The Brownfield Consultancy

Historical Aerial Photograph, 1999

LAND TO THE SOUTH OF SOUTH SIDE, STEEPLE ASTON, OXFORDSHIRE.
OX25 4RX

SITE INVESTIGATION REPORT

Prepared for: RECTORY HOMES

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APPENDICES

SITE INVESTIGATION REPORT

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1 INTRODUCTION

The Brownfield Consultancy was instructed by Rectory Homes Ltd to carry out a Phase 2 Ground Investigation of a site in Steeple Aston, Oxfordshire (hereinafter referred to as 'the site').

The site currently comprises of a roughly rectangular field, recently cleared of all vegetation. It is proposed to construct 5No. residential houses with associated infrastructure and driveways. Access will be off South Side. A location plan and a proposed site layout is presented in Appendix A.

The purpose of the site investigation is to provide an assessment of the geotechnical engineering properties of the soils and the extent of any soil contamination at the site. The report is subject to limitations which are set out in Appendix F.

A previous Desk Top Study has been undertaken by The Brownfield Consultancy (Ref: BC340 RE001 26.07.2017) and the reader is referred to this report. The salient points of that report are presented in Section 3.

2 SITE DESCRIPTION

The site is located on the southwestern edge of the village of Steeple Aston, Oxfordshire. The site covers an area of approximately 0.83hectare and is roughly rectangular in shape. The entrance to the site is located in the northwest of the site, directly off South Side. At the time of the initial walkover undertaken on 20th July 2017, the site was overgrown with a healthy covering of a variety of small trees, plants, thistles and brambles. The far western area of the site is generally laid to grass with the ground surface showing signs of previous disturbance/reworking. The fenced boundary with an adjacent Car Repair shop is visible. There is a small area of concrete hardstanding (21m x 11m) with scattered building debris, traffic cones and traffic barriers to the immediate east of the site entrance. We understand from the site owners that there were some former sheds in this area used for storage of general agricultural supplies. There were 3No. stockpiles of imported soil in this location.

A soakaway investigation was also undertaken by the Brownfield Consultancy in mid-November 2017, by which time the site had been cleared of vegetation. The removal of the vegetation revealed the presence of some empty concrete sheds along the northwestern boundary, the base of a former static caravan and a sceptic tank housing. Photographs are presented below:-

Fridge freezer

Static Caravan Base

Static Caravan Base

Limited concrete slab near to caravan base

Underside of Concrete Slab

Sceptic Tank Housing

3 PREVIOUS WORK

The conclusions and recommendations made in the Desk Study report are set out below:-

- *From the earliest historical maps, the site was part of a larger open field. Buildings appeared in the central northern area by 1900 which had extended westerly along the northern boundary. The owners of the site indicated that these buildings had been used as storage barns for agricultural goods and materials.*
- *The presence of on-site generated Made Ground including demolition fill as a result of the erection and subsequent demolition of the structures along the central northern boundary is considered a potential source of metal, hydrocarbon and asbestos contamination. The hydrocarbon components may also be a source of harmful vapours.*

- *Storage of agricultural materials and machinery is a potential source of metals, oils, solvents, asbestos, insecticides, e.g. organochlorines, organophosphates, pyrethroids, phenols and herbicides.*
- *The walkover did not identify any immediate pollution concerns.*
- *A Car Repair Yard is present immediately adjacent to the sites western boundary although it is unclear for how long this has been operating. This is a source of potential hydrocarbons, solvents and metals in close proximity to the western boundary.*
- *Reference to the on line BGS Mapping Index indicates that two different strata types outcrop below the site. The west of the site is underlain by the Chipping Norton Limestone and the East of the site is underlain by the Horseshay Sand Formation. Groundwater stored in both of these formations is considered vulnerable to pollution.*
- *The site is not located in an area considered at risk of flooding by the Environment Agency. The site is located in an area with 'Limited Potential' for groundwater flooding to occur.*
- *The Landmark report identifies no significant geological hazards.*
- *The latest BRE guidance on radon protective measures indicates that no radon protection measures are necessary for new build.*

Should the residential proposals proceed then we would recommend that the following investigation works are undertaken:-

- *One day of trial pitting to determine ground conditions. Samples of near surface soils (Made Ground) should be submitted to laboratory analysis for hydrocarbons, metals, solvents, pesticides, insecticides, asbestos and sulphates. A greater frequency of testing will be required along the northern central boundary in the vicinity of the former structures. The western boundary should also be targeted to determine whether or not pollutants may have migrated from the adjacent Car Repair Yard.*
- *One day of windowless sampling together with the installation of 4No. gas monitoring standpipes followed by a programme of 6No. gas monitoring visits at weekly intervals. If groundwater is encountered in the boreholes then samples should be retrieved and submitted to laboratory analysis for metals, hydrocarbons and solvents. At least one borehole installation should be located on the western boundary to determine impacts from the Car Repair Yard.*
- *It is recognised that access for the required plant to obtain any meaningful information from across the entire site is limited and that investigations should ideally be timed to coincide with tree/ vegetation clearance. This would allow for the necessary plant (JCB, mini-digger, drilling rig) to access the full site.*

4 GEOLOGY, HYDROLOGY AND HYDROGEOLOGY

4.1 Geology

Reference to the on line BGS Mapping Index indicates that two different strata types outcrop below the site. The west of the site is underlain by the Chipping Norton Limestone described as.. *'Limestone, off-white to pale brown fine- to medium-grained ooidal and coated peloidal grainstone, with common fine burrows, medium- to coarse-grained shell debris and flakes of greenish grey mudstone and dark lignite and minor amounts of fine-grained sand'.*

The East of the site is underlain by the Horseshay Sand Formation described as…

'Unbedded to weakly bedded and cross-bedded, pale grey and brown to off-white, medium- to fine-grained, quartzose sand, locally cemented into calcareous or weakly ferruginous sandstone with thin dark grey mudstone and siltstone beds in places, rootlets and lignitic debris common, shells and shell debris very rare'.

Superficial deposits are not denoted.

4.2 Hydrology

The nearest surface water feature is a small, spring fed stream located 185m northeast of the site. There is no water quality records for this watercourse.

The site is not located within an area considered at risk of flooding from rivers or the sea by the Environment Agency. The site is located in an area with 'Limited Potential' for groundwater flooding to occur.

There are no surface water abstractions within 1000m of the site.

4.3 Hydrogeology

The Groundwater Vulnerability map indicates that the Chipping Norton Limestone is designated a Principal Aquifer and the Horseshay Sandstone is designated a Secondary A Aquifer. Groundwater stored in both of these geological formations is considered vulnerable to pollution.

The site is not located within a groundwater source protection zone.

The nearest groundwater abstraction is located 735m northwest of the site at Brasenose Farm where groundwater is abstracted for general farming and domestic use.

5 FIELDWORK

The intrusive fieldwork was carried out on 13th and 14th December 2017 and comprised 15No. trial pits, 3No. dynamic windowless sampler boreholes and 6No. dynamic probes.

The site work was undertaken by The Brownfield Consultancy, with the ground investigation procedures and sample descriptions based on BS 5930 (2015) 'Code of Practice for Site Investigations' and BS 10175 "Investigation of potentially contaminated sites - code of practice". The locations of the exploratory holes are shown on the Drawing included in

Appendix A. The exploratory hole records are presented in Appendix B. The full details of the fieldwork undertaken are summarised in the following sections.

5.1 Trial Pits

The trial pits, designated TP4 to TP18, were excavated by a mechanical backhoe excavator and were backfilled with arisings upon completion. TP1, TP2 and TP3 were excavated in November 2017 as part of the soakaway investigation but are included in Appendix B. TP1 to TP14 were excavated to depths of 1.20m to 3.00m, many being terminated on reaching bedrock. TP15 and TP16 were excavated into the concrete slab to the immediate east of the gated entrance off Southside. TP17 and TP18 were excavated to investigate an elongated stockpile ('Stockpile 2') of imported soil to the immediate south of the concrete slab. A further 2No. pits were excavated into 2No. stockpiles denoted 'Stockpile 1' and 'Stockpile 3' to obtain samples of soil for contamination testing and to inspect the materials for asbestos.

An Exploratory Hole Location Plan of the whole site and one denoting the stockpile and concrete slab investigations are included in Appendix A.

5.2 Dynamic Windowless Boreholes

The dynamic windowless sampler boreholes, designated WS1 to WS3 were advanced to depths of 1.50m to 4.45m. WS1 and WS3 were terminated on reaching impenetrable bedrock.

The dynamic sampling technique uses a lightweight tracked rig to advance a borehole by 1m intervals using 1m long steel sampler tubes at diameters of 100mm reducing to 70mm. The soils are then recovered from each sampler tube as continuous core samples, which are then logged and sub-sampled on site.

In situ Standard Penetration Tests (SPTs) were undertaken in accordance with BS EN ISO 22476-3:2005+A1:2011 at 1.0m intervals in the sampler holes in order to provide strength parameters to assist in geotechnical design.

Standpipes were installed in all three boreholes to facilitate ground-borne gas and groundwater level monitoring.

5.3 Dynamic Probing

The dynamic probes, DP1 to DP6, were advanced to 1.60m to 7.00m depth, their purpose being to provide numerical data on ground strength. The super-heavy dynamic probe test (DPSH) used, comprises a 63.5kg weight falling through a constant drop of 760mm, driving a solid 51mm diameter steel cone of 90° angle into the deposits under test. The relative density of the deposit is determined by recording the number of blows per 100mm of penetration. The probe provides a continuous profile of the relative density of the soils. The energy and dynamics of the test are similar to that of the Standard Penetration Test (SPT) undertaken in the dynamic sampler boreholes.

The probe results are presented in Appendix B.

6 LABORATORY TESTING

6.1 Geotechnical

A programme of laboratory testing was scheduled to determine the geotechnical properties of selected soil samples obtained from the investigation. The details of the geotechnical testing are summarised below:-

Table 1 Summary of Geotechnical Laboratory Testing Suites

Determinant	No
BRE SD1 Suite B	6
Atterberg limits including moisture content	7
Particle Size Distribution (sieve only)	1

Tests were carried out in accordance with BS1377 (1990) “Methods of test for Soils for Civil Engineering purposes” and Building Research Establishment Special Digest 1 “Concrete in Aggressive Ground”. The results of the geotechnical testing are presented in Appendix D.

6.2 Environmental

A programme of chemical laboratory testing was scheduled on 21No. soil samples taken from the Made Ground and Topsoil recovered from the boreholes. The samples were placed into suitable containers for the required chemical analysis. All samples were transported to I2 Laboratories who are UKAS and MCerts accredited. The following table summarises the contaminants scheduled:-

Summary of Soil Chemical Laboratory Testing Suites

Determinant	No
Metals and semi-metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc)	12
Speciated polycyclic aromatic hydrocarbons (PAH)	11
Asbestos screen	7
TPH Texas banded	1
TPH Total (C8-C40)	2
Pesticide/Herbicide Screen	1
WAC	1

The results of the laboratory chemical testing are interpreted in Section 9 and presented in full in Appendix C.

7 GROUND AND GROUNDWATER CONDITIONS

7.1 Strata Encountered

The exploratory holes revealed the site to be underlain by predominantly clay beds of the Oolite Group, with occasional granular beds, then bedrock. Other than the stockpile and concrete slab, very minor deposits of Made Ground were encountered.

7.2 Topsoil

Topsoil was present in most of the exploratory holes in thicknesses of 0.10m to 0.40m.

7.3 Made Ground

Made Ground was found below ground level only in TP3, TP15 and TP16. In TP3, timber fragments were present in the 0.2m thick topsoil. The Made Ground in TP15 and TP16 consisted of the hardstanding located on the northern boundary and consisted of 100mm thick concrete in both pits, over buried gravelly topsoil to 0.35m in TP15, and brick and concrete gravel and cobbles to 0.37m in TP16.

7.4 Oolite Group Deposits

The Oolite Group Deposits mainly comprised an upper horizon of clayey sandy limestone GRAVEL and COBBLES over stiff sandy, or very sandy CLAY. The gravel and cobble bed was overlain, locally, by a thin bed of clay. In those exploratory holes located on or near the footprints of the proposed houses, the lower clay bed was penetrated at depths of between 0.9m and 1.6m apart from in WS2 and WS3, located at the extreme western end of the site, where the granular layer was absent and clay was immediately beneath the topsoil. A rock bed was encountered beneath the clay at many locations at depths of 1.5m to 2.6m, but

generally between 2.0m and 2.6m. The rock bed was shown to be laterally discontinuous as it was not reached at some locations or was so thin that it was fully penetrated. In WS2, the clay was underlain at 3.5m by medium dense silty fine sand to the base of the borehole at 4.45m.

Atterberg Limit analyses undertaken on seven samples of the cohesive deposits of the Oolite Group Deposits yielded Liquid Limits of 44% to 60%, Plastic Limits of 17% to 21% and Plasticity Indices of 27% to 39% indicating them to be clays of intermediate or high plasticity (with respect to BS 5930, 1999) and medium volume change potential (with respect to NHBC Chapter 4.2).

7.5 Groundwater

Groundwater was not encountered in the exploratory holes during the fieldwork. On subsequent monitoring of the standpipe installations in the boreholes, all holes were dry with the exception of WS3 which contained a small amount of water in the initial 2No. monitoring visits but which subsequently were dry over the last 4No. monitoring visits.

7.6 Contamination

Evidence of contamination was not recorded in any of the trial pits with the exception of TP17 and TP18. TP17 and TP18 were excavated into a stockpile of soil ('Stockpile2') and fragments of suspected asbestos roof sheet were observed. (Photograph below)

The sceptic tank housing was empty and appeared free of residues and detritus.

Two other stockpiles located near to the concrete hardstanding contained largely inert material. Stockpile 1 comprised brown sandy GRAVEL and COBBLE with geotextile, lumps of soft clay and the occasional breeze block.

Stockpile 3 comprised of a visually clean TOPSOIL but with tin roof sheeting. (Photograph below)

8 HUMAN HEALTH QUANTITATIVE RISK ASSESSMENT

Qualitative assessment of risks may be sufficient in many cases to eliminate the possibility of significant pollutant linkages. However, quantitative risk assessment is formally required to determine whether there is a 'significant possibility of significant harm being caused'. Part IIA of the Environmental Protection Act 1990 recommends that ‘authoritative and scientifically based guideline values for concentrations of the potential pollutants in or under the land’ be used to quantify the risk posed by contamination.

Under the Planning Regime a quantitative risk assessment can be used to decide whether the site is suitable for the proposed use. In addition, the National Planning Policy Framework (March 2012) also indicates that after remediation as a minimum land should not be capable of being determined as contaminated land under Part IIA.

8.1 Current UK Screening Values

The UK technical guidance for assessing risks to human health is issued from various UK bodies including the Environment Agency (EA), DEFRA, Contaminated Land: Applications in Real Environment (CL:AIRE), Chartered Institute of Environmental Health (CIEH) and Land Quality Management (LQM) Ltd (part of the University of Nottingham).

New and updated screening values in the form of provisional Category Four Screening Levels (C4SL) (published in 2014) and Suitable for Use Levels (S4UL) (published 2015) have been produced by defra and CIEH / LQM respectively using modified versions of the EA's Contaminated Land Exposure Assessment (CLEA) software.

8.2 C4SL

Provisional C4SL have been derived by CL:AIRE following guidance and as a tool to assist in applying the Part IIA Category 1- 4 classifications to a site. The purpose of the C4SL is to provide a simple test for deciding that land is suitable for use and 'definitely not' contaminated land under Part IIA. They describe a level of risk that is above minimal but is still low. Six contaminants have been assigned provisional C4SL: arsenic; benzene; benzo[a]pyrene; cadmium; chromium VI and lead for the standard land uses (residential with and without plant uptake, allotments, commercial and public open space (parks and residential). The C4SL are also considered suitable to be used under the planning regime.

8.3 S4UL

The LQM / CIEH S4UL represent generic assessment criteria based on minimal or tolerable risk that are intended to be protective of human health. They represent values above which further assessment of the risks or remedial actions may be needed. S4UL have been derived for a comprehensive list of organic and inorganic determinants.

9 SOIL CHEMISTRY

9.1 Results

The results of chemical testing of 13No. samples of near surface soils are compared with the S4UL and C4SL for a residential end use with vegetable uptake in the following table:-

Comparison of Soil Chemical Test Results with Guideline Values

Determinant	Maximum Measured Concentration (mg/kg)	C4SL / S4UL Residential (mg/kg)	No. of tests carried out	No. of exceedances
Arsenic	19	37	12	0
Cadmium	<dl	11	12	0
Chromium (total)	30	910	12	0
Mercury	<dl	1.2	12	0
Lead	82	210	12	0
Nickel	26	180	12	0
Selenium	<dl	250	12	0
Copper	52	2400	12	0
Zinc	150	3700	12	0
Asbestos	Present	presence	7	**TP18 @ 0.40m**
Naphthalene	<dl	2.3	11	0
Acenaphthylene	<dl	170	11	0
Acenaphthene	<dl	210	11	0
Fluorene	<dl	170	11	0
Phenanthrene	<dl	95	11	0
Anthracene	<dl	2400	11	0
Fluoranthene	<dl	280	11	0
Pyrene	<dl	620	11	0
Benzo(a)anthracene	<dl	7.2	11	0
Chrysene	<dl	15	11	0
Benzo(b)fluoranthene	<dl	2.6	11	0
Benzo(k)fluoranthene	<dl	77	11	0
Benzo(a)pyrene	<dl	2.2	11	0
Indeno(1,2,3-c,d)pyrene	<dl	27	11	0
Dibenzo(a,h)anthracene	<dl	0.24	11	0
Benzo(g,h,i)perylene	<dl	320	11	0

9.2 Interpretation

Metals and Polycyclic Aromatic Hydrocarbons

Exceedances of the guideline values for metals and polycyclic aromatic hydrocarbons was not recorded.

Asbestos

7No. samples of soil were submitted to an asbestos screen and asbestos was only recorded in Stockpile 2. Visual evidence of asbestos roof sheet was recorded in TP17 and TP18 which was subsequently confirmed as *'Chrysotile - hard cement'* in TP17 at 0.10m and *'Chrysotile-Bitumen'* in TP18 at 0.40m. Loose asbestos fibres were not recorded in either sample. We estimate that the stockpile amounts to a volume of approximately 120m^3.

Pestcides

1No. sample of shallow Topsoil was submitted to a pesticide screen and concentrations were not recorded above the laboratory limit of detection.

9.3 Controlled Waters

Groundwater was not encountered in the Oolite Formation. Based upon the recorded concentrations of contaminants in shallow soils we do not consider that controlled waters are at risk of impact.

9.4 Water Supply Pipework

Plastic water supply pipes are permeable to hydrocarbons such as petrol, diesel, heating fuel and white spirits. The site has not had a history of contaminative use. Samples of soil from typical pipework installation depths from TP5 (1.00m), TP6 (1.20m), TP10 (0.85m) and WS2 (1.00m) were submitted to analysis for common hydrocarbon determinants and the laboratory limit of detection for any of the compounds was not exceeded. Thus, protective pipework is not a requirement.

9.5 Waste Classification and Reuse

Existing topsoil at the site should be stockpiled and set aside for re-use. Foundation arisings will consist of virgin soil which will carry and 'inert' classification. A combined sample of virgin Oolite Group from WS1 and TP8 (1.00-1.45m) was submitted to WAC testing which demonstrates an inert classification. The results are included in Appendix C.

Asbestos was recorded in 'Stockpile 2' the location of which is denoted on the hand drawn plan in Appendix A. Visual evidence of asbestos roof sheet was recorded in TP17 and TP18 which was subsequently confirmed as *'Chrysotile - hard cement'* in TP17 at 0.10m and *'Chrysotile-Bitumen'* in TP18 at 0.40m. Loose asbestos fibres were not recorded in either sample. We estimate that the stockpile amounts to a volume of approximately 120m^3. The concentrations of metals and PAH would render this stockpile suitable for re-use provided that the asbestos was removed by hand picking. Following removal of the asbestos validation testing would be required to demonstrate that the stockpile is free from asbestos.

Alternatively, the stockpile can be removed to landfill and based upon our visual assessment we consider that a 'non-hazardous' waste classification would be applicable as the content of asbestos within the matrix will be <0.1wt%.

We would recommend that the classification for the purposes of muck away should be confirmed with the closest relevant landfill site where pricing should be sought based upon the individual characteristics of the landfill site and haulier.

Any excavated material and excess spoil should always be classified prior to removal from site as required by 'Duty of Care' (Environmental Protection Act 1990) legislation. This means that material has to be given a proper description and waste classification prior to removal consequently; details of the materials required for disposal, together with certificates of chemical analysis should be sent to a suitably licensed waste disposal contractor for classification and to confirm compliance with their license conditions.

10 GEOTECHNICAL ENGINEERING ASSESSMENT

10.1 Proposed Redevelopment

It is understood that it is proposed to construct six houses on the site, some with separate garages, with associated infrastructure. The layout indicated on the Exploratory Hole Location Plan is assumed to be valid.

10.2 Summary of Ground Conditions

The exploratory holes indicated the subsoils underlying the site to be Oolite Group Deposits mainly comprising clayey sandy limestone gravel and cobbles over stiff sandy clays. The gravel was overlain by a relatively thin bed of clay at some locations. In the areas where the houses will be located, the lower clay layer was encountered at depths of 0.90m to 1.60m. A rock bed was encountered at many locations, mainly at depths between 2.00m and 2.60m.

Groundwater was not encountered.

10.3 Foundations

Spread foundations bearing in the Oolite Group Deposits should be suitable for supporting the loads likely to be generated by the proposed low-rise residences. On the evidence of many of the exploratory holes and most of the dynamic probes, the soils above 1.50m depth are of relatively low strength requiring a limited allocated allowable bearing pressure. It may be more economical to found in the significantly stronger soils consistently found at 1.50m depth or below.

For foundations *up to* 1.0m wide, net allowable bearing pressures of 100kN/m^2 and 130kN/m^2 are recommended for the design of foundations bearing in either the granular or clay Oolite Group Deposits at depths of 0.90m and 1.50m respectively. These figures incorporate factors of safety of at least 3.0 against shear failure of the clays and should keep settlements to less than 10mm. However, it is strongly recommended that the foundations

are reinforced to counter differential rates of settlement through founding in variable soil types. It is recognised that this may not always be the case, but the variable depth of the clay horizon beneath the granular may still lead to differential movement where the upper surface of the clay is close to the base of the foundation.

It should be noted that none of the above takes into account the possibility that the new buildings are within the zone of influence of trees that previously stood on the site. Vegetation was recently cleared from the interior of the site but the pre-existence or otherwise is not known of trees or other deep-rooting vegetation that may have significantly depleted the clay moisture levels such that heave is now occurring as the soil rehydrates to its natural level. Such a process can take several years to complete. During the investigation roots and hair roots of a live appearance were recorded in TP4 to 2.00m, TP5 to 1.00m and TP6 to 2.00m.

If an assessment is made of the possible effects of trees and the requirement or otherwise for deeper footings, the clay soils should be assumed to be of *medium* volume-change potential with regard to the NHBC Standards classification. Although foundations may potentially be bearing in granular soils at many locations, should an increase in foundation depth be required to account for the pre-existence of trees, the depth of the underlying clay is unlikely to be sufficient to meet the criteria of NHBC Clause 4.2.9. This clause requires the shrinkable soil to be at least 0.75 x 'required depth' beneath the foundation, where the 'required depth' is that calculated using the methods of the Standards, assuming shrinkable soil to be present throughout. Furthermore, the clause also requires that consistent soil conditions exist across the plot, which is also unlikely.

10.4 Ground Floor Slabs

The near-surface soils are of variable composition but locally comprised soft clay. There may also be localised heave if, and where trees were removed (see above). It is recommended, therefore, that suspended ground floors are utilised. If an adjustment to the foundation depth has been necessary to account for the possible effect of trees, then a subjacent void should be provided of a dimension in accordance with the method of construction and types of materials used, as detailed in the NHBC guidelines (or other).

10.5 Road Pavement Design

As previously discussed, the near-surface soils are variable, seemingly randomly so, rendering it necessary adopt a lower-bound value of an overall California Bearing Ratio (CBR) for pavement design purposes. A CBR value of 2% is recommended, based on the localised presence of soft clays. This will be a conservative figure for many areas but delineating those areas immediately underlain by clay and those by granular soils is not practical. The soils are not considered to be frost-susceptible. The formation should be proof rolled and any significant soft spots removed and replaced with granular backfill.

10.6 Chemical Considerations for Buried Concrete

Chemical analysis of samples of the subsoils yielded water-soluble sulphate concentrations (SO4 in 2:1 soil aqueous extract) of 6mg/l to 143mg/l with pH values of 8.1 to 8.7. Calculation of the oxidisable sulphates using the methods of BRE SD1 (2005) "Concrete in aggressive ground", indicates an insignificant presence of pyrite in the soils. These factors, along with 'static' groundwater conditions, place the site in Design Sulphate Class DS-1 and ACEC Class AC-1s. Therefore, no special precautions will be necessary to protect buried concrete from potential chemical attack.

11 GAS PROTECTION REQUIREMENTS

11.1 Ground Gas

The current guidance on protecting buildings from ground gas hazards is contained in the document CIRIA C665 with updated risk assessment guidance contained within BS8485 (2015). It is intended that the proposed new build will be two storey apartments.

The level of gas protection is determined by comparing the following parameters to cut-off values prescribed within BS8485 (2015):

- "Typical Maximum Concentrations" for initial screening purposes.
- Risk based "Gas Screening Values" (GSV) for consideration where the typical maximum concentrations are exceeded.

The GSV is calculated using the following equation and the resulting GSV are compared to the Site Characteristic GSV given in Table 2 of BS8485 (2015).

Maximum gas concentration (%) x worst case borehole flow rate (l/h)

6No. gas monitoring visits were undertaken at the site from boreholes WS1, WS2 and WS3.

Methane was not recorded during any of the visits. Slightly elevated concentrations of CO_2 were recorded. The maximum CO_2 concentrations, the maximum flow rate and the screening values for the boreholes during the fieldwork period are summarised in the following table:-

Table 9 Calculated GSV

Location	Maximum CO_2 Concentration (% v/v)	Maximum Flow Rate (l/hr)	Gas Screening Value (l/hr)
WS1	3.3	0.2	0.0066
WS2	2.9	0.4	0.0116
WS3	1.9	0.1	0.0019

The ground investigation has identified a maximum carbon dioxide concentration of 3.3% vol. (in WS1) and a worst case flow rate of 0.4 l/hr, giving a maximum GSV of 0.0132 l/h. These values are then compared to Table 2 within BS8485 (2015). Referring to Table 2 of BS8485 (2015), the site can be categorised as a Characteristic Situation 1 (CS1). Gas protection measures are not required. The results of gas monitoring are presented in Appendix E.

12 CONCLUSIONS AND RECOMMENDATIONS

12.1 Land Quality

The Brownfield Consultancy have determined through site investigation, chemical testing and detailed quantitative risk assessment that a risk to future residential end users is not present from recorded concentrations of contaminants at the site. Consequently, remediation is not required. The site is considered suitable for the proposed end use.

A stockpile of soil located in the northern area of the site (denoted Stockpile 2 on the drawing in Appendix A) contains fragments of asbestos. Visual evidence of asbestos roof sheet was recorded in TP17 and TP18 which was subsequently confirmed as *'Chrysotile - hard cement'* in TP17 at 0.10m and *'Chrysotile-Bitumen'* in TP18 at 0.40m. Loose asbestos fibres were not recorded in either sample. We estimate that the stockpile amounts to a volume of approximately 120m^3.

The concentrations of metals and PAH would render this stockpile suitable for re-use provided that the asbestos and any oversize objects were removed by hand picking. Following removal of the asbestos validation testing would be required to demonstrate that the stockpile is free from asbestos. This exercise would be subject to regulatory approval.

Alternatively, the stockpile can be removed to landfill and based upon our visual assessment we consider that a 'non-hazardous' waste classification would be applicable as the content of asbestos within the matrix will be <0.1wt%.

Stockpile 1 and 2 were free from asbestos and again these materials can be reused subject to removing oversized objects.

There is a sceptic tank housing which will require careful removal. The presence of contamination below the sceptic tank cannot be ruled out.

It is possible that additional hotspots of contamination may be encountered during groundworks including additional incidences of asbestos contamination. The principal contractor should contact The Brownfield Consultancy who will attend site and advise on the best course of action in consultation with the Local Planning Authority.

12.2 Gas Protection Measures

The results of 6No. gas monitoring visits has determined that gas protection measures are not required for the development.

Radon gas protection measures are also not required.

12.3 Buried Services

The ground investigation and results of laboratory testing have confirmed that the site is free from contamination at pipework installation depths. Hence there is no requirement for protective pipework. The reader is referred to Section 9.4.

12.4 Soil Disposal and Reuse

The reader is referred to Section 9.4.

12.5 Geotechnical

The reader is referred to Section 10 where the geotechnical conclusions are presented in full.

Prepared and approved by

JIM TWADDLE BSc (Hons) CGeol FGS
Director

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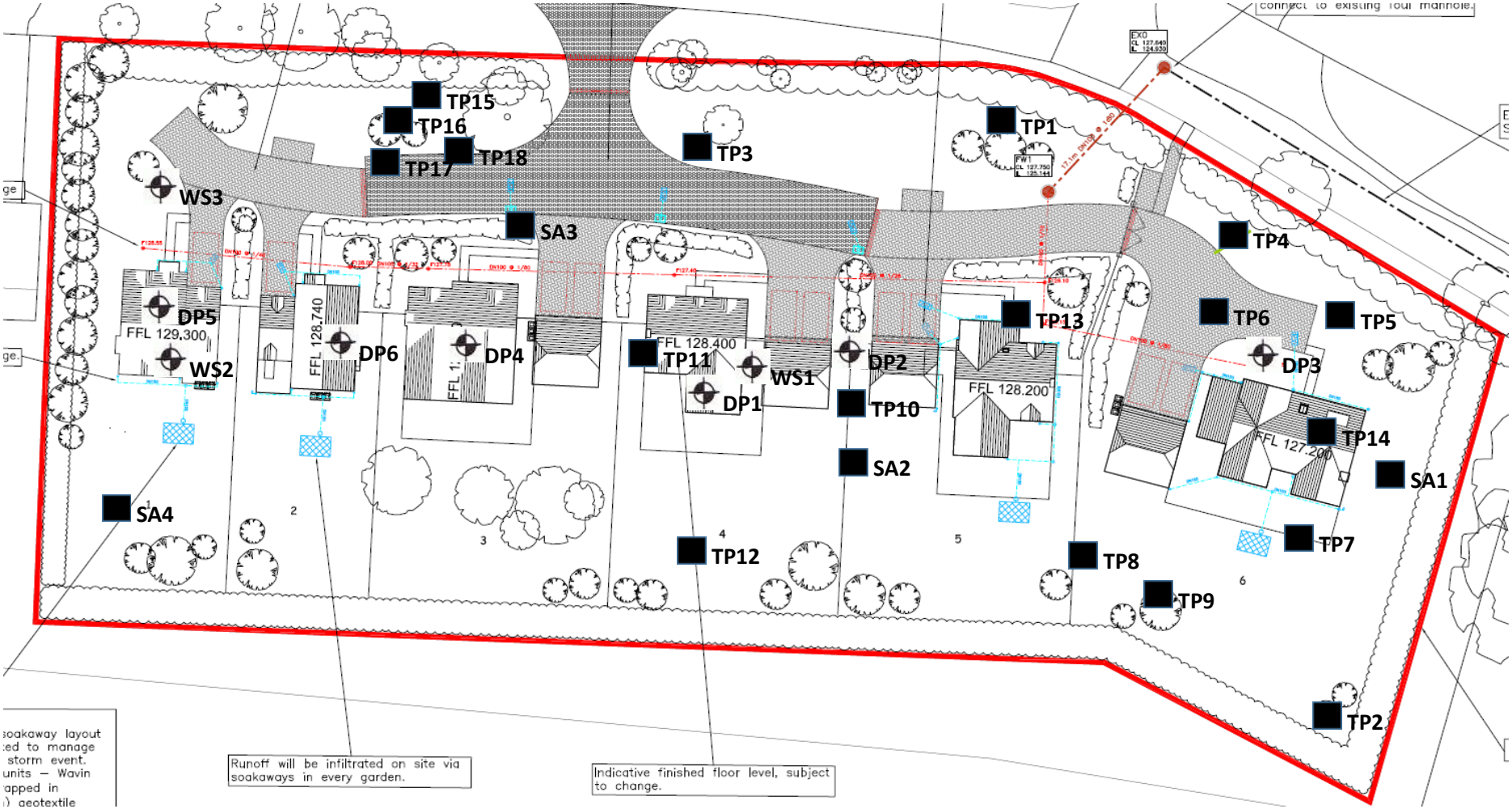
APPENDIX A

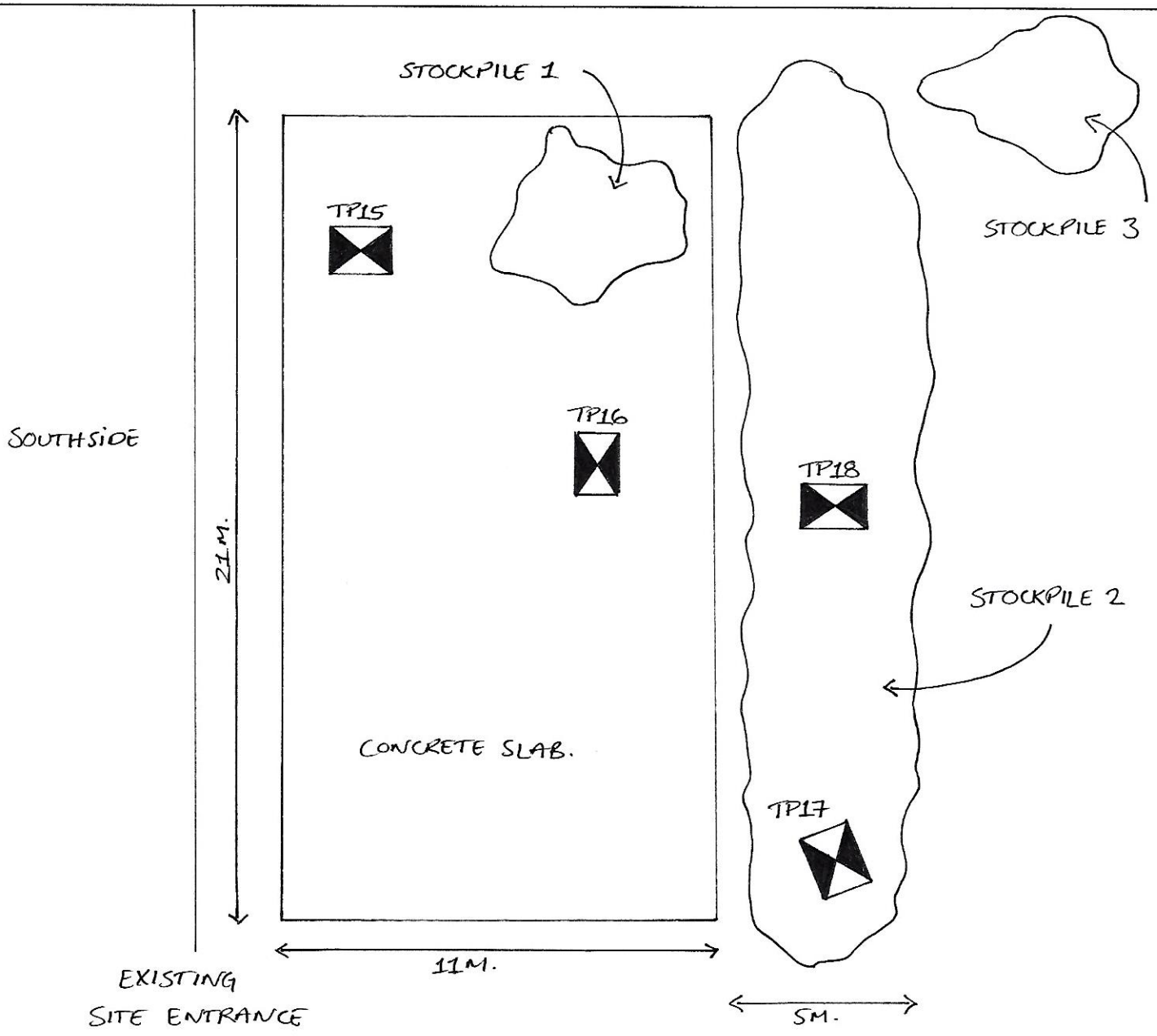
Exploratory Hole Location Plan

STEEPLE ASTON – EXPLORATORY HOLE LOCATION PLAN



Site Location Plan	Sheet: 1 of 1	The Brownfield Consultancy
	Job No: BC340	Mobile : 07852881086
Scale: Not to scale	Date: 13/12/17	www.brownfieldconsultancy.co.uk
Client: Rectory Homes		

Site: Land to the south of Southside, Steeple Aston, Oxfordshire, OX25 4RX



Remarks:

Key:

	Trial Pit		Borehole
MH	Man Hole	G	Gulley
SVP	Soil Vent Pipe		Tree / Bush
RWP	Rain Water Pipe		(approx. ht. in m)

APPENDIX B

Exploratory Hole Logs

Brownfield Consultancy
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

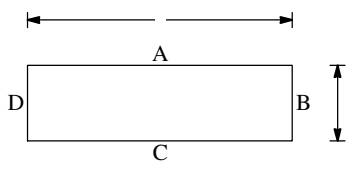
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				**TP1**
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	15-11-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.40			Grass over TOPSOIL. (TOPSOIL)			
0.40-2.20			Brown slightly clayey sandy GRAVEL & COBBLE of subangular and subrounded occasionally tabular limestone. Occasional boulder. (OOLITE GROUP) 1.00 Becoming very sandy below 1.00m.			
2.20-2.40			Firm brown sandy CLAY with abundant shell fragments. (OOLITE GROUP)			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Groundwater not encountered. Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

BROWNFIELD TP STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

Brownfield Consultancy
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

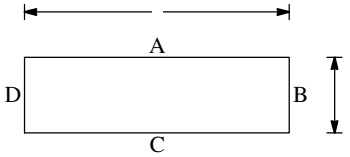
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				**TP2**
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	15-11-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.20			Grass over TOPSOIL. (TOPSOIL)			
0.20-1.00			Buff brown slightly clayey very sandy GRAVEL of subangular and subrounded fine to coarse limestone. (OOLITE GROUP)			
1.00-1.90			Firm brown sandy CLAY with shell fragments. Shell fragments abundant in places. (OOLITE GROUP)			
1.90			No further progress due to encountering bedrock.			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Groundwater not encountered. Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

BROWNFIELD TP STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

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Phone: 07852881086

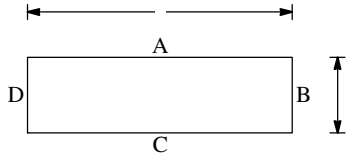
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				TP3
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	15-11-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.20			Black humic TOPSOIL with timber. (MADE GROUND)			
0.20-0.90			Soft brown sandy CLAY. Rare gravel of limestone. (OOLITE GROUP)			
0.90-1.50			Brown slightly clayey sandy GRAVEL & COBBLE of subangular and subrounded occasionally tabular limestone. (OOLITE GROUP)			
1.50-3.00			Firm brown sandy CLAY with abundant shell fragments. (OOLITE GROUP)			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Groundwater not encountered. Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

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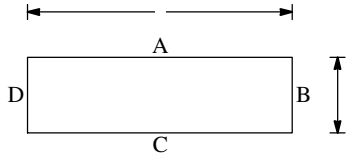
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				TP4
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.30			Grass over TOPSOIL. Roots and rootlets. (TOPSOIL)	0.20	ES	
0.30-1.60			Dark brown becoming light brown at 0.50m slightly clayey very sandy GRAVEL & COBBLE of subangular and angular frequently tabular limestone. (OOLITE GROUP)			
1.60-2.50			Firm and stiff sandy very shelly CLAY. Becoming a very weak shelly mudstone below 2.20m. Fine hair roots of a live appearence to 2.00m.	1.70	D	
2.50			No further progress due to encountering bedrock. Bedrock is a grey calcareous siltstone.			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

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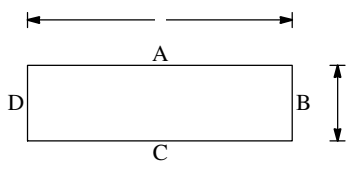
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				**TP5**
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.40			Grass over TOPSOIL. (TOPSOIL)			
0.40-1.40			Brown slightly clayey very sandy GRAVEL & COBBLE of subangular and angular frequently tabular limestone. (OOLITE GROUP)			
			1.00 Live rootlets to 1.00m.	1.00	ES	
1.40-2.20			Stiff brown very sandy shelly CLAY. (OOLITE GROUP)			
2.20-2.30			Hard LIMESTONE. Recovered as tabular COBBLE & BOULDER of tabular blue limestone.			
2.30			No further progress due to encountering hard bedrock.			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

BROWNFIELD TP STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

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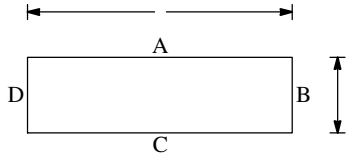
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				TP6
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.20			Grass over TOPSOIL. (TOPSOIL)			
0.20-1.60			Brown slightly clayey very sandy GRAVEL & COBBLE of subangular and angular frequently tabular limestone. (OOLITE GROUP)	1.20	ES	
1.60-2.00			Very stiff brown sandy very shelly CLAY. Fine hair roots of a live appearance. (OOLITE GROUP)			
2.00-2.60			Very stiff light brown sandy locally very sandy shelly CLAY with mudstone lithorelics. Grading into a very weak shelly mudstone. (OOLITE GROUP)	2.00	D	
2.60			No further progress due to encountering bedrock.			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

Brownfield Consultancy
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Phone: 07852881086

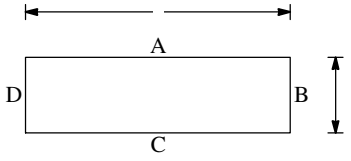
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				TP7
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.30			Grass over soft brown sandy gravelly CLAY with rootlets. (TOPSOIL)	0.10	ES	
0.30-1.50			Brown slightly clayey very sandy GRAVEL & COBBLE of subangular and angular frequently tabular limestone. (OOLITE GROUP)			
1.50-2.00			Stiff brown sandy shelly locally very shelly CLAY. (OOLITE GROUP)	1.60	D	
2.00-2.60			Very stiff light brown sandy locally very sandy shelly CLAY with mudstone lithorelics. Grading into a very weak shelly mudstone. (OOLITE GROUP)	2.30	D	
2.60			No further progress due to encountering bedrock.			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

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Fenny Compton, CV47 2YF
Phone: 07852881086

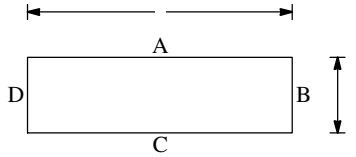
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				**TP8**
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.20			Grass over TOPSOIL. Roots and rootlets. (TOPSOIL)	0.10	ES	
0.20-0.70			Brown clayey sandy GRAVEL & COBBLE of subangular and angular frequently tabular limestone. (OOLITE GROUP)	0.50	ES	
0.70-1.30			Firm brown and buff brown sandy gravelly shelly CLAY. Gravel is subangular fine to medium limestone. (OOLITE GROUP)	0.75	D	
1.30-2.40			Firm brown sandy slightly gravelly slightly shelly CLAY. Gravel is subangular fine to coarse limestone. (OOLITE GROUP)	1.30	D	
				1.60	HV	90kPa
				2.30	D	
2.40			No further progress due to encountering bedrock.			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

BROWNFIELD TP STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

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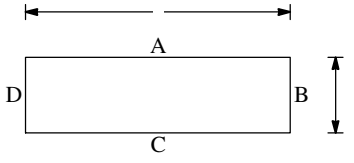
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				**TP9**
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.20			Grass over TOPSOIL. Roots and rootlets. (TOPSOIL)			
0.20-1.00			Brown clayey sandy GRAVEL & COBBLE of subangular and angular frequently tabular limestone. (OOLITE GROUP)			
1.00-1.20			Firm brown and buff brown sandy gravelly shelly CLAY. Gravel is subangular fine to medium limestone. (OOLITE GROUP)			
1.20			Trial Pit terminated.			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

BROWNFIELD TP STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

Brownfield Consultancy
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

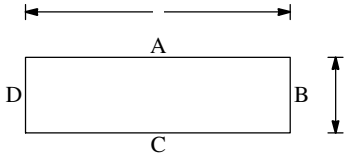
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				**TP10**
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.20			Grass over TOPSOIL. Roots and rootlets. (TOPSOIL)	0.10	ES	
0.20-1.40			Brown clayey sandy GRAVEL & COBBLE of subangular and angular frequently tabular limestone. (OOLITE GROUP)	0.85	ES	
1.40-2.40			Soft becoming firm at 2.10m very sandy shelly CLAY. (OOLITE GROUP)	1.60	HV	35kPa
				2.00	HV	45kPa
2.40-2.50			Very soft orange brown very sandy slightly shelly SILT/CLAY. (OOLITE GROUP)	2.45	D	
2.50			No further progress due to encountering bedrock.			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

Brownfield Consultancy
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

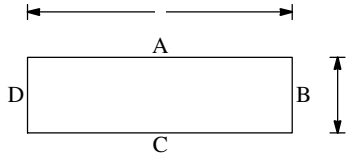
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				TP11
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.30			Grass over TOPSOIL. Roots and rootlets. (TOPSOIL)			
0.30-0.50			Soft brown slightly sandy slightly shelly CLAY. Fine hair roots. (OOLITE GROUP)			
0.50-0.90			Buff brown clayey locally very clayey sandy GRAVEL of subangular fine to coarse limestone. (OOLITE GROUP)			
0.90-2.40			Stiff buff brown very sandy shelly locally very shelly CLAY. (OOLITE GROUP)	1.60	D	
			1.80 - 2.40 Very hard digging. Becoming pale grey.			
2.40			No further progress due to encountering bedrock.			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

Brownfield Consultancy
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

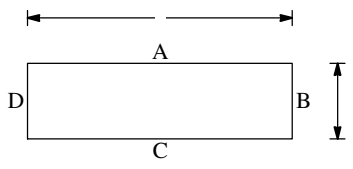
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				TP12
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.20			Grass over TOPSOIL. Roots and rootlets. (TOPSOIL)			
0.20-0.60			Soft brown slightly sandy slightly shelly gravelly CLAY. Gravel is subanagular fine to medium limestone. Fine hair roots. (OOLITE GROUP)	0.45 0.50	ES D	
0.60-1.90			Buff brown clayey locally very clayey sandy GRAVEL of subangular fine to coarse limestone. Infrequent horizons of friable shelly mudstone and firm shelly clay. (OOLITE GROUP)			
1.90-2.10			Brown poorly laminated shelly MUDSTONE. (OOLITE GROUP)			
2.10			No further progress due to encountering bedrock.			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

BROWNFIELD TP STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

Brownfield Consultancy
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

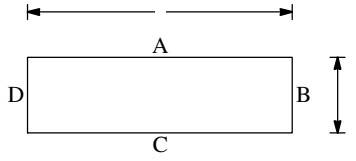
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				TP13
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.10			Grass over TOPSOIL. Roots and rootlets. (TOPSOIL)			
0.10-0.30			Soft brown slightly sandy CLAY. Rare fine to medium subangular limestone gravel. (OOLITE GROUP)			
0.30-1.20			Brown clayey sandy GRAVEL & COBBLE of subangular and angular frequently tabular limestone. (OOLITE GROUP)			
1.20-1.60			Firm buff brown and brown very sandy very gravelly CLAY. Gravel is subangular fine to coarse limestone. Locally a clayey sandy gravel. (OOLITE GROUP)	1.30	B	
1.60-1.90			Horizon of blue LIMESTONE. Recovered as boulders. (OOLITE GROUP)			
1.90-2.50			Firm locally stiff brown sandy very shelly CLAY. (OOLITE GROUP)			
2.50			No further progress due to encountering bedrock.			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

Brownfield Consultancy
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

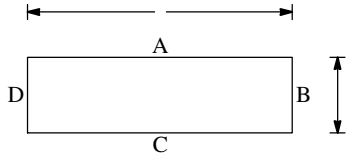
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				**TP14**
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.20			Grass over TOPSOIL. Roots and rootlets. (TOPSOIL)			
0.20-1.50			Dark brown becoming light brown at 0.50m slightly clayey very sandy GRAVEL & COBBLE of subangular and angular frequently tabular limestone. Roots and rootlets. (OOLITE GROUP)			
1.50-2.50			Firm brown very sandy very shelly CLAY. (OOLITE GROUP)			
				2.45	HV	50kPa
2.50			No further progress due to encountering bedrock.			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

BROWNFIELD TP STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

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Fenny Compton, CV47 2YF
Phone: 07852881086

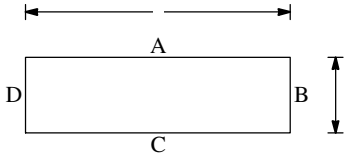
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				TP15
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.10			CONCRETE. (MADE GROUND)			
0.10-0.35			Dark grey slightly sandy slightly gravelly CLAY. Gravel is subangular fine to medium red brick. Buried Topsoil. (MADE GROUND)	0.20	ES	
0.35-0.60			Firm brown sandy CLAY. (OOLITE GROUP)			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

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The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

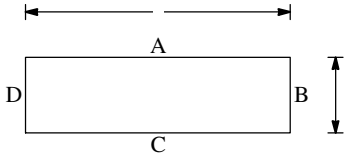
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				TP16
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.10			CONCRETE. (MADE GROUND)			
0.10-0.37			Loose red and brown sandy GRAVEL & COBBLE of angular and subangular red brick and concrete. (MADE GROUND)	0.20	ES	
0.37-0.60			Firm brown sandy CLAY. (OOLITE GROUP)			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

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Fenny Compton, CV47 2YF
Phone: 07852881086

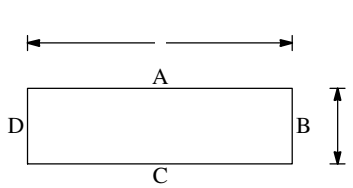
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				TP17
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.40			Loose brown and grey clayey locally very clayey slightly sandy GRAVEL & COBBLE of brick, concrete slab, tile and occasional pieces of breeze block. Pockets of soft brown clay. 2 pieces of suspected asbestos roofing sheet. (MADE GROUND)	0.10 0.30	ES ES	
0.40-0.60			Dark grey slightly sandy slightly gravelly CLAY. Gravel is subangular fine to medium red brick. Buried Topsoil. (MADE GROUND)			
0.60-0.90			Firm brown sandy CLAY. (OOLITE GROUP)			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Trial pit excavated into the western area of the stockpile near to the site entrance. Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

Brownfield Consultancy
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

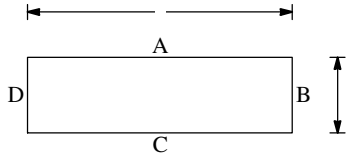
TRIAL PIT LOG

The Brownfield Consultancy

Project				TRIAL PIT No
Southside, Steeple Aston				**TP18**
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	13-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.60			Fill comprising slightly sandy slightly gravelly and cobbly CLAY and TOPSOIL. Whole and half bricks, plastic sheeting, geotextile. Suspected asbestos containing roof sheet fragments. Rare pieces of slate. (MADE GROUND)	0.40	ES	
0.60-0.80			Dark grey slightly sandy slightly gravelly CLAY. Gravel is subangular fine to medium limestone. Buried Topsoil. (MADE GROUND)			
0.80-1.00			Firm brown sandy CLAY. (OOLITE GROUP)			

Shoring/Support:
Stability: Sides stable.



GENERAL REMARKS

Trial pit excavated into the eastern area of the stockpile near to the site entrance. Backfilled with arisings.

All dimensions in metres Scale 1:25	Client Rectory Homes Ltd	Method/ Plant Used JCB 3CX	Logged By JT

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The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

BOREHOLE LOG

The Brownfield Consultancy

Project				BOREHOLE No
Southside, Steeple Aston				WS1
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	14-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

SAMPLES & TESTS			Water	STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION			
						0.10	Grass over TOPSOIL. (TOPSOIL)			
						(0.40) 0.50	Stiff brown sandy CLAY. (OOLITE GROUP)			
						(0.50) 1.00	Brown slightly clayey slightly sandy GRAVEL & COBBLE of subangular limestone. (OOLITE GROUP)			
1.00 1.00	D	N18 10,7/ 5,5,4,4				(0.40) 1.40	Medium dense buff brown very clayey SAND. (OOLITE GROUP)			
						1.50	Firm buff brown very sandy slightly gravelly CLAY. Gravel is subangular fine to medium limestone. (OOLITE GROUP)			
						1.55	Shattered gravel and cobble of LIMESTONE. (OOLITE GROUP)			
2.00 2.00	D	N23 4,5/ 5,6,5,7				(1.05) 2.60	Very stiff brown sandy locally very sandy shelly CLAY. Poorly laminated. Orange staining along laminated surfaces. Grading at depth into a very shelly weak mudstone. (OOLITE GROUP)			
2.60		N50/20mm 25,25/ 50					No further progress. CPT driven.			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	Gas and groundwater monitoring pipework installed.

All dimensions in metres Scale 1:50	Client Rectory Homes Ltd	Method/ Plant Used Dynamic Sampling Rig	Logged By JT

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The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

BOREHOLE LOG

The Brownfield Consultancy

Project				BOREHOLE No
Southside, Steeple Aston				WS2
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	14-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
0.10	ES					0.20	Grass over TOPSOIL. (TOPSOIL)		
						0.50	Stiff dark brown very sandy slightly shelly CLAY. (OOLITE GROUP)		
1.00	D						Stiff light brown very sandy shelly CLAY. (OOLITE GROUP)		
1.00	ES					(1.50)			
1.00		N53 2,3/ 6,16,25,6							
						2.00			
2.00		N15 3,3/ 3,3,4,5	▼1			(0.50)	Very stiff dark grey very sandy shelly CLAY. Locally a clayey sand. (OOLITE GROUP)		
						2.50			
2.40	ES						Stiff dark grey and brown mottled very sandy CLAY. (OOLITE GROUP) 2.50 Strata wet.		
3.00	D					(1.00)			
3.00		N19 4,3/ 3,5,6,5							
						3.50			
							Medium dense light grey slightly silty fine SAND. (OOLITE GROUP)		
						(0.95)			
4.00		N30 8,8/ 8,7,8,7							
						4.45			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	Gas and groundwater monitoring pipework installed.

All dimensions in metres Scale 1:50	Client Rectory Homes Ltd	Method/ Plant Used Dynamic Sampling Rig	Logged By JT

BROWNFIELD DS LOG STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

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Fenny Compton, CV47 2YF
Phone: 07852881086

BOREHOLE LOG

The Brownfield Consultancy

Project				BOREHOLE No
Southside, Steeple Aston				WS3
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	14-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
						0.30	Grass over TOPSOIL. (TOPSOIL)		
						0.50	Stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular fine to medium limestone. (OOLITE GROUP)		
0.50	HV	80kPa					Stiff buff brown very sandy shelly CLAY. Locally very shelly. (OOLITE GROUP)		
1.00	D					(1.00)			
1.00		N15 2,3/ 3,4,5,3							
1.50		N50/220mm 9,25/ 27,14,9				1.50	No further progress. CPT driven.		

Boring Progress and Water Observations						Chiselling			Water Added	
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To

GENERAL REMARKS

Gas and groundwater monitoring pipework installed.

All dimensions in metres Scale 1:50	Client Rectory Homes Ltd	Method/ Plant Used Dynamic Sampling Rig	Logged By JT

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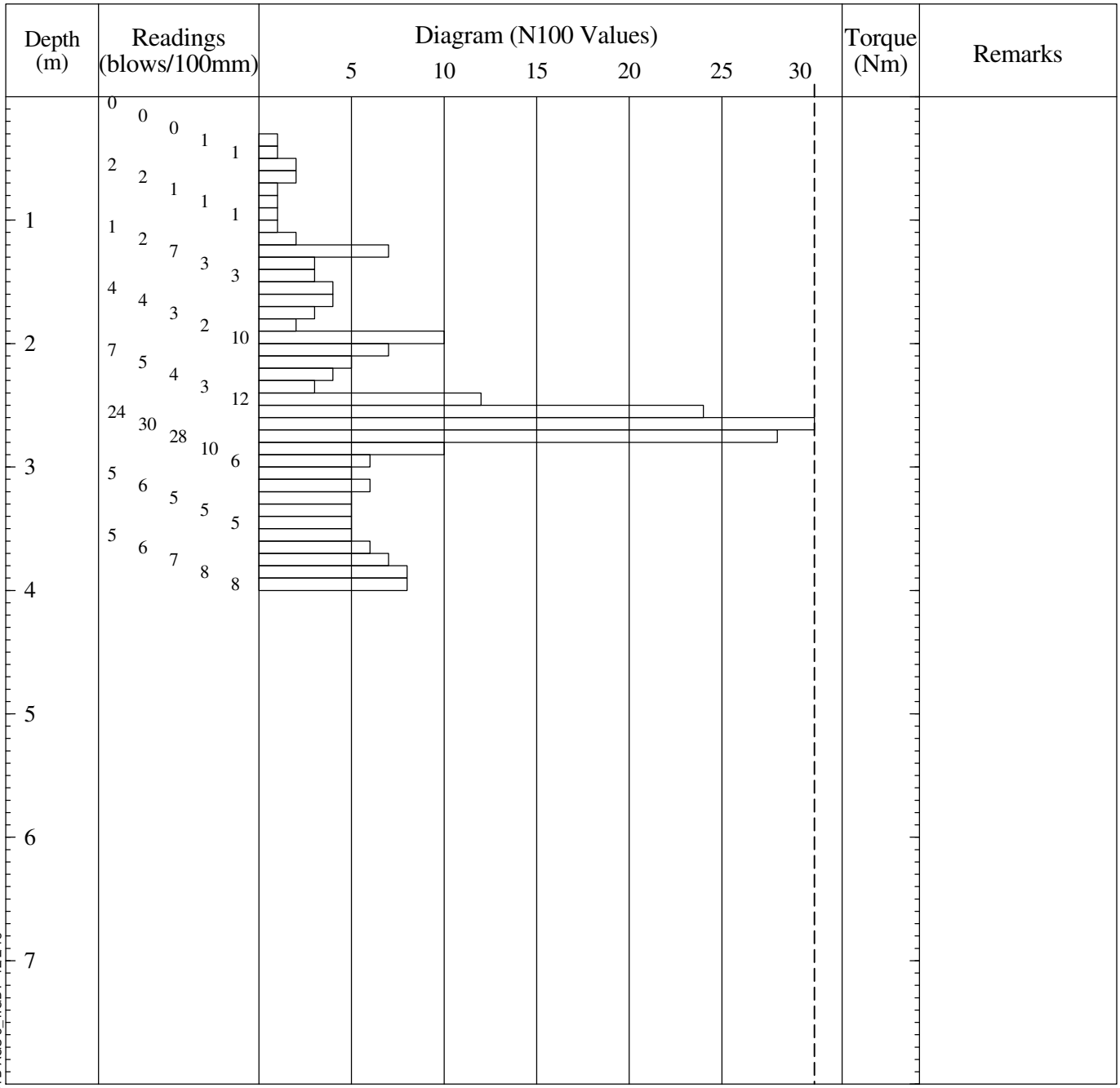
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

DYNAMIC PROBE LOG

The Brownfield Consultancy

Project				PROBE No
Southside, Steeple Aston				DP1
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	14-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1



Hammer Wt (kg)	63.5
Hammer Drop (mm)	760
Cone Dia (mm)	50.5
Cone Type	Fixed
Damper	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client Rectory Homes Ltd	Method/ Plant Used Dynamic Sampling Rig	Logged By JT

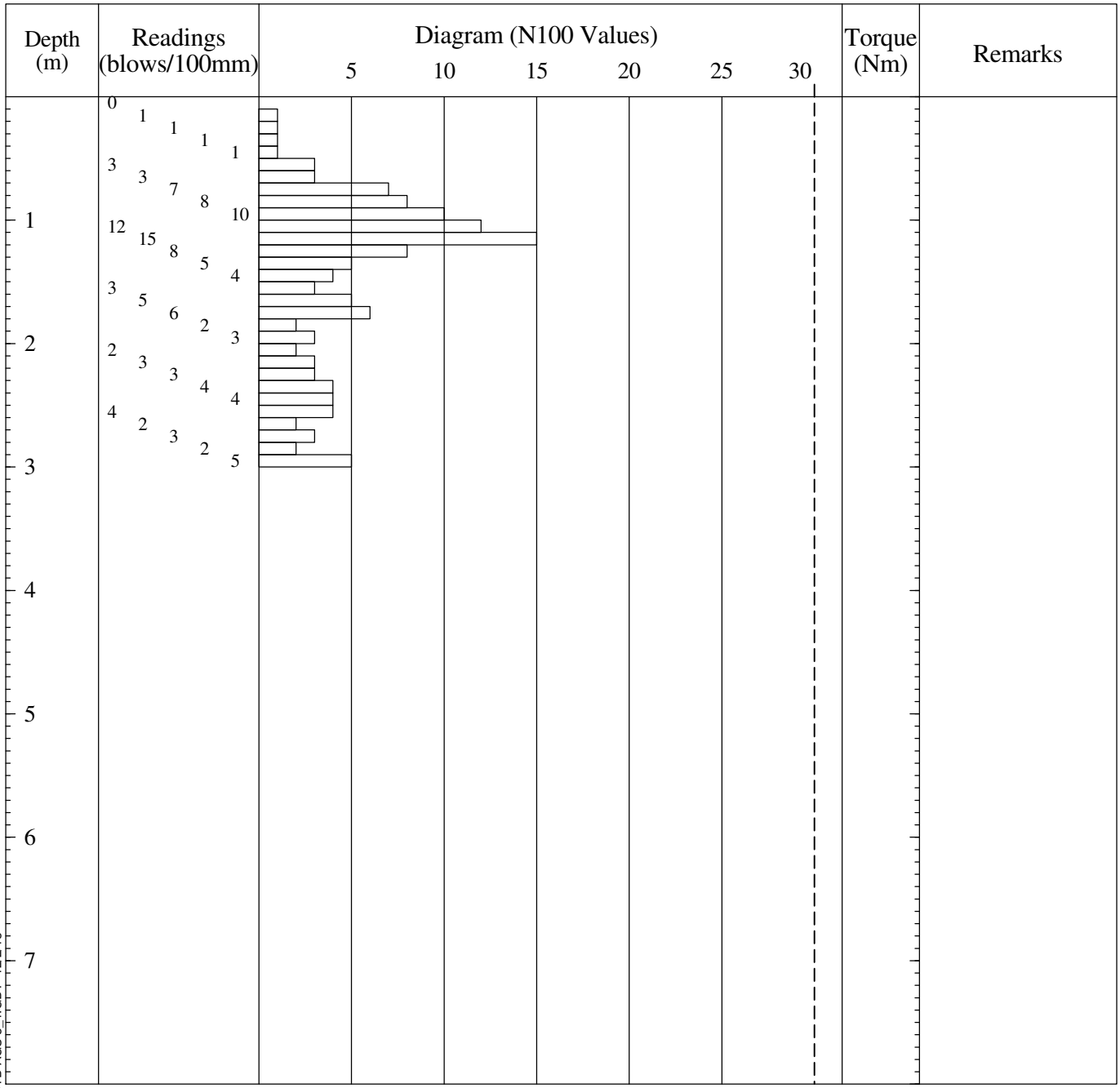
BROWNFIELD DP LOG STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

Brownfield Consultancy
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

DYNAMIC PROBE LOG

The Brownfield Consultancy

Project				PROBE No
Southside, Steeple Aston				DP2
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	14-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1



Hammer Wt (kg)	63.5
Hammer Drop (mm)	760
Cone Dia (mm)	50.5
Cone Type	Fixed
Damper	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client Rectory Homes Ltd	Method/ Plant Used Dynamic Sampling Rig	Logged By JT

BROWNFIELD DP LOG STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

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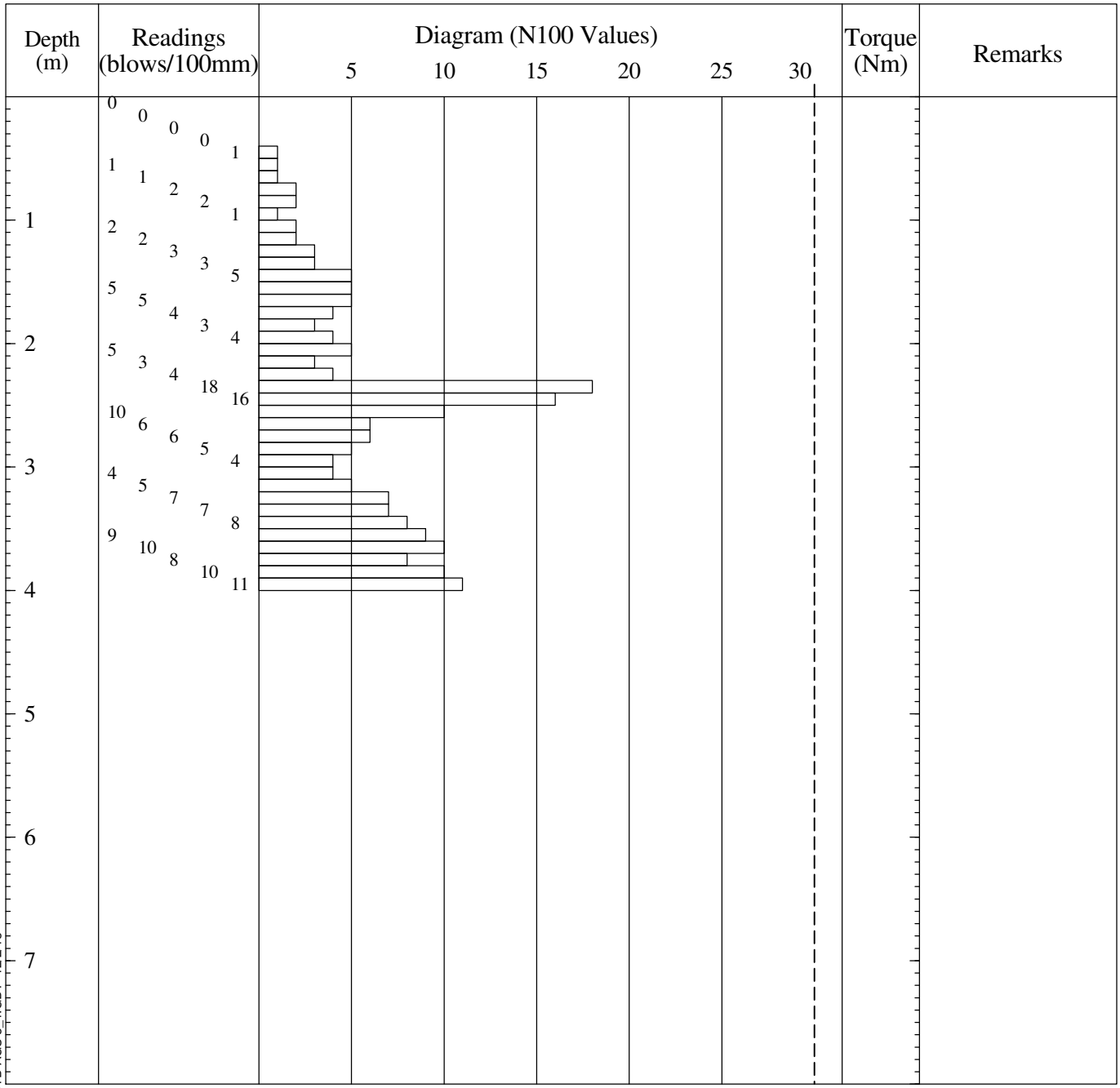
Fenny Compton, CV47 2YF
Phone: 07852881086

DYNAMIC PROBE LOG

The Brownfield Consultancy

Project				PROBE No
Southside, Steeple Aston				DP3
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	14-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1



Hammer Wt (kg)	63.5
Hammer Drop (mm)	760
Cone Dia (mm)	50.5
Cone Type	Fixed
Damper	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client Rectory Homes Ltd	Method/ Plant Used Dynamic Sampling Rig	Logged By JT

BROWNFIELD DP LOG STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

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Fenny Compton, CV47 2YF
Phone: 07852881086

DYNAMIC PROBE LOG

The Brownfield Consultancy

Project				PROBE No
Southside, Steeple Aston				DP4
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	14-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

Depth (m)	Readings (blows/100mm)	Diagram (N100 Values)	Torque (Nm)	Remarks
0.00	0			
0.10	0			
0.20	0			
0.30	0			
0.40	0			
0.50	0			
0.60	1			
0.70	0			
0.80	1			
0.90	1			
1.00	2			
1.10	1			
1.20	3			
1.30	11			
1.40	50			
1.50	50			

Diagram (N100 Values): 5, 10, 15, 20, 25, 30

Hammer Wt (kg)	63.5
Hammer Drop (mm)	760
Cone Dia (mm)	50.5
Cone Type	Fixed
Damper	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client Rectory Homes Ltd	Method/ Plant Used Dynamic Sampling Rig	Logged By JT

BROWNFIELD DP LOG STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

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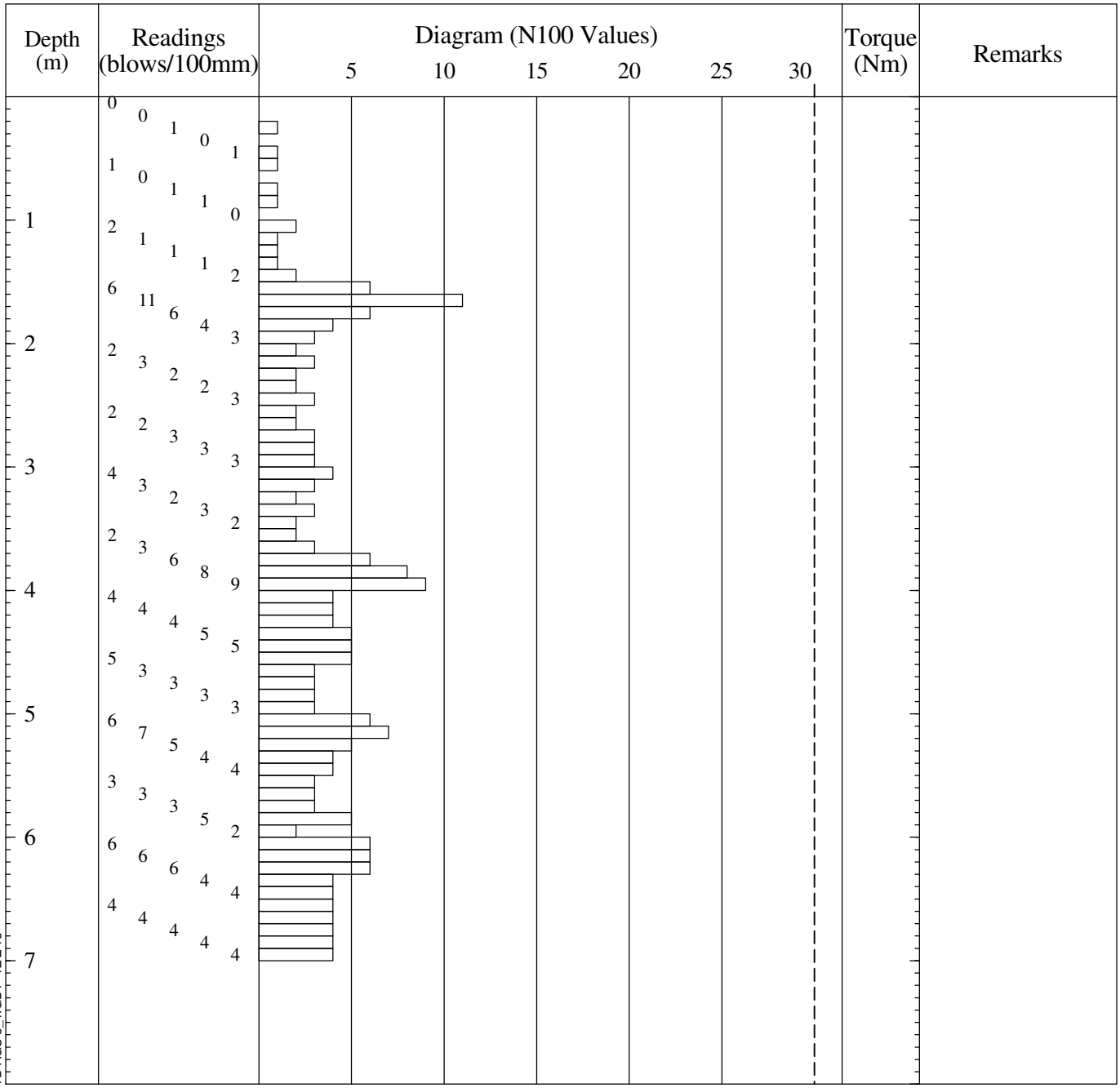
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

DYNAMIC PROBE LOG

The Brownfield Consultancy

Project				PROBE No
Southside, Steeple Aston				DP5
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	14-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1



Hammer Wt (kg)	63.5
Hammer Drop (mm)	760
Cone Dia (mm)	50.5
Cone Type	Fixed
Damper	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client Rectory Homes Ltd	Method/ Plant Used Dynamic Sampling Rig	Logged By JT

BROWNFIELD DP LOG STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

Brownfield Consultancy
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

DYNAMIC PROBE LOG

The Brownfield Consultancy

Project				PROBE No
Southside, Steeple Aston				DP6
Job No	Date	Ground Level (m)	Co-Ordinates ()	
BC340	14-12-17			
Contractor				Sheet
Brownfield Consultancy Ltd				1 of 1

Depth (m)	Readings (blows/100mm)	Diagram (N100 Values)	Torque (Nm)	Remarks
1	0 0 1 1 1 1 0 1 0 1 1 4 2 7 9 50	5 10 15 20 25 30 — 50		
2				
3				
4				
5				
6				
7				

Hammer Wt (kg)	63.5
Hammer Drop (mm)	760
Cone Dia (mm)	50.5
Cone Type	Fixed
Damper	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client Rectory Homes Ltd	Method/ Plant Used Dynamic Sampling Rig	Logged By JT

BROWNFIELD DP LOG STEEP LOGS.GPJ GINT STD AGS 3_1.GDT 12/2/18

APPENDIX C

Chemical Laboratory Results

Jim Twaddle
The Brownfield Consultancy
Woodstock
Memorial Road
Fenny Compton
Warwickshire
CV47 2XU

e: jim.twaddle@brownfieldconsultancy.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 17-71017

Project / Site name:	Steeple Aston	**Samples received on:**	15/12/2017
Your job number:	BC340	**Samples instructed on:**	15/12/2017
Your order number:		**Analysis completed by:**	28/12/2017
Report Issue Number:	1	**Report issued on:**	28/12/2017
Samples Analysed:	1 bulk sample - 21 soil samples		

Signed: [redacted]

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Analytical Report Number: 17-71017

Project / Site name: Steeple Aston

Lab Sample Number				877644	877645	877646	877647	877648
Sample Reference				TP4	TP5	TP6	TP7	TP8
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	1.00	1.20	0.10	0.10
Date Sampled				13/12/2017	13/12/2017	13/12/2017	13/12/2017	13/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	18	13	6.6	15	19
Total mass of sample received	kg	0.001	NONE	0.41	0.45	0.39	0.40	0.46
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	Not-detected	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	-	8.7	-	-
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	0.134	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	0.014	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	13.5	-	-
Total Sulphur	%	0.005	MCERTS	-	-	0.053	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	-	-	12	15
Boron (water soluble)	mg/kg	0.2	MCERTS	1.3	-	-	1.7	1.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	-	-	-	-	-
Chromium (III)	mg/kg	1	NONE	-	-	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	-	-	16	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	21	-	-	14	15
Lead (aqua regia extractable)	mg/kg	1	MCERTS	32	-	-	26	29
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	13	-	-	9.8	13
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	48	-	-	38	45

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Project / Site name: Steeple Aston

Lab Sample Number				877644	877645	877646	877647	877648
Sample Reference				TP4	TP5	TP6	TP7	TP8
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	1.00	1.20	0.10	0.10
Date Sampled				13/12/2017	13/12/2017	13/12/2017	13/12/2017	13/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	-	-	-	-	-
TPH5 (C6 - C10)	mg/kg	0.1	MCERTS	-	< 0.1	-	-	-
TPH5 (C10 - C20)	mg/kg	10	MCERTS	-	< 10	-	-	-
TPH5 (C20 - C30)	mg/kg	10	NONE	-	< 10	-	-	-
TPH5 (C30 - C40)	mg/kg	10	NONE	-	< 10	-	-	-
TPH5 (C6 - C40)	mg/kg	10	NONE	-	< 10	-	-	-
Pesticide and Herbicide Screen								
Pesticides/Herbicides Screen in Soil	P/A	N/A	NONE	-	-	-	-	-

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Project / Site name: Steeple Aston

Lab Sample Number				877649	877650	877651	877652	877653
Sample Reference				TP8	TP10	TP10	TP12	TP12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.10	0.85	0.45	0.50
Date Sampled				13/12/2017	13/12/2017	13/12/2017	13/12/2017	13/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	8.3	26	12	17	15
Total mass of sample received	kg	0.001	NONE	0.17	0.32	0.43	0.38	1.0
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	-	8.5	-	8.5
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	0.140	-	0.144
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	0.0065	-	0.0074
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	6.5	-	7.4
Total Sulphur	%	0.005	MCERTS	-	-	0.051	-	0.051
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Pyrene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Chrysene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	< 0.80	< 0.80	-	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.4	13	-	15	-
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	2.6	-	1.1	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	-	< 0.2	-
Chromium (hexavalent)	mg/kg	4	MCERTS	-	-	-	-	-
Chromium (III)	mg/kg	1	NONE	-	-	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	7.2	23	-	26	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	5.8	26	-	13	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	4.0	32	-	17	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	4.2	15	-	15	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	13	56	-	38	-

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Project / Site name: Steeple Aston

Lab Sample Number				877649	877650	877651	877652	877653
Sample Reference				TP8	TP10	TP10	TP12	TP12
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.10	0.85	0.45	0.50
Date Sampled				13/12/2017	13/12/2017	13/12/2017	13/12/2017	13/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	-	-	-	-	-
TPH5 (C6 - C10)	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH5 (C10 - C20)	mg/kg	10	MCERTS	-	-	-	-	-
TPH5 (C20 - C30)	mg/kg	10	NONE	-	-	-	-	-
TPH5 (C30 - C40)	mg/kg	10	NONE	-	-	-	-	-
TPH5 (C6 - C40)	mg/kg	10	NONE	-	-	-	-	-
Pesticide and Herbicide Screen								
Pesticides/Herbicides Screen in Soil	P/A	N/A	NONE	-	-	-	-	-

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Project / Site name: Steeple Aston

Lab Sample Number				877654	877655	877656	877657	877658
Sample Reference				TP13	Stockpile 1	TP15	TP16	TP17
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.30-1.40	1.00	0.20	0.20	0.30
Date Sampled				13/12/2017	13/12/2017	13/12/2017	13/12/2017	13/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	-	< 0.1
Moisture Content	%	N/A	NONE	12	16	16	-	20
Total mass of sample received	kg	0.001	NONE	1.1	1.7	1.3	-	1.1
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.6	8.4	-	-	-
Total Sulphate as SO_4	%	0.005	MCERTS	0.092	-	-	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	290	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0082	0.14	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	8.2	143	-	-	-
Total Sulphur	%	0.005	MCERTS	0.033	-	-	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	< 0.80	-	-	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	14	19	-	16
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	7.8	-	1.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	-	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	-	< 4.0	-	-	-
Chromium (III)	mg/kg	1	NONE	-	14	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	14	23	-	30
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	15	52	-	18
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	15	82	-	36
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	13	26	-	22
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	< 1.0	-	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	49	150	-	91

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Lab Sample Number				877654	877655	877656	877657	877658
Sample Reference				TP13	Stockpile 1	TP15	TP16	TP17
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.30-1.40	1.00	0.20	0.20	0.30
Date Sampled				13/12/2017	13/12/2017	13/12/2017	13/12/2017	13/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	-	< 10	-	-	-
TPH5 (C6 - C10)	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH5 (C10 - C20)	mg/kg	10	MCERTS	-	-	-	-	-
TPH5 (C20 - C30)	mg/kg	10	NONE	-	-	-	-	-
TPH5 (C30 - C40)	mg/kg	10	NONE	-	-	-	-	-
TPH5 (C6 - C40)	mg/kg	10	NONE	-	-	-	-	-
Pesticide and Herbicide Screen								
Pesticides/Herbicides Screen in Soil	P/A	N/A	NONE	-	-	-	-	-

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Project / Site name: Steeple Aston

Lab Sample Number				877659	877660	877661	877662	877663
Sample Reference				TP18	Stockpile 3	TP7	WS2	WS2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.30	1.60	0.10	1.00
Date Sampled				13/12/2017	13/12/2017	13/12/2017	14/12/2017	14/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	20	20	13	27	18
Total mass of sample received	kg	0.001	NONE	1.3	0.42	1.2	0.39	0.43
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile-Bitumen	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	-	-	-
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.1	-	8.5	-	-
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	0.083	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	64	-	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.032	-	0.0057	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	32.0	-	5.7	-	-
Total Sulphur	%	0.005	MCERTS	-	-	0.033	-	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	-	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	16	-	14	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	1.3	-	1.8	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	-	< 0.2	-
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	-	-	-	-
Chromium (III)	mg/kg	1	NONE	28	-	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	29	25	-	26	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	17	17	-	16	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	29	36	-	27	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	17	-	17	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	72	89	-	49	-

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Project / Site name: Steeple Aston

Lab Sample Number				877659	877660	877661	877662	877663
Sample Reference				TP18	Stockpile 3	TP7	WS2	WS2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.30	1.60	0.10	1.00
Date Sampled				13/12/2017	13/12/2017	13/12/2017	14/12/2017	14/12/2017
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	< 10	-	-	-	-
TPH5 (C6 - C10)	mg/kg	0.1	MCERTS	-	-	-	-	-
TPH5 (C10 - C20)	mg/kg	10	MCERTS	-	-	-	-	-
TPH5 (C20 - C30)	mg/kg	10	NONE	-	-	-	-	-
TPH5 (C30 - C40)	mg/kg	10	NONE	-	-	-	-	-
TPH5 (C6 - C40)	mg/kg	10	NONE	-	-	-	-	-
Pesticide and Herbicide Screen								
Pesticides/Herbicides Screen in Soil	P/A	N/A	NONE	-	-	-	Absent	-

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Project / Site name: Steeple Aston

Lab Sample Number				877664				
Sample Reference				WS2				
Sample Number				None Supplied				
Depth (m)				2.40				
Date Sampled				14/12/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	20				
Total mass of sample received	kg	0.001	NONE	0.36				
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-				
Asbestos in Soil	Type	N/A	ISO 17025	-				
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.3				
Total Sulphate as SO_4	%	0.005	MCERTS	0.100				
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.016				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	15.7				
Total Sulphur	%	0.005	MCERTS	0.040				
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-				
Acenaphthylene	mg/kg	0.05	MCERTS	-				
Acenaphthene	mg/kg	0.05	MCERTS	-				
Fluorene	mg/kg	0.05	MCERTS	-				
Phenanthrene	mg/kg	0.05	MCERTS	-				
Anthracene	mg/kg	0.05	MCERTS	-				
Fluoranthene	mg/kg	0.05	MCERTS	-				
Pyrene	mg/kg	0.05	MCERTS	-				
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-				
Chrysene	mg/kg	0.05	MCERTS	-				
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-				
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-				
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-				
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-				
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-				
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-				
Boron (water soluble)	mg/kg	0.2	MCERTS	-				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-				
Chromium (hexavalent)	mg/kg	4	MCERTS	-				
Chromium (III)	mg/kg	1	NONE	-				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-				

Analytical Report Number: 17-71017

Project / Site name: Steeple Aston

Lab Sample Number				877664				
Sample Reference				WS2				
Sample Number				None Supplied				
Depth (m)				2.40				
Date Sampled				14/12/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	-				
TPH5 (C6 - C10)	mg/kg	0.1	MCERTS	-				
TPH5 (C10 - C20)	mg/kg	10	MCERTS	-				
TPH5 (C20 - C30)	mg/kg	10	NONE	-				
TPH5 (C30 - C40)	mg/kg	10	NONE	-				
TPH5 (C6 - C40)	mg/kg	10	NONE	-				
Pesticide and Herbicide Screen								
Pesticides/Herbicides Screen in Soil	P/A	N/A	NONE	-				

Analytical Report Number: 17-71017

Project / Site name: Steeple Aston

Lab Sample Number				877665				
Sample Reference				TP17				
Sample Number				None Supplied				
Depth (m)				0.10				
Date Sampled				13/12/2017				
Time Taken				None Supplied				
Analytical Parameter (Bulk Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Asbestos Identification Name	Type	N/A	ISO 17025	Chrysotile-Hard/Cement Type Material				

Analytical Report Number : 17-71017

Project / Site name: Steeple Aston

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
877644	TP4	None Supplied	0.20	Light brown clay and sand with gravel and vegetation.
877645	TP5	None Supplied	1.00	Light brown clay and sand.
877646	TP6	None Supplied	1.20	Light brown clay and sand with gravel.
877647	TP7	None Supplied	0.10	Brown loam and clay with gravel and vegetation.
877648	TP8	None Supplied	0.10	Brown loam and clay with vegetation.
877649	TP8	None Supplied	0.50	Light brown clay and sand with vegetation.
877650	TP10	None Supplied	0.10	Brown loam and clay with vegetation.
877651	TP10	None Supplied	0.85	Light brown clay and sand with rubble.
877652	TP12	None Supplied	0.45	Brown clay.
877653	TP12	None Supplied	0.50	Brown clay.
877654	TP13	None Supplied	1.30-1.40	Light brown clay.
877655	Stockpile 1	None Supplied	1.00	Brown clay and sand with gravel.
877656	TP15	None Supplied	0.20	Brown clay and sand with rubble and gravel
877657	TP16	None Supplied	0.20	-
877658	TP17	None Supplied	0.30	Brown clay with vegetation.
877659	TP18	None Supplied	0.40	Brown clay and loam with gravel.
877660	Stockpile 3	None Supplied	0.30	Brown loam and clay with vegetation.
877661	TP7	None Supplied	1.60	Light brown clay.
877662	WS2	None Supplied	0.10	Brown loam and clay with vegetation.
877663	WS2	None Supplied	1.00	Light brown clay with vegetation and gravel.
877664	WS2	None Supplied	2.40	Grey clay.

Analytical Report Number : 17-71017

Project / Site name: Steeple Aston

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Bulks	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Pesticides and Herbicides in soil screening	In-house method	In-house method		W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L038	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038	W	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding.	L076-PL	W	MCERTS
TPH5 (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method	L076-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Jim Twaddle
The Brownfield Consultancy
Woodstock
Memorial Road
Fenny Compton
Warwickshire
CV47 2XU

e: jim.twaddle@brownfieldconsultancy.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 17-71018

Project / Site name:	Steeple Aston	**Samples received on:**	15/12/2017
Your job number:	BC340	**Samples instructed on:**	15/12/2017
Your order number:		**Analysis completed by:**	28/12/2017
Report Issue Number:	1	**Report issued on:**	28/12/2017
Samples Analysed:	1 10:1 WAC sample		

Signed: [redacted]

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

i2 Analytical
7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YS

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**17-71018**						
					Client:	**BROWNFIELD**	
Location	**Steeple Aston**						
Lab Reference (Sample Number)	877668 / 877669				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	14/12/2017				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS1 + TP8 combined						
Depth (m)	1.00-1.45						
Solid Waste Analysis							
TOC (%)**	0.6				3%	5%	6%
Loss on Ignition (%) **	1.8				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.9				100	--	--
pH (units)**	8.4				--	>6	--
Acid Neutralisation Capacity (mol / kg)	28				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0020			0.0153	0.5	2	25
Barium *	0.0066			0.0514	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0032			0.025	0.5	10	70
Copper *	0.022			0.17	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0013			0.0098	0.5	10	30
Nickel *	0.0048			0.037	0.4	10	40
Lead *	0.0040			0.031	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.023			0.18	4	50	200
Chloride *	0.83			6.5	800	4000	25000
Fluoride	0.24			1.8	10	150	500
Sulphate *	1.3			10	1000	20000	50000
TDS	50			390	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	3.56			27.8	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.80						
Dry Matter (%)	85						
Moisture (%)	15						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

*= UKAS accredited (liquid eluate analysis only)
** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 17-71018

Project / Site name: Steeple Aston

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
877668	WS1 + TP8	combined	1.00-1.45	Light brown clay and sand.

Analytical Report Number : 17-71018

Project / Site name: Steeple Aston

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-UK	W	NONE
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	in-house method	L076-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by electrometric measurement.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS

Analytical Report Number : 17-71018

Project / Site name: Steeple Aston

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
WS1 + TP8	combined	S	17-71018	877668	b	BTEX in soil (Monoaromatics)	L073B-PL	b
WS1 + TP8	combined	S	17-71018	877668	b	Mineral Oil (Soil) C10 - C40	L076-PL	b
WS1 + TP8	combined	S	17-71018	877668	b	PCB's By GC-MS in soil	L027-PL	b
WS1 + TP8	combined	S	17-71018	877668	b	Speciated WAC-17 PAHs in soil	L064-PL	b
WS1 + TP8	combined	S	17-71018	877668	b	Total BTEX in soil (Poland)	L073-PL	b

APPENDIX D

Geotechnical Laboratory Testing

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

Client:	The Brownfield Consultancy	Client Reference:	BC340
Client Address:	Woodstock Memorial Road Fenny Compton Warwickshire CV47 2XU	Job Number:	17-70944
		Date Sampled:	13/12/2017
		Date Received:	15/12/2017
Contact:	Jim Twaddle	Date Tested:	22/12/2017
Site Name:	Steeple Aston	Sampled By:	Not Given
Site Address:	Not Given		

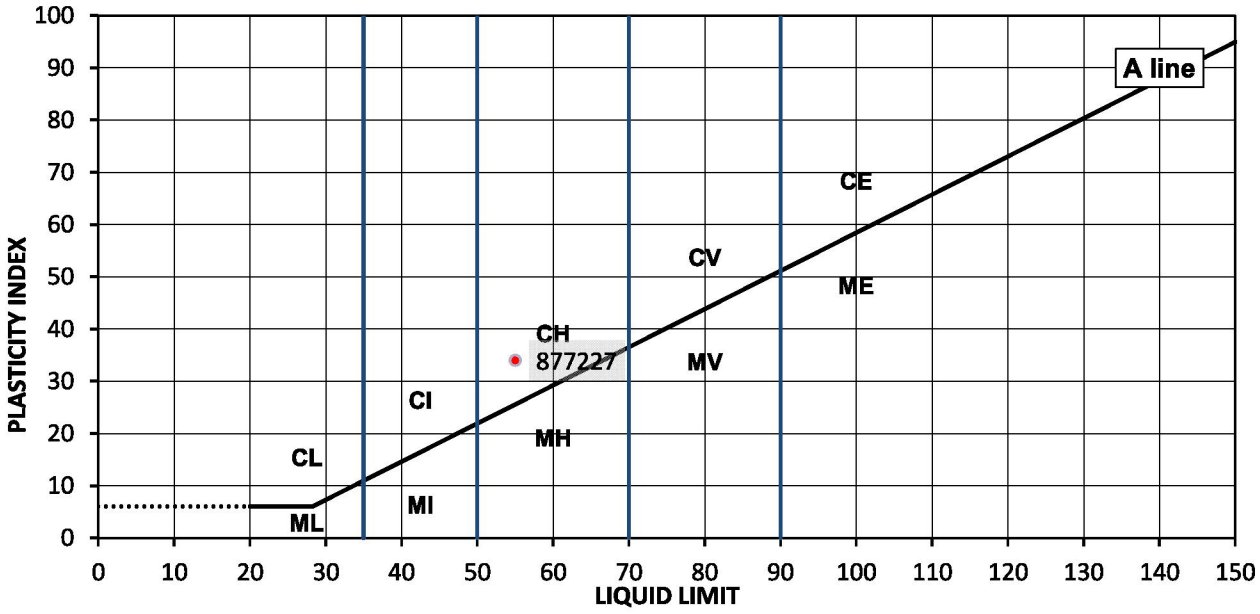
TEST RESULTS

Laboratory Reference: 877227
Sample Reference: Not Given

Description: Yellowish brown slightly gravelly slightly sandy CLAY
Location: TP4
Sample Preparation: Tested after >425um removed by hand

Sample Type: D
Depth Top [m]: 1.70
Depth Base [m]: Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
21	55	21	34	95



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 02/01/2018

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

GF 105.11

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

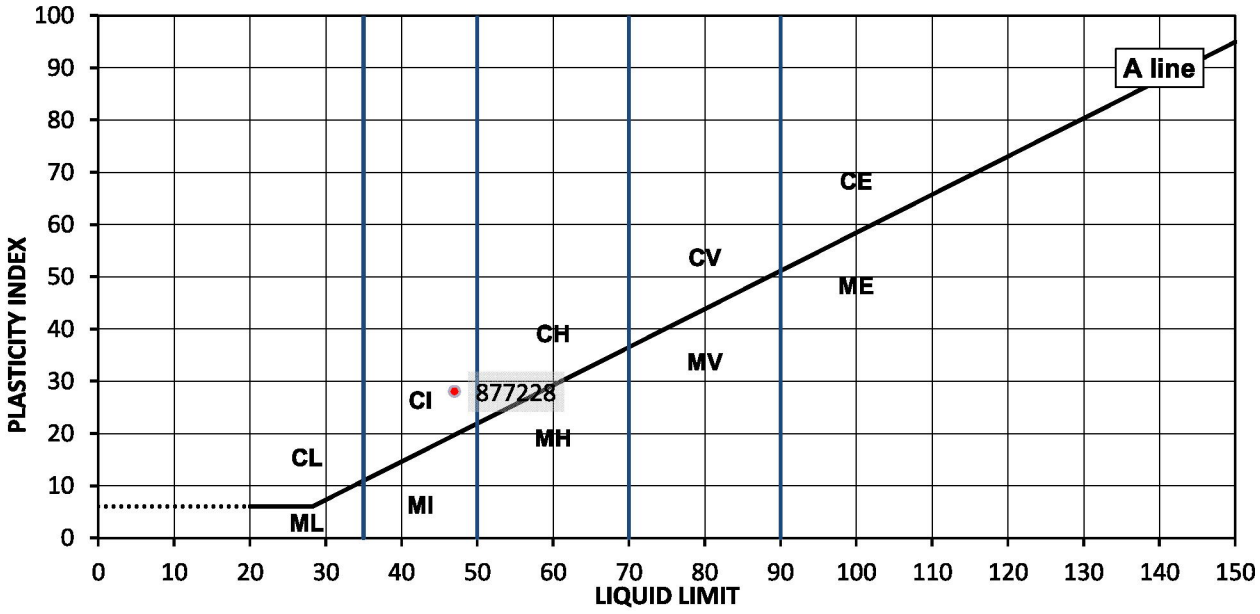
Client:	The Brownfield Consultancy	Client Reference:	BC340
Client Address:	Woodstock Memorial Road Fenny Compton Warwickshire CV47 2XU	Job Number:	17-70944
		Date Sampled:	13/12/2017
		Date Received:	15/12/2017
Contact:	Jim Twaddle	Date Tested:	22/12/2017
Site Name:	Steeple Aston	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 877228
Sample Reference: Not Given

Description:	Light brown slightly gravelly slightly sandy CLAY	Sample Type:	D
Location:	TP6	Depth Top [m]:	2.00
Sample Preparation:	Tested after washing to remove >425um	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
13	47	19	28	86



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 02/01/2018

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

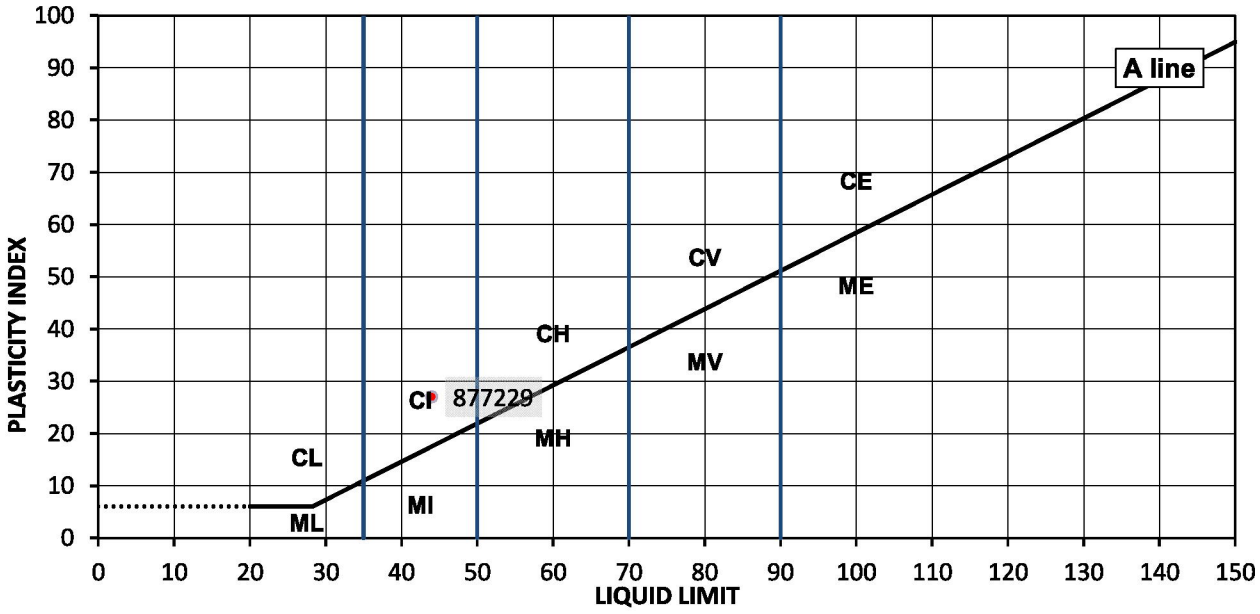
Client:	The Brownfield Consultancy	Client Reference:	BC340
Client Address:	Woodstock Memorial Road Fenny Compton Warwickshire CV47 2XU	Job Number:	17-70944
		Date Sampled:	13/12/2017
		Date Received:	15/12/2017
Contact:	Jim Twaddle	Date Tested:	22/12/2017
Site Name:	Steeple Aston	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 877229
Sample Reference: Not Given

Description:	Light brown slightly gravelly slightly sandy CLAY with fragments of shell	Sample Type:	D
Location:	TP7	Depth Top [m]:	2.30
Sample Preparation:	Tested after >425um removed by hand	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
17	44	17	27	97



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 02/01/2018

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

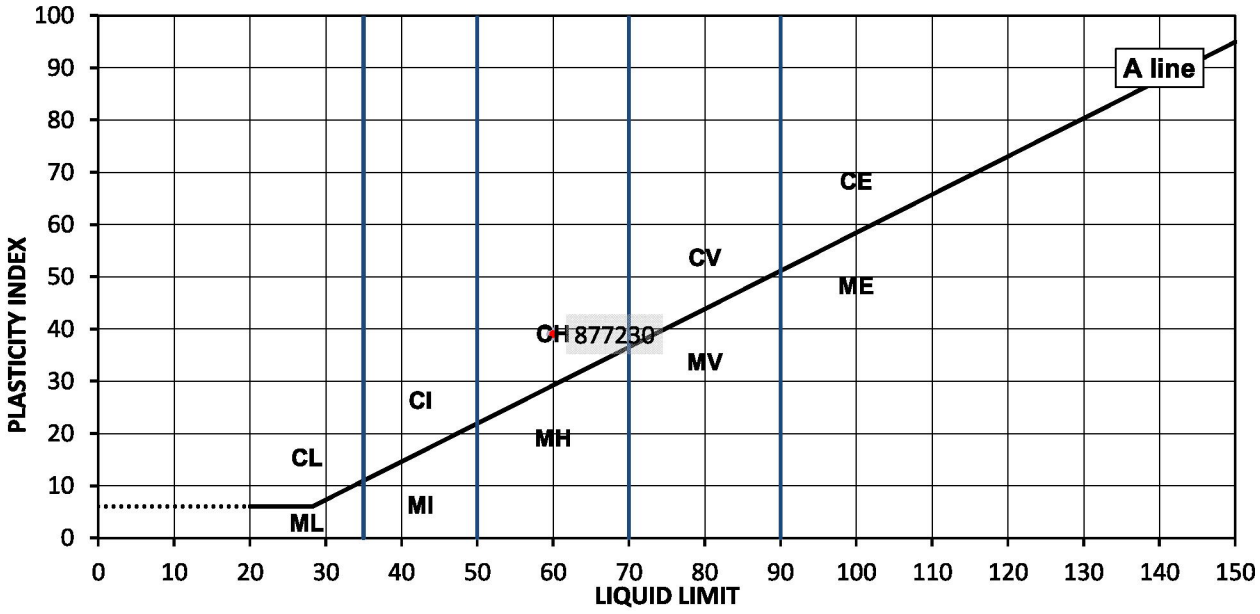
Client:	The Brownfield Consultancy	Client Reference:	BC340
Client Address:	Woodstock Memorial Road Fenny Compton Warwickshire CV47 2XU	Job Number:	17-70944
		Date Sampled:	13/12/2017
		Date Received:	15/12/2017
Contact:	Jim Twaddle	Date Tested:	22/12/2017
Site Name:	Steeple Aston	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 877230
Sample Reference: Not Given

Description:	Light brown slightly sandy CLAY	Sample Type:	D
Location:	TP8	Depth Top [m]:	0.75
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
15	60	21	39	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 02/01/2018

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

Client:	The Brownfield Consultancy	Client Reference:	BC340
Client Address:	Woodstock Memorial Road Fenny Compton Warwickshire CV47 2XU	Job Number:	17-70944
		Date Sampled:	13/12/2017
		Date Received:	15/12/2017
Contact:	Jim Twaddle	Date Tested:	22/12/2017
Site Name:	Steeple Aston	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 877231
Sample Reference: Not Given

Description: Yellowish brown slightly gravelly slightly sandy CLAY with fragments of shell

Sample Type: D

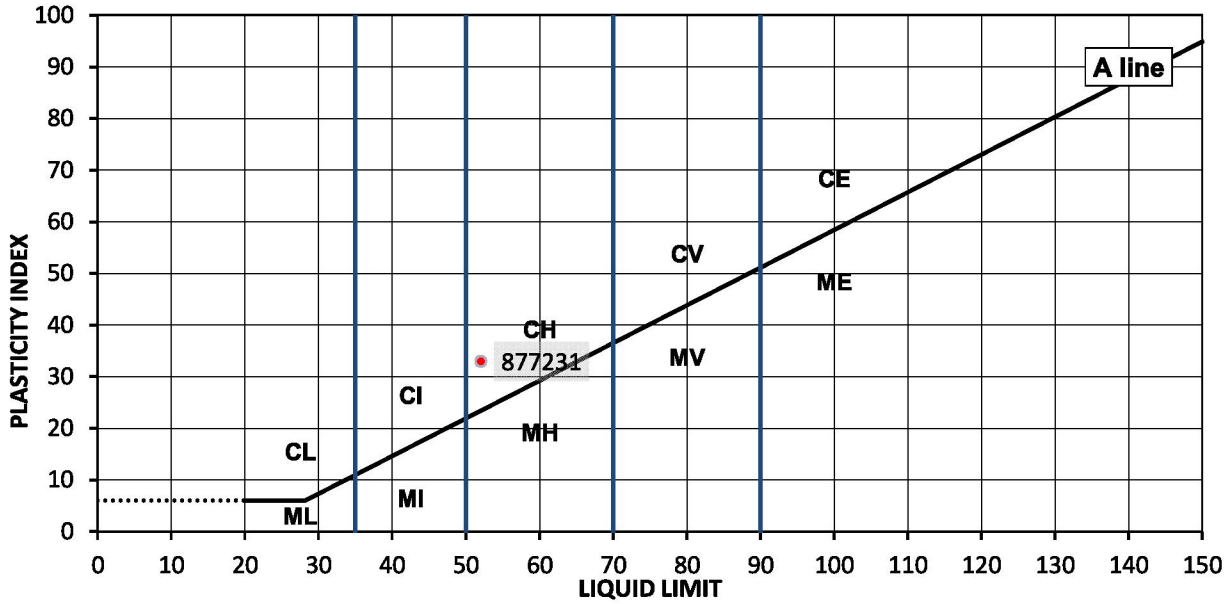
Location: TP8

Depth Top [m]: 2.30

Sample Preparation: Tested after washing to remove >425um

Depth Base [m]: Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
19	52	19	33	91



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section

Signed:

Mark Beastall
Geotechnical Commercial Manager

Date Reported: 02/01/2018

for and on behalf of i2 Analytical Ltd

GF 105.11

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

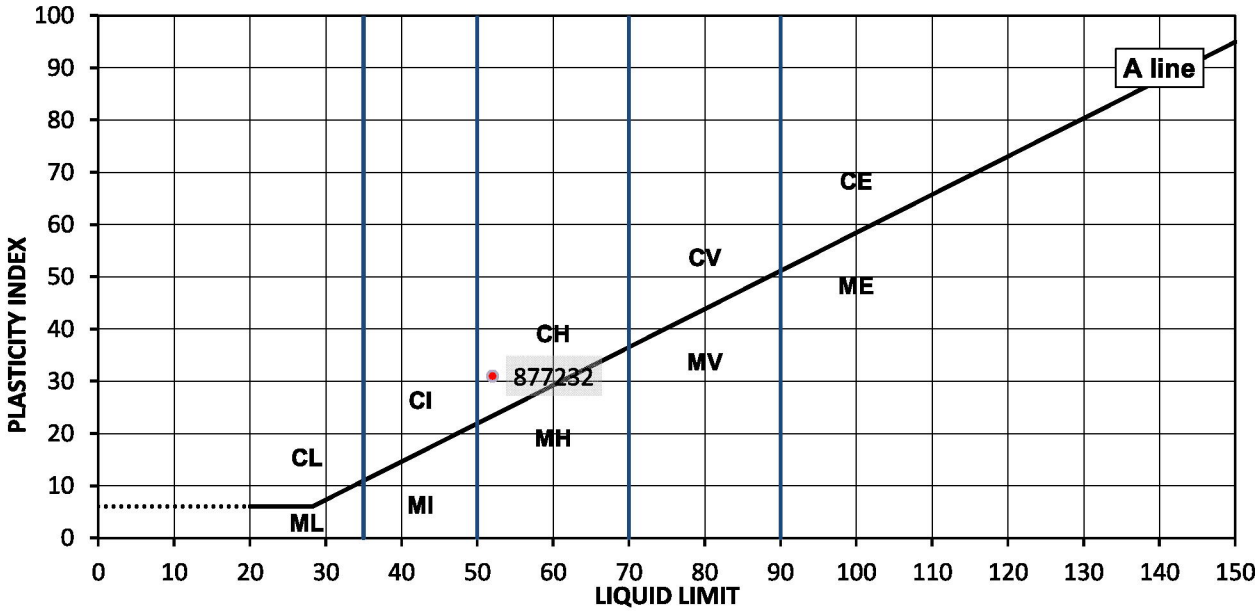
Client:	The Brownfield Consultancy	Client Reference:	BC340
Client Address:	Woodstock Memorial Road Fenny Compton Warwickshire CV47 2XU	Job Number:	17-70944
		Date Sampled:	13/12/2017
		Date Received:	15/12/2017
Contact:	Jim Twaddle	Date Tested:	22/12/2017
Site Name:	Steeple Aston	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 877232
Sample Reference: Not Given

Description:	Yellowish brown slightly sandy CLAY	Sample Type:	D
Location:	TP10	Depth Top [m]:	2.45
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
28	52	21	31	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 02/01/2018

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

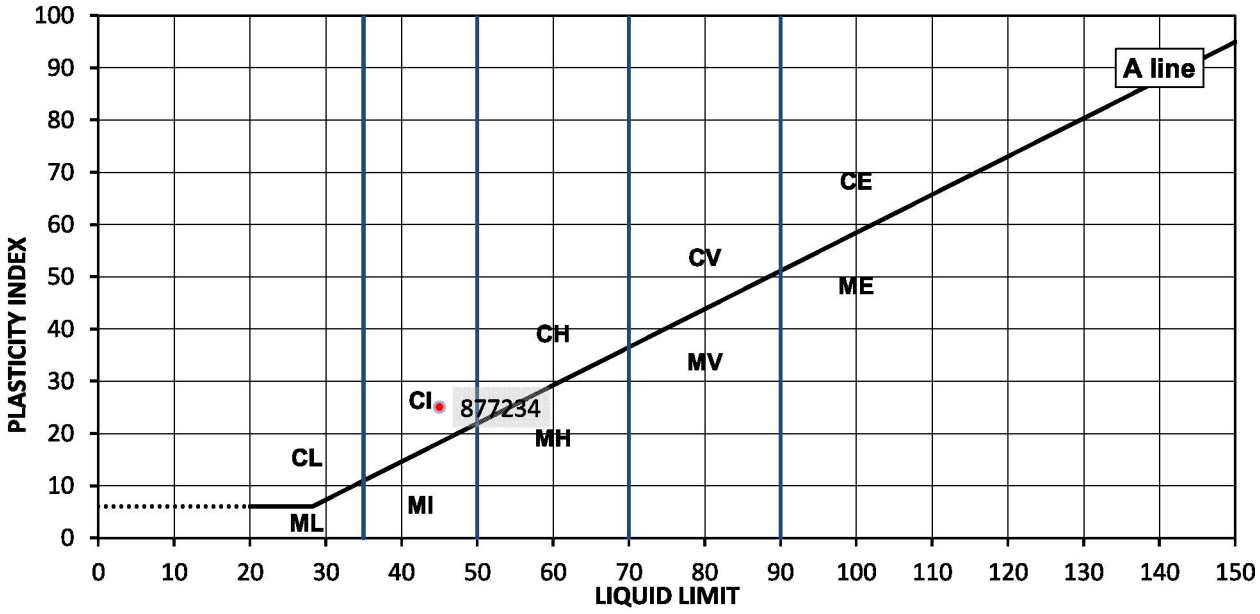
Client:	The Brownfield Consultancy	Client Reference:	BC340
Client Address:	Woodstock Memorial Road Fenny Compton Warwickshire CV47 2XU	Job Number:	17-70944
		Date Sampled:	14/12/2017
		Date Received:	15/12/2017
Contact:	Jim Twaddle	Date Tested:	22/12/2017
Site Name:	Steeple Aston	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 877234
Sample Reference: Not Given

Description:	Light brown slightly gravelly slightly sandy CLAY	Sample Type:	D
Location:	WS1	Depth Top [m]:	2.00
Sample Preparation:	Tested after >425um removed by hand	Depth Base [m]:	2.45

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
14	45	20	25	89



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 02/01/2018

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Summary of Classification Test Results

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Environmental Science

Client: The Brownfield Consultancy
Client Address: Woodstock
Memorial Road
Fenny Compton
Warwickshire
CV47 2XU
Contact: Jim Twaddle
Site Name: Steeple Aston
Site Address: Not Given

Client Reference: BC340
Job Number: 17-70944
Date Sampled: 13/12 - 14/12/2017
Date Received: 15/12/2017
Date Tested: 22/12/2017
Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Soil Description	Density		M/C	Atterberg				PD
		Reference	Top depth [m]	Base depth [m]	Type		bulk Mg/m3	dry Mg/m3	%	% Passing 425um %	LL %	PL %	PI %	Mg/m3
877232	TP10	Not Given	2.45	Not Given	D	Yellowish brown slightly sandy CLAY			28	100	52	21	31	
877227	TP4	Not Given	1.70	Not Given	D	Yellowish brown slightly gravelly slightly sandy CLAY			21	95	55	21	34	
877228	TP6	Not Given	2.00	Not Given	D	Light brown slightly gravelly slightly sandy CLAY			13	86	47	19	28	
877229	TP7	Not Given	2.30	Not Given	D	Light brown slightly gravelly slightly sandy CLAY with fragments of shell			17	97	44	17	27	
877230	TP8	Not Given	0.75	Not Given	D	Light brown slightly sandy CLAY			15	100	60	21	39	
877231	TP8	Not Given	2.30	Not Given	D	Yellowish brown slightly gravelly slightly sandy CLAY with fragments of shell			19	91	52	19	33	
877234	WS1	Not Given	2.00	2.45	D	Light brown slightly gravelly slightly sandy CLAY			14	89	45	20	25	

Comments:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

[redacted]

Date Reported: 02/01/2018

Signed:

Mark Beastall
Geotechnical Commercial Manager

[redacted]

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

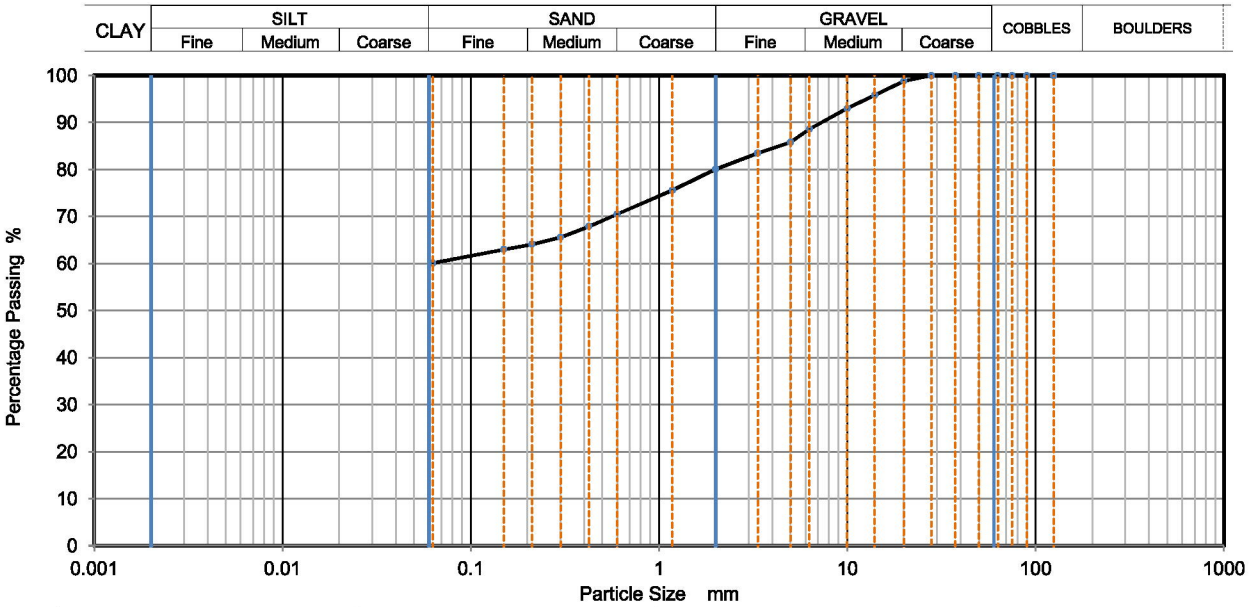
4041

Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Client:	The Brownfield Consultancy	Client Reference:	BC340
Client Address:	Woodstock Memorial Road Fenny Compton Warwickshire CV47 2XU	Job Number:	17-70944
		Date Sampled:	13/12/2017
		Date Received:	15/12/2017
Contact:	Jim Twaddle	Date Tested:	22/12/2017
Site Name:	Steeple Aston	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS Laboratory Reference: 877233 Sample Reference: Not Given

Sample description:	Yellow slightly gravelly slightly sandy CLAY	Sample Type:	B
Location:	TP13	Depth Top [m]:	1.30
Supplier:	Not Given	Depth Base [m]:	1.40



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	99		
14	96		
10	93		
6.3	89		
5	86		
3.35	84		
2	80		
1.18	76		
0.6	71		
0.425	68		
0.3	66		
0.212	64		
0.15	63		
0.063	60		

Dry Mass of sample [g]: 1052

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	19.90
Sand	20.00
Fines <0.063mm	60.10

Grading Analysis		
D100	mm	28
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Mark Beastall
Geotechnical Commercia
Manager

Date Reported: 02/01/2018

for and on behalf of i2 Analytical Ltd

APPENDIX E

Gas Monitoring Results

GAS MONITORING DATA

The Brownfield Consultancy

Site:	**Steeple Aston**	**Operator:**	**HK**
Project:	**BC340**	**Date:**	**6.1.18**
		Weather:	**Cold dry**

Monitoring Location	Standpipe diameter (mm)	Standpipe Depth (m bgl)	Water Level (m bgl)	Atmos. Pressure (mb)	Initial Flow Rate (litres/hr)	Temp (^{o}C)	Reading Duration (s)	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Notes
WS1	50	2.70	Dry	998	0.1		30	<0.1	3.7	16.4	
							60	<0.1	3.7	16.0	
							120	<0.1	3.7	16.0	
							180	<0.1	3.7	16.0	
							240	<0.1	3.7	16.0	
							300	<0.1	3.7	16.0	
WS2	50	3.92	Dry	998	<0.1		30	<0.1	0.7	20.7	
							60	<0.1	1.9	19.7	
							120	<0.1	2.4	18.8	
							180	<0.1	2.6	18.5	
							240	<0.1	2.9	18.1	
							300	<0.1	2.9	18.1	
WS3	50	1.75	1.50	998	<0.1		30	<0.1	1.4	20.2	
							60	<0.1	1.4	20.2	
							120	<0.1	1.4	20.2	
							180	<0.1	1.4	20.2	
							240	<0.1	1.4	20.2	
							300	<0.1	1.4	20.2	

GAS MONITORING DATA

The Brownfield Consultancy

Site: Steeple Aston | **Operator:** HK

Project: BC340 | **Date:** 11.1.18 | **Weather:** Foggy damp

Monitoring Location	Standpipe diameter (mm)	Standpipe Depth (m bgl)	Water Level (m bgl)	Atmos. Pressure (mb)	Initial Flow Rate (litres/hr)	Temp (^{o}C)	Reading Duration (s)	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Notes
WS1	50	2.70	Dry	1006	0.2		30	<0.1	3.3	17.4	
							60	<0.1	3.3	17.0	
							120	<0.1	3.3	16.9	
							180	<0.1	3.3	16.9	
							240	<0.1	3.3	16.9	
							300	<0.1	3.3	16.9	
WS2	50	3.92	Dry	1006	<0.1		30	<0.1	0.3	20.8	
							60	<0.1	0.3	20.8	
							120	<0.1	0.3	20.8	
							180	<0.1	0.3	20.8	
							240	<0.1	0.3	20.8	
							300	<0.1	0.3	20.8	
WS3	50	1.75	1.62	1006	<0.1		30	<0.1	1.9	20.2	
							60	<0.1	1.9	20.0	
							120	<0.1	1.9	20.0	
							180	<0.1	1.9	20.0	
							240	<0.1	1.9	20.0	
							300	<0.1	1.9	20.0	

GAS MONITORING DATA

The Brownfield Consultancy

Site:	**Steeple Aston**	**Operator:**	**HK**
Project:	**BC340**	**Date:**	**19.1.18**
		Weather:	**Warm, frosty**

Monitoring Location	Standpipe diameter (mm)	Standpipe Depth (m bgl)	Water Level (m bgl)	Atmos. Pressure (mb)	Initial Flow Rate (litres/hr)	Temp (^{o}C)	Reading Duration (s)	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Notes
WS1	50	2.70	Dry	995	<0.1		30	<0.1	1.8	18.8	
							60	<0.1	1.8	18.7	
							120	<0.1	1.8	18.7	
							180	<0.1	1.8	18.7	
							240	<0.1	1.8	18.7	
							300	<0.1	1.8	18.7	
WS2	50	3.92	Dry	995	<0.1		30	<0.1	0.2	20.6	
							60	<0.1	0.2	20.6	
							120	<0.1	0.2	20.6	
							180	<0.1	0.2	20.6	
							240	<0.1	0.2	20.6	
							300	<0.1	0.2	20.6	
WS3	50	1.75	Dry	995	<0.1		30	<0.1	1.7	19.4	
							60	<0.1	1.7	19.3	
							120	<0.1	1.7	19.3	
							180	<0.1	1.7	19.3	
							240	<0.1	1.7	19.3	
							300	<0.1	1.7	19.3	

GAS MONITORING DATA

The Brownfield Consultancy

Site: Steeple Aston | **Operator:** HK

Project: BC340 | **Date:** 19.1.18 | **Weather:** Heavy rain

Monitoring Location	Standpipe diameter (mm)	Standpipe Depth (m bgl)	Water Level (m bgl)	Atmos. Pressure (mb)	Initial Flow Rate (litres/hr)	Temp (^{o}C)	Reading Duration (s)	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Notes
WS1	50	2.70	Dry	987	<0.1		30	<0.1	2.2	18.6	
							60	<0.1	2.2	18.3	
							120	<0.1	2.2	18.3	
							180	<0.1	2.2	18.3	
							240	<0.1	2.2	18.3	
							300	<0.1	2.2	18.3	
WS2	50	3.92	Dry	987	0.4		30	<0.1	2.8	17.9	
							60	<0.1	2.8	17.6	
							120	<0.1	2.8	17.6	
							180	<0.1	2.8	17.6	
							240	<0.1	2.8	17.6	
							300	<0.1	2.8	17.6	
WS3	50	1.75	Dry	987	<0.1		30	<0.1	1.2	19.8	
							60	<0.1	1.2	19.6	
							120	<0.1	1.2	19.6	
							180	<0.1	1.2	19.6	
							240	<0.1	1.2	19.6	
							300	<0.1	1.2	19.6	

GAS MONITORING DATA

The Brownfield Consultancy

Site: Steeple Aston | **Operator:** HK

Project: BC340 | **Date:** 1.2.18 | **Weather:** Dry cold

Monitoring Location	Standpipe diameter (mm)	Standpipe Depth (m bgl)	Water Level (m bgl)	Atmos. Pressure (mb)	Initial Flow Rate (litres/hr)	Temp (^{o}C)	Reading Duration (s)	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Notes
WS1	50	2.70	Dry	990	<0.1		30	<0.1	1.8	18.6	
							60	<0.1	1.8	18.4	
							120	<0.1	1.8	18.4	
							180	<0.1	1.8	18.4	
							240	<0.1	1.8	18.4	
							300	<0.1	1.8	18.4	
WS2	50	3.92	Dry	990	<0.1		30	<0.1	1.7	19.6	
							60	<0.1	1.7	19.5	
							120	<0.1	1.7	19.5	
							180	<0.1	1.7	19.5	
							240	<0.1	1.7	19.5	
							300	<0.1	1.7	19.5	
WS3	50	1.75	Dry	990	<0.1		30	<0.1	1.8	19.8	
							60	<0.1	1.8	19.6	
							120	<0.1	1.8	19.6	
							180	<0.1	1.8	19.6	
							240	<0.1	1.8	19.6	
							300	<0.1	1.8	19.6	

GAS MONITORING DATA

The Brownfield Consultancy

Site:	**Steeple Aston**	**Operator:**	**HK**
Project:	**BC340**	**Date:**	**6.2.18**
		Weather:	**Dry cold**

Monitoring Location	Standpipe diameter (mm)	Standpipe Depth (m bgl)	Water Level (m bgl)	Atmos. Pressure (mb)	Initial Flow Rate (litres/hr)	Temp (^{o}C)	Reading Duration (s)	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Notes
WS1	50	2.70	Dry	1005	<0.1		30	<0.1	2.9	16.8	
							60	<0.1	2.9	16.1	
							120	<0.1	2.9	16.1	
							180	<0.1	2.9	16.1	
							240	<0.1	2.9	16.1	
							300	<0.1	2.9	16.1	
WS2	50	3.92	Dry	1005	<0.1		30	<0.1	2.0	18.3	
							60	<0.1	2.0	18.0	
							120	<0.1	2.0	18.0	
							180	<0.1	2.0	18.0	
							240	<0.1	2.0	18.0	
							300	<0.1	2.0	18.0	
WS3	50	1.75	Dry	1005	<0.1		30	<0.1	1.9	19.3	
							60	<0.1	1.9	19.0	
							120	<0.1	1.9	18.9	
							180	<0.1	1.9	18.9	
							240	<0.1	1.9	18.9	
							300	<0.1	1.9	18.9	

APPENDIX F

Limitations

NOTES ON LIMITATIONS

This report has been prepared by the Brownfield Consultancy with all reasonable skill, care and diligence. This report is confidential and has been prepared solely for the benefit of the client as stated at the front of the report in relation to a specific development or scheme; and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from The Brownfield Consultancy; a charge may be levied against such approval. We accept no responsibility or liability for the consequences of this document being used for any purpose or project other than for which it was commissioned, and: this document to any third party with whom an agreement has not been executed.

Any comments given are based on the understanding that the proposed development will be as detailed. The Brownfield Consultancy warrants the accuracy of this report up to and including the published date. Additional information, improved practice or changes in legislation may necessitate this report having to be reviewed in whole or in part after that date.

This report is only valid when used it its entirety. Any information or advice included in the report should not be relied upon until considered in the context of the whole report. Whilst this report and the opinion made herein are correct to the best of our belief we cannot guarantee the accuracy or completeness of any information provided by third parties.

The opinions and recommendations expressed in this report are based on statute, guidance, and appropriate practice current at the date of its preparation. The Brownfield Consultancy does not accept any liability whatsoever for the consequences of any future legislative changes or the release of subsequent guidance documentation, etc. Such changes may render some of the opinions and advice in this report inappropriate or incorrect and we will be pleased to advise if any report requires revision due to changing circumstances. Following delivery of a report we have no obligation to advise the Client or any other party of such changes or their repercussions.

Phase 1 Reports

The work undertaken to provide the basis of a Phase I report comprised a study of available documented information from a variety of sources, together with (where appropriate) a brief walk over inspection of the site. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Historical maps and aerial photographs provide a “snap shot” in time about conditions or activities at the site and cannot be relied upon as indicators of any events or activities that may have taken place at other times.

Phase II Intrusive Investigations

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made. The conclusions and recommendations made in this site appraisal report and the opinions expressed are based on the information reviewed and/or the ground conditions encountered in exploratory holes and the results of any field or laboratory testing undertaken. There may be ground conditions at the site that have not been disclosed by the information reviewed or by the investigative work undertaken. Such undisclosed conditions cannot be taken into account in any analysis and reporting.

Some of the conclusions in this site appraisal report may be based on third party data. No guarantee can be given for the accuracy or completeness of any of the third party data used.

The evaluation and conclusions do not preclude the existence of contamination, which could not reasonably have been revealed by the current work. Given the discrete nature of sampling, no investigation technique is capable of identifying all conditions present in all areas. The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered. Hence this report should be used for information purposes only and should not be construed as a comprehensive characterisation of all site conditions.

It should be noted that groundwater levels, groundwater chemistry, surface water levels, surface water chemistry, soil gas concentrations and soil gas flow rates can vary due to seasonal, climatic, tidal and man-made effects.

The interpretation carried out in this report is based on scientific and engineering appraisal carried out by suitably experienced and qualified technical consultants based on the scope of our engagement. We have not taken into account the perceptions of, for example, banks, insurers, other funders, lay people, etc., unless the report has been prepared specifically for that purpose. Advice from other specialists may be required such as the legal, planning and architecture professions, whether specifically recommended in our report or not.

The objectives of the investigation have been linked to establishing the risks associated with potential human targets, building materials, the environment (including adjacent land), and to surface and ground water. The amount of exploratory work and chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to areas unoccupied by the building(s) on the site and by buried services.

Registered Office:-

The Brownfield Consultancy
Woodstock
Memorial Road
Fenny Compton
CV47 2XU

Company No: 8143932

Jim.twaddle@brownfieldconsultancy.co.uk

Tel: 07852 881086