8-C10		µg l ⁻¹	N	< 0.1

All tests undertaken between 14/05/2013 and 17/05/2013

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

Column page 1

Report page 1 of 2

LIMS sample ID range Al67669 to Al67669

LABORATORY TEST REPORT

Results of analysis of 1 sample
received 13 May 2013

Report Date
17 May 2013

FAO Aaron Stokoe

C2157 - NW Cambridge

					229901
					AI67669
					BH406
					9/5/2013
					0.00m
					WATER
1675	TPH aromatic >C10-C12		µg l ⁻¹	N	< 0.1
	TPH aromatic >C12-C16		µg l ⁻¹	N	< 0.1
	TPH aromatic >C16-C21		µg l ⁻¹	N	< 0.1
	TPH aromatic >C21-C35		µg l ⁻¹	N	< 0.1
	TPH aromatic >C35-C44		µg l ⁻¹	N	< 0.1
	Total Petroleum Hydrocarbons		µg l ⁻¹	N	< 10
	Total Aliphatic Hydrocarbons		µg l ⁻¹	N	< 5
1700	Total Aromatic Hydrocarbons		µg l ⁻¹	N	< 5
	Naphthalene	91203	µg l ⁻¹	N	<0.01
	Acenaphthylene	208968	µg l ⁻¹	N	<0.01
	Acenaphthene	83329	µg l ⁻¹	N	<0.01
	Fluorene	86737	µg l ⁻¹	N	<0.01
	Phenanthrene	85018	µg l ⁻¹	N	<0.01
	Anthracene	120127	µg l ⁻¹	N	<0.01
	Fluoranthene	206440	µg l ⁻¹	N	<0.01
	Pyrene	129000	µg l ⁻¹	N	<0.01
	Benzo[a]anthracene	56553	µg l ⁻¹	N	<0.01
	Chrysene	218019	µg l ⁻¹	N	<0.01
	Benzo[b]fluoranthene	205992	µg l ⁻¹	N	<0.01
	Benzo[k]fluoranthene	207089	µg l ⁻¹	N	<0.01
	Benzo[a]pyrene	50328	µg l ⁻¹	N	<0.01
	Dibenzo[a,h]anthracene	53703	µg l ⁻¹	N	<0.01
	Indeno[1,2,3-cd]pyrene	193395	µg l ⁻¹	N	<0.01
	Benzo[g,h,i]perylene	191242	µg l ⁻¹	N	<0.01
	Total (of 16) PAHs		µg l ⁻¹	N	<0.2

APPENDIX D Gas Monitoring Results

18/04/2013

		Percentage Concentrations				Parts per Million		m bgl	litres/hour		
Location	State (Peak/Steady)	Oxygen (O ₂)	Carbon Dioxide (CO ₂)	Methane (CH ₄)	LEL	Hydrogen Sulphide (H ₂ S)	Carbon Monoxide (CO)	Water Level	Flow	Sheen (Y/N)	Notes
BH401	Peak	20.2	ND	ND	ND	ND	ND	3.62	ND	No	
	Steady	20.3	ND	ND	ND	ND	ND				
BH402	Peak	20.2	ND	ND	ND	ND	ND	1.00	ND	No	
	Steady	20.2	ND	ND	ND	ND	ND				
BH403	Peak	20.6	ND	ND	ND	ND	ND	0.57	ND	No	
	Steady	20.6	ND	ND	ND	ND	ND				
BH404	Peak	20.8	ND	ND	ND	ND	ND	1.57	ND	No	
	Steady	20.8	ND	ND	ND	ND	ND				
BH405	Peak	20.6	ND	ND	ND	ND	ND	0.78	ND	No	
	Steady	20.6	ND	ND	ND	ND	ND				
BH406	Peak	20.7	0.1	ND	ND	ND	ND	NGW	ND	No	
	Steady	20.8	0.0	ND	ND	ND	ND				
BH407	Peak	18.3	2.1	ND	ND	ND	ND	3.62	ND	No	
	Steady	19.0	1.0	ND	ND	ND	ND				
	Percentage Concentrations				Parts per Million		mb				
Ambient	Oxygen (O ₂)	Carbon Dioxide (CO ₂)	Methane (CH4)	LEL	Hydrogen Sulphide (H2S)	Carbon Monoxide (CO)	Atm Pressure	Monitored by	Equipment	Weather	Pressure Trend
Start	20.6	ND	ND	ND	ND	ND	1016	AJS	GA2000	Sunny, Dry	Steady
Finish	20.6	ND	ND	ND	ND	ND	1016				

Key
 ND
 NA
 NGW

Not Detected
 Not Available
 No Groundwater

C2157

Ground Gas Monitoring Results

09/05/2013

		Percentage Concentrations				Parts per Million		m bgl	litres/hour		
Location	State (Peak/Steady)	Oxygen (O ₂)	Carbon Dioxide (CO ₂)	Methane (CH ₄)	LEL	Hydrogen Sulphide (H ₂ S)	Carbon Monoxide (CO)	Water Level	Flow	Sheen (Y/N)	Notes
BH401	Peak	20.8	0.1	ND	ND	ND	ND	0.86	ND	No	
	Steady	20.8	0.0	ND	ND	ND	ND				
BH402	Peak	20.8	ND	ND	ND	ND	ND	1.12	ND	No	
	Steady	20.8	ND	ND	ND	ND	ND				
BH403	Peak	20.7	ND	ND	ND	ND	ND	1.05	ND	No	
	Steady	20.7	ND	ND	ND	ND	ND				
BH404	Peak	20.6	ND	ND	ND	ND	ND	1.76	ND	No	
	Steady	20.7	ND	ND	ND	ND	ND				
BH405	Peak	20.9	ND	ND	ND	ND	ND	1.11	ND	No	
	Steady	20.9	ND	ND	ND	ND	ND				
BH406	Peak	21.0	ND	ND	ND	ND	ND	1.59	ND	No	
	Steady	21.0	ND	ND	ND	ND	ND				
BH407	Peak	15.2	6.0	ND	ND	ND	ND	NGW	ND	No	
	Steady	15.1	5.2	ND	ND	ND	ND				
	Percentage Concentrations				Parts per Million		mb				
Ambient	Oxygen (O ₂)	Carbon Dioxide (CO ₂)	Methane (CH4)	LEL	Hydrogen Sulphide (H2S)	Carbon Monoxide (CO)	Atm Pressure	Monitored by	Equipment	Weather	Pressure Trend
Start	21.0	ND	ND	ND	ND	ND	1008	AJS	GA2000	Overcast	Falling
Finish	21.0	ND	ND	ND	ND	ND	1008				

Key
 ND
 NA
 NGW

Not Detected
 Not Available
 No Groundwater

29/05/2013

		Percentage Concentrations (% v/v)				Parts per Million		m bgl	litres/hour		
Location	State (Peak/Steady)	Oxygen (O ₂)	Carbon Dioxide (CO ₂)	Methane (CH ₄)	LEL	Hydrogen Sulphide (H ₂ S)	Carbon Monoxide (CO)	Water Level	Flow	Sheen (Y/N)	Notes
BH401	Peak	20.5	ND	ND	ND	ND	ND	0.82	ND	No	
	Steady	20.5	ND	ND	ND	ND	ND				
BH402	Peak	20.5	ND	ND	ND	ND	ND	1.36	ND	No	
	Steady	20.5	ND	ND	ND	ND	ND				
BH403	Peak	20.4	ND	ND	ND	ND	ND	1.08	ND	No	
	Steady	20.4	ND	ND	ND	ND	ND				
BH404	Peak	20.6	0.1	ND	ND	ND	ND	1.60	ND	No	
	Steady	20.6	0.0	ND	ND	ND	ND				
BH405	Peak	19.8	ND	ND	ND	ND	ND	1.45	ND	No	
	Steady	19.8	ND	ND	ND	ND	ND				
BH406	Peak	19.8	ND	ND	ND	ND	ND	1.62	ND	No	
	Steady	19.8	ND	ND	ND	ND	ND				
BH407	Peak	19.9	0.7	ND	ND	ND	ND	NGW	ND	No	
	Steady	20.0	0.5	ND	ND	ND	ND				
	Percentage Concentrations				Parts per Million			mb			
Ambient	Oxygen (O ₂)	Carbon Dioxide (CO ₂)	Methane (CH4)	LEL	Hydrogen Sulphide (H2S)	Carbon Monoxide (CO)	Atm Pressure	Monitored by	Equipment	Weather	Pressure Trend
Start	20.6	ND	ND	ND	ND	ND	1014	ANB	GA2000	Overcast, wet	Rising
Finish	20.6	ND	ND	ND	ND	ND	1014				

Key
ND
NA
NGW

Not Detected
Not Available
No Groundwater

APPENDIX E

In-Situ Groundwater Testing Results

NW CAMBRIDGE DEVELOPMENT

UNIVERSITY OF CAMBRIDGE

BSL

C2157

On - Site Groundwater Monitoring

23/04/2013

Location	pH	Dissolved O ₂ (mg/l)	Conductivity (u/S)	Redox (mV)	Temp (°C)	Groundwater Level	Notes
BH401	5.97	1.9	818	79	9.9	0.86	Light brown
BH402	6.02	3.6	849	92	10.2	1.76	Light brown
BH403	6.11	4.1	994	88	9.4	0.81	Light brown
BH404	5.99	3.9	879	83	9.9	1.76	Light brown
BH405	6.13	6.2	841	152	10.5	1.11	Light brown
BH406	5.73	4.3	819	97	9.7	1.59	Light brown, sampled 9/05/2013
BH407	5.62	3.7	2970	72	10.6	DRY	Light brown,

Monitored by	Weather	Ambient Temp (°C)
AJS	Sunny, Dry	14.9

APPENDIX F Limitations

Limitations

This ground investigation was conducted and has been prepared for the sole internal use and reliance of the Client, The University of Cambridge and their Engineer URS. This report shall not be relied upon or transferred to any other parties without the express written authorisation of BSL. If an unauthorised third party comes into possession of this report they rely on it at their risk and the authors owe them no duty of care or skill.

The findings and opinions conveyed via the desk study within this report are based on information obtained from a variety of sources as detailed within this report, which BSL believes are reliable. In addition if information has been used from third parties and in particular other investigations and reports this information has been used in good faith. BSL cannot and does not guarantee the authenticity or reliability of third party information it has relied upon.

The investigation carried out on the site has been conducted to provide the best information and assessment on the ground conditions within site access and budgetary constraints. Exploratory holes only investigate a small area in relation to the overall site area and can therefore only provide a general indication of overall site conditions. Therefore the findings, opinions, geotechnical and environmental recommendations within this report are based on the ground conditions encountered at each location. It should be noted that different ground conditions may exist that have not been identified within this investigation.

The occurrence of and depths to groundwater may vary seasonally due to changes in weather, it should be noted that any observations and recommendations made on groundwater within this report are based on a select number of site visits over a limited period of time and may not be fully representative of groundwater conditions on the site.

Although every effort has been made to position exploratory holes in the least sensitive areas of the site, exploratory hole positions were located approximately as part of this investigation and no guarantee can be given as to their accuracy. Consideration should be given to the possibility that exploratory holes excavated as part of this investigation and indeed any previous ground investigation work by others may be encountered beneath or within the influence of individual foundations. BSL cannot be held responsible for structural failures caused by the location of foundations of any form of structure within the influence of exploratory holes.

No existing manhole covers were lifted or drainage runs inspected during the course of this ground investigation. The site plans enclosed in this report should not be scaled off.

APPENDIX C TIER I SCREENING ASSESSMENT RESULTS (SOIL AND GROUNDWATER)

Groundwater Analytical Results

		Tier 1 - GAC Controlled Waters	Client Sample ID	BH401	BH402	BH403	BH404	BH405	BH406	BH407
			Date Sampled	23-Apr-12	23-Apr-12	23-Apr-12	23-Apr-12	23-Apr-12	09-May-13	23-Apr-12
Determinand	Units		Sample Type	Water	Water	Water	Water	Water	Water	Water
pH	pH	5		7.7	7.7	7.6	7.8	7.6	7.7	7.3
Electrical Conductivity	us/cm	1000		1000	950	1300	2200	1000		1900
Sulfur				60	23	107	367	22		107
Chloride	mg/l	250		18	13	28	91	16		26
Ammoniacal nitrogen	mg/l	1		0.07	0.12	0.11	0.28	0.56	0.26	0.14
Nitrate	mg/l	42		29	140	130	6.4	26		130
Cyanide (total)	mg/l			<0.05	<0.05	<0.05	<0.05	<0.05		<0.05
Cyanide (free)	mg/l	0		<0.05	<0.05	<0.05	<0.05	<0.05		<0.05
Sulfide	mg/l	No criteria		<0.05	<0.05	<0.05	<0.05	<0.05		<0.05
Hardness	mg/l			280	340	380	890	340	2100	850
Calcium	mg/l	250		110	130	140	300	120		310
Potassium	mg/l	12		1.4	<0.50	27	34	37		87
Magnessium	mg/l	50		4.1	3.7	6.7	37	9.1		18
Sodium	mg/l	170		38	12	27	160	25		41
Sulfate	mg/l	400		180	69	320	1100	66	1700	320
Arsenic	ug/l	50		3.1	<1.0	<1.0	1.7	<1.0	1.7	4.1
Boron (water soluble)	ug/l	2000		540	1000	840	660	590	970	1300
Barium	ug/l	700		29	34	43	40	50		53
Beryllium	ug/l	73		<1.0	<1.0	<1.0	<1.0	<1.0		<1.0
Cadmium	ug/l	0		<0.080	<0.080	<0.080	<0.080	<0.080	0.12	<0.080
Chromium	ug/l	23		<1.0	<1.0	<1.0	12	<1.0	<1.0	2.4
Copper	ug/l	6		1.6	1.2	1.6	4	4.8	5.4	3.9
Mercury	ug/l	0		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Nickel	ug/l	20		1.3	<1.0	1.3	2	2.3	6.5	3.6
Lead	ug/l	7		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium	ug/l	20		26	4.4	13	29	5.5		4.1
Vanadium	ug/l	20		<1.0	<1.0	<1.0	<1.0	<1.0		1
Zinc	ug/l	75		7.5	3.6	4.4	12	3.4	56	12
Chromium (hexavalent)	ug/l	3		<20	<20	<20	<20	<20		<20
Total (of 17) PAHs				<2	<2	<2	<2	<2		<2
Naphthalene				<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Acenaphthylene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Acenaphthene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Fluorene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Phenanthrene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Anthracene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Fluoranthene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Pyrene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Benzo(a)anthracene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Chrysene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Benzo(b)fluoranthene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Benzo(k)fluoranthene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Benzo(a)pyrene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Dibenzo(a,h)anthracene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Indeno(1,2,3-cd)perylene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Benzo(g,h,i)perylene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Coronene	ug/l			<0.10	<0.10	<0.10	<0.10	<0.10		<0.10
Phenols (total)	ug/l			<0.03	<0.03	<0.03	<0.03	<0.03		<0.03
TPH (Aqueous Phase)				<10	<10	<10	<10	<10		<10
Ali >C5-C6	ug/l								<0.01	
Ali >C6-C8	ug/l								<0.01	
Ali >C8-C10	ug/l								<0.01	
Ali >C10-C12	ug/l								<0.1	
Ali >C12-C16	ug/l								<0.1	
Ali >C16-C21	ug/l								<0.1	
Ali >C21-C35	ug/l								<0.1	
Aro >C5-C7	ug/l								<0.01	
Aro >C7-C8	ug/l								<0.01	
Aro >C8-C10	ug/l								<0.01	
Aro >C9-C10	ug/l								<0.01	

' < ' Less than MDL

Soil Analytical Results

		Tier 1 - GAC (Human Health)	Client Sample ID	TP406	TP407	TP407	TP408	TP408	TP409	TP410	TP411	TP411	TP412	TP413	TP414	TP414	TP415	TP416	TP417	TP419	TP419	TP419	TP420	TP421	TP422	TP423	TP427	TP428	TP428	TP430	TP431	TP432	TP433
			Sample Depth	0.70	0.20	1.80	0.30	1.60	0.40	0.35	0.40	1.2	0.45	0.6	0.5	1.00	0.60	0.50	0.60	0.20	0.10	1.30	0.40	0.50	0.50	0.50	0.50	0.30	1.40	0.60	0.60	0.45	0.70
Determinand	Units		Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Asbestos in soil																																	
pH	pH	No criteria		7.80	8.20	8.10	8.50	8.50	7.50	8.10	8.00	8.60	7.20	7.30	7.00	8.40	7.90	7.80	7.90	7.80	7.60	7.70	7.90	8.10	8.00	8.20	8.10	8.10	7.80	8.20	8.10	8.20	8.30
Organic matter	%	No criteria		0.95	<0.40	0.97	<0.40	<0.40	0.50	1.40	0.48	<0.4	0.83	0.66	0.93	<0.4	1.10	1.20	0.91	1.10	0.59	4.00	0.47	1.40	2.10	1.40	1.40	1.30	0.69	1.20	1.00	0.81	2.20
Boron (hot water soluble)	mg/kg	291		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	1.70	0.60	<0.4	0.60	0.50	1.00	<0.4	1.00	1.20	0.50	1.10	0.50	<0.4	<0.4	1.50	<0.4	1.50	1.30	0.40	0.50	0.80	0.60	0.50	1.70
Chromium (hexavalent)	mg/kg	4		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Arsenic	mg/kg	32		9.10	20.00	9.10	9.90	9.80	13.00	11.00	20.00	17.00	27.00	18.00	22.00	21.00	19.00	21.00	13.00	12.00	9.60	14.00	19.00	8.60	12.00	12.00	8.60	11.00	14.00	7.80	12.00	17.00	18.00
Cadmium	mg/kg	10		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.21	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Chromium	mg/kg	627		22.00	16.00	21.00	8.40	5.40	19.00	23.00	21.00	13.00	16.00	9.20	12.00	9.00	29.00	28.00	24.00	26.00	14.00	16.00	18.00	24.00	34.00	32.00	32.00	28.00	23.00	25.00	34.00	22.00	34.00
Copper	mg/kg	2330		7.90	12.00	18.00	<5.0	5.10	8.70	8.40	12.00	5.80	13.00	9.80	14.00	9.30	13.00	14.00	18.00	9.70	5.10	9.20	8.50	12.00	17.00	12.00	16.00	12.00	17.00	12.00	16.00	8.30	92.00
Mercury	mg/kg	170		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.13
Nickel	mg/kg	130		21.00	26.00	36.00	14.00	7.30	26.00	21.00	37.00	17.00	27.00	28.00	24.00	25.00	34.00	38.00	42.00	26.00	17.00	25.00	25.00	24.00	34.00	30.00	32.00	28.00	38.00	24.00	44.00	29.00	44.00
Lead	mg/kg	354		14.00	11.00	16.00	7.60	<5.0	9.90	32.00	14.00	5.30	18.00	12.00	13.00	9.80	19.00	18.00	15.00	14.00	6.60	7.80	9.50	24.00	35.00	18.00	19.00	18.00	16.00	18.00	18.00	11.00	95.00
Selenium	mg/kg	350		<0.20	<0.20	0.33	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Zinc	mg/kg	3750		32.00	23.00	34.00	12.00	15.00	38.00	33.00	38.00	18.00	43.00	28.00	33.00	28.00	45.00	46.00	34.00	38.00	21.00	23.00	27.00	28.00	47.00	38.00	38.00	34.00	31.00	26.00	38.00	22.00	210.00
Sulfate (2:1 water soluble) as SO4	g/l	No criteria																															
TPH																																	
Ali >C5-C6	mg/kg	30		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ali >C6-C8	mg/kg	73		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ali >C8-C10	mg/kg	19		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ali >C10-C12	mg/kg	93		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ali >C12-C16	mg/kg	740		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ali >C16-C21	mg/kg	use Ali C16-35		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.60	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ali >C21-C35	mg/kg	use Ali C16-35		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	16.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ali >C35-C44	mg/kg	45000		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	15.00	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aro >C5-C7	mg/kg	65		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aro >C7-C8	mg/kg	120		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aro >C8-C10	mg/kg	27		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aro >C10-C12	mg/kg	69		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aro >C12-C16	mg/kg	140		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aro >C16-C21	mg/kg	250		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.60	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aro >C21-C35	mg/kg	890		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	3.60	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aro >C35-C44	mg/kg	890		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Petroleum Hydrocarbons	mg/kg	1200												<10	<10	<10	<10	39.00	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Naphthalene		2		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.00
Acenaphthylene	mg/kg	170		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03
Acenaphthene	mg/kg	210		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06
Fluorene	mg/kg	160		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.21
Phenanthrene	mg/kg	92		0.																													

Soil Analytical Results

		Tier 1 - GAC (Human Health)	Client Sample ID	TP433	TP434	TP434	TP435	TP436	TP436	TP437	TP437	TP438	TP402	TP402	TP403	TP404	TP405	TP424	TP425	TP426	BH401	BH401	BH402	BH402	BH403	BH404	BH404	BH405	BH405	BH406	BH406	BH407	BH407
			Sample Depth	1.80	0.40	1.00	1.00	0.15	0.90	0.30	0.90	0.50	0.70	0.70	0.70	1.40	0.60	1.10	1.70	0.80	0.20	1.00	0.50	2.00	0.50	0.20	2.00	0.50	2.00	1.00	3.00	0.50	3.00
Determinand	Units		Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
Asbestos in soil																																	
pH	pH	No criteria		8.50	8.30	8.00	8.30	7.80	8.00	8.20	8.20	8.30	8.80	8.30	8.50	7.80	8.30	8.20	8.20	7.80	8.30	8.40	8.50	8.70	8.40	8.10	8.30	9.00	8.30	8.00	8.30	9.20	
Organic matter	%	No criteria		<0.4	0.43	<0.4	0.52	2.10	<0.4	2.10	0.67	0.72	0.72	<0.4	0.57	<0.4	0.59	0.41	<0.4	1.10	1.40	1.10	0.67	0.72	0.47	3.80	1.10	<0.40	0.59	1.10	0.76	0.71	1.70
Boron (hot water soluble)	mg/kg	291		<0.4	<0.4	0.50	<0.4	1.00	<0.4	0.70	<0.4	0.50	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.40	0.50	0.60	0.40	0.40	<0.4	<0.4	2.10	<0.4	<0.4	<0.4	0.60	0.40	<0.4	0.80
Chromium (hexavalent)	mg/kg	4		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5																				
Arsenic	mg/kg	32		15.00	33.00	23.00	29.00	22.00	23.00	19.00	21.00	18.00	17.00	21.00	6.50	21.00	14.00	34.00	18.00	17.00	23.00	13.00	17.00	20.00	20.00	15.00	9.10	11.00	11.00	9.00	7.80	8.40	20.00
Cadmium	mg/kg	10		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.14	<0.10	0.20	0.15	0.13	<0.10	0.15	0.26	<0.01	<0.01	0.13	0.13	0.22	<0.1	0.12	<0.1	<0.1	<0.1	0.52	
Chromium	mg/kg	627		21.00	28.00	37.00	22.00	24.00	16.00	16.00	21.00	21.00	22.00	13.00	11.00	20.00	30.00	17.00	23.00	25.00	29.00	25.00	21.00	17.00	13.00	36.00	16.00	14.00	7.10	16.00	14.00	21.00	
Copper	mg/kg	2330		17.00	18.00	21.00	12.00	26.00	9.60	40.00	19.00	11.00	21.00	6.60	11.00	17.00	10.00	16.00	16.00	12.00	20.00	18.00	11.00	9.40	11.00	24.00	15.00	9.10	6.90	13.00	14.00	26.00	
Mercury	mg/kg	170		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.15	
Nickel	mg/kg	130		29.00	44.00	47.00	34.00	29.00	24.00	27.00	31.00	24.00	50.00	16.00	20.00	42.00	27.00	26.00	39.00	27.00	38.00	30.00	23.00	21.00	25.00	37.00	27.00	21.00	14.00	25.00	26.00	12.00	
Lead	mg/kg	354		13.00	20.00	12.00	13.00	83.00	7.90	29.00	17.00	13.00	17.00	9.50	9.00	12.00	13.00	10.00	14.00	22.00	24.00	16.00	10.00	8.70	7.30	36.00	11.00	7.20	<5.0	10.00	9.90	9.70	
Selenium	mg/kg	350		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20																				
Zinc	mg/kg	3750		25.00	68.00	51.00	40.00	160.00	31.00	59.00	49.00	37.00		55.00	31.00	23.00	62.00	38.00	100.00	38.00	53.00	87.00	47.00	34.00	30.00	38.00	75.00	34.00	31.00	20.00	26.00	27.00	
Sulfate (2:1 water soluble) as SO4	g/l	No criteria											0.04	<0.01	0.01	0.04	0.18	0.07	0.07	0.14	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.24	<0.01	<0.01	0.15	1.50	0.09	
TPH																																	
Ali >C5-C6	mg/kg	30		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Ali >C6-C8	mg/kg	73		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Ali >C8-C10	mg/kg	19		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Ali >C10-C12	mg/kg	93		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Ali >C12-C16	mg/kg	740		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Ali >C16-C21	mg/kg	use Ali C16-35		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Ali >C21-C35	mg/kg	use Ali C16-35		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Ali >C35-C44	mg/kg	45000		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Aro >C5-C7	mg/kg	65		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Aro >C7-C8	mg/kg	120		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Aro >C8-C10	mg/kg	27		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Aro >C10-C12	mg/kg	69		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Aro >C12-C16	mg/kg	140		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Aro >C16-C21	mg/kg	250		<1	<1	<1	<1	<1	5.40	2.80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Aro >C21-C35	mg/kg	890		<1	<1	<1	<1	<1	11.00	6.80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<										

APPENDIX D GROUND-GAS MONITORING ANALYSES

Gas Monitoring Results Analysis

Location	Monitoring Round	Date	Methane	Carbon Dioxide	Oxygen	Carbon Monoxide	Hydrogen Sulphide	Flow	Atmospheric Pressure	Gas Screening Value (l/s)		Depth to Water	Gas Screening Value Classification
			(% v/v max)	(% v/v max)	(% v/v min)	(ppm max)	(ppm max)	(l/s max)	(mBar)	CH4	CO2	(m bgl)	
BH401	1	18/04/2013	0.0	0.0	20.2	ND	ND	0.0	1016	0.000	0.000	3.62	Very low risk
	2	09/052013	0.0	0.1	20.8	ND	ND	0.0	1008	0.000	0.000	0.86	Very low risk
	3	29/05/2013	0.0	0.0	20.5	ND	ND	0.0	1014	0.000	0.000	0.82	Very low risk
	4	10/06/2013	0.0	0.0	20.6	ND	ND	0.0	1014	0.000	0.000	1.28	Very low risk
	Min		0.0	0.0	20.2	0.0	0.0	0.0	1008				
	Max		0.0	0.1	20.8	0.0	0.0	0.0	1016				
BH402	1	18/04/2013	0.0	0.0	20.2	ND	ND	0.0	1016	0.000	0.000	1.00	Very low risk
	2	09/052013	0.0	0.0	20.8	ND	ND	0.0	1008	0.000	0.000	1.12	Very low risk
	3	29/05/2013	0.0	0.0	20.2	ND	ND	0.0	1014	0.000	0.000	1.36	Very low risk
	4	10/06/2013	0.0	0.0	20.4	ND	ND	0.0	1014	0.000	0.000	1.37	Very low risk
	Min		0.0	0.0	20.2	0.0	0.0	0.0	1008				
	Max		0.0	0.0	20.8	0.0	0.0	0.0	1016				
BH403	1	19/04/2013	0.0	0.0	20.6	ND	ND	0.0	1016	0.000	0.000	0.57	Very low risk
	2	09/052014	0.0	0.0	20.7	ND	ND	0.0	1008	0.000	0.000	1.05	Very low risk
	3	08/03/2013	0.0	0.0	20.4	ND	ND	0.0	1014	0.000	0.000	1.08	Very low risk
	4	10/06/2013	0.0	0.0	20.6	ND	ND	0.0	1014	0.000	0.000	0.78	Very low risk
	Min		0.0	0.0	20.4	0.0	0.0	0.0	1008				
	Max		0.0	0.0	20.7	0.0	0.0	0.0	1016				
BH404	1	26/01/2013	0.0	0.0	20.8	ND	ND	0.0	1016	0.000	0.000	1.57	Very low risk
	2	09/052014	0.0	0.0	20.6	ND	ND	0.0	1008	0.000	0.000	1.76	Very low risk
	3	30/05/2013	0.0	0.1	20.6	ND	ND	0.0	1014	0.000	0.000	1.60	Very low risk
	4	10/06/2013	0.0	0.0	20.3	ND	ND	0.0	1014	0.000	0.000	0.90	Very low risk
	Min		0.0	0.0	20.3	0.0	0.0	0.0	1008				
	Max		0.0	0.1	20.8	0.0	0.0	0.0	1016				
BH405	1	20/04/2013	0.0	0.0	20.6	ND	ND	0.0	1016	0.000	0.000	0.78	Very low risk
	2	09/052015	0.0	0.0	20.9	ND	ND	0.0	1008	0.000	0.000	1.11	Very low risk
	3	16/12/2012	0.0	0.0	19.8	ND	ND	0.0	1014	0.000	0.000	1.45	Very low risk
	4	10/06/2013	0.0	0.1	20.5	ND	ND	0.0	1014	0.000	0.000	1.24	Very low risk
	Min		0.0	0.0	19.8	0.0	0.0	0.0	1008				
	Max		0.0	0.1	20.9	0.0	0.0	0.0	1016				
BH406	1	05/11/2012	0.0	0.1	20.7	ND	ND	0.0	1016	0.000	0.000	NGW	Very low risk
	2	09/052015	0.0	0.0	21.0	ND	ND	0.0	1008	0.000	0.000	1.59	Very low risk
	3	31/05/2013	0.0	0.0	19.8	ND	ND	0.0	1014	0.000	0.000	1.62	Very low risk
	4	10/06/2013	0.0	0.0	20.4	ND	ND	0.0	1014	0.000	0.000	1.97	Very low risk
	Min		0.0	0.0	19.8	0.0	0.0	0.0	1008				
	Max		0.0	0.1	21.0	0.0	0.0	0.0	1016				
BH407	1	21/04/2013	0.0	2.1	18.3	ND	ND	0.0	1016	0.000	0.000	3.62	Very low risk
	2	09/052016	0.0	6.0	15.1	ND	ND	0.0	1008	0.000	0.000	NGW	Very low risk
	3	25/09/2012	0.0	0.7	19.9	ND	ND	0.0	1014	0.000	0.000	NGW	Very low risk
	4	10/06/2013	0.0	3.1	17.8	ND	ND	0.0	1014	0.000	0.000	NGW	Very low risk
	Min		0.0	0.7	15.1	0.0	0.0	0.0	1008				
	Max		0.0	6.0	19.9	0.0	0.0	0.0	1016				

APPENDIX E GROUNDWATER STRIKE DATA

Groundwater Strikes Data

Location	Depth of Damp Condition			Strata Description
	Groundwater	Slight Seepage	Moderate Seepage	
BH401				
BH402	1.7			Sand & Gravel
BH403				
BH404				
BH405	1.8			Sand & Gravel
BH406				
BH407				
TP401				
TP402	1.4			Sand & Gravel
TP403				
TP404	1.7			Sand & Gravel
TP405	1.6			Sand & Gravel
TP406	1.6			Sand & Gravel
TP407		1.6		gravelly CLAY
TP408	1.2			Sand & Gravel
TP409				
TP410	1.2			Sand & Gravel
TP411			1.2	gravelly SAND
TP412	2			Sand & Gravel
TP413	2.2			Sand & Gravel
TP414	2			Sand & Gravel
TP415	0.95			Clayey Sand
TP416			1.5	Sand & Gravel
TP417				
TP418		2.8		Gaulk clay
TP419				
TP420			1	gravelly SAND
TP421				
TP422				
TP423				
TP424	1.5			Sand & Gravel
TP425				
TP426	1.6			Sand & Gravel
TP427				
TP428				
TP429	2			Sand & Gravel
TP430				
TP431				
TP432	1			gravelly sandy CLAY
TP433	1.4	1.1		gravelly sandy CLAY
TP434				
TP435				
TP436				
TP437	2.9			Clayey silty SAND
TP438			1.2	Sandy GRAVEL