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REPORT ON GROUND INVESTIGATION

FOR

PROPOSED FACTORY EXTENSION

AT

SMART SYSTEMS, YATTON

ON BEHALF OF

DJP CONSULTING ENGINEERS

REPORT NO: 15131
DATE: NOVEMBER, 2007

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Attention is drawn to the following notes which should be read in conjunction with this report, which has been prepared for the exclusive use of the Client for the specified purpose described.

1. The comments, opinions and recommendations made in this report are based on the information obtained during the investigation. This assessment has been prepared to assist the Client and his/her Advisers with preparation of their design. Conditions not revealed by the investigation may exist, for example between borehole positions, or there may be special conditions appertaining to the site for which no responsibility can be taken.
2. Where comments are made concerning correlation between boreholes or the strata configuration below the maximum depth of the investigation, this is for guidance only and liability is not accepted for its accuracy.
3. The borehole records appended to this report have been prepared following visual inspection of the samples obtained and, where possible, have been modified in the light of site and laboratory test results.
4. Unless otherwise stated, standard "Shell and Auger" soft ground boring techniques have been employed. Although normally satisfactory information is obtained, some mixing of layered or interbedded soils occurs, an unavoidable loss of "fines" from granular soil takes place and "rock" is identified usually only from small fragments.
5. Comments on groundwater conditions are based on the conditions revealed by the investigation at that time. Ground water levels are subject to seasonal variations, local drainage changes, and abnormal climatic conditions, which may also affect the engineering characteristics of the ground.
6. The whole of this report is copyright.

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1.0 INTRODUCTION

1.1 TERMS OF REFERENCE

This report describes the ground investigation completed for the proposed extension to the existing Smart Systems factory at Arnolds Way, Yatton. It has been completed in accordance with instructions received from DJP Consulting Engineers acting on behalf of the Client. The investigation has included the construction of boreholes, trial pit excavations, the monitoring of soil gases and water levels and the completion of laboratory tests. In addition the proposed new power supply trench around the perimeter of the site was inspected and excavations were made adjacent to the existing building to examine certain aspects of the foundation construction.

1.2 DEVELOPMENT PROPOSALS

It is proposed to increase the existing Smart Systems facility by constructing a large extension. This will be to the south west of the existing building across an area at present comprising two fields, although likely to have comprised a larger number of smaller fields prior to the removal of hedgerows etc. In addition to the factory there will be extensive external areas to service the facility together with water storage tanks and a wind turbine.

In view of the anticipated ground conditions it has been assumed that the building will be supported by piled foundations and consideration is being given to subsoil lime stabilisation to improve the nature of the ground for construction and enhance its performance beneath the external areas.

1.3 OBJECTIVES OF THE INVESTIGATION

The main aims of the investigation have been to:

- Delineate the strata succession at six borehole and six trial pit positions within the area of the site with particular emphasis on the presence of peat and the depth to "bedrock" beneath the anticipated alluvial deposits.

- Observe and record the presence and level of water in the boreholes and trial pits during the investigation and at two positions install slotted pipes for the monitoring of soil gases and ground water.
- Complete insitu tests and obtain samples of the various subsoil materials encountered, to enable laboratory tests to be completed to establish basic chemical and engineering soil parameters.
- Excavate at three positions alongside the existing building to permit the Engineer to examine the foundation construction in order to assess its influence on the proposed new building.
- Comment in general on the proposed construction work in the light of its current understanding and discuss potential geotechnical difficulties revealed by the present ground investigation.

2.0 SITE DETAILS

2.1 LOCATION AND DESCRIPTION

The approximately rectangular shaped site extends south westward from the existing factory across agricultural land centred on the approximate National Grid Reference ST416,662. The ground is relatively flat and level with a general fall to the south west of approximately 0.5m other than in the vicinity of the hedgerow and water filled ditch which crosses the site and around the perimeter where there are similar features. Adjacent to the factory the field is grassed with hedgerows and a number of trees whereas the more south westerly field beyond the separating hedgerow has been in arable use. At the time of this investigation a trench nominally 1m deep extended around the perimeter of the site, which it is understood is for the new electricity supply cable. Although at the time of this investigation the site was fairly firm underfoot and dry with desiccation cracks visible in the topsoil of the arable field parts of the site were waterlogged following rainfall.

2.2 HISTORY

The history of the site has not formed part of this investigation. It seems likely however that the site has not had other than agricultural use although it is possible it previously

comprised a larger number of smaller fields prior to the removal of hedgerows and the infilling of ditches.

The existing factory was constructed over similar agricultural land following an investigation by this company completed in 2002.

There is no reason to suspect that the land has been contaminated by any previous site use.

2.3 GEOLOGY

According to the British Geological Survey map of the district, Sheet No. 264 Solid and Drift edition at the scale of 1:50,000 the site is in an area where superficial Drift deposits conceal the Solid or "Bedrock" geology. The former are classified as Tidal Flat Deposits described as "organic-rich clay and silt" of Quarternary age. The latter are implied to comprise strata of the Mercia Mudstone Group of Triassic age shown as "Undivided" comprising "Mudstone, red with greenish grey sandstone". An inlier of Mercia Mudstone Group strata is shown outcropping to the east, where it was encountered during the investigation for the existing factory. This confirms that in this geological setting the thickness of the Drift deposits varies even over relatively short distances. The interface between the Drift and Solid deposits is a concealed topographic surface eroded prior to the recent deposition of the Tidal Flat Deposits.

The present investigation has generally confirmed the anticipated geological succession.

3.0 INVESTIGATION

3.1 FIELDWORK

The fieldwork aspects of the investigation are described under the following headings:

Trial Pits:

A rubber tyred back acting excavator was employed to open the test pits, the positions of which are shown on the appended site plan. In addition to pits opened to delineate the shallow strata succession and permit insitu testing, excavation was also undertaken adjacent to the existing building in order to reveal construction details. A trench opened

for the new power supply cable around the perimeter of the site was also examined in order to provide additional information.

As the excavation progressed at each position, details of the strata succession were recorded, together with observations concerning the presence and level of groundwater, and the immediate short term stability of the trial pit sides. Disturbed samples representative of the materials encountered were taken and returned to the laboratory for further inspection and testing. A Pilcon hand vane was used to measure at various levels, where practical to do so, the apparent cohesion of the subsoil materials. A Mexecon Penetrometer was also used to indicate the CBR at depths of approximately 0.5m and 1.0m. Full details of the pits are included on the records appended to this report. Tests were also completed in the base of the cable trench and the tabulated measurements are appended.

The test pits varied in depth between 1.0m and 1.4m. The excavations adjacent to the building extended to between 0.5m and 1.0m.

The ground levels included on the trial pit records have been estimated from the site survey.

Cable Percussive Boreholes:

A Dando 2000 Investigator rig was used to construct six boreholes at the positions shown on the appended site plan using 150mm nominal diameter tools and equipment. The boreholes varied in depth between 10.45m and 11.25m terminating at virtual "refusal" for this method of exploration. It is concluded that deeper penetration, if required, would need the use of rotary drilling methods.

As the boring progressed details of the strata succession were recorded together with observations concerning the presence and level of groundwater. The use of temporary casings, necessary to support the sides of the holes however, is thought to have sealed the ingress of water at shallow depth. Throughout the drilling operations disturbed samples of the materials encountered were collected and returned to the laboratory for further inspection and testing. In addition undisturbed 100mm nominal diameter samples were extracted and insitu Standard Penetration Tests completed. The "N" values measured during these tests are included on the individual borehole records. Where the

full test penetration was not achieved within 50 blows the measured penetration is recorded. In those instances where the initial seating penetration prior to the test was not achieved the penetration after 50 blows is recorded and the test identified by an *.

On completion of boreholes 1 and 6 perforated pipes were installed within granular backfill together with a bentonite/cement plug and valve for the monitoring of groundwater and soil gases.

The borehole records which include ground levels estimated from the site survey are appended.

3.2 MONITORING

The borehole installations have been monitored for the presence and level of groundwater using a cable reel dipmeter and the common soil gases Oxygen, Carbon dioxide, Methane and Hydrogen sulphide using a Geotechnical Instruments GA 2000 Infra red Analyser. The ambient atmospheric pressure at the time of the monitoring has also been measured together with gas pressure and/or flow within the pipes.

The groundwater level at position 6 shortly after the pipe was installed was 0.6m and to check if this was due to displacement during installation, water was bailed from the pipe to a depth of 2m. It subsequently reached an equilibrium level 0.6m. The results of the monitoring are attached.

3.3 LABORATORY TESTING

The following types of laboratory tests have been completed using samples selected from those extracted from the boreholes and trial pits, the results of which are appended to this report in tabular form:

Engineering Tests:

Moisture Content Determinations,
Plastic and Liquid Limit Determinations,
Hand Vane Tests and Bulk Density determinations (on undisturbed samples),

Water Soluble and Total Sulphate, Sulphide and pH Reaction Determinations,
Organic Matter Content.

Chemical Contamination Analysis:

A "Screening" suite of common potentially contaminative substances based on CLEA and the former ICRCCL guidelines,
Waste Acceptance Criteria Tests on combined samples.

4.0 GROUND CONDITIONS

4.1 MADE GROUND

The boreholes and trial pits, other than those immediately adjacent to the building, did not encounter made ground except agriculturally disturbed topsoil. It is normal to expect made ground and disturbance close to buildings and in the vicinity of services etc. Additional disturbance and filling is possible at this site if hedgerows and drainage ditches have been grubbed out and infilled.

The grubbing out of the existing hedgerows and the infilling of ditches will influence the proposed development of the site. It is assumed the ditches will be either infilled, with the drainage diverted, or the watercourses will be culverted. In either case, this will result in areas of different engineering properties to the adjacent undisturbed ground. It is advisable that these areas of disturbance are carefully backfilled with material systematically "stepped" into the natural ground to avoid abrupt transitions between different materials. Trial pits 1, 2 and 3 excavated adjacent to the existing building exposed substructure concrete at depths of 0.15 – 0.2m below ground level with projections of between 0.4 – 0.5m from the side of the building.

It is advisable to grub out hedgerows which are to be removed in advance of construction to permit the soil moisture to achieve an equilibrium moisture content to reduce future impact on construction.

4.2 NATURAL GROUND

The natural strata encountered during this investigation is consistent with that anticipated from an examination of the geological map and the investigation completed in 2002 for

the existing factory. It is possible to recognise both Drift and Solid geological deposits in the boreholes although the test pits being of limited depth were restricted to the former.

The boreholes encountered and terminated within the Mercia Mudstone Group strata expected beneath the cover of superficial deposits identified as Tidal Flat Deposits. There is a relatively abrupt interface between the Drift and Solid geological deposits, the latter having been encountered at depths of between 9m and 10m beneath the site. In boreholes 1, 2, 5 and 6 however there is a layer of similar coloured material but the presence of gravel indicates it to be part of the Drift succession where the two materials appear to be mixed. This layer was encountered at depths varying from 9.0m to 9.5m and is of the order of 0.3m to 1.0m thick. It is classified as part of the Drift succession although material from the underlying Solid geology being the primary or "parent" source is a major constituent.

The Mercia Mudstone encountered in the boreholes comprises stiff to hard clay with depth increasing in strength and containing very weak mudstone lithorelicts. The laboratory test results indicate in accordance with Figure 18 of BS5940:1999 it to be classified as material of Clay and Silt of Intermediate to High Plasticity and by NHBC Table 1 to have Low to Medium Volume change potential. The material becomes essentially non plastic with depth. The apparent cohesion exceeds 120 kPa as determined by hand vane tests but the fabric of the material is such that it is generally friable. For material of this plasticity it is reasonable to estimate the soil cohesion from the insitu test results using the equation $c, \text{ kPa} = 5 \times N$. Below the termination of the boreholes the strength should be assessed as a weak rock.

The Drift deposits which conceal the Mercia Mudstone Group strata exhibit many of the characteristic features of such deposits. At shallow depth there is a "crust" of relatively firmer and generally mottled silty clay below which the material is softer, less mottled and/or blue grey in colour often with organic matter as well as discrete accumulations of peat. The "crust" extends generally to depths of the order of 1 – 1.5m below the surface beneath which there is a significant reduction in strength. Peat was encountered in all the boreholes. There is a substantial layer of peat, the base of which varies from 6.7m to 7.5m below site level and this the clay is frequently organic especially towards the bottom of the Drift succession. The top of the peat varies from 4.2 – 4.9m below ground level although in most instances there is a thin layer of peaty clay with more peat above. The top of the uppermost peat varies between 3.6 – 4.1m below ground level.

The presence of peat has particular engineering significance because of its weak strength and high compressibility. It should be noted however, that peat does not consolidate in the classical soil mechanics manner because it consists of organic fibres which distort under load unlike soil particles which during consolidation come closer together expelling interstitial moisture.

The laboratory tests results indicate the shallow alluvial clay to be material of Intermediate to High Plasticity in accordance with Figure 18 of BS 5990:1999 with soil Volume change potential in accordance with NHBC Table 1 of Low to Medium

There is a correlation between the soil moisture content which increases with depth and the decrease in the apparent cohesion and CBR. Below approximately 1.5 – 2m the moisture content increases more rapidly and the clay is much softer.

The moisture content of the peat is significantly higher (the results being relative to the dry weight of the samples often exceeding 100%). The moisture content of the deeper basal alluvial clays is relatively high and variable due to the presence of organic and peaty material.

4.3 GROUNDWATER

The boreholes encountered groundwater although it is possible the use of temporary casings and the initial speed of penetration at shallow depth sealed and masked slow seepages. Groundwater seepages were noted in some of the trial pits. It is thought the fields have a system of land drains, which will be preferential seepage routes.

The groundwater level standing in the perforated pipes installed into boreholes 1 and 6 indicate the equilibrium water table to be of the order of 0.75m to 0.6m below ground level. After the installation was completed at position 6 water was bailed from the hole to a depth of 2m in order to check if the higher level was due to water being displaced by the installation. This proved not to be the case.

The presence of water in places in the electricity cable trench and the ditches around and across the site also indicate that the groundwater is shallow. It is probable that the groundwater level will fluctuate seasonally and there may be areas of perched water within backfilled ditches and where the ground has been disturbed by hedgerow removal.

4.4 SOIL GASES

The results of the monitoring for soil gases completed during this investigation are appended. The monitoring has detected Methane but not Hydrogen sulphide. Carbon dioxide has been measured at levels above normal atmospheric concentrations and the Oxygen levels are depleted which is normal in the ground. No soil gas pressure or flow from the boreholes has been detected. The gas concentrations have varied with changes in atmospheric pressure.

It is recommended the monitoring of soil gases should continue in order that the significance of soil Methane and Carbon dioxide can be more fully assessed. It is probable that the boreholes by penetrating through the clay to the underlying peat have released gas but it is unlikely that it is being generated at rates which will be significant. The proposed piling for the factory foundations may like the boreholes provide gas migration routes. As a prudent precaution in the light of this preliminary conceptual site model it is advisable to include for a sealed gas membrane within the floor construction and around service entries to the building.

4.5 CHEMICAL TEST RESULTS

The results of the chemical tests completed on natural subsoil samples have been considered, where possible, in accordance with the guidelines published by the Department of the Environment, Food and Rural Affairs (DEFRA) on the basis of the Contaminated Land Exposure Assessment Model (CLEA). This introduces the notion of Soil Guideline Values (SGVs) for a range of commonly occurring potential contaminants, applicable to a variety of land uses in accordance with the Source-Pathway-Receptor linkage. It has also been possible to make reference to the more recently published Generic Assessment Criteria for Human Health Risk Assessment published by Land Quality Management Limited (LQM) in association with the Chartered Institute for Environmental Health (CIEH). In the case of Cyanide reference has been made to the (now withdrawn) guidance of the former Interdepartmental Committee on the Redevelopment of Contaminated Land (ICRCL) although this has no statutory authority. All the Cyanide determinations are however below the laboratory detection limit.

The test results are summarised below in respect of the SGVs for commercial/industrial development. It is concluded there is no indication of elevated concentrations of the compounds in the test suite. As a consequence in the absence of a Source the source-

pathway-receptor linkage is broken and there is no concern in respect of ground contamination posing a significant risk of significant harm to human health or the wider environment.

| DETERMINANT | TEST RESULTS RANGE mg/kg | COMPARISON CRITERIA mg/kg |
|---------------------------|-----------------------------|-----------------------------------------------------|
| Arsenic | 11.0 – 15.1 | SGV 500 |
| Cadmium | <0.5 | SGV 1,400 |
| Chromium | 36 - 50 | SGV 5,000 |
| Lead | 19 - 42 | SGV 750 |
| Mercury | <0.5 | SGV 480 |
| Selenium | 0.8 – 1.1 | SGV 8,000 |
| Nickel | 31 - 41 | SGV 5,000 |
| Copper | 11 - 19 | LQM CIEH GAC 45,700 |
| Zinc | 98 - 129 | LQM CIEH GAC 188,000 |
| Phenols | <1 | LQM CIEH GAC 21,900 (at 1% soil organic matter) |
| Cyanide | <1 | ICRCL 100 Free Cyanide (building and hard cover) |
| Polyaromatic Hydrocarbons | <0.5 | No SGV |

Samples at 0.5m and 1.0m depth have also been tested for various parameters to enable the suitability of the subsoil for lime stabilisation to be assessed together with engineering parameters which are appended.

The Waste Acceptance Criteria Tests completed on combined samples of subsoil indicate that excavation spoil comprising natural subsoil other than topsoil may be accepted at landfill as Inert Waste. It is important however that all the test results are provided to prospective landfill recipients for assessment in accordance with the details of their particular licence.

5.0 RECOMMENDATIONS

5.1 FOUNDATIONS AND FLOOR SLAB, WATER TANKS AND TURBINE

The investigation has shown, other than in areas affected by hedgerows and ditches (and where these may have been removed) that the site is underlain by relatively uniform ground conditions. The ground conditions are consistent with those anticipated in the area based on an examination of the geological map and the information from the 2002 investigation for the existing factory. The expectation that the new construction will

require piled foundations with a suspended slab because of the presence of extensive peat deposits is confirmed by this investigation.

Piled foundations will be supported primarily by end bearing resistance from the Mercia Mudstone Group strata with a contribution from shaft friction related to the depth of pile embedment into the bearing stratum. Shaft friction within the superficial deposits should be ignored. If there is any proposal to raise the general site level then provision should be made for negative skin friction due to settlement of the alluvial deposits. Negative skin friction should also be anticipated where piles penetrate backfilled drainage ditches and the ground disturbed by hedgerow removal.

It is recommended experienced prospective piling contractors are approached to ascertain the most suitable type of pile for the site and ground conditions and to determine the loads which can be guaranteed on piles of individual manufacture. Preference may be given to driven or displacement piles as each can be installed to a predetermined set making it possible to adjust the length of individual piles should the ground conditions vary. A particular advantage of driven piles is that spoil is not brought to the surface eliminating the costs associated with off site disposal.

Although soil gases are not considered a significant long term risk as a prudent precaution it is recommended a sealed gas membrane is included in the design of the floor slab and service entries. Enclosed areas within the building should also be ventilated.

5.2 BURIED CONCRETE

The laboratory test results do not indicate elevated concentrations of total or water soluble sulphate and neutral to alkaline pH conditions. In accordance with Table C1 of BRE Special Digest 1, 2005 the Design Sulphate Class for the site is concluded to be DS-1 with mobile groundwater.

5.3 DRAINAGE

The heavy clay subsoil at this site and the shallow water table make it unlikely that stormwater soakaways will be practical.

5.4 CBR TEST RESULTS

It has been possible to complete Mexecon Penetrometer CBR tests in the trial pits and the electricity cable trench. The test results are consistent, although there may in places be some influence from the hedgerows due to desiccation. The CBR generally decreases with depth below 0.5m corresponding with the reduction in soil cohesion and the increase in moisture content. Generally a CBR of 2% is recommended for external areas.

It is understood that specialist advice is being sought regarding the potential use of lime stabilisation to improve the quality of the clay subsoil. External areas should be laid with generous falls to facilitate surface water drainage and to avoid any reasonable possibility of a reversal of drainage. External areas subjected to sustained loading are expected to settle and in some instances these may need to be piled.

Appendix A –Borehole Records

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Site
SMART SYSTEMS, YATTON, PHASE II.

Borehole Number
BH1

| | | | | |
|-------------------------------------------------|------------------------------------------|----------------------------|---------------------------------------|---------------------|
| Boring Method CABLE PERCUSSION DANDO 2000 | Casing Diameter 150mm cased to 10.00m | Ground Level (mOD) 5.73 | Client SMART SYSTEMS. | Job Number 15131 |
| Location SEE SITE PLAN | | Dates 07/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 1/2 |

| Depth (m) | Sample / Tests | Casing Depth (m) | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water | Instr |
|--------------|----------------|------------------|-----------------|-----------------------------|-------------|-----------------------|------------------------------------------------------------------------------|--------|-------|-------|
| 0.50 | D | | | | 5.43 | (0.30) 0.30 | Firm orange brown slightly sandy silty clay TOPSOIL with fine roots. | | | |
| 1.00 1.00 | C D | 1.00 | | N = 5 | | (1.10) | Firm to stiff grey and orange brown mottled silty CLAY. | | | |
| 1.50 | D | | | Water standing(1) at 1.50m. | 4.33 | 1.40 | Firm grey and orange brown mottled silty CLAY. | | Σ | |
| 2.00 | U | 2.00 | | | | (1.10) | | | | |
| 2.50 | D | | | | 3.23 | 2.50 | Soft to firm grey silty to very silty CLAY with black organic traces. | | | |
| 3.00 3.00 | C D | 3.00 | | N = 4 | | (1.00) | | | | |
| 3.50 | D | | | | 2.23 | 3.50 | Soft to firm blue grey and grey mottled silty to very silty CLAY. | | | |
| 4.00 | U | 4.00 | | | | (0.90) | | | | |
| 4.50 | D | | | | 1.33 | 4.40 (0.30) | Black spongy fibrous PEAT with very soft blue grey silty to very silty CLAY. | | | |
| 4.70 | D | | | | 1.03 | 4.70 | Black spongy fibrous PEAT. | | | |
| 5.00 5.00 | C D | 5.00 | | N = 1 | | | | | | |
| 5.50 | D | | | | | (2.10) | | | | |
| 6.00 | D | | | | | | | | | |
| 6.50 6.50 | C D | 6.50 | | N = 0 | | | | | | |
| 6.80 | D | | | | -1.07 | 6.80 | Very soft to soft blue grey silty CLAY. | | | |
| 7.00 | D | 7.00 | | | | | | | | |
| 7.50 | D | | | | | | | | | |

Remarks

- 1) Water entry first noticed at 9.5m and sealed at 10m but shallower entry probably sealed by casings following the installation of the standpipe water at 1.5m.
- 2) Ground level estimated from site survey.
- 3) Water and gas monitoring details appended.

| | |
|-------------------------|-----------------|
| Scale (approx) 1:40 | Logged By JF |
| Figure No. 15131.BH1 | |

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Site
SMART SYSTEMS, YATTON, PHASE II.

Borehole Number
BH1

| | | | | |
|-------------------------------------------------|------------------------------------------|----------------------------|---------------------------------------|---------------------|
| Boring Method CABLE PERCUSSION DANDO 2000 | Casing Diameter 150mm cased to 10.00m | Ground Level (mOD) 5.73 | Client SMART SYSTEMS. | Job Number 15131 |
| | Location SEE SITE PLAN | Dates 07/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 2/2 |

| Depth (m) | Sample / Tests | Casing Depth (m) | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water | Instr |
|----------------------|----------------|------------------|-----------------|-------------------------------------|-------------|-----------------------|--------------------------------------------------------------------------------------------------------|--------|-------|-------|
| 8.00 | D | 8.00 | | N = 1 | | (2.60) | Very soft to soft blue grey silty CLAY. | | | |
| 8.00 | C | | | | | | | | | |
| 8.50 | D | 9.00 | | Water strike(2) at 9.50m. N = 30 | | 9.40 (0.50) | Firm to stiff orange brown and grey mottled sandy silty CLAY with occasional gravel. | | | |
| 9.00 | D | | | | | | | | | |
| 9.40 9.50 9.50 | D C D | | | | | | | | | |
| 10.00 | D | 10.00 | | N = 50 for 140mm | | 9.90 (0.80) | Stiff to hard friable red brown and blue grey mottled silty CLAY with very weak mudstone lithorelicts. | | | |
| 10.40 10.40 | D C | | | | | | | | | |
| | | | | | | 10.70 | Complete at 10.70m | | | |

| | | |
|---------|-------------------------|-----------|
| Remarks | Scale (approx) | Logged By |
| | 1:40 | JF |
| | Figure No. 15131.BH1 | |

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| | |
|------------------------------------------|-------------------------------|
| Site SMART SYSTEMS, YATTON, PHASE II. | Borehole Number BH2 |
|------------------------------------------|-------------------------------|

| | | | | |
|-------------------------------------------------|------------------------------------------|----------------------------|---------------------------------------|---------------------|
| Boring Method CABLE PERCUSSION DANDO 2000 | Casing Diameter 150mm cased to 10.00m | Ground Level (mOD) 5.57 | Client SMART SYSTEMS. | Job Number 15131 |
| Location SEE SITE PLAN | | Dates 07/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 1/2 |

| Depth (m) | Sample / Tests | Casing Depth (m) | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|--------------|----------------|------------------|-----------------|---------------------------|-------------|-----------------------|----------------------------------------------------------------------|--------|-------|
| 0.50 | D | | | | 5.27 | (0.30) 0.30 | Firm orange brown slightly sandy silty clay TOPSOIL with fine roots. | | |
| 1.00 | U | 1.00 | | | | (1.20) | Firm to stiff grey and orange brown mottled silty CLAY. | | |
| 1.50 | D | | | | 4.07 | 1.50 | Firm grey and orange brown mottled silty CLAY. | | |
| 2.00 2.00 | C D | 2.00 | | N = 2 | 3.57 | 2.00 | Soft grey silty to very silty CLAY. | | |
| 2.50 | D | | | Water strike(1) at 2.50m. | | | | | V1 |
| 3.00 | U | 3.00 | | | | (2.10) | | | |
| 3.50 | D | | | | | | | | |
| 4.00 4.00 | C D | 4.00 | | N = 1 | 1.47 | 4.10 | Black spongy fibrous PEAT. | | |
| 4.50 | D | | | | 1.07 | 4.50 (0.30) | Soft blue grey silty to very silty CLAY. | | |
| 5.00 | U | 5.00 | | | 0.77 | 4.80 | Black spongy fibrous PEAT. | | |
| 5.50 | D | | | | | (1.90) | | | |
| 6.00 | D | | | | | | | | |
| 6.50 6.50 | D C | 6.00 | | N = 0 | -1.13 | 6.70 | Soft grey silty to very silty CLAY. | | |
| 7.00 | D | 7.00 | | | | | | | |
| 7.50 | D | | | | | | | | |

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------|
| Remarks 1) Water entry first noticed at 2.5m and sealed at 5m but shallower entry probably sealed by casings. 2) Ground level estimated from site survey. | Scale (approx) 1:40 | Logged By JF |
| Figure No. 15131.BH2 | | |

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Site
SMART SYSTEMS, YATTON, PHASE II. Borehole Number
BH3

| | | | | |
|-------------------------------------------------|------------------------------------------|----------------------------|---------------------------------------|---------------------|
| Boring Method CABLE PERCUSSION DANDO 2000 | Casing Diameter 150mm cased to 10.00m | Ground Level (mOD) 5.45 | Client SMART SYSTEMS. | Job Number 15131 |
| | Location SEE SITE PLAN | Dates 07/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 1/2 |

| Depth (m) | Sample / Tests | Casing Depth (m) | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|--------------|----------------|------------------|-----------------|---------------------------|-------------|-----------------------|----------------------------------------------------------------------------------|--------|-------|
| 0.50 | D | | | | 5.15 | (0.30) 0.30 | Firm orange brown slightly sandy silty clay TOPSOIL with fine roots. | | |
| | | | | | | (0.70) | Firm to stiff grey and orange brown mottled silty CLAY. | | |
| 1.00 | U | 1.00 | | | 4.45 | 1.00 | Firm grey and orange brown mottled silty CLAY. | | |
| 1.50 | D | | | | | (1.00) | | | |
| 2.00 2.00 | C D | 2.00 | | N = 3 | 3.45 | 2.00 | Soft to firm blue grey silty to very silty CLAY with black fibrous peaty traces. | | |
| 2.50 | D | | | | | | | | |
| 3.00 | U | 3.00 | | | | (2.00) | | | |
| 3.50 | D | | | | | | | | |
| 4.00 4.00 | C D | 4.00 | | N = 2 | 1.45 | 4.00 | Black spongy fibrous PEAT. | | |
| 4.50 | D | | | | 0.95 | 4.50 | Very soft to soft blue grey very silty CLAY. | | |
| 5.00 5.00 | D C | 5.00 | | N = 1 | 0.55 | 4.90 | Black spongy fibrous PEAT. | | |
| 5.50 | D | 6.00 | | | | | | | |
| 6.00 | D | | | | | (1.80) | | | |
| 6.50 6.50 | C D | | | N = 0 | | | | | |
| | | | | Water strike(1) at 6.70m. | -1.25 | 6.70 | Very soft to soft blue grey very silty CLAY with black fibrous peaty traces. | | ▽1 |
| 7.00 | D | 7.00 | | | | | | | |
| 7.50 | D | | | | | | | | |

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------|
| Remarks 1) Water entry first noted at 6.7m and sealed at 9.5m but shallower entry probably sealed by casings. 2) Ground level estimated from site survey. | Scale (approx) 1:40 | Logged By JF |
| Figure No. 15131.BH3 | | |

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Site
SMART SYSTEMS, YATTON, PHASE II.

Borehole Number
BH4

| | | | | |
|-------------------------------------------------|------------------------------------------|----------------------------|---------------------------------------|---------------------|
| Boring Method CABLE PERCUSSION DANDO 2000 | Casing Diameter 150mm cased to 10.00m | Ground Level (mOD) 5.48 | Client SMART SYSTEMS. | Job Number 15131 |
| | Location SEE SITE PLAN | Dates 05/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 1/2 |

| Depth (m) | Sample / Tests | Casing Depth (m) | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|-----------|----------------|------------------|-----------------|---------------------------|-------------|-----------------------|-------------------------------------------------------------------------|--------|-------|
| 0.50 | D | | | | 5.23 | (0.25) 0.25 | Firm orange brown slightly sandy silty clay TOPSOIL with fine roots. | | |
| 1.00 | C D | 1.00 | | N = 20 | | (1.25) | Firm to stiff grey and orange brown mottled silty CLAY. | | |
| 1.50 | D | | | Water strike(1) at 1.60m. | 3.98 | 1.50 | Firm grey, blue grey and orange brown mottled silty CLAY. | | ▽1 |
| 2.00 | U | 2.00 | | | | (1.00) | | | |
| 2.50 | D | | | | 2.98 | 2.50 | Soft grey and blue grey mottled silty to very silty CLAY. | | |
| 3.00 | C D | 3.00 | | N = 2 | | (1.10) | | | |
| 3.60 | D | | | | 1.88 | 3.60 | Very soft to soft grey very silty CLAY with black fibrous peaty traces. | | |
| 3.90 | D U | 4.00 | | | | (0.60) | | | |
| 4.50 | D | | | | 1.28 | 4.20 | Black spongy fibrous PEAT. | | |
| 5.00 | D | 5.00 | | N = 2 | | (3.30) | | | |
| 5.50 | D | | | | | | | | |
| 6.00 | U | | | | | | | | |
| 6.50 | D C | | | N = 0 | | | | | |
| 7.00 | C D | 7.00 | | | | | | | |
| 7.50 | D | | | | -2.02 | 7.50 | Very soft blue grey very silty CLAY with black fibrous spongy PEAT. | | |

| | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------|
| Remarks 1) Water entry noted at 1.6m, and at 8.0m sealed at 3.6m and 9.5m respectively. 2) * Initial standard penetration not achieved. 3) Ground level estimated from site survey. | Scale (approx) 1:40 | Logged By JF |
| Figure No. 15131.BH4 | | |

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Site
SMART SYSTEMS, YATTON, PHASE II.

Borehole Number
BH4

| | | | | |
|-------------------------------------------------|------------------------------------------|----------------------------|---------------------------------------|---------------------|
| Boring Method CABLE PERCUSSION DANDO 2000 | Casing Diameter 150mm cased to 10.00m | Ground Level (mOD) 5.48 | Client SMART SYSTEMS. | Job Number 15131 |
| | Location SEE SITE PLAN | Dates 05/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 2/2 |

| Depth (m) | Sample / Tests | Casing Depth (m) | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|-------------------------|----------------|------------------|-----------------|------------------------------------|-------------|-----------------------|--------------------------------------------------------------------------------------------------------|------------------|-------|
| 8.00 8.00 | C D | 8.00 | | Water strike(2) at 8.00m. N = 1 | | (1.00) | Very soft blue grey very silty CLAY with black fibrous spongy PEAT. | x x x x | ▽2 |
| 8.50 | D | | | | -3.02 | 8.50 | Very soft blue grey very silty CLAY. | x x x x | |
| 9.00 | D | | | | | (1.00) | | x x x x | |
| 9.50 9.50 | C D | 9.00 | | N = 29 | -4.02 | 9.50 (0.50) | Stiff to hard friable red brown and blue grey mottled silty CLAY with very weak mudstone lithorelicts. | x x x x | |
| 10.00 | D | 10.00 | | | -4.52 | 10.00 | Hard friable red brown and blue grey mottled silty CLAY with very weak mudstone lithorelicts. | x x x x | |
| | | | | | | (1.15) | | x x x x | |
| 11.00 11.10 11.10 | CDC C C | | | N = 50 for 150mm | -5.67 | 11.15 | Complete at 11.15m | x x x x | |

| | | |
|---------|-------------------------|-----------------|
| Remarks | Scale (approx) 1:40 | Logged By JF |
| | Figure No. 15131.BH4 | |

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| | |
|------------------------------------------|-------------------------------|
| Site SMART SYSTEMS, YATTON, PHASE II. | Borehole Number BH5 |
|------------------------------------------|-------------------------------|

| | | | | |
|-------------------------------------------------|------------------------------------------|----------------------------|---------------------------------------|---------------------|
| Boring Method CABLE PERCUSSION DANDO 2000 | Casing Diameter 150mm cased to 10.00m | Ground Level (mOD) 5.54 | Client SMART SYSTEMS. | Job Number 15131 |
| Location SEE SITE PLAN | | Dates 06/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 1/2 |

| Depth (m) | Sample / Tests | Casing Depth (m) | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|-----------|----------------|------------------|-----------------|---------------------------|--------------|-----------------------|------------------------------------------------------------------------------|----------------------------|-------|
| 0.50 | D | | | | 5.29 | (0.25) 0.25 | Firm orange brown slightly sandy silty clay TOPSOIL with fine roots. | | |
| 1.00 | C D | 1.00 | | N = 6 | | (1.25) | Firm to stiff grey and orange brown mottled silty CLAY. | | |
| 1.50 | D | | | | 4.04 | 1.50 | Firm grey and orange brown mottled silty CLAY. | | |
| 2.00 | U | 2.00 | | | 3.54 | 2.00 | Soft to firm grey and blue grey mottled silty CLAY. | | |
| 2.50 | D | | | | | | | | |
| 3.00 | C D | 3.00 | | N = 2 | | (2.30) | | | |
| 3.50 | D | | | | | | | | |
| 4.00 | C D | 4.00 | | N = 3 | | | | | |
| 4.50 | D | | | Water strike(1) at 4.40m. | 1.24 1.14 | 4.30 4.40 | Black spongy fibrous PEAT. | | ▽1 |
| 5.00 | D C | 5.00 | | N = 2 | | 0.64 | 4.90 | Black spongy fibrous PEAT. | |
| 5.50 | D | 6.00 | | | | | | | |
| 6.00 | D | | | | | (2.10) | | | |
| 6.50 | C D | | | N = 4 | | | | | |
| 6.50 | | | | | | | | | |
| 7.00 | D | 7.00 | | | -1.46 | 7.00 | Very soft to soft blue grey very silty CLAY with black organic peaty traces. | | |
| 7.50 | D | | | | | | | | |

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------|
| Remarks 1) Water entry first noted at 4.4m and sealed at 9.5m but shallower entry probably sealed by casings. 2) Ground level estimated from site survey. | Scale (approx) 1:40 | Logged By JF |
| Figure No. 15131.BH5 | | |

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| | |
|-------------------------------------------|-------------------------------|
| Site: SMART SYSTEMS, YATTON, PHASE II. | Borehole Number BH5 |
|-------------------------------------------|-------------------------------|

| | | | | |
|-------------------------------------------------|------------------------------------------|----------------------------|---------------------------------------|---------------------|
| Boring Method CABLE PERCUSSION DANDO 2000 | Casing Diameter 150mm cased to 10.00m | Ground Level (mOD) 5.54 | Client SMART SYSTEMS. | Job Number 15131 |
| Location SEE SITE PLAN | | Dates 06/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 2/2 |

| Depth (m) | Sample / Tests | Casing Depth (m) | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|----------------|----------------|------------------|-----------------|---------------|-------------|-----------------------|-------------------------------------------------------------------------------------------------------------------|--------|-------|
| 8.00 8.00 | C D | 8.00 | | N = 1 | | (2.50) | Very soft to soft blue grey very silty CLAY with black organic peaty traces. | | |
| 8.50 | D | | | | | | | | |
| 9.00 | D | | | | | | | | |
| 9.50 9.50 | C D | 9.00 | | N = 26 | -3.96 | 9.50 | Firm to stiff grey and orange brown mottled sandy silty CLAY with occasional gravel. | | |
| | | | | | -4.26 | (0.30) 9.80 | Stiff to hard friable red brown and blue grey mottled silty CLAY with occasional very weak mudstone lithorelicts. | | |
| 10.00 10.00 | U D | 10.00 | | | -4.91 | (0.65) 10.45 | Complete at 10.45m | | |

| | | |
|---------|-------------------------|-----------|
| Remarks | Scale (approx) | Logged By |
| | 1:40 | JF |
| | Figure No. 15131.BH5 | |

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Site
SMART SYSTEMS, YATTON, PHASE II.

Borehole
Number
BH6

| | | | | |
|-------------------------------------------------|------------------------------------------|----------------------------|---------------------------------------|---------------------|
| Boring Method CABLE PERCUSSION DANDO 2000 | Casing Diameter 150mm cased to 10.00m | Ground Level (mOD) 5.63 | Client SMART SYSTEMS. | Job Number 15131 |
| | Location SEE SITE PLAN | Dates 07/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 1/2 |

| Depth (m) | Sample / Tests | Casing Depth (m) | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water | Instr |
|--------------|----------------|------------------|-----------------|-----------------------------|-------------|-----------------------|---------------------------------------------------------------------------------------|--------|-------|-------|
| | | | | | 5.38 | (0.25) 0.25 | Firm orange brown slightly sandy silty clay TOPSOIL with fine roots. | | | |
| 0.50 0.50 | D D | | | Water standing(1) at 0.60m. | | | Firm to stiff orange brown mottled silty CLAY. | | ∇1 | |
| 1.00 | U | 1.00 | | | | (1.35) | | | | |
| 1.50 | D | | | Water strike(2) at 1.70m. | 4.03 | 1.60 | Firm grey and orange brown mottled silty CLAY. Becoming soft with depth. | | ∇2 | |
| 2.00 2.00 | C D | 2.00 | | N = 7 | | (0.90) | | | | |
| 2.50 | D | | | | 3.13 | 2.50 | Soft grey and blue grey silty to very silty CLAY. | | | |
| 3.00 | U | 3.00 | | N = 1 | | (1.40) | | | | |
| 3.50 | D | | | | | | | | | |
| 4.00 4.00 | C D | 4.00 | | | 1.73 | 3.90 | Black spongy fibrous PEAT. | | | |
| 4.50 | D | | | | 1.13 | 4.50 | Black spongy fibrous PEAT with very soft blue grey very silty CLAY. | | | |
| 5.00 5.00 | D C | 5.00 | | N = 2 | 0.63 | 5.00 | Black spongy fibrous PEAT. | | | |
| 5.50 | D | | | | | (2.00) | | | | |
| 6.50 6.50 | C D | 6.00 | | N = 1 | | | | | | |
| 7.00 | D | 7.00 | | | -1.37 | 7.00 | Very soft blue grey and grey mottled very silty CLAY with black organic peaty traces. | | | |

Remarks
 1) Water entry noticed at 1.7m, and at 8.5m sealed at 4m and 9m respectively following the installation of the standpipe water standing at 0.6m.
 2) * Initial standard penetration not achieved.
 3) Ground level estimated from site survey.
 4) Water and gas monitoring details appended.

| | |
|-------------------------|-----------------|
| Scale (approx) 1:40 | Logged By JF |
| Figure No. 15131.BH6 | |


Appendix B – Trial Pit Records

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Site
SMART SYSTEMS, YATTON, PHASE II. Trial Pit Number
TP2

| | | | | |
|------------------------------------------------------------|---------------------------|----------------------------|---------------------------------------|---------------------|
| Excavation Method TRIAL PIT JCB WHEELED EXCAVATOR | Dimensions 0.6 x 2.0m | Ground Level (mOD) 5.82 | Client SMART SYSTEMS. | Job Number 15131 |
| | Location SEE SITE PLAN | Dates 08/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 1/1 |

| Depth (m) | Sample / Tests | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|------------------------------|------------------|-----------------|------------------------------------------|-------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------|
| 0.30 0.50 0.50 0.50 | D D C V | | CBR @ 0.5m = 5% c @ 0.5m = 90 kPa | 5.32 | (0.50) 0.50 | MADE GROUND comprising: 0.0 - 0.05m - Limestone gravel surface. 0.05 - 0.3m - Brown sandy clayey hardcore. 0.3 - 0.5m - Stiff grey and orange brown mottled silty CLAY (possibly natural ground). Complete at 0.50m |  | |

| | |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Plan</p> <p style="font-size: small;">.</p> | <p>Remarks</p> <ol style="list-style-type: none"> 1) No groundwater encountered. 2) Trial pit sides stable throughout excavation. 3) Apparent cohesion (c) indicated by Pilcon hand vane. 4) CBR indicated by Mexecon Penetrometer. 5) Concrete substructure exposed at 0.15m depth, extends 0.4m away from building. 6) Ground level estimate from site survey. |
| Scale (approx) 1:25 | Logged By JF |
| Figure No. 15131.TP2 | |

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Site
SMART SYSTEMS, YATTON, PHASE II.

Trial Pit Number
TP3

| | | | | |
|------------------------------------------------------------|---------------------------|----------------------------|---------------------------------------|---------------------|
| Excavation Method TRIAL PIT JCB WHEELED EXCAVATOR | Dimensions 0.6 x 1.5m | Ground Level (mOD) 5.72 | Client SMART SYSTEMS. | Job Number 15131 |
| | Location SEE SITE PLAN | Dates 08/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 1/1 |

| Depth (m) | Sample / Tests | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|------------------------------|------------------|-----------------|--------------------------------------------|-------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|
| 0.30 0.50 0.50 0.50 | D D C V | | CBR @ 0.5m = 3.5% c @ 0.5m = 45 kPa | 5.22 | (0.50) 0.50 | MADE GROUND comprising: 0.0 - 0.05m - Limestone gravel surface. 0.05 - 0.3m - Brown sandy clay hardcore with cobble sized fragments of concrete. 0.3 - 0.5m - Firm blue grey and orange brown silty clay (possibly natural ground). Complete at 0.50m | | |

| | | | | | | | |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|------------|------|----|-----------|
| <p>Plan</p> | <p>Remarks</p> <ol style="list-style-type: none"> 1) No groundwater encountered. 2) Trial pit sides stable throughout excavation. 3) Apparent cohesion (c) indicated by Pilcon hand vane. 4) CBR indicated by Mexecon Penetrometer. 5) Concrete substructure exposed at 0.2m depth, extends 0.5m away from building. 6) Ground level estimate from site survey. | | | | | | |
| | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Scale (approx)</td> <td style="width: 33%;">Logged By</td> <td style="width: 33%;">Figure No.</td> </tr> <tr> <td style="text-align: center;">1:25</td> <td style="text-align: center;">JF</td> <td style="text-align: center;">15131.TP3</td> </tr> </table> | Scale (approx) | Logged By | Figure No. | 1:25 | JF | 15131.TP3 |
| Scale (approx) | Logged By | Figure No. | | | | | |
| 1:25 | JF | 15131.TP3 | | | | | |



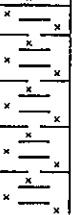
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Site
SMART SYSTEMS, YATTON, PHASE II.

Trial Pit Number
TP5

| | | | | |
|------------------------------------------------------------|---------------------------|----------------------------|---------------------------------------|---------------------|
| Excavation Method TRIAL PIT JCB WHEELED EXCAVATOR | Dimensions 0.6 x 2.0m | Ground Level (mOD) 5.62 | Client SMART SYSTEMS. | Job Number 15131 |
| | Location SEE SITE PLAN | Dates 08/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 1/1 |

| Depth (m) | Sample / Tests | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|----------------------------------------------|----------------------------|-----------------|----------------------------------------------------------------------------------|-------------|-----------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------|
| 0.10 | D | | | 5.42 | (0.20) 0.20 | Firm orange brown sandy clayey TOPSOIL with occasional gravel and fine roots. |  | |
| | | | | | (0.30) | Stiff grey and orange brown mottled silty CLAY. |  | |
| 0.50 0.50 0.50 | V D C | | c @ 0.5m = 90 kPa CBR @ 0.5m = 3.5% | 5.12 | 0.50 | Firm to stiff blue grey and orange brown mottled silty CLAY. |  | |
| | | | | | (0.70) | | | |
| 1.00 1.00 1.00 1.20 1.20 1.20 | V D C V D C | | c @ 1.0m = 80 kPa CBR @ 1.0m = 2% c @ 1.2m = 50 kPa CBR @ 1.2m = 1% | 4.42 | 1.20 | Complete at 1.20m | | |


| | | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|------------|------|----|-----------|
| <p>Plan</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> | <p>Remarks</p> <ol style="list-style-type: none"> 1) Water seepage at 1.2m. 2) Trial pit sides stable throughout excavation. 3) Apparent cohesion (c) indicated by Pilcon hand vane. 4) CBR indicated by Mexecon Penetrometer. 5) Ground level estimate from site survey. | | | | | | |
| | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Scale (approx)</td> <td style="width: 33%;">Logged By</td> <td style="width: 33%;">Figure No.</td> </tr> <tr> <td style="text-align: center;">1:25</td> <td style="text-align: center;">JF</td> <td style="text-align: center;">15131.TP5</td> </tr> </table> | Scale (approx) | Logged By | Figure No. | 1:25 | JF | 15131.TP5 |
| Scale (approx) | Logged By | Figure No. | | | | | |
| 1:25 | JF | 15131.TP5 | | | | | |

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Site
SMART SYSTEMS, YATTON, PHASE II. Trial Pit Number
TP7

| | | | | |
|------------------------------------------------------------|---------------------------|----------------------------|---------------------------------------|---------------------|
| Excavation Method TRIAL PIT JCB WHEELED EXCAVATOR | Dimensions 0.6 x 2.0m | Ground Level (mOD) 5.60 | Client SMART SYSTEMS. | Job Number 15131 |
| | Location SEE SITE PLAN | Dates 08/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 1/1 |

| Depth (m) | Sample / Tests | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|-----------|----------------|-----------------|----------------------------------------|-------------|-----------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------|
| 0.10 | D | | | | (0.25) | Firm orange brown sandy clayey TOPSOIL with occasional gravel and fine roots. |  | |
| 0.30 | D | | | 5.35 | 0.25 (0.15) | Firm orange brown and grey brown silty CLAY. | x | |
| 0.50 | V | | c @ 0.5m = 70 kPa CBR @ 0.5m = 3% | 5.20 | 0.40 | Firm orange brown and blue grey silty CLAY. Becoming soft to firm with depth. | x | |
| 0.50 | C | | | | | | x | |
| 0.80 | D | | | | (0.90) | | x | |
| 1.00 | V | | c @ 1.0m = 60 kPa CBR @ 1.0m = 1.5% | | | | x | |
| 1.00 | C | | | | | | x | |
| 1.30 | D | | CBR @ 1.3m = 1% | | | | x | |
| 1.30 | C | | | | | | x | |
| 1.30 | V | | c @ 1.3m = 45 kPa | 4.30 | 1.30 | Complete at 1.30m | x | |


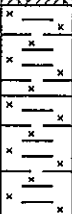


| | | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------|-----------|----|------------|-----------|
| <p>Plan</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> | <p>Remarks</p> <ol style="list-style-type: none"> 1) Water seepage at 1.0m. 2) Trial pit sides stable throughout excavation. 3) Apparent cohesion (c) indicated by Pilcon hand vane. 4) CBR indicated by Mexecon Penetrometer. 5) Ground level estimate from site survey. | | | | | | |
| | <table border="1" style="width: 30%;"> <tr> <td>Scale (approx)</td> </tr> <tr> <td style="text-align: center;">1:25</td> </tr> </table> <table border="1" style="width: 30%;"> <tr> <td>Logged By</td> </tr> <tr> <td style="text-align: center;">JF</td> </tr> </table> <table border="1" style="width: 30%;"> <tr> <td>Figure No.</td> </tr> <tr> <td style="text-align: center;">15131.TP7</td> </tr> </table> | Scale (approx) | 1:25 | Logged By | JF | Figure No. | 15131.TP7 |
| Scale (approx) | | | | | | | |
| 1:25 | | | | | | | |
| Logged By | | | | | | | |
| JF | | | | | | | |
| Figure No. | | | | | | | |
| 15131.TP7 | | | | | | | |


GEO-TESTING SERVICES LTD.

Tel: 0117 9634471 Fax:0117 9636807

Site
SMART SYSTEMS, YATTON, PHASE II. Trial Pit Number
TP9

| | | | | |
|------------------------------------------------------------|---------------------------|----------------------------|---------------------------------------|---------------------|
| Excavation Method TRIAL PIT JCB WHEELED EXCAVATOR | Dimensions 0.8 x 2.0m | Ground Level (mOD) 5.63 | Client SMART SYSTEMS. | Job Number 15131 |
| | Location SEE SITE PLAN | Dates 08/11/2007 | Engineer DJP CONSULTING ENGINEERS. | Sheet 1/1 |

| Depth (m) | Sample / Tests | Water Depth (m) | Field Records | Level (mOD) | Depth (m) (Thickness) | Description | Legend | Water |
|----------------------|----------------|-----------------|----------------------------------------|--------------|------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------|
| 0.10 | D | | | | (0.30) | Firm orange brown sandy clayey TOPSOIL with occasional gravel and fine roots. |  | |
| 0.50 0.50 0.50 | V D C | | c @ 0.5m = 80 kPa CBR @ 0.5m = 2.5% | 5.33 5.03 | 0.30 (0.30) 0.60 | Stiff grey and orange brown mottled silty CLAY. Firm to stiff blue grey and orange brown mottled silty CLAY. |  | |
| 1.00 | D | | c @ 1.0m = 80 kPa CBR @ 1.0m = 3.5% | 4.63 | 1.00 (0.40) | Firm blue grey and faintly orange brown silty CLAY. |  | |
| 1.40 | D | | c @ 1.4m = 50 kPa CBR @ 1.4m = 1.5% | 4.23 | 1.40 | Complete at 1.40m |  | |

| | |
|------|------------------------------------------------------------------------------------|
| Plan |  |
|------|------------------------------------------------------------------------------------|

| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|
| Remarks | | |
| 1) Water seepage at 1.1m. 2) Trial pit sides stable throughout excavation. 3) Apparent cohesion (c) indicated by Pilcon hand vane. 4) CBR indicated by Mexecon Penetrometer. 5) Ground level estimate from site survey. | | |
| Scale (approx) | Logged By | Figure No. |
| 1:25 | JF | 15131.TP9 |

Appendix C –Results of Soil Gas and Water Monitoring

RESULTS OF GAS MONITORING.

| Borehole No. | Date | Atmospheric Pressure mbars | Flow Rate l/hr | Water level m | Sampling Depth m | Methane % | Carbon Dioxide % | Oxygen % | Hydrogen Sulphide ppm |
|--------------|----------|----------------------------|----------------|---------------|------------------|-----------|------------------|----------|-----------------------|
| 1 | 21.11.07 | 998 | - | 1.45 | 0.0 | 5.8 | 1.7 | 18.7 | <1 |
| | | | | | 1.0 | 4.2 | 1.1 | 19.4 | <1 |
| | 26.11.07 | 1028 | <0.2 | 0.75 | 0.0 | 1.9 | 1.6 | 19.8 | <1 |
| | 30.11.07 | 1003 | <0.2 | 0.75 | 0.0 | 1.4 | 1.5 | 17.8 | <1 |
| 6 | 5.11.07 | 1008 | - | 0.60 | 0.0 | <0.1 | <0.1 | 20.6 | <1 |
| | 7.11.07 | 1024 | - | 0.60 | 0.0 | <0.1 | <0.1 | 20.4 | <1 |
| | 21.11.07 | 998 | - | 0.60 | 0.0 | 40.5 | 1.3 | 9.3 | <1 |
| | 26.11.07 | 1028 | <0.2 | 0.60 | 0.0 | 5.0 | 0.9 | 19.4 | <1 |
| | 30.11.07 | 1003 | <0.2 | 0.65 | 0.0 | 8.7 | 0.6 | 18.4 | <1 |

Appendix D – CBR and Apparent Cohesion measured in Trench

RESULTS OF INSITU TESTS IN TRENCH.

| Location No: | Depth (m) | CBR % | Apparent Cohesion (kPa) |
|--------------|-----------|-------|-------------------------|
| 1 | 1.0 | 4 | >120 |
| 2 | 0.8 | 5 | >120 |
| 3 | 0.8 | 5 | 80 |
| 4 | 0.6 | 2.5 | 70 |
| 5 | 1.0 | 2 | 70 |
| 6 | 1.0 | 3 | 80 |
| 7 | 0.9 | 3 | 70 |
| 8 | 0.8 | 4 | 90 |
| 9 | 0.8 | 5 | >120 |
| 10 | 0.7 | 4 | 75 |
| 11 | 0.8 | 3.5 | 65 |
| 12 | 0.9 | 2.5 | 60 |
| 13 | 1.0 | 2.5 | 60 |
| 14 | 1.0 | 3.5 | 70 |
| 15 | 0.9 | 4 | 75 |
| 16 | 1.0 | 3.5 | 65 |
| 17 | 0.9 | 3.5 | 75 |
| 18 | 1.0 | 3 | 60 |
| 19 | 1.1 | 2.5 | 70 |
| 20 | 1.0 | 2.5 | 60 |
| 21 | 1.0 | 2 | 50 |
| 22 | 1.0 | 2.5 | 60 |

- 1) CBR indicated by Mexecon penetrometer.
- 2) Apparent cohesion indicated by Pilcon hand vane.
- 3) Tests in the bottom of an open trench around the perimeter of the site.

Appendix E – Laboratory Test Results

- a) **Borehole Samples:**
Moisture Content, Plasticity, Density and Apparent Cohesion,
- b) **Borehole Samples:**
pH and Water Soluble Sulphate,
- c) **Trial Pit Samples:**
Moisture Content and Plasticity,
Site measured CBR and Apparent Cohesion,
- d) **Chemical Test Results.**

RESULTS OF LABORATORY TESTS.

| Sample Ref. | Sample Depth (m) | Moisture Content % | Density Kg/m ³ | Apparent Cohesion kPa | Liquid Limit % | Plastic Limit % | Plasticity Index % |
|-------------|------------------|--------------------|---------------------------|-----------------------|----------------|-----------------|--------------------|
| BH1 | 0.5 | 24 | | | | | |
| | 1.0 | 26 | | | | | |
| | 1.5 | 27 | | | | | |
| | 2.0 | 29 | 1935 | 50 | | | |
| | 2.5 | 28 | | | | | |
| | 3.5 | 45 | | | | | |
| | 4.0 | 48 | 1665 | 20 | | | |
| | 4.5 | 76 | | | | | |
| | 5.5 | 230 | | | | | |
| | 6.8 | 63 | | | | | |
| | 9.5 | 33 | | | 47 | 32 | 15 |
| | 10.0 | 30 | | | 58 | 36 | 22 |
| | 10.4 | 21 | | | | Non Plastic | Non Plastic |
| BH2 | 0.5 | 27 | | | | | |
| | 1.0 | 29 | 1950 | 100 | | | |
| | 1.5 | 30 | | | | | |
| | 2.0 | 39 | | | | | |
| | 2.5 | 42 | | | | | |
| | 3.0 | 44 | 1730 | 10 | | | |
| | 3.5 | 60 | | | | | |
| | 5.0 | 340 | 995 | 10 - 20 | | | |
| | 5.5 | 290 | | | | | |
| | 7.0 | 61 | | | | | |
| | 8.7 | 120 | | | | | |
| | 9.0 | 34 | | | | | |
| | 9.5 | 38 | | | | | |
| | 10.0 | 37 | | | | | |
| | 10.8 | 33 | | | | | |

RESULTS OF LABORATORY TESTS.

| Sample Ref. | Sample Depth (m) | Moisture Content % | Density Kg/m ³ | Apparent Cohesion kPa | Liquid Limit % | Plastic Limit % | Plasticity Index % |
|-------------|------------------|--------------------|---------------------------|-----------------------|----------------|-----------------|--------------------|
| BH3 | 0.5 | 27 | | | | | |
| | 1.0 | 29 | 1960 | 70 | | | |
| | 1.5 | 33 | | | | | |
| | 2.0 | 35 | | | | | |
| | 2.5 | 37 | | | | | |
| | 3.0 | 33 | 1870 | 40 | | | |
| | 4.0 | 150 | | | | | |
| | 5.0 | 330 | 1030 | 15 - 20 | | | |
| | 6.5 | 76 | | | | | |
| | 8.5 | 64 | | | | | |
| | 9.0 | 43 | | | | | |
| | 9.5 | 66 | | | | | |
| | 10.0 | 37 | | | | | |
| | 10.5 | 30 | 2045 | >120 | | | |
| BH4 | 0.5 | 22 | | | | | |
| | 1.0 | 29 | | | | | |
| | 1.5 | 39 | | | | | |
| | 2.0 | 34 | 1670 | 20 | | | |
| | 3.0 | 40 | | | | | |
| | 4.0 | 370 | 1430 | 10 | | | |
| | 5.5 | 310 | | | | | |
| | 6.0 | 290 | 1050 | 10 - 20 | | | |
| | 7.0 | 44 | | | | | |
| | 9.5 | 32 | | | | | |
| | 10.0 | 30 | | | | | |
| | 11.0 | 15 | 2010 | >120 | | | |

RESULTS OF LABORATORY TESTS.

| Sample Ref. | Sample Depth (m) | Moisture Content % | Density Kg/m ³ | Apparent Cohesion kPa | Liquid Limit % | Plastic Limit % | Plasticity Index % |
|-------------|------------------|--------------------|---------------------------|-----------------------|----------------|-----------------|--------------------|
| BH5 | 0.5 | 25 | | | | | |
| | 1.0 | 26 | | | | | |
| | 1.5 | 27 | | | | | |
| | 2.0 | 30 | 1905 | 30 | | | |
| | 2.5 | 39 | | | | | |
| | 3.0 | 34 | | | | | |
| | 4.0 | 370 | | | | | |
| | 5.5 | 310 | | | | | |
| | 7.0 | 44 | | | | | |
| | 9.5 | 32 | | | | | |
| | 10.0 | 30 | 1990 | <120 | | | |
| BH6 | 0.5 | 22 | | | | | |
| | 1.0 | 29 | 1830 | 80 | | | |
| | 1.5 | 39 | | | | | |
| | 2.0 | 34 | | | | | |
| | 3.0 | 39 | 1725 | 40 | | | |
| | 4.5 | 250 | | | | | |
| | 7.0 | 85 | | | | | |
| | 8.0 | 56 | | | | | |
| | 8.5 | 200 | | | | | |
| | 9.0 | 36 | | | | | |
| | 9.5 | 26 | 1940 | <120 | 55 | 38 | 17 |
| | 10.0 | 22 | | | | | |
| | 11.0 | 13 | | | 40 | 27 | 13 |

RESULTS OF LABORATORY TESTS -
pH AND WATER SOLUBLE SULPHATE TESTS.

| Sample Ref. | Sample Depth (m) | pH | Water Soluble Sulphate mg/l SO ⁴ |
|-------------|------------------|-----|---------------------------------------------|
| BH1 | 9.5 | 7.8 | 200 |
| | 10.4 | 7.9 | 200 |
| BH6 | 9.0 | 7.6 | 150 |
| | 10.0 | 8.1 | 250 |
| | 11.0 | 8.0 | 200 |

RESULTS OF LABORATORY AND CBR TESTS.

| Sample Ref. | Sample Depth (m) | Moisture Content % | CBR % | Apparent Cohesion kPa | Liquid Limit % | Plastic Limit % | Plasticity Index % |
|-------------|------------------|--------------------|----------------|-----------------------|----------------|-----------------|--------------------|
| TP4 | 0.5 | 25 | 4 | 85 | 45 | 23 | 22 |
| | 1.0 | 30 | 2 | 70 | 55 | 26 | 29 |
| TP5 | 0.5 | 24 | 3.5 | 90 | | | |
| | 1.0 | 26 | 2 | 80 | | | |
| | 1.2 | 28 | 1 | 50 | | | |
| TP6 | 0.5 | 23 | 3 | 85 | | | |
| | 0.9 | 28 | 1.5 (@1.0m) | 70 (@1.0m) | | | |
| | 1.3 | 29 | 1 | 50 | | | |
| TP7 | 0.3 | 25 | 3 (@0.5m) | 70 (@0.5m) | 45 | 23 | 22 |
| | 0.8 | 24 | 1.5 (@1.0m) | 60 (@1.0m) | 37 | 20 | 17 |
| | 1.3 | 29 | 1 | 45 | | | |
| TP8 | 0.5 | 25 | 3 | 90 | | | |
| | 1.0 | 31 | 1.5 | 50 | | | |
| | 1.4 | 33 | 0.5 - 1.0 | 35 | | | |
| TP9 | 0.5 | 23 | 2.5 | 80 | 45 | 21 | 24 |
| | 1.0 | 28 | 3.5 | 80 | 44 | 20 | 24 |
| | 1.4 | 32 | 1.5 | 50 | | | |



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THE ENVIRONMENTAL LABORATORY LTD

F.A.O. Ron Matthews
Geo-Testing Services Ltd
Number One, Dean Street
Bedminster
Bristol. BS3 1BG

Reporting Date: 26/11/2007

ANALYTICAL REPORT No. AR11514A (Supplementary Report)

| | |
|-----------------------|----------|
| Samples Received By:- | Courier |
| Samples Received:- | 12/11/07 |
| Your Ref No: | 15131 |
| No Samples Received:- | 20 |

Report Checked By:-

Steve Knight
Laboratory Manager

Authorised By:-

Cliff P.V. Knight BSc, EurChem, CChem FRSC
Managing Director

Any comments, opinions, or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



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 Bristol, BS3 1BG

Soils

THE ENVIRONMENTAL LABORATORY LTD

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 Tel: 01424 718618 Fax: 01424 729911



ANALYTICAL REPORT No. AR11514A (Supplementary Report)

Your Ref No: 15131

Reporting Date: 26/11/2007

| Characteristic | Silty clay BH1 | Clay BH1 | Clay BH2 | Silty clay BH3 | Clay BH2 | Silty clay BH3 | Silty clay BH3 |
|-----------------------------------------------------|-------------------|-------------|-------------|-------------------|-------------|-------------------|-------------------|
| TP/BH | 0.50 | 1.00 | 0.50 | 0.50 | 1.00 | 0.50 | 1.00 |
| Depth (m) | 0.50 | 1.00 | 0.50 | 0.50 | 1.00 | 0.50 | 1.00 |
| Our ref | 60824 | 60825 | 60826 | 60827 | 60828 | 60829 | 60829 |
| pH Value** | 8.0 | 7.9 | 7.5 | 7.0 | 7.8 | 7.0 | 8.4 |
| Water Soluble Sulphate (g/l as SO ₄) | 0.04 | 0.05 | 0.06 | 0.05 | 0.04 | 0.05 | 0.05 |
| Organic Matter* (%) | 1.3 | 1.1 | 1.2 | 1.3 | 1.3 | 1.3 | 0.3 |
| Sulphide (mg/kg) | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Sulphate (%) | 0.06 | 0.07 | 0.05 | 0.06 | 0.03 | 0.06 | 0.04 |

| Characteristic | Clay BH4 | Clay BH4 | Silty clay BH5 | Silty clay BH6 | Clay BH5 | Silty clay BH6 | Clay BH6 |
|-----------------------------------------------------|-------------|-------------|-------------------|-------------------|-------------|-------------------|-------------|
| TP/BH | 0.50 | 1.00 | 0.50 | 0.50 | 1.00 | 0.50 | 1.00 |
| Depth (m) | 0.50 | 1.00 | 0.50 | 0.50 | 1.00 | 0.50 | 1.00 |
| Our ref | 60830 | 60831 | 60832 | 60833 | 60833 | 60834 | 60835 |
| pH Value** | 8.2 | 8.1 | 8.0 | 7.5 | 7.7 | 7.5 | 8.1 |
| Water Soluble Sulphate (g/l as SO ₄) | 0.05 | 0.05 | 0.04 | 0.03 | 0.03 | 0.03 | 0.06 |
| Organic Matter* (%) | 0.8 | 0.9 | 0.8 | 1.6 | 1.9 | 1.6 | 1.1 |
| Sulphide (mg/kg) | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Total Sulphate (%) | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.08 |

All results expressed on dry weight basis
 ** - M-CERTS accredited test
 * = UKAS accredited test



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Soils

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ANALYTICAL REPORT No. AR11514A (Supplementary Report)



Your Ref No: 15131

Reporting Date: 26/11/2007

| Characteristic | Clay | Silty clay | Clay | Silty clay | Clay | Silty clay |
|----------------------------|-------|------------|-------|------------|-------|------------|
| TP/BH | BH1+2 | BH1+2 | BH3+4 | BH3+4 | BH5+6 | BH5+6 |
| Depth (m) | 0.50 | 1.00 | 0.50 | 1.00 | 0.50 | 1.00 |
| Our ref | 60836 | 60837 | 60838 | 60839 | 60840 | 60841 |
| Asenic** | 15.1 | 11.0 | 11.5 | 13.9 | 13.4 | 13.3 |
| Cadmium** | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Chromium** | 50 | 37 | 43 | 37 | 46 | 36 |
| Lead** | 29 | 42 | 23 | 20 | 26 | 19 |
| Mercury** | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Nickel** | 41 | 31 | 33 | 31 | 36 | 32 |
| Copper** | 19 | 17 | 17 | 13 | 15 | 11 |
| Zinc** | 127 | 112 | 110 | 102 | 129 | 98 |
| Selenium | 1.1 | 0.8 | 1.0 | 0.7 | 1.0 | 0.8 |
| Hexavalent Chromium | <2 | <2 | <2 | <2 | <2 | <2 |
| Water Soluble Boron | 1.2 | 0.7 | 0.9 | 0.6 | 0.9 | 0.7 |
| Total Cyanide** | <1 | <1 | <1 | <1 | <1 | <1 |
| Total Monohydric Phenols** | <1 | <1 | <1 | <1 | <1 | <1 |

All results expressed on dry weight basis
 ** - NERCERTS accredited test
 * - UKAS accredited test



2683 2683

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ANALYTICAL REPORT No. AR11514A (Supplementary Report)

Your Ref No: 15131

F.A.O. Ron Matthews
 Geo-Testing Services Ltd
 Number One, Dean Street
 Bedminster
 Bristol, BS3 1BG

Reporting Date: 23/11/2007

| Soils | Characteristic TP/BH | Clay BH7 | Silty clay BH7 | Clay BH3+4 | Silty clay BH3+4 | Clay BH5+6 | Silty clay BH5+6 |
|------------------------|-------------------------|-------------|-------------------|---------------|---------------------|---------------|---------------------|
| | Depth (m) | 0.50 | 1.00 | 0.50 | 1.00 | 0.50 | 1.00 |
| | Our ref | 60836 | 60837 | 60838 | 60839 | 60840 | 60841 |
| Naphthalene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Acenaphthylene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Acenaphthene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluorene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Phenanthrene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Anthracene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluoranthene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Pyrene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benz(e)anthracene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Chrysene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(b)fluoranthene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(k)fluoranthene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(a)pyrene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Indeno(123-cd)pyrene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Dibenz(ah)anthracene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Benzo(ghi)perylene** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Total PAH** | (mg/kg) | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |

All results expressed on dry weight basis
 ** - MCERTS accredited test



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THE ENVIRONMENTAL LABORATORY LTD

| Waste Acceptance Criteria ANALYTICAL RESULTS | | | | | | | |
|----------------------------------------------|-------------------------------------------------------|---------|--|-----------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------|
| Report No: | ANALYTICAL REPORT No. AR11514A (Supplementary Report) | | | | Page 4 of 8 | | |
| Project Name: | 15131 | | | | CLIENT: Geo-Testing Services Ltd | | |
| Lab Reference | n/a | | | | Landfill Waste Acceptance Criteria | | |
| Sampling Date | n/a | | | | Limits | | |
| Sample ID | Composite Samples from 1.0m | | | | Inert Waste Landfill | Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill | Hazardous Waste Landfill |
| Depth | 1.00 | | | | | | |
| Solid Waste Analysis | | | | | | | |
| TOC (%) | 1.1 | | | | 3% | 5% | 6% |
| Loss on Ignition (%)** | 5.2 | | | | - | - | 10% |
| BTEX (mg/kg)** | <0.01 | | | | 6 | - | - |
| Sum of PCBs (mg/kg) | <0.01 | | | | 1 | - | - |
| Mineral Oil (mg/kg)** | <6 | | | | 500 | - | - |
| Total PAH (mg/kg)** | <0.5 | | | | 100 | - | - |
| pH (Units)** | 7.9 | | | | - | - | - |
| Acid Neutralisation Capacity (mol/kg) | <0.1 | | | | - | To be evaluated | To be evaluated |
| Eluate Analysis | 2:1 | 8:1 | | Cumulative 10:1 | Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg) | | |
| | mg/l | mg/l | | mg/kg | | | |
| Arsenic* | <0.005 | <0.005 | | <0.1 | 0.5 | 2 | 25 |
| Barium* | 0.009 | 0.008 | | <0.1 | 20 | 100 | 300 |
| Cadmium* | <0.001 | <0.001 | | <0.01 | 0.04 | 1 | 5 |
| Chromium* | <0.005 | <0.005 | | <0.1 | 0.5 | 10 | 70 |
| Copper* | <0.005 | <0.005 | | <0.1 | 2 | 50 | 100 |
| Mercury* | <0.0001 | <0.0001 | | <0.001 | 0.01 | 0.2 | 2 |
| Molybdenum* | <0.005 | <0.005 | | <0.1 | 0.5 | 10 | 30 |
| Nickel* | <0.005 | <0.005 | | <0.1 | 0.4 | 10 | 40 |
| Lead* | <0.005 | <0.005 | | <0.1 | 0.5 | 10 | 50 |
| Antimony* | <0.005 | <0.005 | | <0.01 | 0.06 | 0.7 | 5 |
| Selenium* | <0.005 | <0.005 | | <0.01 | 0.1 | 0.5 | 7 |
| Zinc* | 0.007 | 0.008 | | <0.1 | 4 | 50 | 200 |
| Chloride* | 14 | 7 | | 36 | 800 | 15000 | 25000 |
| Fluoride* | <1 | <1 | | <1 | 10 | 150 | 500 |
| Sulphate* | 10 | 3 | | 17 | 1000 | 20000 | 60000 |
| TDS | 250 | <5 | | 174 | 4000 | 60000 | 100000 |
| Phenol Index | <0.5 | <0.5 | | <0.5 | 1 | - | - |
| DCC | 16.4 | 12.3 | | 58 | 500 | 800 | 1000 |
| Leach Test Information | | | | | | | |
| pH * | 7.6 | 7.6 | | | | | |
| EC* | 263 | 127 | | | | | |
| Sample Mass (kg) | 0.215 | | | | | | |
| Dry Matter (%) | 81 | | | | | | |
| Moisture (%) | 24 | | | | | | |
| Stage 1 | | | | | | | |
| Volume Eluate L2 (litres) | 0.308 | | | | | | |
| Filtred Eluate VE1 (litres) | 0.122 | | | | | | |

Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ELAB cannot be held responsible for any discrepancies with current legislation

* - UKAS accredited
 ** - MCERTS accredited test



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| Waste Acceptance Criteria ANALYTICAL RESULTS | | | | | | | |
|----------------------------------------------|-------------------------------------------------------|---------|--|-----------------|--------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------------|
| Report No: | ANALYTICAL REPORT No. AR11514A (Supplementary Report) | | | | | Page 5 of 8 | |
| Project Name: | 15131 | | | | | CLIENT: | Geo-Testing Services Ltd |
| Lab Reference | n/a | | | | | Landfill Waste Acceptance Criteria | |
| Sampling Date | n/a | | | | | Limits | |
| Sample ID | Composite Samples from 0.5m | | | | | Inert Waste Landfill | Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill |
| Depth | 0.50 | | | | | | |
| Solid Waste Analysis | | | | | | | |
| TOC (%) | 1.1 | | | | | 3% | 5% |
| Loss on Ignition (%)** | 5.0 | | | | | - | 10% |
| BTEX (mg/kg)** | <0.01 | | | | | 6 | - |
| Sum of PCBs (mg/kg) | <0.01 | | | | | 1 | - |
| Mineral Oil (mg/kg)** | <5 | | | | | 500 | - |
| Total PAH (mg/kg)** | <0.5 | | | | | 100 | - |
| pH (Units)** | 8.1 | | | | | - | - |
| Acid Neutralisation Capacity (mol/kg) | <0.1 | | | | | - | To be evaluated |
| Eluate Analysis | 2:1 | 8:1 | | Cumulative 10:1 | Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg) | | |
| | mg/l | mg/l | | mg/kg | | | |
| Arsenic* | <0.005 | <0.005 | | <0.1 | 0.5 | 2 | 25 |
| Barium* | 0.008 | 0.009 | | <0.1 | 20 | 100 | 300 |
| Cadmium* | <0.001 | <0.001 | | <0.01 | 0.04 | 1 | 5 |
| Chromium* | <0.005 | <0.005 | | <0.1 | 0.5 | 10 | 70 |
| Copper* | <0.005 | <0.005 | | <0.1 | 2 | 50 | 100 |
| Mercury* | <0.0001 | <0.0001 | | <0.001 | 0.01 | 0.2 | 2 |
| Molybdenum* | <0.005 | <0.005 | | <0.1 | 0.5 | 10 | 30 |
| Nickel* | <0.005 | 0.017 | | <0.1 | 0.4 | 10 | 40 |
| Lead* | <0.005 | <0.005 | | <0.1 | 0.5 | 10 | 50 |
| Antimony* | <0.005 | <0.005 | | <0.01 | 0.06 | 0.7 | 5 |
| Selenium* | <0.005 | <0.005 | | <0.01 | 0.1 | 0.5 | 7 |
| Zinc* | 0.011 | 0.017 | | <0.1 | 4 | 50 | 200 |
| Chloride* | 12 | 8 | | 46 | 800 | 15000 | 25000 |
| Fluoride* | <1 | <1 | | <1 | 10 | 150 | 500 |
| Sulphate* | 11 | 6 | | 33 | 1000 | 20000 | 50000 |
| TDS | 140 | 210 | | 1038 | 4000 | 60000 | 100000 |
| Phenol Index | <0.5 | <0.5 | | <0.5 | 1 | - | - |
| DOC | 16.5 | 15.4 | | 81 | 500 | 800 | 1000 |
| Leach Test Information | | | | | | | |
| pH* | 7.9 | 7.8 | | | | | |
| EC* | 211 | 139 | | | | | |
| Sample Mass (kg) | 0.206 | | | | | | |
| Dry Matter (%) | 85 | | | | | | |
| Moisture (%) | 18 | | | | | | |
| Stage 1 | | | | | | | |
| Volume Eluate L2 (litres) | 0.318 | | | | | | |
| Filtered Eluate VE1 (litres) | 0.124 | | | | | | |

Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and ELAB cannot be held responsible for any discrepancies with current legislation

* = UKAS accredited
 ** = MCERTS accredited test



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 TN38 9BA
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 Facsimile (01424) 729911

THE ENVIRONMENTAL LABORATORY LTD

SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number AR11514A (Supplementary Report |)
 Your Ref No: 15131
 Sample Receipt Date: 12/11/07
 Reporting Date: 26/11/07
 Registered: 12/11/07
 Prepared: 13/11/07
 Analysis complete: 23/11/07

TEST METHOD SUMMARY

| PARAMETER | Analysis Undertaken on | Date Tested | Method Number | Technique |
|----------------------------|------------------------|-------------|---------------|--------------------|
| Arsenic** | Air dried sample | 20/11/07 | 118 | ICPMS |
| Cadmium** | Air dried sample | 20/11/07 | 118 | ICPMS |
| Chromium** | Air dried sample | 20/11/07 | 118 | ICPMS |
| Lead** | Air dried sample | 20/11/07 | 118 | ICPMS |
| Mercury** | Air dried sample | 20/11/07 | 118 | ICPMS |
| Nickel** | Air dried sample | 20/11/07 | 118 | ICPMS |
| Copper** | Air dried sample | 20/11/07 | 118 | ICPMS |
| Zinc** | Air dried sample | 20/11/07 | 118 | ICPMS |
| Selenium | Air dried sample | 20/11/07 | 118 | ICPMS |
| Hexavalent Chromium | Air dried sample | 20/11/07 | 110 | Colorimetry |
| Water Soluble Boron | Air dried sample | 21/11/07 | 202 | Colorimetry |
| pH Value** | Air dried sample | 19/11/07 | 113 | Probe |
| Water Soluble Sulphate | Air dried sample | 20/11/07 | 172 | Turbidity |
| Total Cyanide** | As submitted sample | 21/11/07 | 106 | Colorimetry |
| Total Monohydric Phenols** | As submitted sample | 23/11/07 | 121 | HPLC |
| Organic Matter* | Air dried sample | 19/11/07 | 111 | Titration |
| Sulphide | As submitted sample | 21/11/07 | 109 | Colorimetry |
| Total Sulphate | Air dried sample | 22/11/07 | 115 | Turbidity |
| Speciated PAH | As submitted sample | 16/11/07 | 133 | Gas Chromatography |

* = UKAS Accredited test
 ** - MCERTS Accredited test

MCERTS accreditation covers samples which are predominantly sand, clay, loam or combinations of these three soil types

Any comments, opinions, or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



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THE ENVIRONMENTAL LABORATORY LTD

SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number AR11514A (Supplementary Report I)
Your Ref No: 15131
Sample Receipt Date: 12/11/07
Reporting Date: 23/11/07
Registered: 12/11/07
Prepared: 13/11/07
Analysis complete: 23/11/07

TEST METHOD SUMMARY

| PARAMETER | Undertaken on | Date Tested | Method Number | Technique |
|---------------------------------|---------------------|-------------|---------------|---------------|
| pH Value** | Air dried sample | 17/11/07 | 113 | Electrometric |
| Total Organic Carbon | Air dried sample | 17/11/07 | 111 | Titrimetry |
| Loss on Ignition | Air dried sample | 17/11/07 | 129 | Gravimetric |
| Neutralization Capacity to pH 7 | Air dried sample | 17/11/07 | - | EA |
| Benzene** | As submitted sample | 21/11/07 | 154 | GCMS |
| Toluene** | As submitted sample | 21/11/07 | 154 | GCMS |
| Ethyl Benzene** | As submitted sample | 21/11/07 | 154 | GCMS |
| Xylenes** | As submitted sample | 21/11/07 | 154 | GCMS |
| Mineral Oil** | As submitted sample | 16/11/07 | 117 | GCFID |
| PCB 28 | As submitted sample | 22/11/07 | 170 | GCMS |
| PCB 52 | As submitted sample | 22/11/07 | 170 | GCMS |
| PCB 101 | As submitted sample | 22/11/07 | 170 | GCMS |
| PCB 118 | As submitted sample | 22/11/07 | 170 | GCMS |
| PCB 138 | As submitted sample | 22/11/07 | 170 | GCMS |
| PCB 153 | As submitted sample | 22/11/07 | 170 | GCMS |
| PCB 180 | As submitted sample | 22/11/07 | 170 | GCMS |
| Speciated PAH** | As submitted sample | 16/11/07 | 133 | GCFID |

The analysts' guide for sampling, analysis and clearance procedures

** - MCERTS Accredited test

MCERTS accreditation covers samples which are predominantly sand, clay, loam or combinations of these three soil types

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THE ENVIRONMENTAL LABORATORY LTD

LEACHATE SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number AR11514A (Supplementary Report)
Your Ref No: 15131
Sample Receipt Date: 12/11/07
Reporting Date: 23/11/07
Registered: 12/11/07
Prepared: 13/11/07
Analysis complete: 23/11/07

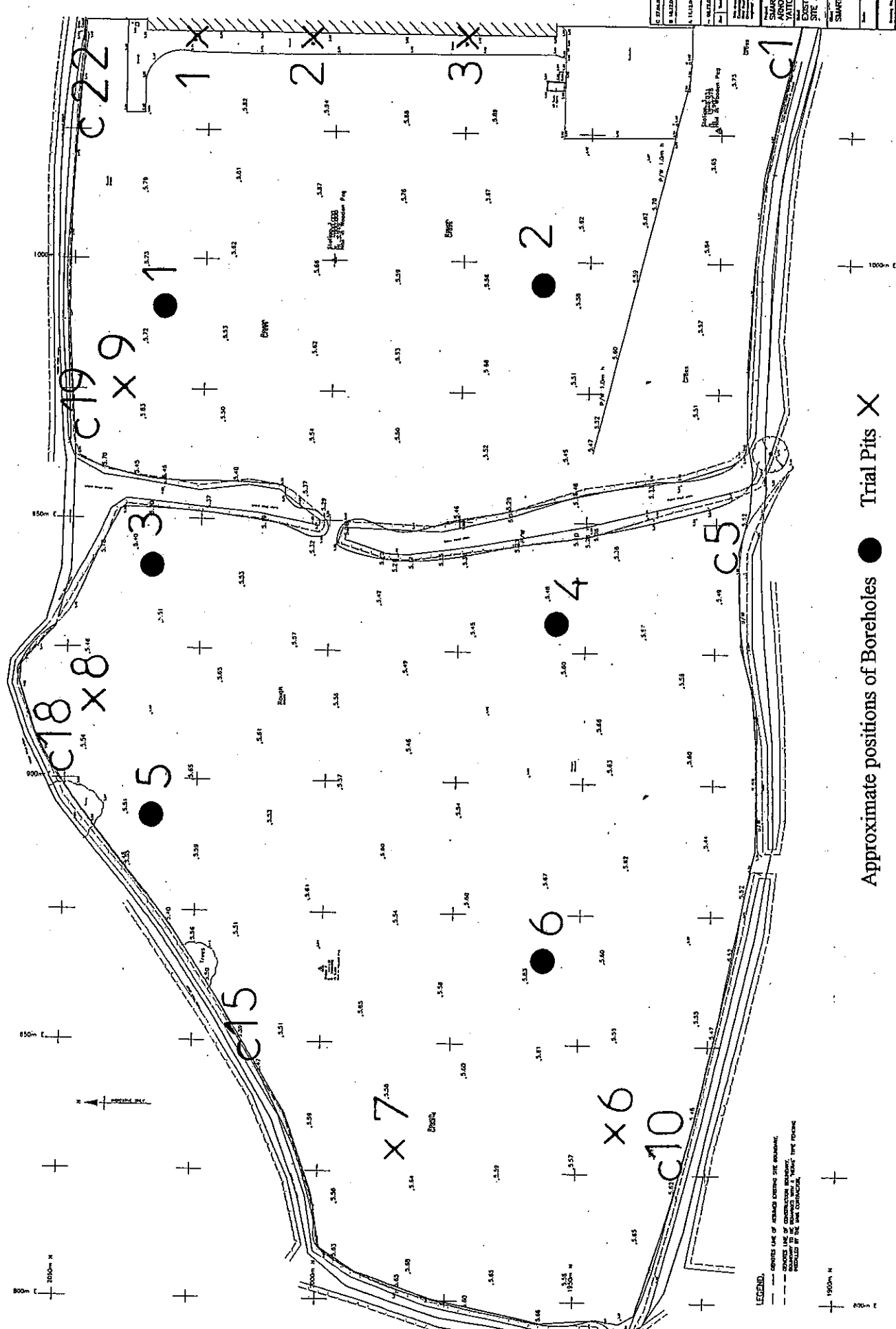
LEACHATE TEST METHOD SUMMARY

| PARAMETER | Method Number | Technique |
|--------------------------|------------------|--------------------|
| Arsenic* | 101 | ICPMS |
| Cadmium* | 101 | ICPMS |
| Chromium* | 101 | ICPMS |
| Lead* | 101 | ICPMS |
| Nickel* | 101 | ICPMS |
| Copper* | 101 | ICPMS |
| Zinc* | 101 | ICPMS |
| Mercury* | 101 | ICPMS |
| Selenium* | 101 | ICPMS |
| Antimony | 101 | ICPMS |
| Barium* | 101 | ICPMS |
| Molybdenum* | 101 | ICPMS |
| pH Value* | 113 | Electrometric |
| Electrical Conductivity* | 136 | Probe |
| Dissolved Organic Carbon | 102 | TOC analyser |
| Chloride* | 131 | Ion Chromatography |
| Fluoride* | 131 | Ion Chromatography |
| Sulphate* | 131 | Ion Chromatography |
| Total Dissolved Solids | 163 | Gravimetric |
| Phenol Index | 121 | HPLC |

* - UKAS Accredited test

Any comments, opinions, or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

Appendix F – Site Plan



| NO. | REVISION | DATE | BY | CHECKED | SCALE |
|-----|-------------------|----------|-----|---------|-------|
| 1 | ISSUED FOR TENDER | 11/11/24 | ... | ... | ... |
| 2 | FOR COMMENT | 11/11/24 | ... | ... | ... |
| 3 | FOR COMMENT | 11/11/24 | ... | ... | ... |
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| 85 | FOR COMMENT | 11/11/24 | ... | ... | ... |
| 86 | FOR COMMENT | 11/11/24 | ... | ... | ... |
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| 91 | FOR COMMENT | 11/11/24 | ... | ... | ... |
| 92 | FOR COMMENT | 11/11/24 | ... | ... | ... |
| 93 | FOR COMMENT | 11/11/24 | ... | ... | ... |
| 94 | FOR COMMENT | 11/11/24 | ... | ... | ... |
| 95 | FOR COMMENT | 11/11/24 | ... | ... | ... |
| 96 | FOR COMMENT | 11/11/24 | ... | ... | ... |
| 97 | FOR COMMENT | 11/11/24 | ... | ... | ... |
| 98 | FOR COMMENT | 11/11/24 | ... | ... | ... |
| 99 | FOR COMMENT | 11/11/24 | ... | ... | ... |
| 100 | FOR COMMENT | 11/11/24 | ... | ... | ... |

Approximate positions of Boreholes ● Trial Pits X

and CBR positions in perimeter cable trench C (not to scale).

LEGEND:
 --- BOUNDARY LINE OF REMAINING EXISTING SITE
 --- BOUNDARY LINE OF CONSTRUCTION SITE
 --- BOUNDARY LINE OF CONSTRUCTION SITE TO BE REMOVED WITH A "NEW" TYPE FENCING
 --- BOUNDARY LINE OF CONSTRUCTION SITE TO BE REMOVED WITH A "NEW" TYPE FENCING

EXISTING SITE LAYOUT



OAP CONSULTING ENGINEERS
 06125 003 7