Salmon Development Limited

Dales Manor Business Park, Sawston

Phase 2 Geoenvironmental Assessment Report

MLM. Group

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AGS Association of Geotechnical & Geoenvironmental Specialists

AGS

Contents

1 Executive Summary

Details	Summary of Main Text
Introduction	This report has been prepared on the instructions of Bradbrook Consulting on behalf of Salmon Development Limited which proposes to develop the site for light industrial and commercial use. It presents the results of a ground investigation and geoenvironmental assessment alongside data from previous MLM geoenvironmental assessments undertaken in 2007 and 2008.
Site description	The 2.9 hectare site is approximately 1km to the northeast of the centre of Sawston, Cambridgeshire and comprises open hardstanding and concrete slabs where previous buildings (now demolished) were situated.
Environmental Setting	Strata comprising the Alluvium (unproductive strata), described as clay, silt, sand and gravel, overlying Zig Zag Chalk Formation are shown to underlie the site. The site is within a groundwater source protection zone SPZ3. The nearest surface water feature is a drainage ditch adjacent to the western boundary. The site is surrounded by agricultural land to the north, South Cambridge Business Park and a Tarmac Readymix plant to the east, residential properties to the southwest and open undeveloped land (a historical landfill) to the west.
Ground Investigation	
Ground Conditions Encountered	Hardstanding (maximum proven depth 0.45m bgl) Made Ground (maximum proven depth 2.00m bgl) Alluvium (maximum proven depth 4.00m bgl) Lowestoft Formation (maximum proven depth 4.45m bgl) Zig Zag Chalk Formation (maximum proven depth 15.00m bgl)
Groundwater	Encountered at between 4.10m and 12.00m bgl during the investigation. Recorded post-fieldwork at depths ranging from 1.00m to 3.78m bgl.
Geotechnical Assessment	
Existing Construction	At the time of writing all previous buildings on site had been demolished and the hardstanding was being broken out and removed as part of the site strip. There is a risk of buried construction across the site. Unless it is to be incorporated within the new development, any old construction encountered should be fully penetrated by all new foundations and broken well away from any new construction.
Excavations	Excavation to proposed founding depth generally should be readily achievable with standard excavation plant. Heavy duty excavation plant/breaking equipment may be required to excavate the existing construction.

Details	Summary of Main Text
Foundations	Pad foundations are considered suitable at the site where founding into firm to stiff Lowestoft Formation and Alluvial deposits or structureless Zig Zag Chalk Formation deposits for blocks B, C, D, G and H. Allowable net bearing capacity of 130kPa for a 1m^2 pad at 1.0m depth or 140kPa for a 1m^2 pad at 2.0m depth. Alternatively an allowable net bearing capacity of 115kPa for a 2m^2 pad at 1.0m depth or 130kPa for a 2m^2 pad foundation at 2.0m depth. In the west and north, deep made ground and soft alluvial deposits are present. These deposits are not considered suitable founding deposits for traditional strip/trench and pad foundations and therefore piled foundations are recommended for blocks A, E, F and G.
Ground Floors	Suspended and ground bearing
Pavements	Soils should be re-engineered through excavation and either sorting and recompaction or replacement with a granular fill Design CBR of 2% on treated made ground.
Soakaways	Soakaway drainage is considered suitable for the site, however drainage into the made ground is unlikely to be accepted and should be made into natural soils below.
Buried Concrete	Design Sulphate Class – DS-1 and ACEC Class – AC-1
Contamination	
Soil Contamination	Hydrocarbons above screening levels for human health in made ground.
Groundwater Contamination	Levels of groundwater contamination have reduced over the past ten years (2007-2017) to the point that only very low levels of mercury and selenium are present.
Gas/Vapour Contamination	CS4 for methane and CS2 for carbon dioxide. Levels of methane have reduced over the past ten years (2007-2017)
Remediation	The following remedial measures are recommended to mitigate the identified risks: • Ground gas and hydrocarbon vapour protection for buildings achieving a BS8485:2015 solution score of 3.5 • Installation of services in corridors of clean soil • Health and safety requirements when working in the ground This report should be presented to the water supply company to assist in their selection of materials for potable water supply pipework.
Further Work	
Geotechnical	Tree survey to determine the potential influence of adjacent trees.
Contaminated land	Remediation strategy and verification plan for LPA submission

2 Limitations and Exceptions

1 This report and its findings should be considered in relation to the terms and conditions proposed and scope of works agreed between MLM Consulting Engineers Ltd (MLM) and the client.

2 The Executive Summary, Conclusions and Recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon until considered in the context of the whole report and the development, if any, proposed.

3 The assessment and interpretation of contamination and associated risks are based on the scope of work agreed with the client and the report may not be sufficient to fully address contaminations or to allow detailed remediation design to proceed without further investigation and analysis.

4 Any assessments made in this report are based on the ground conditions as revealed by the exploratory holes and pits, together with the results of any field or laboratory testing undertaken and, where appropriate, other relevant data which may have been obtained for the sites including previous site investigation reports. There may be special conditions appertaining to the site, however, which have not been revealed by the investigation and which have not, therefore, been taken into account in the report. The assessment may be subject to amendment in the light of additional information becoming available.

5 Interpretations and recommendations contained in the report represent our professional opinions, which were arrived at in accordance with currently accepted industry practices at the time of reporting and based on current legislation in force at that time.

6 Where the data available from previous site investigation reports, supplied by the Client, have been used, it has been assumed that the information is correct. No responsibility can be accepted by MLM for inaccuracies within the data supplied.

7 Whilst the report may express an opinion of possible configuration of strata between or beyond exploratory hole or pit locations, or on the possible presence of features based on visual, verbal or published evidence, this is for guidance only and no liability can be accepted for the accuracy.

8 Comments on groundwater conditions are based on observations made at the time of the investigation unless otherwise stated. It should be noted that groundwater levels can vary due to seasonal or other effects.

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3 Introduction

3.1 General

This report has been prepared by MLM Consulting Engineers Ltd (MLM) on the instructions of Bradbrook Consulting (Agent) on behalf of Salmon Development Limited (Client), which is proposing to develop the site for light industrial and commercial use.

The objective of this report is to provide an assessment of ground conditions with respect to design of foundations, slabs and infrastructure and gives recommendations for appropriate solutions. It also includes a generic quantitative risk assessment (GQRA) of contamination risks to human health and the environment and provides, where necessary, a summary of recommended mitigation or remediation measures.

This report will combine and update data collected during two previous site investigations at the site covered under MLM reports Phase II Geoenvironmental Assessment Report (Ref. DMB/721750/R1/F) dated April 2008 and Supplementary Geoenvironmental Assessment Report (Ref. DMB/721750/R2/F) dated August 2008. Data will be compared against current S4UL/C4SL screening values and gas monitoring results will be assessed using BS8485:2015 guidance.

It is understood that this report will form part of a planning submission for the site and will inform construction.

3.2 Terms of Reference

The terms of reference for the work were set out in the MLM proposals ref. 775322-FEE-ENV-002-Rev1 dated 12 June 2017 and 775322-FEE-ENV-003 dated 16 June 2017.

3.3 Technical Approach

The geoenvironmental and geotechnical work undertaken by MLM follows the Association of Geotechnical and Geoenvironmental Specialists (AGS) *Good Practice Guidelines for Site Investigations.*

The process of contamination assessment adopted in this report generally follows the model procedures for the management of contaminated land described in the Environment Agency Contaminated Land Report 11. It also takes into account the guidance issued in the National Planning Policy Framework (NPPF)

The format of the report is in general accordance with the reporting requirements of BS5930:2015.

3.4 Proposed Development

It is understood that the proposed development will comprise eight blocks (Blocks A to H), comprising 27 commercial and light industrial business units and the associated access roads, car parking areas and soft landscaping.

Details of the proposed layout are shown on Woods Hardwick Proposed site plan drawing 16088-SK011-N dated November 2016.

4 The Site

4.1 Location and Description

The site is located off West Way, approximately 1km to the northeast of the centre of Sawston village, Cambridgeshire. It is irregular in shape and covers an area of 2.9 hectares. It is bordered to the north by agricultural land, to the east by West Way with a Tarmac Readymix plant and South Cambridge Business Park beyond, to the southwest by residential properties and to the northwest by open undeveloped land where a historical landfill was situated.

The site is generally level and covered entirely by mixed hardstanding of concrete, macadam and brickwork. Buildings previously occupying the site have been demolished and raised concrete areas are still present where they stood. Tall metal fencing surrounds the entire site and large metal gates provide access from West Way in the southeast corner and half way along the eastern boundary.

At the time of writing this report the site had recently undergone vegetation clearance and areas of hardstanding in the south were being broken out and the materials stockpiled on site.

The National Grid Reference for the approximate centre of the site is 549040, 250430.

A location plan of the site is presented as Figure 1.

4.2 Geology

The geological map of the area shows the site to be underlain by Alluvium overlying Zig Zag Chalk Formation in the west. Superficial deposits are not shown to underlie the Zig Zag Chalk Formation in the eastern half of the site.

The site is shown to lie in an area unaffected by historical landslips.

4.3 Hydrogeology

The Environment Agency website provides the following hydrogeological information:

Table 4.1 Aquifer Properties

Aspect	Designation	Description
Groundwater Source Protection Zone	SPZ3	Source catchment protection zone. Defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source.
Aquifer Designation – Superficial Deposit	Unproductive Strata	These are deposits with low permeability that have negligible significance for water supply or river base flow.
Aquifer Designation – Bedrock Deposit	Principal Aquifer	These are deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.

4.4 Hydrology

The closest significant surface water feature is a drainage ditch running directly adjacent with the western boundary. The River Granta is located approximately 700m to the north of the site.

There are no abstractions from surface waters within 500m of the site.

5 Previous Assessment

The following reports have been produced for the site and are summarised below:

Table 5.1 Previous Reports

Company (Date) Title	Findings
MLM (2007) Phase I Desk Study. Ref. 721576/R1/F	The site was developed around 1960 as a factory used for the manufacture of roof tiles. The site was used for this purpose until it was sold in 2007. On site processes involved in the manufacture of roof tiles included the mixing of sand and cement with various additives and baking in kilns. A drainage ditch fed by a spring to the north runs alongside the western boundary. An outfall was noted in the southwest corner of the site which discharged surface water runoff from the site into the ditch via a 'Conder' interceptor. This also included surface water runoff from the Tarmac Readymix site to the east, which was piped below the site via a three-stage interceptor, located in the northeast corner of the site. Surrounding land uses include arable land to the north, a Tarmac Readymix plant to the east, residential properties to the south and a former landfill to the west which was restored in 1977. Along the northern boundary was a dismantled single track railway line. Five above ground storage tanks (AST) were on the site containing diesel, kerosene/heating oil and mould oil. Although no underground storage tanks (UST) were believed to be present, four underground storage chambers were identified, including, one for the storage of aggregate, a waste liquid sump, a liquid waste pit and a waste pigment sump. Other drums and containers were present on site containing oil, waste oil, general waste, pigment, concrete, flammable liquids (possibly solvents) and hydrochloric acid. Visual evidence of minor spillage was noted on the ground around a diesel pump and pipework associated with a kerosene AST. Pigment staining was also identified in the northwest.
MLM (2008) Phase II Geoenvironmental Assessment Report. Ref. DMB/721750/R1/F	Ground conditions encountered included made ground generally 1.0m thick and locally up to 2.6m bgl, comprising mainly soft to firm sandy gravelly clay. Underlying the made ground was Glacial Till comprising soft to very stiff clay with variable gravel content and locally Alluvium. The chalk bedrock was encountered at depths of 1.1m to 3.7m bgl. Groundwater was encountered at depths of between 4.3m and 12m rising to between 4.1m and 10m during the ground investigation and during subsequent monitoring visits at depths of between 1.81m and 3.26m bgl. Traditional pad/strip foundations will be appropriate for the majority of the site with allowable bearing pressures in the range of 100-150kN/m^2. Locally soil conditions are such that deep pads, vibrotreatment or piling will be appropriate. Subgrades will comprise made ground where preliminary design CBRs of 2% are appropriate.

Company (Date) Title	Findings
	Below ground structures are present on site including infilled pits and sumps for the storage of waste pigment and concrete tailings. Soil contamination was not present above screening values for risks to human health in respect to the site end use as a light industrial or commercial development. Low levels of soil contamination were present in respect to risks to water supply and would therefore require upgraded water supply pipes to be installed at the site. Zinc was present in soil locally which could present risks to plant life. Groundwater contamination in excess of UK drinking water standards was present locally in the centre of the site in Glacial Till deposits in the form of arsenic, mercury and selenium. Gas monitoring recorded elevated levels of methane (maximum 81%) and carbon dioxide. Gas protection measures will be required for the proposed development.
MLM (2008) Supplementary Geoenvironmental Assessment Report. Ref. DMB/721750/R2/F	An assessment of the former landfill off site to the west showed it was operational between 1974 and 1993 and was licenced to accept inert waste. However there is mention in an Envirocheck Report that the waste types also included Cat. 3 waste type chemicals and chemical compounds. Records also indicate that the landfill may not be lined. TPH compounds were present locally in soil in excess of guideline screening values for light industrial or commercial land use. Groundwater contamination including arsenic, mercury, selenium and TPH was present locally in excess of UK drinking water standards.

6 Ground Investigation

This section includes the work undertaken as part of the previous MLM Phase II Geoenvironmental Assessment (Ref. DMB/721750/R1/F) and Supplementary Geoenvironmental Assessment (Ref. DMB/721750/R2/F) undertaken in 2008.

6.1 Site Work

Site work was carried out in September 2007, July 2008 and between 4 and 6 July 2017 and included the following.

Table 6.1 Summary of Exploratory Holes

Type	Ref. (2007/2008)	Ref. (2017)	Depth Range (m bgl)
Cable percussion boreholes	BH1 - BH3, BH2A,	CP201 - CP203	15.00
Windowless sampler boreholes	WS1 - WS11, WS101 - WS114,	WS201 - WS205	3.00 - 5.00
Trial pits		TP201, TP202, TP203	0.70 – 2.00
Soakaway pits	TP1 – TP2	TP202A, TP204	1.80 – 3.35

The exploratory holes were set out by an MLM engineer based on the findings of the desk study and site walkover in locations to maximise the available data, whilst operating within the constraints of the site.

All boreholes were logged by a geoenvironmental engineer in general accordance with BS5930:2015. The exploratory hole logs are presented in Appendix A.

The locations of all the exploratory holes are presented on Drawing 775322-DWG-ENV-001.

6.2 Installations

Combined gas and groundwater monitoring standpipes were installed in boreholes WS3, WS5 – WS7, WS10, WS11 and BH1 in 2007, WS101, WS103 – WS105, WS108 and WS112 in 2008 and WS201 – WS205 and CP201 – CP203 in 2017.

Details of the installations are provided on the relevant borehole logs.

6.3 In Situ Testing

Standard penetration tests (SPTs) were undertaken at regular intervals in the cable percussion/windowless sampler boreholes (BH1 – BH3, BH2A, WS1 – WS11 and WS101 – WS111).

Hand shear vane tests were undertaken at shallow depth (<1.2m) in the trial pits and on samples recovered from depth in trial pits.

In situ test types and depths are recorded on the relevant exploratory hole records.

6.4 Sampling

Geotechnical undisturbed samples were recovered from the cable percussion borehole in U100 tubes.

Continuous soil cores were recovered from the windowless sampler boreholes in clear PVC liners to prevent cross contamination and aid sample recovery.

Disturbed samples were recovered from all exploratory holes, in bulk bags and/or tubs depending on the soil types and proposed laboratory testing.

Contamination samples were recovered in plastic tubs and glass jars, appropriate for the laboratory analysis undertaken.

Sample types and depths are recorded on the relevant exploratory hole records.

6.5 Post-Fieldwork Monitoring

Post-fieldwork monitoring of ground gas/organic vapour concentrations and groundwater levels has been undertaken on four occasions between 3 and 29 October 2007, on four occasions between 16 July and 5 August 2008 and on six occasions between 11 July and 22 August 2017. The results are presented in Appendix B.

6.6 Laboratory Analysis

The following laboratory tests were scheduled on samples recovered from the exploratory holes.

Table 6.2 Summary of Geotechnical Testing

Test	2007
Natural moisture content	6
Atterberg limits	6
pH and water soluble sulphate	4

Geotechnical testing was undertaken by a UKAS-accredited laboratory to BS1377 and the results are presented in Appendix C.

Table 6.3 Summary of Contamination Analysis

Test	2007	2008	2017
Metals (As, Cd, Cr, Cu, Ni, Zn, Pb, Hg, Se)	12	6	-
Petroleum hydrocarbons (speciated TPHCWG)	7	7	-
Speciated polycyclic aromatic hydrocarbons (PAH USEPA16)	5	2	-
Total Organic Carbon (TOC)	5		-
MLM standard suite : metals (As, Cd, Cr, Cu, Ni, Zn, Pb, Hg, Se), speciated polycyclic aromatic hydrocarbons (PAH USEPA16), petroleum hydrocarbons (speciated TPHCWG), total cyanide and total phenols	-	-	2
Waste Acceptance Criteria (WAC) Testing	-	-	2

Table 6.4 Summary of Contamination Analysis – Groundwater, in 2007

Test	2007	2008	2017
Metals (As, Cd, Cr, Cu, Ni, Zn, Pb, Hg, Se)	1	1	4
Petroleum hydrocarbons (speciated TPHCWG)	1	1	4
pH and water soluble sulphate	1	-	-
PAH (speciated USEPA 16)	-	-	4
Volatile Organic Compounds (VOC)	-	-	4
Hardness	-	-	4

Contamination analysis was undertaken by a UKAS-accredited laboratory and the results are presented in Appendix D.

7 Ground and Groundwater Conditions

7.1 General

The following sections include data from the previous investigations by MLM dated April 2008 (ref: DMB/721750/R1/F) and August 2008 (ref: DMB/721750/R2/F).

The following general strata sequence was encountered across the site. Interpolation between exploratory hole positions has been undertaken based on visual observations and laboratory testing.

Table 7.1 Generalised Strata Sequence

Stratum	Depth range (m bgl)		Proven Thickness range (m)
	Top	Base	
Hardstanding (concrete, macadam and brick paving)	GL	0.08 – 0.45	0.08 – 0.45
Made Ground	0.08 – 0.45	0.20 – 2.00	0.20 – 2.52
Alluvium	0.55 – 3.80	1.70 – 4.00	0.40 – 3.00
Lowestoft Formation (glacial)	0.20 – 2.40	1.10 – 4.45	0.60 – 3.00*
Zig Zag Chalk Formation	0.50 – 5.20	1.80 – 15.00*	0.10 – 13.90*

* Base of stratum not proven in all holes

Features, structures or certain ground conditions may be present between exploratory hole locations, which are different to those encountered during the investigation but which may impact upon construction.

The findings of the site investigations generally match the published geology for the area.

7.2 Made Ground and Surfacing

Made ground was present in boreholes BH1 – BH3, BH2A, CP201 – CP203, WS3 – WS11, WS101 – WS114, WS201 – WS205 and trial pits TP1, TP2, TP201 – TP204 and TP202A across the site and comprised concrete, macadam and brick paving surfacing over sand gravel and sandy gravelly clay, red containing gravel sized fragments of brick, concrete, wood, ash, clinker and tile.

Borehole BH2, trial pits TP201 and TP202 was terminated in this soil.

7.3 Alluvium

Underlying the made ground in boreholes CP201 – CP203, WS5, WS101, WS103, WS104, WS107, WS109, WS111, WS112, WS201 – WS205 in the northern half of the site, gravelly and sandy silts and clays, occasional peat and organic clay were encountered. These deposits are considered to be Alluvium.

Trial pits TP202A and TP203 was terminated in these soils

7.4 Lowestoft Formation

Underlying the made ground in boreholes BH1, BH3, WS1 – WS4, WS6 – WS11, WS102, WS105, WS106, WS108, WS109 and WS112, and in trial pits TP1 and TP2 across the site sand, gravel and sandy, gravelly clays were encountered. These deposits are considered to be glacial till of the Lowestoft Formation.

Borehole WS3, WS4, WS11, WS105, WS108 and WS110 were terminated in these soils.

7.5 Zig Zag Chalk Formation

Underlying the Alluvium and Lowestoft Formations in boreholes BH1, BH2A, BH3, CP201, CP202, CP203, WS1, WS2, WS5, WS6, WS7, WS8, WS9, WS10, WS101, WS102, WS103, WS104, WS106, WS107, WS109, WS111, WS112, WS113, WS114, WS201, WS202, WS203, WS204 and WS205, and trial pits TP1, TP2 and TP204 across the site chalk was encountered. These deposits are considered to be of the Zig Zag Chalk Formation.

All exploratory holes which encountered the chalk were terminated in these soils.

7.6 Groundwater Conditions

Groundwater seepages were encountered during the fieldwork in boreholes BH1, BH2A, BH3, WS107 WS113, CP201, CP202 and CP203 at depths ranging from 4.10m bgl to 12.00m bgl.

During post-fieldwork monitoring water levels were recorded at depths ranging from 1.00m bgl to 3.78m bgl.

The groundwater is from the chalk and is considered to be representative of the groundwater table in the area.

Groundwater flows in a southwest direction.

7.7 Contamination Observations

Made ground, including fragments of ash, clinker, wood (potentially treated), brick and concrete is present across the site. These soils may be an indicator of the potential presence of contaminants.

Table 7.2 below lists the visual or olfactory evidence of contamination noted during the investigation.

Table 7.2 Evidence of Contamination During Investigation

Description	Location	Depth (m bgl)
Hydrocarbon odour and occasional black staining	WS6, WS7, WS11, WS101, WS102, WS104, WS105, WS106, WS107, WS112, WS113, WS114, TP1	0.20 – 3.80

Olfactory and visual evidence of contamination was observed in exploratory holes at several locations in the vicinity of the former main building, in the northwest and southwest corners and in one location in the northeast.

7.8 Ground Gas and Vapour Conditions

The presence of made ground across the site indicates the potential for ground gases to be present. There was visual and olfactory evidence of hydrocarbon contamination in soil which could indicate the potential presence of organic vapour.

A summary of the range of readings is presented in table 7.3 below.

Table 7.3 Summary of Gas and Vapour Monitoring

Date	Methane (%)	Carbon Dioxide (%)	VOC (ppm)	Flow Rate (l/hr)	Barometric Pressure (mb)
3-Oct-07	<0.1 – 30.5	<0.1 – 5.6	<1.0 – 2.0	<0.1	1016 - 1017
17-Oct-07	<0.1 – 49.7	<0.1 – 4.6	<1.0	<0.1 – 0.8	1013 - 1014
24-Oct-07	<0.1 – 81.8	<0.1 – 5.7	<1.0 – 6.3	<0.1 – 0.3	1029
29-Oct-07	<0.1 – 64.8	<0.1 – 5.8	<1.0 – 3.0	<0.1 – 0.3	1013
16-Jul-08	<0.1 – 73.0	<0.1 – 4.3	<0.1 – 0.8	<0.1 – 2.5	1016 - 1020
23-Jul-08	<0.1 – 62.7	<0.1 – 3.4	<0.1 - 33	<0.1 – 0.9	1014 - 1020
28-Jul-08	<0.1 – 72.1	<0.1 – 4.0	-	<0.1 – 0.8	1007 - 1008
5-Aug-08	<0.1 – 78.1	<0.1 – 5.8	<0.1 – 0.7	0.2 – 0.7	1011 - 1012
11-Jul-17	<0.1 – 60.8	<0.1 – 4.1	<0.1 – 0.3	<0.1	1006 - 1007
27-Jul-17	<0.1 – 65.5	0.2 – 3.2	<0.1	<0.1	1002
1-Aug-17	<0.1 – 65.5	0.2 – 4.9	<0.1	<0.1	1011 - 1012
11-Aug-17	<0.1 – 66.0	0.2 – 5.2	<0.1	<0.1 – 4.8	1016
15-Aug-17	<0.1 – 65.9	0.2 – 3.7	<0.1	<0.1	1011 - 1012
22-Aug-17	<0.1 – 59.7	1.5 – 5.8	<0.1	<0.1	1018

7.9 Underground Obstructions

The buildings and structures present on site during the ground investigations in 2007 and 2008 have since been demolished, however the hardstanding and concrete slabs were still present at the time of the ground investigation in July 2017. Therefore there is a risk of buried construction (e.g. foundations and services) across the site.

At the time of writing, site clearance was being undertaken at the site, all vegetation had been cleared and the hardstanding was being broken out and removed, it is unknown whether all buried construction will be removed as part of this process.

8 Material Properties

8.1 General

The following sections include data from the previous investigations by MLM dated 2008 (Ref. DMB/721750/R1/F and Ref. DMB/721750/R2/F).

The following presents a summary of the properties of the soils encountered, based on field observations, in situ field testing and laboratory test results.

For the purposes of property designation, soils are divided into fine soils (clays and silts) and coarse soils (sands and gravels).

Soil plasticity class for fine soils is based on the classification system of BS5930, adopting modified plasticity index values (based on percentage passing 425μm sieve).

Volume change potential of fine soils on change of moisture content has been assessed using guidance provided in NHBC Standards/BRE Digest 240 - Part 1.

Equivalent approximate undrained shear strengths (c_u) and equivalent approximate coefficients of volume compressibility (m_v) have been calculated from recorded SPT N values, adopting $f_1$and $f_2$values respectively (based on CIRIA 143)appropriate to the recorded plasticity.

The angle of shearing resistance (⌧) of the coarse soils has been derived from the uncorrected standard penetration resistance N using the relationship published by Peck et al (1967).

Because of the nature of the investigation techniques employed, it is difficult to determine with accuracy the Grade of the structured Chalk (structureless Chalk can be generally reasonable accurately graded based on visual observation of disturbed samples), which is best determined from significantly more costly, rotary cored boreholes. Therefore, the Chalk Grades assigned to the structured Chalk strata are based on visual observations of the recovered material and engineering judgement concerning the in situ fracture spacing and aperture.

8.2 Made Ground

The made ground is inherently variable and as such representative values of geotechnical properties are impracticable to determine. On this basis, limited laboratory geotechnical testing has been undertaken on it.

SPT 'N' values (uncorrected for overburden pressure) in the granular made ground deposits at a depth of 1.0m bgl ranged from to 5 to 8 indicating a loose density and angles of friction of approximately 28° -29°.

SPT 'N' values (uncorrected for overburden pressure) in the cohesive made ground deposits, at depths of 1.0m to 2.0m bgl, ranged from 4 to 29, equating to approximate shear strengths of 18kPa to 131kPa, indicating a very low to high undrained shear strength classification (BS5930).

A single atterberg limits test was undertaken on a sample of cohesive made ground, the natural moisture content was 21% with a modified plasticity index of 13%. On this basis, the soil is classified as intermediate plasticity (CI soil) and of low swelling/shrinkage potential on change of moisture content.

Sulphate (SO_4) analysis on the made ground recorded a level of 0.06 l^{-1} and pH value of 7.7.

8.3 Alluvium

Atterberg limits testing was undertaken on a single sample of the cohesive alluvial soils. The natural moisture content was 17% with a modified plasticity index of 7%. On this basis, the soil is classified as low plasticity (CL soil) and of low swelling/shrinkage potential on change of moisture content.

SPT 'N' values (uncorrected for overburden pressure) in the Alluvium deposits, at depths of 1.0m to 3.0m bgl, ranged from 4 to 13, equating to approximate shear strengths of 18kPa to 58.5kPa , indicating a very low to medium undrained shear strength classification.

8.4 Lowestoft Formation (Glacial Till)

SPT 'N' values (uncorrected for overburden pressure) in the granular glacial deposits, at depths of 2.0m to 4.0m bgl, ranged from 9 to 25 indicating a loose to medium relative density. Angles of shearing resistance based on these results range from 30° to 35°.

SPT 'N' values (uncorrected for overburden pressure) in the cohesive glacial till, at depths of 1.0m to 4.0m bgl, ranged from 6 to 63, which equates to approximate shear strengths of 27kPa to 283.5kPa, indicating a low to very high undrained shear strength classification.

Recorded natural moisture contents in the fine fraction of these materials range from 14% to 21% and modified plasticity indices from 7% to 20%. On this basis these soils are classified as of low to intermediate plasticity (CL to CI soils) and of low to medium swelling/shrinkage potential on change of moisture content.

Atterberg limits testing was undertaken on samples taken from the glacial till described as 'chalky' clay, chalk and very clayey 'chalky' gravelly sand. Recorded natural moisture contents in the fine fraction of these materials range from 12% to 38% and modified plasticity indices were 4%. On this basis these soils are classified as a silt (ML soil) and of low swelling/shrinkage potential on change of moisture content.

Sulphate (SO4) analysis on the Glacial Till recorded levels of <0.01 to 0.02g l-1 and pH values of 7.9 to 8.3.

8.5 Chalk

SPT 'N' values (uncorrected for overburden pressure) recorded in the chalk range from 5 to 39 which, based on published guidance, indicates the chalk to be of a weathering grade Dm/Dc to A.

8.6 Summary

In summary the following geotechnical parameters have been recorded and/or calculated:

Table 8.1 Geotechnical Parameters

Stratum	Moisture Content (%)	Plasticity Index* (%)	Swelling/ Shrinkage Potential	SPT N Values	Angle of friction (Ø) (Deg)	Undrained Shear Strength (kN/m²) SPT
Made Ground	21	13	Low	4 to 29	28 to 29	18 to 131
Alluvium	17	7	Low	4 to 13	-	18 to 58.5
Lowestoft Formation (Glacial till)	14 to 21	7 to 20	Low to intermediate	6 to 63	30 to 35	27 to 283.5
Zig Zag Chalk Formation	-	-	-	5 to 39	-	-

* Modified

9 Geotechnical Assessment

9.1 General

This geotechnical assessment is based on the parameters determined from the field work and laboratory analysis as described in section 8. It presents a geotechnical assessment of possible foundation solutions and infrastructure design; it does not constitute a detailed design report for the proposed development.

The merits of the available options discussed should be reviewed by the foundation/structural engineers.

The proposed development is understood to comprise eight blocks of commercial and light industrial business units and associated access roads, car parking and soft landscaping.

It is anticipated that finished ground levels will be at, or close to, existing ground levels. Should this not be the case then this assessment may need to be reviewed.

9.2 Existing Buried Construction

At the time of writing, the hardstanding on site and concrete slabs below previous building was being broken out and removed as part of the site strip. It is possible that existing buried construction including tanks, sumps, foundations and services will be encountered below the site.

Unless it is to be incorporated within the new development, any old construction encountered should be fully penetrated by all new foundations and broken well away from any new construction.

Any soil disturbed by excavation of foundations, tanks, sumps and services should also be fully penetrated by new foundations.

9.3 Excavations

Excavation to anticipated founding depths should be readily achievable using standard excavation plant. However, excavation through any buried construction may require heavy-duty excavation plant.

Instability of excavation faces was not noted during excavation of the trial pits, however random and sudden falls should be expected from the faces of near vertically sided excavations put down at the site. This situation is likely to be prevalent in the made ground and low strength natural fine soils and is likely to be exacerbated by water inflows.

Temporary trench support, or battering of excavation sides, is likely to be required for all excavations that are to be left open for any length of time, and will definitely be required where man entry is required.

Particular attention should be paid to excavation at, or close to, site boundaries and adjoining existing roads/structures/buildings, where collapse of excavation faces could have a disproportionate effect.

A risk assessment of the stability of any open excavation should be undertaken by a competent person and appropriate measures adopted to ensure safe working practise in and around open excavations. Further guidance on responsibilities and requirements for working near, and in, excavations can be obtained from the Construction Design and Management Regulations (2015).

Recorded groundwater levels are generally shallow. Based on site observations, it is considered that sump pumping is likely to be sufficient to deal with anticipated flows. However, it should be recognised that groundwater levels will fluctuate seasonally and the timing of construction may dictate the extent of groundwater control required.

Any water pumped from excavations is likely to need to be passed via settlement tanks before being discharged to the sewer; discharge consents will also be required.

9.4 Foundations

The appropriate foundation solution adopted for the site will depend not only on ground conditions, but also on structural loading, load distribution and the limiting criteria for movement or settlement of the buildings, which may have high specification finishes and unevenly distributed loadings so that settlement, and particularly differential settlement, will need to be maintained within tight tolerances.

The made ground and soft Alluvium deposits are considered unsuitable in their present condition for use as founding soils on the basis of their relatively low strength and high compressibility and should be fully penetrated by all new foundations.

The ground conditions at the site vary significantly and foundation types and depths will depend on the depth of made ground and soft alluvial deposits, underground obstructions and the variability of soils laterally across the building footprints.

9.4.1 Pad Foundations

Pad foundations are considered suitable for the proposed development where founding into firm to stiff Lowestoft Formation and alluvial deposits or structureless Zig Zag Chalk Formation deposits for blocks B, C, D, G and H in the south and east and based on the design soil parameters provided in earlier sections of this report, as a guide, an allowable net bearing capacity of 130kPa should be available for a $1m^2$ pad at 1.0m depth or 140kPa for a $1m^2$ pad foundation at 2.0m depth. Alternatively an allowable net bearing capacity of 115kPa should be available for a $2m^2$ pad at 1.0m depth or 130kPa for a $2m^2$ pad foundation at 2.0m depth. Table 9.1 shows a summary of suitable founding depths for each block.

Table 9.1 Summary of suitable foundation depths by block

Block	Suitable founding depth (m bgl)	Strata description
B	2.4	Sandy gravelly clay
C	1.6	Gravelly clay
D	1.0	Gravelly clay
G	2.8 (or piles)	Sandy gravelly silt (north) Structureless chalk (south)
H	1.0	Gravelly clay

These values should result in total settlements of not more than 25mm, keeping differential settlements within acceptable limits. NB should enlarging the pads be considered (for example because loads are such that the quoted bearing pressure is inadequate based on the size of foundation identified) this will probably lead to increased settlements and the above recommendations should be reviewed.

9.4.2 Piled Foundations

In the west and north of the site, made ground and soft alluvial deposits have been encountered at depths greater than 2.0m bgl and in the southwest corner at depths greater than 3.0m bgl. Due to the variability and poor consolidation characteristics of these deposits, it is unlikely that traditional pad foundations will be suitable and therefore piled foundations are recommended for blocks A, E and F. Either pad foundations or piles are considered suitable for block G in the southwest. Driven piles should be suitable for this site. However, the choice of piling system and detailed design of piles are beyond the scope of this report and should be undertaken the specialist piling contractor taking into account the following considerations.

Obstructions in the ground, such as old foundations can cause piles to stop at shallower than design depth, or deviate from the vertical, thereby reducing their capacity

Groundwater was observed during the boring of the intrusive holes and temporary casing may be required for bored piles unless CFA piles with placement of concrete as the pile is withdrawn, are used.

Piles should extend a minimum of five pile diameters into the bearing stratum to fully mobilise end-bearing resistance

The made ground and natural low strength soils will provide only minimal lateral resistance and piles should be designed to be sufficiently rigid, and to have sufficient embedment into the founding soils to minimise the risk of unacceptable lateral movement

Piles should be designed adopting the parameters and recommendations provided in earlier sections of this report and CIRIAC574.

9.5 Ground Improvement

The made ground and alluvial deposits are considered unsuitable in their present condition for use as founding soils and it is recommended that they be treated in situ to improve their bearing characteristics to allow shallow foundations to be constructed upon them.

Vibrotreatment may not be suitable at the site due to high organic content in the alluvial deposits. It is understood that discussions are currently taking place into the feasibility of improving the ground using Controlled Modulus Columns (CMC).

9.6 Ground Floor Slabs

Suspended and ground bearing slabs should be suitable for use at the site. Ground floor slabs should be employed in conjunction with a suitable gas protection scheme due to the presence of made ground and ground gases at the site.

Following site preparation/regrading it is anticipated that made ground will remain below floor slabs. This material is likely to be mixed and variable and generally of relatively low strength. It is recommended that it be re-engineered through excavation and sorting to remove any oversize or otherwise unsuitable materials prior to recompaction or replacing with a granular fill.

9.7 Pavement Construction

Following site preparation and regrading the sub-grade will comprise made ground and natural clays.

The made ground is mixed and variable and it is recommended that, where encountered at formation level, these deposits be excavated rolled. The excavated material should be sorted to remove any oversize or otherwise unsuitable materials, prior to recompacting. Any deficit in material should be made up in suitable imported material suitably compacted as above. Following this treatment an overall design CBR of 2% should be available.

To improve upon the design CBR values of the sub grade the following options could also be considered:

- Lime or cement stabilisation will improve design CBR values significantly and could be considered in order to reduce capping and or sub-base thicknesses.
- Use of geogrid support layers in capping/sub base layer.
- Use of crushed concrete from on site as capping.

9.8 Below Ground Concrete Design

Based on the results of the pH and water soluble sulphate determinations on soil samples and in accordance with the categorisation system of BRE Special Digest 1, the soils below the site fall within Design Sulphate Class DS-1 with a corresponding ACEC Class of AC-1.

9.9 Soakaway Potential

Soakaway testing was undertaken as part of the investigations in 2008 and 2017, the results are presented in Appendix E. Based on these results a 'design' infiltration rate of 3.04E-04m^2/hr should be recommended.

The Environment Agency are unlikely to accept soakaways discharging into made ground and discharge should be below the made ground into the natural soil.

Concentrated ingress of water into the chalk can initiate new dissolution features, particularly in low-density chalk and destabilise the loose backfill of existing ones. Infilled dissolution feature have not been identified at the site, however based on the CIRIA guidance, soakaways should be avoided in areas where dissolution features are known to be prevalent if at all possible but, if unavoidable, should be sited at least 20m away from any foundations. The type of soakaway adopted and their locations should be discussed with a Building Control approved inspector to obtain their requirements in terms of Building Regulations.

9.10 Reuse of Materials

The made ground below the site is considered unsuitable in its present condition for re-use as fill at the site on the basis of the recorded contamination/that it contains significant volumes of unsuitable materials.

Excavated natural fine soils are considered are considered unsuitable for re-use as fill at the site due to their low strength/high compressibility. Excavated natural coarse soils are considered suitable for re-use as fill at the site below areas of hard-standing or buildings following sorting to remove any deleterious, oversize or otherwise unsuitable materials.

Excavated natural heavily weathered (Grade D) Chalk soils are considered unsuitable for re-use as fill at the site due to their relatively low strength and likely high compressibility. Excavated Grade C and above Chalk should be suitable for re-use as fill at the site. However, it should be noted that chalk is highly susceptible to wetting and overworking, which can quickly render otherwise suitable materials unsuitable.

10 Assessment of Soil Chemical Data

The following sections include data from the previous investigations by MLM in 2007 and 2008 alongside data from the recent investigation in July 2017. All data will be compared against current guideline screening values.

10.1 Guidelines

This section presents a generic quantitative risk assessment (GQRA) to identify potential sources of contamination for further evaluation in the Contaminated Land Risk Assessment section of the report. GQRA involves a comparison of chemical laboratory test results to soil screening levels that are considered to be appropriate to the context of the intended site use.

Soil screening values used in this human health risk assessment have been drawn from the following publications:

- Suitable for Use Levels (S4ULs) were published in 2015 by Land Quality Management Ltd (LQM) and the Chartered Institute of Environmental Health (CIEH). S4ULs are based on the principles of 'minimal' or 'tolerable' risk and are therefore sufficiently conservative for GQRAs under the planning regime, which need only demonstrate that new development is 'safe' and 'suitable for use'. By reproducing these S4ULs, MLM acknowledges "Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3184. All rights reserved".
- Category 4 Screening Levels (C4SLs) were published in 2014 by Defra and have been used for lead, which has no S4UL.
- There is no S4UL for cyanide and, in the absence of UK guidance, a Dutch Intervention Value (DIV) of 50mg/kg has been used.
- Generic Assessment Criteria (GAC) were published jointly in 2009 by the Environmental Industries Commission, Association of Geotechnical and Geoenvironmental Specialists and Contaminated Land: Applications in Real Environments (EIC/AGS/CL:AIRE) for a range of organic and inorganic contaminants not covered by S4ULs.

A full list of screening levels used in the assessment is included in Appendix F.

Appropriately sensitive testing methods have been adopted throughout and on this basis, where contaminants are recorded at less than detection limits, they are considered to be 'not present'.

10.2 Risks to Human Health

The development proposals are for commercial and light industrial and for the purpose of this human health risk assessment the intended land use scenario is considered to be commercial.

Soil organic matter tests in samples of made ground gave values of between 0.60% and 2.1% with a mean of 1.3%, therefore a generic SOM of 1% has been used for selecting appropriate screening levels.

Table 10.1 below provides a summary of the measured contaminant concentrations above screening levels. Results below screening levels are not presented in the table and further assessment of these contaminants is not considered to be necessary.

Table 10.1 Results Exceeding Human Health Screening Levels

Contaminant	Screening Level	Number Tested	Location Exceeding (loc., depth, conc., soil)
Aliphatic TPH >C10 - C12	9700	17	WS113 (0.40m, 16000, MG)*

All concentrations in mg/kg
MG denotes made ground

*The contamination testing undertaken on soil samples in 2008 measured TPH in broader faction bands than the screening values published in current guidance. We have therefore conservatively compared historic TPH banded results to the lowest screening value that is most protective of human health.

10.3 Nature and Distribution of Soil Contamination

TPH contamination was identified in one location (WS113) at the southeast end of the main building on site. This contamination was in a 0.31m thick layer of made ground associated with hydrocarbon odour. There was no evidence of hydrocarbon odour in soil in the deeper made ground or in the underlying chalk.

11 Assessment of Groundwater Chemical Data

11.1 Guidelines

The site is underlain by a Principal Aquifer and therefore the results of the analyses have been compared to the UK Drinking Water Standards (DWS).

The site is bordering a drainage ditch and therefore the results of the analyses have also been compared to Environmental Quality Standards (EQS). Where there are no EQS for a contaminants of concern reference will be made to appropriate alternatives.

EQS for some metals are banded according to water hardness. Water hardness values ranging from 280 to 370 $CaCO_3$/l have been recorded and for the purposes of this assessment the EQS values for the >250 mg $CaCO_3$/l range have been adopted.

11.2 Groundwater

Tables 11.1 and 11.2 below provide a summary of the contaminant concentrations recorded above DWS and EQS. Results below DWS/EQS are not presented in the table and further assessment of these contaminants is not considered to be necessary.

Table 11.1 Groundwater Results Exceeding DWS

Contaminant	DWS	2007 (location, conc., depth, stratum)	2008 (location, conc., depth, stratum)	2017 (location, conc., depth, stratum)
Arsenic	10	WS3 (13, 3.26m, ZZC)	WS113 (26.6, 0.51, MG)	-
Mercury	1.0	WS3 (4.1, 3.26m, ZZC) WS5 (4.4, 1.98m, AL) WS6 (2.1, 2.54m, LF)	-	WS202 (1.1, 3.59m, ZZC)
Selenium	10	WS3 (14, 3.26m, ZZC)	-	WS201 (12, 3.29m, ZZC) WS202 (18, 3.59m, ZZC)
Nickel	20	-	WS113 (69.7, 0.51m, MG)	-
TPH	10	-	WS113 (5200, 0.51m, MG)	-

All concentrations in µg/l
MG denotes Made Ground
AL denotes Alluvium
LF denotes Lowestoft Formation
ZZC denotes Zig Zag Chalk Formation

Table 11.2 Groundwater Results Exceeding EQS

Contaminant	EQS	2007 (location, conc., depth, stratum)	2008 (location, conc., depth, stratum)	2017 (location, conc., depth, stratum)
Copper	28	WS3 (100, 3.26m, ZZC)	WS113 (80.8, 0.51m, MG)	-
Mercury	1.0	WS3 (4.1, 3.26m, ZZC) WS5 (4.4, 1.98m, AL) WS6 (2.1, 2.54m, LF)	-	WS202 (1.1, 3.59m, ZZC)
TPH	30	-	WS113 (5200, 0.51m, MG)	-

All concentrations in µg/l
MG denotes Made Ground
AL denotes Alluvium
LF denotes Lowestoft Formation
ZZC denotes Zig Zag Chalk Formation

11.3 Nature and Distribution of Soil Leachate and Groundwater Contamination

In the 2007/2008 investigations, groundwater contamination in excess of DWS and EQS was identified in the southern half of the site in the vicinity of the former large building. By 2017, groundwater contamination in excess of DWS and EQS had reduced and was more localised to an area in the southwest of the former building. The previously identified arsenic, nickel, copper and hydrocarbons are no longer present in 2017 and the extent and concentrations of mercury are greatly reduced.

The overall groundwater flow beneath the site is towards the southwest, suggesting the contamination may not be associated with the historic landfill off-site to the west. Equally, however, there is no evidence of an on-site source of mercury and selenium as levels in soil are relatively low.

12 Assessment of Ground Gas and Organic Vapour Data

This section presents a GQRA to identify potential sources of gas and organic vapour in the ground that could impact on human health.

12.1 Guidelines

The proposed development is commercial and the potential impact of ground gas on development is assessed through the British Standard BS8485:2015 and the Characteristic Situations published by CIRIA.

A generic quantitative risk assessment for organic vapour (v-GQRA) has been undertaken in accordance with the CIRIA VOC Handbook C682 to assess the potential impact on human health from the indoor inhalation of vapour generated by organic compounds in soil. For TPH, the LQM S4ULs are considered to be protective of human health from the indoor inhalation of hydrocarbon vapour.

12.2 Screening Assessment – Ground Gas

Fourteen visits to site have been made following site work (four visits in 2007, four in 2008 and six in 2017). A summary of site maximum monitoring results are presented in Table 12.1 below from which Gas Screening Values (GSVs) have been calculated.

Table 12.1 Site Maximum Gas Concentrations and Flow Rate

Parameter	Maximum 2007	GSV 2007	Maximum 2008	GSV 2008	Maximum 2017	GSV 2017
Methane	81.8%	0.654 l/hr	78.1%	1.95 l/hr	66.0%	3.17 l/hr
Carbon dioxide	5.8%	0.0464 l/hr	5.8%	0.145 l/hr	5.8%	0.278 l/hr
Flow rate	0.8 l/hr		2.5 l/hr		4.8 l/hr	

An initial screening assessment on the most recent data from 2017 places the site in a CIRIA Characteristic Situation CS3 for methane ground gas and CS2 for carbon dioxide ground gas. However, the levels of methane are significantly greater than 1% and the GSV is at the upper limit for CS3, therefore the Characteristic Situation for methane is raised to CS4.

12.3 Screening Assessment – Organic Vapour

Based on soil test results, S4ULs for TPH compounds in soil are exceeded, which indicates that there is a potential risk to human health for the inhalation of vapour generated by organic compounds in soil.

12.4 Nature and Distribution of Ground Gas and Organic Vapour Contamination

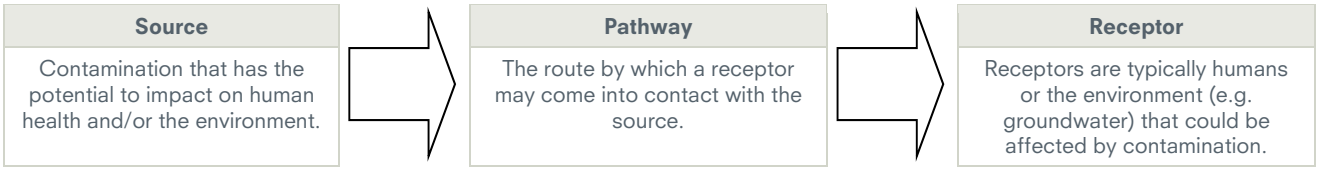
Elevated concentrations of methane were recorded in boreholes located along the western boundary, nearest to the historic landfill offsite to the west.

Levels of methane show a trend in reduction between 2007 and 2017, however longer term monitoring would be required to establish if this a truly reducing source term.

13 Contaminated Land Risk Assessment and Conceptual Site Model

13.1 General Approach

The assessment of risk from contamination follows the source-pathway-receptor (SPR) approach. Each of these elements is described as follows.



Without a source-pathway-receptor linkage in place, it is considered that there is no risk of harm and remediation is unlikely to be required. If, however, there is a linkage between source and receptor then a risk-based approach is used to assess the significance or potential impact of the SPR-linkage to determine if remediation is required.

Such an assessment involves Quantitative Risk Assessment (QRA). The QRA process involves the identification of sources based on site investigation findings (eg compound concentration exceeding S4UL) together with identification of the exposure pathway and sensitive receptor. A Conceptual Site Model (CSM) is then developed and presented that shows the possible pollution linkages.

In terms of identifying *significant* pollution linkages (i.e. those that require remediation), a level of risk (ranging from Very Low to Very High) is assigned to each. Where the level of risk is 'Moderate' or greater, then the pollution linkage is considered to be 'significant' and remediation is required. Risk definitions are provided in Appendix G.

13.2 Identified Contamination Sources

Based on the GQRA presented in the previous sections, sources of contamination that could impact on receptors have been identified and are summarised in Table 13.1 below.

Table 13.1 Residual Sources of Contamination in 2017

Receptor type	Source
Human health	Hydrocarbons in made ground Methane and carbon dioxide ground gas
Groundwater	Mercury and selenium in groundwater
Surface waters	Mercury in groundwater

13.3 Potential Pollution Linkages

Table 13.2 below presents a review of potential pollution linkages for the site.

Table 13.2 Potential Sources, Exposure Pathways and Receptors

Receptor	Pathway	Notes	SPR Link
Human Health			
Future site users	Dermal contact, ingestion or inhalation of soil and soil dust	Site users could come into contact with contaminated soils in landscape areas and screening levels are exceeded.	✓
	Migration in permeable strata and inhalation of gas/organic vapour	Ground gas could enter new buildings and accumulate. Gas monitoring has recorded elevated methane, carbon dioxide and gas flow.	✓
	Migration in permeable strata, accumulation and risk of explosion	Ground gas could enter new buildings and accumulate. Gas monitoring has recorded elevated methane and gas flow.	✓
Adjacent site users	Ingestion/inhalation of windblown dust	Residential properties are located adjacent to the site and screening levels are exceeded.	✓
Construction workers and services maintenance staff	Dermal contact, ingestion or inhalation of soil and soil dust	Construction workers may come into contact with contaminated soil during site works and screening levels are exceeded.	✓
Development			
Future plant life	Plant uptake in garden or landscape area	See section 12.5.	-
Water supply pipes	Contact with contaminated material	See section 12.6.	-
Environment			
Surface water: Drainage ditch along western boundary	Surface runoff	The site will be capped with hardstanding and buildings	✘
	Groundwater movement	Groundwater contamination is in excess of EQS and could be in hydraulic connection with the drainage ditch	✓
Groundwater: Superficial aquifer	Leaching from soil and vertical fluid movement	Superficial deposits are designated as unproductive strata	✘
Groundwater: Bedrock Principal aquifer	Leaching from soil and vertical fluid movement	Groundwater contains mercury and selenium in excess of DWS	✓

Potentially complete SPR linkages are carried forward for further assessment in Table 13.3.

13.4 Phase 2 Updated Conceptual Model

Based on the sources, pathways and receptors identified above, Table 13.3 below summarises all complete pollutant linkages for the site and identifies the level of risk from each.

Table 13.3 Risk Estimation Table

Source	Area Affected	Contaminants	Pathway	Receptor	Likelihood	Potential Magnitude	Overall Risk	Justification and/or Mitigating Factors
Made Ground	Southeast	TPH	Ingestion, dermal contact and fugitive inhalation	Site users	Unlikely	Medium	Low	Site will be capped by buildings and hardstanding.
				Site construction/ maintenance workers	Likely	Medium	Moderate	Exposure to contaminated soils could occur during construction and ground works.
				Adjacent site users	Low	Medium	Low	Contaminated soil dust could reach neighbouring residential development to the south during construction and ground works
	Southwest	Mercury and Selenium	Leaching or vertical fluid movement	Groundwater (bedrock aquifer)	Likely	Medium	Moderate	DWS are exceeded in groundwater.
		Mercury	Groundwater movement	Surface water	Likely	Medium	Moderate	EQS are exceeded in groundwater.
Off site landfill	West	Ground gas (Methane)	Migration and explosion	Site users and structures	Likely	Severe	High	Characteristic Situation CS4 for methane.
		Ground gas (Carbon dioxide)	Inhalation	Site users	Low	Medium	Low	Characteristic Situation CS2 for carbon dioxide.
				Site construction/ maintenance workers	Low	Medium	Moderate	Carbon dioxide >5% and could accumulate in deep excavations and services voids.

14 Remediation and Risk Management

14.1 General

This assessment has identified potential hazards at the site with possible SPR-linkages, which could represent potentially unacceptable risks to identified receptors.

Mitigation of the SPR-linkages summarised in Table 13.3 is recommended to reduce the impact of contamination on site occupants.

The following is for guidance only and does not represent final design of a remediation scheme. Remediation schemes can require the submission of a remediation strategy and verification plan to the Local Authority and/or Environment Agency.

14.2 Soil Remediation

On the basis of the GQRA and CSM, the following soil remediation is considered to be required.

Table 14.1 Summary of Recommended Soil Remediation and Mitigation

Aspect	Description
Direct contact by construction workers	Construction workers should be provided with suitable PPE when dealing with potentially contaminated soils.
Direct contact by future maintenance workers	Bedding, backfill and surround to all services constructed in clean imported materials such that installation of new pipework and future maintenance is in clean soil.

14.3 Groundwater Remediation

DWS and EQS are exceeded by a small margin for selenium and mercury, however the results over the past ten years (2007-2017) suggest a reducing source term. Groundwater treatment will almost certainly be ineffective against such low concentrations and is not proposed.

14.4 Gas and Organic Vapour Protection

The site is CS4 for methane and CS2 for carbon dioxide and gas protection is therefore required. The development will include industrial (Type D) buildings and gas protection should achieve a minimum BS8485:2015 solution score of 3.5, taking into account proposed construction.

Hydrocarbon vapour protection is required for new buildings, however this can be fulfilled as part of the proposed gas protection.

14.5 Water Supply Pipework

Certain contaminants in soil can have an adverse effect on the quality of drinking water in pipework constructed underground.

The UKWIR publication 10/WM/03/21, *Guidance for the selection of water supply pipes to be used in brownfield sites*, provides developers and water companies with criteria against which the results of soil testing can be compared as part of design. It should be noted that the scope of testing in the guidance exceeds what is required from a contaminated land investigation based on previous site use.

It is advised therefore that this report is provided to the water company who, in turn, will advise on appropriate materials to be used in the water supply network.

In the absence of testing or feedback from the water supply company, it should be assumed that barrier pipe construction is required on all brownfield sites or where pipework will pass through made ground soil whose chemical quality will be compromised compared to natural soil.

14.6 Off Site Disposal

All waste soils which are to be removed from site (e.g. foundation arisings) need to be classified in terms of waste disposal prior to export.

The proposed receiving landfill site should be provided with a copy of the laboratory test results, including the results of any waste acceptance criteria (WAC) testing in order to confirm the waste classification and that they are suitably licensed to accept the waste.

Some additional testing may be necessary for the receiving landfill site to confirm its ability to accept the waste.

Natural soils from an uncontaminated site (excluding peat and topsoil) would normally be disposed of at an inert landfill without the need for further testing.

Non-hazardous soils require pre-treatment prior to disposal. Effective pre-treatment, involving separation, sorting and screening can offer cost reductions. Costs for disposal of non-hazardous and hazardous soils are significant compared to disposal of inert material.

14.7 Remediation Documentation

Based on the findings of this report, remediation is considered to be required and under the conditions of planning, a remediation strategy and verification plan may need to be submitted to the planning authority.

14.8 Construction Health and Safety

It is recommended that construction workers at the site adopt appropriate personal hygiene precautions at the site and use personal protective equipment as required, particularly provision of washing facilities, wearing of gloves and avoidance of hand to mouth contact (e.g. eating or smoking), especially when dealing with made ground.

Handling of soil and water should be minimised and dust suppression measures should be implemented, particularly during any excavation through the made ground. Soils should be dampened during excavation and handling to limit dust, and lorries suitably sheeted. Surface run-off from vehicle washing, dust suppression or storms, during construction, should be controlled to prevent entry into watercourses and off-site drainage systems.

Gas and vapour monitoring should be carried out before entry into deep excavations or confined spaces.

These precautions are considered to be industry standard when developing sites of this nature, and reference can be made to the HSE document HSG66 *Protection of workers and the general public during development of contaminated land* for further information.

14.9 Land Remediation Relief

At the time of writing, Land Remediation Relief (LRR) is a 150% credit on corporation tax claimable by certain corporate bodies against qualifying expenditure when undertaking investigation and remediation of potentially contaminated or derelict sites.

Contamination requiring remediation has been identified and there may be potentially qualifying expenditure.

15 Summary and Recommendations

The site is underlain by made ground over superficial Alluvium and Lowestoft deposits, which in turn overlie soils identified as Zig Zag Chalk Formation. Existing construction including foundations, services and tanks is likely to be present as a result of the previous development of the site.

15.1 Geotechnical

Pad foundations are considered suitable for the proposed development where founding into the firm to stiff Lowestoft and Alluvial deposits of structureless Zig Zag Chalk Formation for blocks B, C, D, G and H, at depths of 1.0m to 2.8m bgl

An allowable net bearing capacity of 130kPa should be available for a $1m^2$ pad at 1.0m depth or 140kPa for a $1m^2$ pad foundation at 2.0m depth. Alternatively an allowable net bearing capacity of 115kPa should be available for a $2m^2$ pad at 1.0m depth or 130kPa for a $2m^2$ pad foundation at 2.0m depth. These values should result in total settlements of not more than 25mm, keeping differential settlements within acceptable limits. In the west and north of the site, deep made ground and soft alluvial deposits are present. These deposits are not considered suitable founding deposits for pad foundations and therefore piled foundations are recommended for blocks A, E, F and G.

Either deeper pad foundations or piles are considered suitable for block G in the southwest.

There is likely to be adequate infiltration capacity for soakaway drainage at the site, though the ground conditions including the presence of made ground, contamination in soil and the potential for new dissolution features forming in chalk should be taken into account when designing a suitable drainage system for the site.

Excavated natural soils are unlikely to be suitable for re-use at the site.

Existing buried construction should be fully penetrated by, and broken away from new foundations.

Ground floors may need to be suspended due to the thickness of made ground and low strength soils. Buried construction should be broken away from the slab to avoid interaction.

Following the surfacing strip an overall design CBR of 2% should be available on the made ground following treatment and natural fine soils, following proof rolling of the formation.

The soils at the site fall within Design Sulphate Class DS-1 with a corresponding ACEC Class of AC-1.

15.2 Residual Contamination in 2017

Hydrocarbons in made ground in the southeast exceed screening levels for future commercial use.

Groundwater contains mercury and selenium above DWS and mercury above EQS. These exceedances are however marginal and the remediation of low levels of metals in groundwater is likely to be highly ineffective and is not therefore proposed.

Based on extensive monitoring, the site is Characteristic Situation CS4 for methane and CS2 for carbon dioxide. Levels of methane have reduced over the past ten years (2007-2017).

Recommended remediation and mitigation could include:

- Gas protection achieving a BS8485:2015 solution score of 3.5 in buildings (possibly in combination with in-ground venting along the western boundary)
- Hydrocarbon vapour protection incorporated into gas protection measures
- Installation of services in corridors of clean soil

- Protection of site workers and the general public during construction

This report should be presented to the water supply company to assist in their selection of materials for potable water supply pipework.

15.3 Further Work

A current tree survey is required to determine the potential influence of trees adjacent to the site, to the proposed foundation solution.

A remediation strategy and verification plan may need to be submitted to the planning authority.

Materials destined for off-site disposal to landfill may require further assessment in accordance with WM3 to determine their waste classification. Waste acceptance criteria testing may also be required by the receiving landfill site in order to confirm they are suitably licenced to accept the waste.

If materials are to be re-used on site, a materials management plan may be required in accordance with the CL:AIRE Definition of Waste: Development Industry Code of Practice in order to demonstrate that the material is not a waste.

16 References

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7 British Standards Institution (2011) Investigation of potentially contaminated sites - code of practice. BS10175:2011.

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14 Building Research Establishment (2003) Soakaway Design. BRE Digest 365.

15 CIRIA (1995) The standard penetration test (SPT). Methods and use. CIRIA Report C143.

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23 Health and Safety Executive (1991) Protection of workers and the general public during the development of contaminated land.

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25 Land Quality Management Ltd (2015) The LQM/CIEH S4ULs for human health risk assessment.

26 National House Building Council (2007) Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present.

Figures

548400 548700 549000 549300 549600

251100 250800 250500 250200 249900 249600

N W MLM E S

North Farm

SITE

WEST WAY

GROVE ROAD

MIDDLE WAY

EAST WAY

Deal Grove

BROADMEADOW

WAKELIN AVENUE

WOODLAND ROAD

EDINBURGH AVENUE

PRINCESS DRIVE

ASHLEY WAY

ASHLEY WAY

DEAL GR

EDINBURGH AVENUE

QUEENSWAY

SAWSTON ROAD

LYNTON WAY

TOWER ROAD

BABRAHAM ROAD

PW

CAMBRIDGE ROAD

ECCLES CLOSE

Police Station

THE LIMES

ROE'S CL

HILLSIDE

SUNDERLAND AVENUE

HUNTINGDON ROAD

SAFFRON ROAD

Education Facility

CHURCHFIELD AVENUE

DALE WAY

FALKNER ROAD

SAINFOIN CL

THE GREEN ROAD

HENRY MORRIS ROAD

PLANTATION

0 80 160 320 Meters

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: METER
NOTE: SITE BOUNDARY IS APPROXIMATE TO SHOW SITE LOCATION ONLY

MLM. Group

Project

DALES MANOR BUSINESS PARK, SAWSTON

SITE LOCATION PLAN

Job No.
775322

Figure No.
1

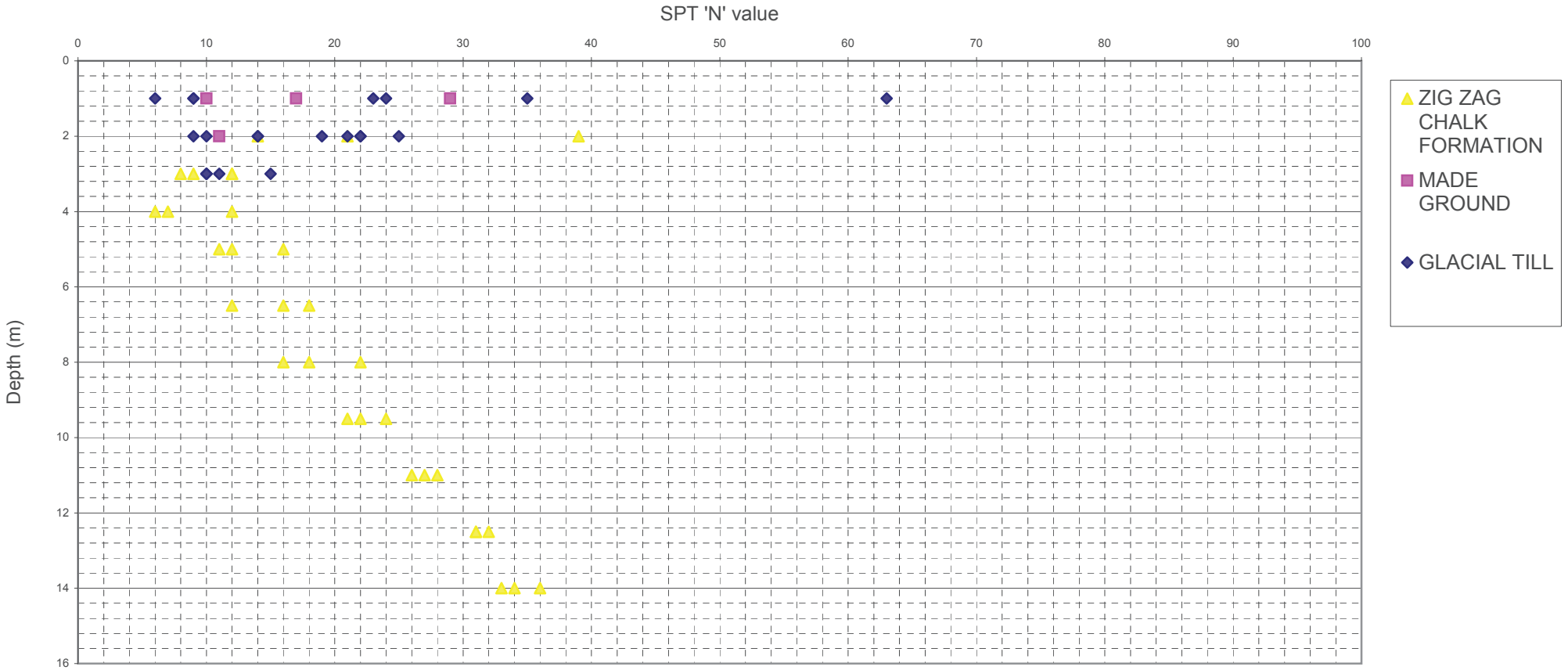
SPT 'N' VALUE vs DEPTH PLOT

Figure: 2

Site: Dales Manor Business Park

Location: Sawston, Cambridgeshire

Job No. 721750

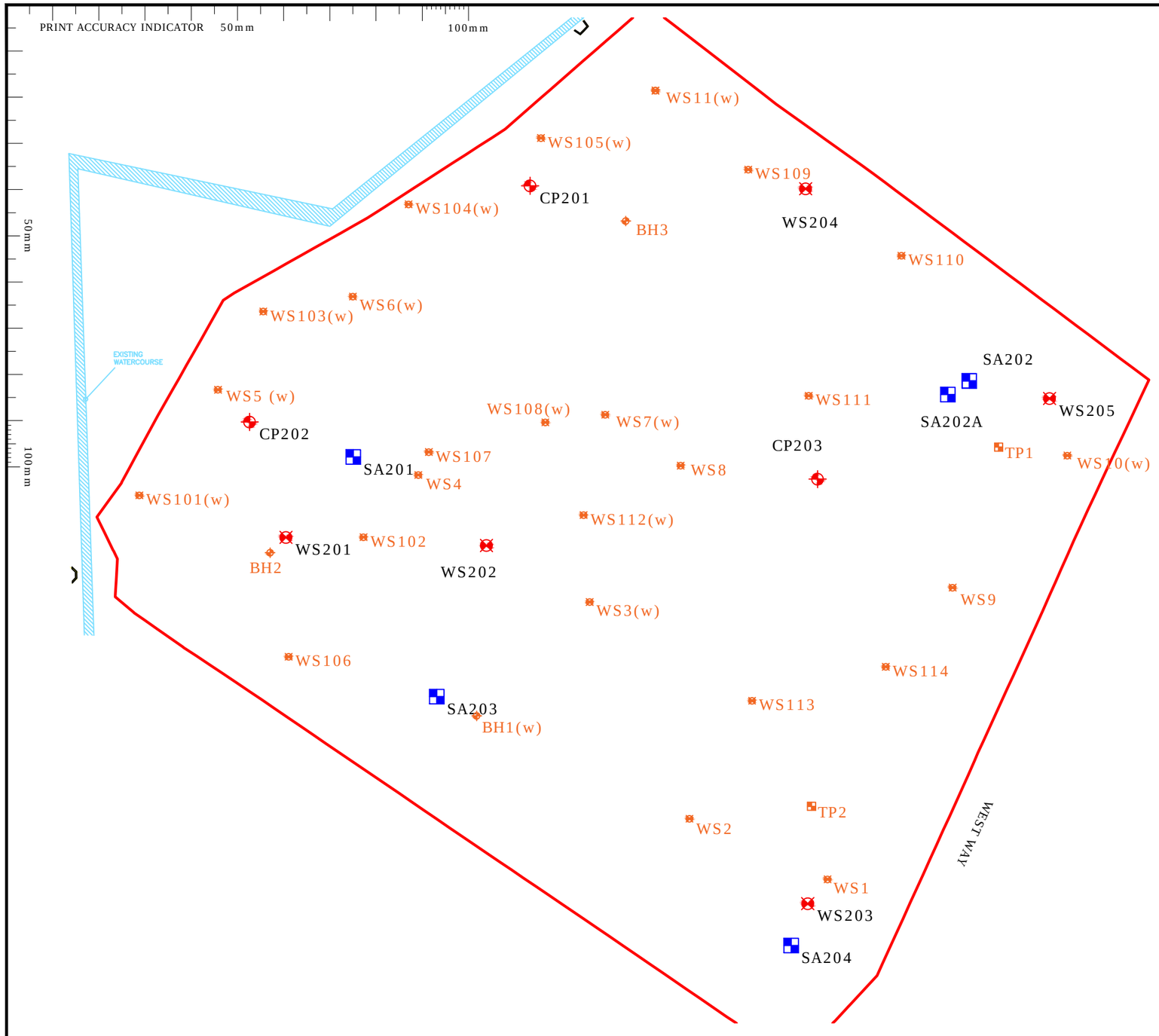


Drawings

775322-DWG-ENV-001 Exploratory Hole Location Plan

16088-SK011-N Proposed Site Plan, Woods Hardwick

PRINT ACCURACY INDICATOR 50mm 100mm



NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM MLM PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.
3. BASE PLAN PROVIDED BY THE CLIENT.

LEGEND

2017 INVESTIGATION

CP201	CABLE PERCUSSION BOREHOLE LOCATION
SA201	SOAKAWAY TEST LOCATION
WS201	WINDOWLESS SAMPLER BOREHOLE LOCATION

2008 INVESTIGATION

BH1(w)	CABLE PERCUSSION BOREHOLE LOCATION
WS113	WINDOWLESS SAMPLER BOREHOLE LOCATION
TP2	TRIAL PIT LOCATION

REV	DATE	REVISION	MADE	CHK	APP
-	19.07.2017	-	AT	WF	MH

DRAWING STATUS

FINAL ISSUE

MLM Group

Building 7200,
Cambridge Research Park,
Cambridge, CB25 9TL
Tel: 01223 632800
Website: www.mlmgroup.com

CLIENT

SALMON DEVELOPMENT LIMITED

PROJECT

DALES MANOR BUSINESS PARK, SAWSTON

DRAWING TITLE

EXPLORATORY HOLE LOCATION PLAN

DRAWN/DESIGN	MLM REF	REVISION
AT	775322	-

SCALE 1:1000 @A3

PROJECT 775322-DWG-ENV-001

SUBJECT TO PLANNING

Notes

1. Contractors must check all dimensions on site. Only figured dimensions are to be worked from. Discrepancies must be reported to the Architect or Engineer before proceeding. © This drawing is copyright
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KEY

- CYCLE STAND (CAMBRIDGE CYCLE SHELTER INCLUDING TYPE B - 8 CYCLE RACK)
- SEATING (REFER TO LANDSCAPE ARCHITECTS DRAWINGS FOR DETAILS)
- FOOTPATHS 80mm. CONCRETE BLOCK PAVING & PCC KERBS
- PAINTED RESTRICTED PARKING ZONE (WHITE THERMOPLASTIC PAINT)
- GRAVEL FOOTPATH WITH CONCRETE PCC KERBS
- SOFT LANDSCAPING (REFER TO LANDSCAPE ARCHITECTS DRAWINGS FOR DETAILS)
- TARMAC FOOTPATH TO MATCH EXISTING
- + 21.79 EXISTING GROUND LEVELS
- GL 22.00 PROPOSED EXTERNAL GROUND LEVELS
- FFL 22.00 PROPOSED FINISHED FLOOR LEVELS
- ARMCO BARRIER

ALL AREAS ARE GROSS INTERNAL

BLOCK	UNIT	GROUND FLOOR GIA		FIRST FLOOR GIA		TOTAL GIA	TOTAL GIA
		SQ. FT.	SQ. M.	SQ. FT.	SQ. M.	SQ. FT.	SQ. M.
A	1	5936	551	732	68	6668	619
	2	5936	551	732	68	6668	619
B	3	7814	726	789	73	8603	799
	4	4811	447	807	75	5618	522
C	5	3765	350	596	53	4361	405
	6	1830	170	---	-	1830	170
	7	1830	170	---	-	1830	170
	8	1830	170	---	-	1830	170
	9	1830	170	---	-	1830	170
	10	3070	285	---	-	3070	285
D	11	3795	352	632	59	4427	412
	12	6343	589	632	59	6975	648
E	13	6451	599	643	60	7094	659
	14	6451	599	643	60	7094	659
F	15	3056	284	---	-	3056	284
	16	1484	138	---	-	1484	138
	17	1484	138	---	-	1484	138
	18/19	3466	322	---	-	3466	322
G	20	3231	300	---	-	3231	300
	21	1484	138	---	-	1484	138
	22	1484	138	---	-	1484	138
	23/24	3433	319	---	-	3433	319
H	25	10912	1014	910	85	11822	1099
	26	10867	1010	903	84	11770	1094
	27	18304	1701	2502	232	20806	1932
GRAND TOTAL		120907	11234	10503	976	131410	12210

BLOCK	UNIT	TOTAL GEA SQ. FT.	TOTAL GEA SQ. M.
A	1 & 2	14413	1339
B, C & D	3, 4, 5, 6, 7, 8, 9, 10, 11 & 12	43727	4062
E	13 & 14	15432	1433
F	15, 16, 17, 18 & 19	10456	971
G	20,21, 22, 23 & 24	10606	985
H	25, 26 & 27	46959	4363
GRAND TOTAL		141593	13153

SITE AREA -	313,025 sq.ft. 29,081m²
DEVELOPMENT DENSITY (GEA) -	45.2%
CAR PARK RATIO BASED ON GROSS EXTERNAL AREAS (1:50 - MAXIMUM RATIO FOR B2 [263 spaces required])	1/49m² (266 SPACES TOTAL)
DISABLED PARKING - (MINIMUM 5% PROVISION OF OVERALL SPACES)	32 SPACES PROVIDED
CYCLE STAND RATIO BASED ON GROSS EXTERNAL AREAS	158 EXTERNAL (1/83m²)
SURVEYED BOUNDARY FENCING -	

Revision	Description	Drawn	Checked	Date
N	1no. UNIT OMITTED FROM BLOCKS G & H, UNIT NUMBERS AMENDED TO SUIT	DMC	CHW	26-04-17
M	DISABLED SPACES TO UNITS 12 AND 13 RE-LOCATED	mrma	mrma	24-11-08
L	WIND TURBINE ADDED AND SITE SIGNAGE BOARD RE-LOCATED	mrma	mrma	22-09-08
K	OVERALL TOTAL GIA FIGURE CORRECTED	BB	MA	28-08-08
J	TITLE NOTE AMENDED	BB	KDM	20-08-08
H	ACOUSTIC FENCE ADDED, INTERNAL CYCLE STAND RATIO TAKEN OFF	BB	KDM	18-08-08
G	PARKING CONFIGURATION TO BLOCK H AMENDED, CYCLE STANDS AMENDED	MA	MA	05-08-08
F	PARKING CONFIGURATIONS AMENDED, TRACKING DIAGRAMS ADDED	MA	MA	30-07-08
E	GENERAL AMENDMENTS TO SITE LAYOUT	DM	MA	23-07-08
D	SEATING ADDED, CAR PARKING AMENDED	DM	MA	18-07-08
C	ROAD LAYOUT AMENDED, HEDGE PARTIALLY REMOVED, CYCLE STANDS	DM	MA	17-07-08
	RELOCATED, 3.0m CLEARENCE INDICATED FROM BLOCK H TO HEDGE,			
	TRACKING REVISED			
B	DISTANCE FROM EXISTING TREES TO PROPOSED BLOCK H INCREASED,	BB	KDM	02-07-08
	RADIUS IN PROPOSED NEW ENTRANCE AMENDED			
	HEAVY GOODS VECHICLES ACCESS FOR BLOCKS F AND G PROVIDED			
A	GENERAL AMENDMENTS TO SITE LAYOUT	DM	MA	18-06-08

Preliminary ☐ Information ■ Tender ☐ Construction ☐ As Built ☐

Woods Hardwick
Architects, Engineers and Development Consultants

15-17 Goldington Road
Bedford
MK40 3NH
United Kingdom
T. +44 (0)1234 268862
F. +44 (0)1234 353034
mail@woodshardwick.com
www.woodshardwick.com

Title DALES MANOR BUSINESS PARK SAWSTON

Details PROPOSED SITE PLAN

Scale 1:500 @ A1 Date NOV 2017 Drawn BB Chk KDM

16088-SK011-N

Please consider the environment before printing this drawing

Appendix A - Exploratory Hole Logs

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	BH1
Drilling Method:	Cable Percussion
Date of Boring:	Start Date: 03/10/2007
	Finish Date: 04/10/2007
Ground Level:	-
Coords:	-

MLM
www.mlm.uk.com

Issue Status:

IN SITU TESTS/SAMPLING | STRATA | NOTES

Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
0.00	D 1			0.08		0.08	BRICK PAVING.			
0.08	D 2			0.20		0.12				
0.20	D 3			0.50		0.30	Loose brown sand. (MADE GROUND)			
0.50	D 4					0.60				
1.10	D 5			1.10	1.00		Dense red medium brick gravel. (MADE GROUND)			
1.20	U 1									
1.70	D 6									
2.00		(S) N=21 (5,6,7,7,4,3)			2.00		Firm dark grey slightly gravelly CLAY. Gravel is fine to medium angular flint and chalk fragments. (GLACIAL TILL)			
2.50	D 7									
3.00		(S) N=12 (3,2,3,2,3,4)			3.00		Structureless white, brown clayey CHALK. Grade Dc. (ZIG ZAG CHALK FORMATION)			
4.00		(S) N=6 (1,1,1,2,2,1)			4.00					4.10 4.30
5.00		(S) N=12 (1,1,2,3,3,4)			5.00					
6.50		(S) N=18 (4,3,4,4,5,5)			6.00					
8.00		(S) N=22 (4,5,5,6,5,6)			8.00	13.90				
9.50		(S) N=24 (4,5,5,6,6,7)			9.00					
11.0		(S) N=27 (5,5,6,6,7,8)			11.00					
12.5		(S) N=31 (5,6,7,7,8,9)			12.00					
14.0		(S) N=34 (5,6,8,8,9,9)			14.00					
15.0	D 8			15.00	15.00		*End of Borehole at 15.00 m*			

Borehole Diameter (mm):

Well Diameter (mm): -

Casing Depth (m bgl):

Remarks: 1. Well installed to 15m bgl.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	BH2
Drilling Method:	Cable Percussion
Date of Boring:	Start Date: 04/10/2007
	Finish Date: 04/10/2007
Ground Level:	-
Coords:	-

MLM
www.mlm.uk.com

Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
0.08 0.20 0.40 0.50 0.75	D 1 D 2 D 3 D 4 D 5			0.08 0.20 0.50 0.75	1.00 2.00 3.00 4.00 5.00 6.00 7.00 8.00 9.00 10.00 11.00 12.00 13.00 14.00 15.00	0.08 0.12 0.30 0.25	0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0 12.5 13.0 13.5 14.0 14.5 15.0 15.5		BRICK PAVING. Loose brown sand. (MADE GROUND) Dense red medium brick gravel. (MADE GROUND) Firm grey gravelly clay. Gravel is fine to medium brick, concrete and flint. (MADE GROUND) *End of Borehole at 15.00 m*			Dry

Borehole Diameter (mm): Well Diameter (mm):

Casing Depth (m bgl):

Remarks: 1. Pipe encountered at 0.75m bgl.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

Bentonite backfill

Filter Gravel

Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	BH2A
Drilling Method:	Cable Percussion
Date of Boring:	Start Date: 04/10/2007
	Finish Date:04/10/2007
Ground Level:	-
Coords:	-

MLM
www.mlm.uk.com

Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
0.08	D 1			0.08		0.08			BRICK PAVING.			
0.20	D 2			0.20		0.12						
0.40	D 3			0.50		0.30			Loose brown sand. (MADE GROUND)			
0.50	D 4				1.00							
1.20	U 1					2.10			Dense red medium brick gravel. (MADE GROUND)			
1.70	D 5											
2.00		(S) N=11 (2,1,3,2,3,3)			2.00				Firm grey gravelly clay. Gravel is fine to medium brick, concrete and flint. (MADE GROUND)			
2.60	D 6			2.60								
3.00		(S) N=12 (2,2,2,3,3,4)			3.00				Structureless white, brown clayey CHALK. Grade Dc. (ZIG ZAG CHALK FORMATION)			
4.00		(S) N=7 (2,1,2,1,2,2)			4.00							
5.00		(S) N=11 (2,1,2,3,3,3)			5.00							5.50
6.50		(S) N=16 (3,2,3,4,4,5)			7.00							
8.00		(S) N=18 (2,1,4,4,5,5)			8.00							
					9.00	12.40						
9.50		(S) N=22 (2,2,5,5,6,6)			10.00							
11.0		(S) N=28 (3,2,6,7,7,8)			11.00							10.80
12.5		(S) N=31 (3,3,7,8,8,8)			12.00							
14.0		(S) N=33 (5,5,8,8,8,9)			13.00							
15.0	D 7			15.00	14.00				*End of Borehole at 15.00 m*			
					15.00							

Borehole Diameter (mm): Well Diameter (mm):

Casing Depth (m bgl):

Remarks: 1. Borehole backfilled with arisings.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	

BOREHOLE NO.	BH3
Drilling Method:	Cable Percussion
Date of Boring:	Start Date: 05/10/2007
	Finish Date:05/10/2007
Ground Level:	-
Coords:	-

MLM
www.mlm.uk.com

Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
0.10	D 1			0.20		0.20			ASPHALT.			
0.30	D 2			0.50		0.30			Dense grey and brown sand and medium to coarse concrete gravel. (MADE GROUND)			
0.50	D 3				1.00	1.30						
1.20	U 1			1.80					Firm grey gravelly clay. Gravel is fine to medium brick, wood, concrete and flint. (MADE GROUND)			
1.70	D 4				2.00							
1.80	D 5											
2.00		(S) N=14 (3,4,4,4,3,3)										
						1.90			Firm light grey, brown sandy gravelly CLAY. Gravel is fine to medium chalk. (GLACIAL TILL)			
3.00		(S) N=15 (3,3,3,4,4,4)			3.00							
3.70	D 6			3.70					Structureless white, brown clayey CHALK. Grade Dc. (ZIG ZAG CHALK FORMATION)			
4.00		(S) N=12 (1,1,2,3,3,4)			4.00							
5.00		(S) N=16 (3,2,3,4,4,5)			5.00							
6.50		(S) N=12 (1,1,3,3,3,3)			6.00							
7.90	D 7				7.00							
8.00		(S) N=16 (2,2,3,4,4,5)			8.00							
					9.00	11.30						
9.50		(S) N=21 (3,3,4,5,6,6)			10.00							10.00
11.0		(S) N=26 (4,4,6,6,7,7)			11.00							
12.5		(S) N=32 (5,5,7,8,8,9)			12.00							12.00
14.0		(S) N=36 (5,6,8,9,9,10)			13.00							
15.0	D 8			15.00	14.00							
					15.00				*End of Borehole at 15.00 m*			

Borehole Diameter (mm): Well Diameter (mm):

Casing Depth (m bgl):

Remarks: 1. Borehole backfilled with arisings.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	WS1
Drilling Method:	Window Sampler
Date of Boring:	Start Date: 25/09/2007
	Finish Date: 25/09/2007
Ground Level:	-
Coords:	-

MLM
www.mlm.uk.com

Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
				0.25		0.25			CONCRETE.			Dry
0.30	D 1								Very stiff dark grey and brown slightly gravelly CLAY. Gravel is fine to medium flint and chalk. (GLACIAL TILL)			
						0.95						
1.00	D 2	(C) N=63 (6,10,16,16,15,16)		1.20	1.00				Structureless white and brown slightly clayey CHALK. Grade Dc. (ZIG ZAG CHALK FORMATION)			
2.00		(C) N=39 (10,9,10,10,9,10)			2.00							
2.50	D 3					2.80						
3.00		(C) N=9 (4,2,3,2,2,2)			3.00							
4.00		(C) N=11 (2,2,3,2,3,3)		4.00	4.00				*End of Borehole at 4.00 m*			

Borehole Diameter (mm):

Well Diameter (mm): -

Casing Depth (m bgl):

Remarks: 1. Borehole backfilled with arisings.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	WS2
Drilling Method:	Window Sampler
Date of Boring:	Start Date: 25/09/2007
	Finish Date: 25/09/2007
Ground Level:	-
Coords:	-

MLM
www.mlm.uk.com

Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
				0.25		0.25			CONCRETE.			Dry
0.40	D 1								Stiff dark grey and brown gravelly CLAY. Gravel is fine to medium flint and chalk. (GLACIAL TILL)			
1.00		(S) N=24 (7,6,6,6,6,6)		1.00	1.00							
1.10	D 2					2.35						
2.00		(S) N=14 (6,4,5,3,3,3)		2.00	2.00							
				2.60					Structureless white and and brown slightly clayey CHALK. Grade Dc. (ZIG ZAG CHALK FORMATION)			
2.80	D 3					0.40						
3.00		(S) N=10 (2,3,2,3,2,3)		3.00	3.00				*End of Borehole at 3.00 m*			
					4.00							

Borehole Diameter (mm): Well Diameter (mm):

Casing Depth (m bgl):

Remarks: 1. Borehole backfilled with arisings.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	WS3
Drilling Method:	Window Sampler
Date of Boring:	Start Date: 25/09/2007
	Finish Date:25/09/2007
Ground Level:	-
Coords:	-

MLM
www.mlm.uk.com

Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
				0.25		0.25			CONCRETE.			Dry
									Very stiff dark grey gravelly clay. Gravel is fine to medium flint, brick, concrete and chalk. (MADE GROUND)			
0.70	D 1					0.85						
1.00		(S) N=29 (4,4,8,8,6,7)		1.10	1.00				Firm dark grey gravelly CLAY. Gravel is fine to medium chalk and flint. (GLACIAL TILL)			
1.50	D 2					0.70						
				1.80					Firm light brown grey and white very gravelly CLAY. Gravel is fine to medium flint and chalk. (GLACIAL TILL)			
2.00		(S) N=10 (2,2,2,2,3,3)			2.00							
2.70	D 3					2.20						
3.00		(S) N=10 (2,2,2,2,3,3)			3.00							
4.00		(S) N=12 (2,2,3,2,3,4)		4.00	4.00				*End of Borehole at 4.00 m*			

Borehole Diameter (mm):

Well Diameter (mm): -

Casing Depth (m bgl):

Remarks: 1. Well installed to 4m bgl

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	WS4
Drilling Method:	Window Sampler
Date of Boring:	Start Date: 25/09/2007
	Finish Date:25/09/2007
Ground Level:	-
Coords:	-

MLM
www.mlm.uk.com

Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
				0.25	1.00	0.25			CONCRETE.			Dry
									Stiff dark grey gravelly clay. Gravel is fine to medium ash, brick and flint. (MADE GROUND)			
0.70	D 1											
1.00		(S) N=17 (3,3,4,4,4,5)				1.55						
1.30	D 2			1.80	2.00				Firm dark grey gravelly CLAY. Gravel is fine to medium chalk and flint. (GLACIAL TILL)			
2.00	D 3	(S) N=22 (5,6,6,5,6,5)				1.00						
				2.80	3.00				Soft to firm light brown grey and white very gravelly CLAY. Gravel is fine to medium flint and chalk. (GLACIAL TILL)			
3.00	D 4	(S) N=10 (3,3,2,2,3,3)				1.20						
4.00		(S) N=6 (2,1,1,1,2,2)		4.00	4.00				*End of Borehole at 4.00 m*			

Borehole Diameter (mm): Well Diameter (mm):

Casing Depth (m bgl):

Remarks: 1. Borehole backfilled with arisings.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	WS5
Drilling Method:	Window Sampler
Date of Boring:	Start Date: 25/09/2007
	Finish Date:25/09/2007
Ground Level:	-
Coords:	-

MLM
www.mlm.uk.com

Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
				0.25		0.25			CONCRETE.			Dry
0.70	D 1			0.25		0.95			Soft dark grey and black gravelly clay. Gravel is fine to medium brick, tile and concrete. (MADE GROUND)			
1.30	D 2			1.20	1.00	0.80			Soft light brown gravelly CLAY. Gravel is fine to medium flint and chalk. (ALLUVIUM)			
				2.00	2.00	0.70			Very soft black sandy organic CLAY. (ALLUVIUM)			
2.50	D 3			2.70		0.80			Soft to firm light brown grey and white very gravelly CLAY. Gravel is fine to medium flint and chalk. (ALLUVIUM)			
3.00	D 4			3.50	3.00	0.50			Structureless white and brown slightly clayey CHALK. Grade Dc. (ZIG ZAG CHALK FORMATION)			
4.00	D 5			4.00	4.00				*End of Borehole at 4.00 m*			

Borehole Diameter (mm):

Well Diameter (mm): -

Casing Depth (m bgl):

Remarks: 1. Well installled to 4m bgl.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	WS6
Drilling Method:	Window Sampler
Date of Boring:	Start Date: 25/09/2007
	Finish Date: 25/09/2007
Ground Level:	-
Coords:	-

MLM
www.mlm.uk.com

Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
				0.35		0.35			CONCRETE.			Dry
0.60	D 1			0.80		0.45			Firm red, grey and black gravelly clay. Gravel is fine to medium concrete and brick. (MADE GROUND)			
1.00	D 2	(S) N=9 (1,1,2,2,2,3)		1.00	1.00				Stiff bluish grey gravelly CLAY. Gravel is fine to medium flint and chalk. (GLACIAL TILL)			
									Strong inorganic odour and staining.			
2.00	D 3	(S) N=19 (3,5,4,4,5,6)		2.10	2.00	1.30			Firm light brown grey and white very gravelly CLAY. Gravel is fine to medium flint and chalk. (GLACIAL TILL)			
3.00	D 4	(S) N=11 (4,3,3,3,2,3)		3.50	3.00	1.40			Structureless white and brown slightly clayey CHALK. Grade Dc. (ZIG ZAG CHALK FORMATION)			
4.00	D 5	(S) N=8 (2,1,2,2,2,2)		4.00	4.00	0.50			*End of Borehole at 4.00 m*			

Borehole Diameter (mm):

Well Diameter (mm): -

Casing Depth (m bgl):

Remarks: 1. Well installed to 4m bgl.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	WS7
Drilling Method:	Window Sampler
Date of Boring:	Start Date: 25/09/2007
	Finish Date: 25/09/2007
Ground Level:	-
Coords:	-

MLM
www.mlm.uk.com

Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
				0.20		0.20			CONCRETE.			Dry
0.50	D 1								Firm light grey and white gravelly clay. Gravel is fine to medium brick and concrete. (MADE GROUND) Inorganic odour.			
1.00		(S) N=10 (2,1,1,2,2,5)			1.00	1.10						
				1.30					Very stiff dark grey gravelly CLAY. Gravel is fine to medium flint. (GLACIAL TILL)			
1.50	D 2					0.70						
2.00		(S) N=25 (4,6,7,6,6,6)		2.00	2.00				Loose brown slightly gravelly SAND. Gravel is fine to medium flint. (GLACIAL TILL)			
2.20	D 3											
2.45		( ) Error				0.90						
				2.90					Structureless white and brown slightly clayey CHALK. Grade Dc. (ZIG ZAG CHALK FORMATION)			
				3.00	3.00	0.10			*End of Borehole at 3.00 m*			
					4.00							

Borehole Diameter (mm):

Well Diameter (mm): -

Casing Depth (m bgl):

Remarks: 1. Well installed to 3m bgl.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	WS8
Drilling Method:	Window Sampler
Date of Boring:	Start Date: 25/09/2007
	Finish Date: 25/09/2007
Ground Level:	-
Coords:	-

MLM
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Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
				0.20		0.20			CONCRETE.			Dry
									Firm dark grey gravelly CLAY. Gravel is fine to medium flint and chalk. (GLACIAL TILL)			
0.80	D 1											
1.00		(S) N=9 (2,2,2,2,3,2)			1.00	1.60						
				1.80					Soft to firm orange and brown sandy CLAY. (GLACIAL TILL)			
2.00	D 2	(S) N=22 (4,4,5,5,6,6)			2.00							
				2.80		1.00			Structureless white and brown slightly clayey CHALK. Grade Dc. (ZIG ZAG CHALK FORMATION)			
3.00		(S) N=8 (2,2,2,2,2,2)			3.00							
3.50	D 3					1.20						
4.00		(S) N=7 (1,2,2,2,1,2)		4.00	4.00				*End of Borehole at 4.00 m*			

Borehole Diameter (mm): Well Diameter (mm):

Casing Depth (m bgl):

Remarks: 1. Borehole backfilled with arisings.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	WS9
Drilling Method:	Window Sampler
Date of Boring:	Start Date: 25/09/2007
	Finish Date:25/09/2007
Ground Level:	-
Coords:	-

MLM
www.mlm.uk.com

Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
				0.25		0.25			CONCRETE.			Dry
0.30	D 1			0.25		0.25			Dense dark grey concrete gravel. (MADE GROUND)			
0.60	D 2			0.50		0.20	0.5		Very stiff dark bluish grey gravelly CLAY. Gravel is fine to medium chalk and flint. (GLACIAL TILL)			
1.00		(S) N=35 (4,5,8,10,9,8)		0.70	1.00		1.0		Firm to stiff light brown grey and white very gravelly CLAY. Gravel is fine to medium flint and chalk. (GLACIAL TILL)			
1.10	D 3					0.90						
				1.60			1.5		Structureless white and brown slightly clayey CHALK. Grade Dc. (ZIG ZAG CHALK FORMATION)			
2.00		(S) N=14 (2,3,2,4,3,5)			2.00		2.0					
						1.40						
2.50	D 4						2.5					
3.00		(S) N=27 (6,6,5,6,6,10)		3.00	3.00		3.0		*End of Borehole at 3.00 m*			
					4.00		3.5					
							4.0					
							4.5					

Borehole Diameter (mm): Well Diameter (mm):

Casing Depth (m bgl):

Remarks: 1. Borehole backfilled with arisings.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	WS10
Drilling Method:	Window Sampler
Date of Boring:	Start Date: 25/09/2007
	Finish Date: 25/09/2007
Ground Level:	-
Coords:	-

MLM
www.mlm.uk.com

Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
				0.08		0.08			BRICK PAVING.			
0.20	D 1			0.30		0.22			Loose red and brown clayey gravelly sand. Gravel is fine to medium brick and concrete. (MADE GROUND)			Dry
0.50	D 2			0.80		0.50			Stiff white and brown very gravelly CLAY. Gravel is fine to coarse flint and chalk (GLACIAL TILL)			
1.00	D 3	(S) N=23 (2,3,3,5,8,7)		1.10	1.00	0.30			Stiff light brown slightly sandy CLAY. (GLACIAL TILL)			
						1.00			Stiff light brown grey and white very gravelly CLAY. Gravel is fine to medium flint and chalk. (GLACIAL TILL)			
2.00	D 4	(S) N=21 (10,11,9,5,4,3)		2.10	2.00				Structureless white and brown slightly clayey CHALK. Grade Dc. (ZIG ZAG CHALK FORMATION)			
2.70	D 5					0.90						
3.00		(S) 50/135mm (15,10,25,25)		3.00	3.00				*End of Borehole at 3.00 m*			
					4.00							

Borehole Diameter (mm):

Well Diameter (mm): -

Casing Depth (m bgl):

Remarks: 1. Well installed to 3m bgl.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project:	Dales Manor Business Park
Location:	Sawston, Cambridgeshire
Project ID:	721750
Client:	Endurance Estates Ltd
Project Engineer:	Ross Blake
Logged by:	Ross Blake

BOREHOLE NO.	WS11
Drilling Method:	Window Sampler
Date of Boring:	Start Date: 25/09/2007
	Finish Date: 25/09/2007
Ground Level:	-
Coords:	-

MLM
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Issue Status:

IN SITU TESTS/SAMPLING				STRATA						NOTES		
Depth (m)	Sample Ref.	SPT Type/ Results	Shear Strength	Depth (m)	Level (mAOD)	Thickness (m)	Installation Details	Legend	Description of Strata	Chiselling Depth (m)	Chiselling Time (mins)	Water (m)
				0.20		0.20			CONCRETE.			Dry
0.50	D 1					0.80			Loose light brown and black clayey sandy brick and concrete gravel. (MADE GROUND)			
1.00		(S) N=6 (3,3,1,2,1,2)		1.00	1.00				Firm light brown slightly gravelly CLAY. Gravel is fine to medium flint. (GLACIAL TILL)			
1.30	D 2								Inorganic odour and staining.			
2.00	D 3	(S) N=9 (1,1,2,2,2,3)			2.00	1.70						
				2.70					Soft to firm light brown grey and white very gravelly CLAY. Gravel is fine to medium flint and chalk. (GLACIAL TILL)			
3.00		(S) N=10 (3,2,2,3,2,3)			3.00	1.30						
3.80	D 4											
4.00		(S) N=7 (2,2,1,2,2,2)		4.00	4.00				*End of Borehole at 4.00 m*			

Borehole Diameter (mm):

Well Diameter (mm): -

Casing Depth (m bgl):

Remarks: 1. Well installed to 4m bgl.

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

HV	Hand Shear Vane Result
PP	Pocket Penetrometer Result

Well Installation Legend:

- Bentonite backfill
- Filter Gravel
- Arisings

Slotted Pipe | Plain Casing | Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS101

Drilling Method: Windowless Sampler
Start of Drilling: 08/07/2008
Completion: 08/07/2008
Ground Level: (mAOD) -
Coordinates: -

MLM
www.mlm.uk.com
MLM Environmental
7200 Cambridge Research Park
Cambridge
CB25 9TL
Tel: 01223 815600
Fax: 01223 815630
email: cambridge@mlm.uk.com

IN SITU TESTS/SAMPLING				STRATA						
Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
					0.10		CONCRETE pavoirs.	0.10		Dry
					0.20		Coarse yellow sand. (MADE GROUND)	0.10		
							Red very sandy coarse brick gravel with occasional clinker and ash. (MADE GROUND)	0.45		
					0.65		Firm to stiff grey-brown sandy gravelly clay. Gravel is fine to coarse of flint, concrete, and chalk with occasional ash streaks. Dark grey staining and faint hydrocarbon odour from 0.65 - 0.8m bgl. (MADE GROUND)			
D1: 0.90-1.00m	1.00m (S) N=4 (1,1,1,1,1,1)				1.00			1.35		
D2: 1.90-2.00m	2.00m (S) N=5 (1,1,1,1,1,2)				2.00		Soft dark grey stained sandy slightly gravelly SILT. Gravel is fine to coarse of chalk and flint. Organic odour. (ALLUVIUM)			
D3: 2.40-2.50m	3.00m (S) N=11 (2,2,2,3,3,3)				2.75		Firm pale grey silty slightly sandy gravelly MARL. Gravel is fine to coarse sub-rounded to sub-angular chalk and occasional flint in a grey silt matrix. (ZIG ZAG CHALK FORMATION)	0.75		
					3.00					
D4: 3.90-4.00m	4.00m (S) N=9 (3,2,3,2,2,2)				4.00			1.70		
					4.45		*End of Borehole at 4.45 m*			

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Monitoring well installed to 3m bgl.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details:
- Concrete
- Bentonite
- Filter Gravel
- Arisings Backfill

Pipe Details:
- Plain Pipe
- Slotted Pipe
- Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS102

Drilling Method: Windowless Sampler
Start of Drilling: 08/07/2008
Completion: 08/07/2008
Ground Level: (mAOD) -
Coordinates: -

MLM
www.mlm.uk.com
MLM Environmental
7200 Cambridge Research Park
Cambridge
CB25 9TL
Tel: 01223 815600
Fax: 01223 815630
email: cambridge@mlm.uk.com

IN SITU TESTS/SAMPLING				STRATA						
Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
					0.00		CONCRETE.	0.20		Dry
D1: 0.40-0.50m					0.20		Dark grey sandy to very sandy fine to coarse sub-rounded to angular clinker, brick, chalk and flint gravel. Hydrocarbon odour. (MADE GROUND)	0.30		
					0.50		Firm to stiff dark grey sandy gravelly clay. Gravel is fine to cobble sized of clinker, brick, charcoal, chalk and tile. Hydrocarbon odour. (MADE GROUND)	0.50		
D2: 0.90-1.00m					1.00		Stiff grey-brown slightly sandy gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded of chalk and flint with a band of broken up flint and chalk GRAVEL from 1.4 - 1.6m bgl. (LOWESTOFT FORMATION)	0.60		
	1.00m (S) N=13 (2,3,3,2,4,4)				1.60		Soft to firm grey-brown occasionally gravelly CLAY. Gravel is fine to coarse chalk, flint and carbonaceous material. (LOWESTOFT FORMATION)	0.80		
D3: 1.90-2.00m					2.40		Structureless grey-white and yellow stained slightly sandy silty gravelly MARL. Gravel is fine to coarse of weak chalk and rare flint and carbonaceous streaks. (ZIG ZAG CHALK FORMATION)	2.05		
	2.00m (S) N=13 (2,2,2,3,4,4)									
D4: 2.90-3.00m										
	3.00m (S) N=8 (2,2,2,2,2,2)									
D5: 3.90-4.00m										
	4.00m (S) N=5 (1,1,1,1,1,2)				4.45		*End of Borehole at 4.45 m*			

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Borehole backfilled with arisings.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details:
- Concrete
- Bentonite
- Filter Gravel
- Arisings Backfill

Pipe Details:
- Plain Pipe
- Slotted Pipe
- Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS103

Drilling Method: Windowless Sampler
Start of Drilling: 08/07/2008
Completion: 08/07/2008
Ground Level: (mAOD) -
Coordinates: -

MLM
www.mlm.uk.com
MLM Environmental
7200 Cambridge Research Park
Cambridge
CB25 9TL
Tel: 01223 815600
Fax: 01223 815630
email: cambridge@mlm.uk.com

IN SITU TESTS/SAMPLING				STRATA							
Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
					0.00		CONCRETE.	0.30		Dry
					0.30		Dark grey very sandy very gravelly clay. Gravel is fine to cobble sized sub-angular to sub-rounded clinker, ash, flint, chalk, tile and concrete. (MADE GROUND)	1.00		
D1: 0.90-1.00m	1.00m (S) N=8 (2,4,2,2,2,2)				1.00					
					1.30		Firm pale brown to beige gravelly CLAY. Gravel is fine to coarse chalk and occasional flint. (ALLUVIUM)	0.70		
D2: 1.90-2.00m	2.00m (S) N=4 (1,1,1,1,1,1)				2.00		Poor recovery.	0.70		
					2.70		Dark brown to black organic silty sandy gravelly CLAY. Gravel is fine flint and chalk. Rootlets and decaying wood fragments encountered. Organic odour. (ALLUVIUM)	1.10		
D3: 2.90-3.00m	3.00m (S) N=4 (1,1,1,1,1,1)				3.00					
					3.80		Black PEAT. Organic odour. (ALLUVIUM)	0.20		
D4: 3.90-4.00m					4.00		Structureless CHALK composed of silty fine to medium weak chalk GRAVEL in a grey-white and yellow stained silt matrix. (ZIG ZAG CHALK FORMATION)	0.45		
D5: 4.00-4.45m	4.00m (S) N=9 (1,2,2,3,2,2)				4.00					
					4.45		*End of Borehole at 4.45 m*			

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Monitoring well installed to 3m bgl.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details:
- Concrete
- Bentonite
- Filter Gravel
- Arisings Backfill

Pipe Details:
- Plain Pipe
- Slotted Pipe
- Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS104

Drilling Method: Windowless Sampler
Start of Drilling: 09/07/2008
Completion: 09/07/2008
Ground Level (mAOD): -
Coordinates: -

MLM
www.mlm.uk.com
MLM Environmental
7200 Cambridge Research Park
Cambridge
CB25 9TL
Tel: 01223 815600
Fax: 01223 815630
email: cambridge@mlm.uk.com

IN SITU TESTS/SAMPLING				STRATA						
Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
					0.04		ASPHALT.	0.04		Dry
							CONCRETE.	0.24		
					0.28		Sandy brick and concrete gravel. (MADE GROUND)	0.12		
					0.40		Dark grey-brown sandy very gravelly clay. Gravel is fine to coarse sub-rounded to angular clinker, tile, brick, flint and chalk. Black staining and faint hydrocarbon odour from 0.6-0.8m bgl. (MADE GROUND)	0.40		
D1: 0.70-0.80m					0.80		Pale grey - beige sandy chalk, brick, clinker and flint gravel. (MADE GROUND)	0.20		
	1.00m (C) N=8 (3,3,3,3,1,1)			1.00	1.00		Pale grey, red-stained sandy brick, flint, clinker and occasional chalk gravel. Hydrocarbon odour. (MADE GROUND)	0.50		
D2: 1.40-1.50m					1.50		Soft to firm grey red streaked CLAY. Faint hydrocarbon odour. (ALLUVIUM)	1.10		
D3: 1.90-2.00m	2.00m (S) N=7 (1,1,1,2,2,2)			2.00						
					2.60		Structureless CHALK composed of cream, slightly sandy silty sub-angular to rounded GRAVEL in a cream, black and red stained matrix. Faint hydrocarbon odour. (ZIG ZAG CHALK FORMATION)	0.40		
D4: 2.90-3.00m	3.00m (S) N=10 (2,2,2,3,3,2)			3.00	3.00		*End of Borehole at 3.00 m*			
				4.00						

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Monitoring well installed to 3m bgl.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details:
- Concrete
- Bentonite
- Filter Gravel
- Arisings Backfill

Pipe Details:
- Plain Pipe
- Slotted Pipe
- Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS105

Drilling Method: Windowless Sampler
Start of Drilling: 09/07/2008
Completion: 09/07/2008
Ground Level: (mAOD) -
Coordinates: -

MLM
www.mlm.uk.com
MLM Environmental
7200 Cambridge Research Park
Cambridge
CB25 9TL
Tel: 01223 815600
Fax: 01223 815630
email: cambridge@mlm.uk.com

IN SITU TESTS/SAMPLING				STRATA						
Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
					0.05		ASPHALT.	0.05		Dry
					0.20		CONCRETE.	0.15		
							Grey-brown sandy gravelly sand. Gravel is fine to coarse tile, brick, concrete, wood and rare clinker. Hydrocarbon odour. (MADE GROUND)	0.90		
D1: 0.90-1.00m					1.00					
					1.10		Bright red-stained broken up tiles with a dark grey band from 2.2 to 2.3m bgl. Strong hydrocarbon odour. (MADE GROUND)	1.30		
D2: 1.90-2.00m					2.00					
					2.40		Pale grey and orange stained gravelly SAND. Gravel is fine chalk and rare fine to coarse flint. (LOWESTOFT FORMATION)	0.60		
D3: 2.90-3.00m					3.00		*End of Borehole at 3.00 m*			
					4.00					

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Monitoring well installed to 3m bgl.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details:
- Concrete
- Bentonite
- Filter Gravel
- Arisings Backfill

Pipe Details:
- Plain Pipe
- Slotted Pipe
- Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS106

Drilling Method: Windowless Sampler
Start of Drilling: 08/07/2008
Completion: 08/07/2008
Ground Level (mAOD): -
Coordinates: -

MLM
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MLM Environmental
7200 Cambridge Research Park
Cambridge
CB25 9TL
Tel: 01223 815600
Fax: 01223 815630
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IN SITU TESTS/SAMPLING				STRATA						
Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
					0.10		CONCRETE pavoirs.	0.10		Dry
							Red sandy brick gravel. (MADE GROUND)	0.40		
					0.50		Firm grey-brown gravelly clay. Gravel is fine to coarse sub-angular chalk, flint, brick, clinker and ash gravel. Faint hydrocarbon odour in places. (MADE GROUND)			
D1: 0.90-1.00m										
	1.00m (S) N=7 (1,1,2,1,2,2)				1.00			1.50		
D2: 1.90-2.00m										
	2.00m (S) N=9 (1,1,1,2,3,3)				2.00		Soft to firm brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse chalk and flint. (LOWESTOFT FORMATION)			
D3: 2.40-2.50m								0.70		
					2.70		Structureless CHALK composed of grey-cream and yellow stained sandy gravelly MARL. Gravel is weak, sub-angular to rounded fine to coarse chalk and occasional flint. (ZIG ZAG CHALK FORMATION)	0.30		
	3.00m (S) N=9 (2,2,3,2,2,2)				3.00		No recovery			
								0.50		
					3.50		Structureless CHALK composed of cream, slightly sandy silty sub-angular to rounded GRAVEL in a grey-white and yellow stained matrix. (ZIG ZAG CHALK FORMATION)			
D4: 3.90-4.00m										
	4.00m (S) N=10 (2,2,2,3,2,3)				4.00			0.95		
					4.45		*End of Borehole at 4.45 m*			

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Borehole backfilled with arisings.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details:
- Concrete
- Bentonite
- Filter Gravel
- Arisings Backfill

Pipe Details:
- Plain Pipe
- Slotted Pipe
- Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS107

Drilling Method: Windowless Sampler
Start of Drilling: 08/07/2008
Completion: 08/07/2008
Ground Level: (mAOD) -
Coordinates: -

MLM
www.mlm.uk.com
MLM Environmental
7200 Cambridge Research Park
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CB25 9TL
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IN SITU TESTS/SAMPLING				STRATA						
Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
					0.18		Reinforced CONCRETE.	0.18		
D1: 0.30-0.40m					0.30		Yellow brown sand and fine to coarse sub-angular flint and concrete gravel. (MADE GROUND)	0.12		
					0.50		Loose dark brown-black gravelly sand. Gravel is clinker, ash and flint. Hydrocarbon odour. (MADE GROUND)	0.20		
D2: 0.90-1.00m							Dense brown occasionally grey stained clayey gravelly sand. Gravel is fine to cobble sized flint, chalk, brick, ash and wood fragments. Organic odour. (MADE GROUND)	0.50		
	1.00m (S) N=13 (3,5,4,3,3,3)				1.00		Brown sandy becoming very sandy CLAY. Gravel is fine to coarse chalk, flint and wood fragments with rare carbonaceous streaks. (ALLUVIUM)			
D3: 1.90-2.00m								1.40		
	2.00m (S) N=10 (2,2,2,3,2,3)				2.00					
					2.40		Pale grey and yellow stained sandy gravelly calcareous SILT. Gravel comprises fine to medium weak chalk. Peat bands and black banding from 3-4m bgl. Organic odour. (ALLUVIUM)			
D4: 2.90-3.00m										
	3.00m (S) N=10 (2,1,2,2,3,3)				3.00			1.60		3.50
D5: 3.90-4.00m										
	4.00m (S) N=8 (1,1,2,2,2,2)				4.00		Structureless CHALK compsed of cream, yellow stained sandy gravelly SILT. Gravel is predominantly fine and medium weak chalk. (ZIG ZAG CHALK FORMATION)	0.45		
					4.45		*End of Borehole at 4.45 m*			

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Borehole backfilled with arisings.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details:
- Concrete
- Bentonite
- Filter Gravel
- Arisings Backfill

Pipe Details:
- Plain Pipe
- Slotted Pipe
- Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS108

Drilling Method: Windowless Sampler
Start of Drilling: 09/07/2008
Completion: 09/07/2008
Ground Level: (mAOD) -
Coordinates: -

MLM
www.mlm.uk.com
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IN SITU TESTS/SAMPLING				STRATA						
Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
					0.00		CONCRETE.	0.22		Dry
					0.22		Orange-brown sand and chalk, flint, concrete, clinker and brick gravel. (MADE GROUND)	0.28		
D1: 0.50-0.60m					0.50		Dark grey sandy flint, concrete, clinker and brick gravel. (MADE GROUND)	0.15		
					0.65		Stiff dark grey gravelly clay. Gravel is chalk, flint and rare ash and brick. (MADE GROUND)	0.35		
	1.00m (S) N=13 (1,2,2,3,4,4)				1.00		Stiff dark grey gravelly clay. Gravel is fine to coarse chalk and flint with rare ash. (MADE GROUND)	1.00		
D2: 1.90-2.00m										
	2.00m (C) N=18 (3,3,5,4,5,4)				2.00		Beige very silty SAND and fine becoming fine to coarse chalk GRAVEL. (LOWESTOFT FORMATION)	2.45		
D3: 2.90-3.00m										
	3.00m (C) N=11 (2,2,2,3,3,3)				3.00					
	4.00m (C) N=9 (1,1,2,2,2,3)				4.00					
					4.45		*End of Borehole at 4.45 m*			

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Monitoring well installed to 3m bgl.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details:
- Concrete
- Bentonite
- Filter Gravel
- Arisings Backfill

Pipe Details:
- Plain Pipe
- Slotted Pipe
- Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS109

Drilling Method: Windowless Sampler
Start of Drilling: 09/07/2008
Completion: 09/07/2008
Ground Level (mAOD): -
Coordinates: -

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MLM Environmental
7200 Cambridge Research Park
Cambridge
CB25 9TL
Tel: 01223 815600
Fax: 01223 815630
email: cambridge@mlm.uk.com

IN SITU TESTS/SAMPLING				STRATA						
Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
					0.03		ASPHALT.	0.03		Dry
					0.10		ASPHALT.	0.07		
					0.20		Yellow brown sand and flint and concrete gravel. (MADE GROUND)	0.10		
							Stiff gravelly clay. Gravel is flint, chalk, brick and ash. (MADE GROUND)	0.80		
D1: 0.90-1.00m					1.00					
	1.00m (S) N=10 (2,2,2,3,2,3)				1.00		Soft black organic slightly sandy PEAT. Gravel is chalk and flint. Faint organic odour. (ALLUVIUM)	0.70		
D2: 1.60-1.70m					1.70		Orange-grey slightly clayey SAND and fine to medium flint and chalk GRAVEL. (LOWESTOFT FORMATION)			
	2.00m (S) N=13 (3,4,3,2,4,4)				2.00			1.80		
D3: 2.90-3.00m					3.00					
	3.00m (C) N=11 (3,3,3,2,3,3)				3.50		Structureless CHALK composed of cream, slightly sandy silty sub-angular to rounded GRAVEL in a cream and orange stained matrix. (ZIG ZAG CHALK FORMATION)			
D4: 3.90-4.00m					4.00			0.95		
	4.00m (C) N=5 (1,1,2,1,1,1)				4.45		*End of Borehole at 4.45 m*			

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Borehole backfilled with arisings.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details:
- Concrete
- Bentonite
- Filter Gravel
- Arisings Backfill

Pipe Details:
- Plain Pipe
- Slotted Pipe
- Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS110

Drilling Method: Windowless Sampler
Start of Drilling: 09/07/2008
Completion: 09/07/2008
Ground Level: (mAOD) -
Coordinates: -

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MLM Environmental
7200 Cambridge Research Park
Cambridge
CB25 9TL
Tel: 01223 815600
Fax: 01223 815630
email: cambridge@mlm.uk.com

IN SITU TESTS/SAMPLING				STRATA						
Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
					0.18		Reinforced CONCRETE.	0.18		Dry
D1: 0.50-0.60m					0.80		Dark grey sandy gravelly clay. Gravel is fine to cobble sized brick, ash, tile, chalk and flint. (MADE GROUND)	0.62		
D2: 0.90-1.00m	1.00m (S) N=5 (1,1,1,2,1,1)				1.00		Structureless chalk and occasional flint and ash gravel in a grey-white silt matrix. (MADE GROUND)	0.70		
					1.50		Dark grey sandy gravelly clay. Gravel is fine to coarse chalk, flint and rare ash and brick. (MADE GROUND)	0.80		
D3: 1.90-2.00m	2.00m (S) N=4 (1,1,1,1,1,1)				2.00					
					2.30		Orange-beige very sandy gravelly CLAY. Gravel is fine to coarse chalk and flint. (LOWESTOFT FORMATION)			
D4: 2.90-3.00m	3.00m (S) N=11 (2,2,3,3,3,2)				3.00			2.15		
D5: 3.90-4.00m	4.00m (S) N=6 (1,1,2,2,1,1)				4.00					
					4.45		*End of Borehole at 4.45 m*			

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Borehole backfilled with arisings.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details:
- Concrete
- Bentonite
- Filter Gravel
- Arisings Backfill

Pipe Details:
- Plain Pipe
- Slotted Pipe
- Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS111

Drilling Method: Windowless Sampler
Start of Drilling: 09/07/2008
Completion: 09/07/2008
Ground Level: (mAOD) -
Coordinates: -

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MLM Environmental
7200 Cambridge Research Park
Cambridge
CB25 9TL
Tel: 01223 815600
Fax: 01223 815630
email: cambridge@mlm.uk.com

IN SITU TESTS/SAMPLING | STRATA

Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
					0.04		ASPHALT.	0.04		Dry
							Reinforced CONCRETE.	0.26		
					0.30		Stiff dark grey-brown slightly gravelly clay. Gravel is fine to coarse brick, chalk, ash, clinker and wood. (MADE GROUND)	0.70		
D1: 0.40-0.50m										
	1.00m (S) N=9 (1,1,1,2,3,3)				1.00 1.00		Soft to firm pale grey and dark grey stained sandy gravelly clay. Gravel is fine to coarse chalk, flint and occasional brick and ash. (MADE GROUND)	0.70		
D2: 1.40-1.50m										
					1.70		Firm pale grey silty slightly sandy gravelly MARL. Gravel is fine to coarse sub-rounded to sub-angular chalk and occasional flint in a grey silt matrix. (ALLUVIUM)	0.20		
D3: 1.90-2.00m					1.90					
	2.00m (S) N=9 (2,1,2,2,2,3)				2.00 2.10		Dark brown sandy PEAT with wood fragments and rootlets. Faint organic odour. (ALLUVIUM)	0.20		
							Firm pale grey silty slightly sandy gravelly MARL. Gravel is fine to coarse sub-rounded to sub-angular chalk and occasional flint in a grey silt matrix. (ZIG ZAG CHALK FORMATION)	0.90		
D4: 2.90-3.00m										
	3.00m (S) N=8 (2,1,2,2,2,2)				3.00 3.00		Structureless CHALK composed of cream, slightly sandy silty sub-angular to rounded GRAVEL in a pale grey and orange stained matrix. (ZIG ZAG CHALK FORMATION)	1.45		
D5: 3.90-4.00m										
	4.00m (S) N=5 (1,1,1,2,1,1)				4.00					
					4.45		*End of Borehole at 4.45 m*			

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Borehole backfilled with arisings.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details: Concrete, Bentonite, Filter Gravel, Arisings Backfill

Pipe Details: Plain Pipe, Slotted Pipe, Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS112

Drilling Method: Windowless Sampler
Start of Drilling: 08/07/2008
Completion: 08/07/2008
Ground Level: (mAOD) -
Coordinates: -

MLM
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MLM Environmental
7200 Cambridge Research Park
Cambridge
CB25 9TL
Tel: 01223 815600
Fax: 01223 815630
email: cambridge@mlm.uk.com

IN SITU TESTS/SAMPLING				STRATA						
Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
					0.00		Reinforced CONCRETE.	0.27		Dry
D1: 0.30-0.40m					0.27		Yellow brown sand and fine to coarse sub-angular flint and concrete gravel. (MADE GROUND)	0.18		
					0.45					
					0.55		Loose dark brown-black gravelly sand. Gravel is clinker, ash and flint. Hydrocarbon odour. (MADE GROUND)	0.10		
D2: 0.90-1.00m					1.00		Brown sandy becoming very sandy CLAY. Gravel is fine to coarse chalk, flint and abundant wood fragments and carbonaceous material. Organic odour. (ALLUVIUM)	1.45		
D3: 1.90-2.00m										
D4: 2.00-2.10m					2.00		Soft to firm pale grey-brown gravelly CLAY. Gravel is chalk, shell fragments and carbonaceous material. (ALLUVIUM)	0.20		
					2.20		Structureless CHALK composed of cream, slightly sandy silty sub-angular to rounded GRAVEL in a cream and yellow stained matrix. (ZIG ZAG CHALK FORMATION)	0.80		
D5: 2.90-3.00m					3.00		*End of Borehole at 3.00 m*			
					4.00					

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Monitoring well installed to 3m bgl.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details:
- Concrete
- Bentonite
- Filter Gravel
- Arisings Backfill

Pipe Details:
- Plain Pipe
- Slotted Pipe
- Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS113

Drilling Method: Windowless Sampler
Start of Drilling: 08/07/2008
Completion: 08/07/2008
Ground Level: (mAOD) -
Coordinates: -

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MLM Environmental
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Cambridge
CB25 9TL
Tel: 01223 815600
Fax: 01223 815630
email: cambridge@mlm.uk.com

IN SITU TESTS/SAMPLING				STRATA						
Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
					0.09		Red ASPHALT.	0.09		
							Reinforced CONCRETE.	0.20		
					0.29		Dense dark grey-brown clayey very gravelly sand. Gravel is fine to coarse clinker, flint, brick, chalk and ash. Strong hydrocarbon odour. (MADE GROUND)	0.31		0.51
D1: 0.40-0.50m										
W1: 0.51-0.51m					0.60		Light grey-brown sandy gravelly clay. Gravel is fine to coarse chalk, flint and occasional wood fragments and carbonaceous material. (MADE GROUND)	0.50		
D2: 0.90-1.00m					1.00					
					1.10		Structureless CHALK composed of cream, slightly sandy silty sub-angular to rounded GRAVEL in a cream and yellow stained matrix. (ZIG ZAG CHALK FORMATION)	1.90		
D3: 1.90-2.00m					2.00					
D4: 2.90-3.00m					3.00		*End of Borehole at 3.00 m*			
					4.00					

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Borehole backfilled with arisings.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details:
- Concrete
- Bentonite
- Filter Gravel
- Arisings Backfill

Pipe Details:
- Plain Pipe
- Slotted Pipe
- Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

BOREHOLE REF: WS114

Drilling Method: Windowless Sampler
Start of Drilling: 09/07/2008
Completion: 09/07/2008
Ground Level: (mAOD) -
Coordinates: -

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MLM Environmental
7200 Cambridge Research Park
Cambridge
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Tel: 01223 815600
Fax: 01223 815630
email: cambridge@mlm.uk.com

IN SITU TESTS/SAMPLING				STRATA						
Sample Ref.	SPT Results (Type)	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Installation Details	Water (m)
							CONCRETE.	0.45		Dry
					0.45		Sandy coarse concrete gravel. (MADE GROUND)	0.45		
D1: 0.90-1.00m					0.90		Beige sandy slightly gravelly SILT. Gravel is fine chalk and occasional flint. Hydrocarbon odour. (LOWESTOFT FORMATION)	1.20		
D2: 1.90-2.00m					2.10		Structureless CHALK composed of cream, slightly sandy silty sub-angular to rounded GRAVEL in a cream and yellow stained matrix. (ZIG ZAG CHALK FORMATION)	0.90		
D3: 2.90-3.00m					3.00		*End of Borehole at 3.00 m*			

Notes:
1. When undertaken Shear Strengths recorded using a Pilcon Hand Shear Vane.
2. When undertaken PID Readings recorded using Photoionisation Detector

Remarks:
1. Borehole backfilled with arisings.

Legend:

▽	Water Strike
▼	Water Standing
S	Standard Penetration Test - Split Spoon Method
C	Standard Penetration Test - Solid Cone Method
N=17	SPT "N" Value with number of blows per 75mm in brackets
55/25	55 blows to achieve 25mm
ES	Environmental Sample (1 tub & 1 jar)
D	Small Disturbed Sample
U	Undisturbed Samples
B	Bulk Sample
J	Jar Sample
W	Water Sample

Well Installation/Backfill Legend:

Backfill Details:
- Concrete
- Bentonite
- Filter Gravel
- Arisings Backfill

Pipe Details:
- Plain Pipe
- Slotted Pipe
- Piezometer Tip

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

TRIAL PIT: TP1

Date of Excavation: 09/07/2008
Backfill Date: 09/07/2008
Ground Level (mAOD): -
Coordinates: -

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MLM Environmental
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Cambridge
CB25 9TL
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Fax: 01223 815630
email: cambridge@mlm.uk.com

IN SITU TESTS/SAMPLING				STRATA						
Depth (m)	Sample Ref.	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Water (m)
					0.20		Reinforced CONCRETE.	0.20	Dry
0.30	D 1				0.25		Sand and gravel comprising concrete, clinker and ash. (MADE GROUND)	0.05	
0.50	D 2				0.35		Dark grey very sandy very gravelly clay. Gravel is brick, ash, flint and chalk. Hydrocarbon odour. (MADE GROUND)	0.10	
					0.80		Pale grey, dark grey stained clayey sand and gravel of fine to coarse flint, chalk, brick and ash. Hydrocarbon odour. (MADE GROUND)	0.45	
1.00	D 3		44				Firm dark grey-brown very sandy slightly gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded chalk and flint. (LOWESTOFT FORMATION)	1.05	
					1.85		Orange silty gravelly to very gravelly SAND. Gravel is predominantly fine to coarse sub-rounded chalk. Gravel content increases with depth. (LOWESTOFT FORMATION)	0.65	
2.00	D 4				2.50		Structureless CHALK with weak cream fine to coarse sub-rounded GRAVEL in a pale grey-cream and yellow stained sandy silt matrix. (ZIG ZAG CHALK FORMATION)	0.85	
3.35	B 1				3.35		*End of Trial Pit at 3.35 m*		

Soakaway Test Details (where applicable)
Depth Range:
Soil Infiltration Rate:

Remarks:
1.Soakaway test undertaken at depth of between 2.35m to 3.35m bgl.
2.Trial pit backfilled with arisings.

Dimensions:

2.00m
0.70m

Stability: Good
Plant Used:

Legend:
- ▽ Water Strike
- ▼ Water Standing
- D Small Disturbed Sample
- B Bulk Sample
- J Jar Sample
- W Water Sample

Notes:
1. When undertaken shear strengths recorded using Pilcon Hand Shear Vane
2. When undertaken PID Readings recorded using Photoionisation Detector

Project: Dales Manor Business Park
Location: Sawston, Cambridgeshire

Project ID: 721750
Client: Salmon Harvester Properties Limited
Project Engineer: Hester Carter
Logged by: HC

TRIAL PIT: TP2

Date of Excavation: 09/07/2008
Backfill Date: 09/07/2008
Ground Level (mAOD): -
Coordinates: -

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www.mlm.uk.com
MLM Environmental
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Cambridge
CB25 9TL
Tel: 01223 815600
Fax: 01223 815630
email: cambridge@mlm.uk.com

IN SITU TESTS/SAMPLING				STRATA						
Depth (m)	Sample Ref.	PID Reading (ppm)	Shear Strength (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata		Thickness (m)	Water (m)
					0.06		ASPHALT.		0.06	Dry
							CONCRETE.		0.24	
					0.30					
					0.40		Loose orange sand and gravel. Gravel comprising of flint, concrete and brick. (MADE GROUND)		0.10	
0.50	D 1				0.5		Grey-brown sandy gravelly CLAY. Gravel is flint and chalk. (LOWESTOFT FORMATION)		0.45	
					0.85		Pale grey-white and orange-brown SAND and GRAVEL. Gravel is fine to coarse of chalk and occasional flint. (LOWESTOFT FORMATION)		0.35	
1.00	D 2				1.0					
					1.20		Structureless CHALK with weak cream fine to coarse sub-rounded GRAVEL in a pale grey-cream and yellow stained sandy silt matrix. (ZIG ZAG CHALK FORMATION)		1.45	
1.50	D 3				1.5					
					2.0					
2.50	B 1				2.5					
					2.65		*End of Trial Pit at 2.65 m*			
					3.0					
					3.5					

Soakaway Test Details (where applicable)
Depth Range:
Soil Infiltration Rate:

Remarks:
1. Soakaway test undertaken at depth of between 1.66m to 2.65m bgl.
2. Trial pit backfilled with arisings.

Dimensions:

Stability: Good
Plant Used:

Legend:
- ▽ Water Strike
- ▼ Water Standing
- D Small Disturbed Sample
- B Bulk Sample
- J Jar Sample
- W Water Sample

Notes:
1. When undertaken shear strengths recorded using Pilcon Hand Shear Vane
2. When undertaken PID Readings recorded using Photoionisation Detector

MLM. Group	Project: Dales Manor Business Park Project ID: 775322 Location: Sawston Client: Salmon Harvester Properties Limited Project Engineer: L. Liness	Method: CP Start: 05/07/2017 Finish: 05/07/2017	CP201		
		Level (mOD): 22.16 Co-ordinates: 549011.81E - 250500.07N	1:50 Sheet 1 of 2 Logged by: A.W		

Depth (m)	SPT Results (Type)	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Inst'/ Backfill	Water (m)
			22.01	0.15		CONCRETE. Re-bar absent.	0.15		
			21.86	0.30		CONCRETE	0.15		
						Light brown clayey sandy fine to coarse brick, concrete and limestone GRAVEL. MADE GROUND			
						Dark grey silty slightly sandy gravelly CLAY. Gravel is fine to coarse brick, concrete, chert and chalk. MADE GROUND	1.00		
			20.86	1.30		Medium dense brown mottled grey silty SAND quickly becoming a brown silty gravelly SAND. Gravel is fine to coarse angular to sub-rounded flint and chalk. ALLUVIUM	2.00		
			18.86	3.30		Firm grey slightly gravelly silty CLAY quickly becoming white mottled off white gravelly CLAY. Gravel is fine to coarse angular to sub-rounded mudstone and chalk. ZIG ZAG CHALK FORMATION	11.70		
						Continued on next sheet			

General Notes
1. Shear Strengths determined by hand shear vane.
2. See key sheet for explanation of symbols

Remarks

Water Strike Details. Recorded in metres below ground level (m bgl)

Date	Depth Encountered	Casing Depth	Inflow Remarks	Depth to water after 20 mins (m)
	4.50			4.40

MLM. Group	Project: Dales Manor Business Park Project ID: 775322 Location: Sawston Client: Salmon Harvester Properties Limited Project Engineer: L. Liness	Method: CP Start: 05/07/2017 Finish: 05/07/2017	CP201		
		Level (mOD): 22.16 Co-ordinates: 549011.81E - 250500.07N	1:50 Sheet 2 of 2 Logged by: A.W		

Depth (m)	SPT Results (Type)	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Inst'/ Backfill	Water (m)
			7.16	15.00		End of borehole at 15.00 m			

General Notes
1. Shear Strengths determined by hand shear vane.
2. See key sheet for explanation of symbols

Remarks

Water Strike Details. Recorded in metres below ground level (m bgl)

Date	Depth Encountered	Casing Depth	Inflow Remarks	Depth to water after 20 mins (m)
	4.50			4.40

MLM. Group	Project: Dales Manor Business Park Project ID: 775322 Location: Sawston Client: Salmon Harvester Properties Limited Project Engineer: L. Liness	Method: CP Start: 06/07/2017 Finish: 06/07/2017	CP202		
		Level (mOD): 21.63 Co-ordinates: 548951.13E - 250448.98N	1:50 Sheet 1 of 2 Logged by: A.W.		

Depth (m)	SPT Results (Type)	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Inst'/ Backfill	Water (m)
			21.43	0.20		CONCRETE. Re-bar absent. CONCRETE	0.20		
			21.03	0.60		Light brown clayey sandy fine to coarse brick, concrete and limestone GRAVEL. MADE GROUND	0.40		
						Firm dark grey silty gravelly CLAY with frequent fine to medium sand lenses. Gravel is fine to coarse angular to rounded chert with gravel sized fragments of brick and concrete. MADE GROUND	0.70		
			20.33	1.30		Medium dense brown mottled grey gravelly silty SAND. Gravel is fine to coarse angular to sub-rounded flint and chalk. ALLUVIUM	1.40		
			18.93	2.70		Firm grey mottled brown slightly gravelly sandy CLAY becoming very sandy with depth. Gravel is fine to coarse angular to sub-rounded flint and chalk. ALLUVIUM	2.50		
			16.43	5.20		Firm white and off white gravelly CLAY. Gravel is fine to coarse angular to sub-rounded chalk. ZIG ZAG CHALK FORMATION			
						Continued on next sheet			

General Notes
1. Shear Strengths determined by hand shear vane.
2. See key sheet for explanation of symbols

Remarks

Water Strike Details. Recorded in metres below ground level (m bgl)

Date	Depth Encountered	Casing Depth	Inflow Remarks	Depth to water after 20 mins (m)
	4.80			4.50

MLM. Group	Project: Dales Manor Business Park Project ID: 775322 Location: Sawston Client: Salmon Harvester Properties Limited Project Engineer: L. Liness	Method: CP Start: 06/07/2017 Finish: 06/07/2017 Level (mOD): 21.63 Co-ordinates: 548951.13E - 250448.98N	1:50 Sheet 2 of 2 Logged by: A.W.	CP202

Depth (m)	SPT Results (Type)	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Inst'/ Backfill	Water (m)
				10					
				11					
				12					
				13			9.80		
				14					
			6.63	15 15.00		End of borehole at 15.00 m			
				16					
				17					
				18					
				19					

General Notes
1. Shear Strengths determined by hand shear vane.
2. See key sheet for explanation of symbols

Remarks

Water Strike Details. Recorded in metres below ground level (m bgl)

Date	Depth Encountered	Casing Depth	Inflow Remarks	Depth to water after 20 mins (m)
	4.80			4.50

MLM. Group	Project: Dales Manor Business Park Project ID: 775322 Location: Sawston Client: Salmon Harvester Properties Limited Project Engineer: L. Liness	Method: CP Start: 05/07/2017 Finish: 05/07/2017	CP203		
		Level (mOD): 22.03 Co-ordinates: 549074.03E - 250436.61N	1:50 Sheet 1 of 2 Logged by: A.W.		

Depth (m)	SPT Results (Type)	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Inst'/ Backfill	Water (m)
			21.88	0.15		CONCRETE. Re-bar absent.	0.15		
			21.73	0.30		CONCRETE	0.15		
						Off-white and grey clayey gravelly silty CHALK. Gravel is weak fine to coarse angular to sub-rounded chalk and chert. MADE GROUND	0.40		
			21.33	0.70		Firm grey silty sandy CLAY. ALLUVIUM			
						Grey mottled green slightly gravelly sandy silty CLAY. Gravel is fine to coarse angular to sub-rounded mudstone. ALLUVIUM	3.50		
			17.83	4.20		Firm white and off white gravelly CLAY. Gravel is fine to coarse angular to sub-rounded chalk. ZIG ZAG CHALK FORMATION	10.80		
						Continued on next sheet			

General Notes
1. Shear Strengths determined by hand shear vane.
2. See key sheet for explanation of symbols

Remarks

Water Strike Details. Recorded in metres below ground level (m bgl)

Date	Depth Encountered	Casing Depth	Inflow Remarks	Depth to water after 20 mins (m)
	4.10			3.70

MLM. Group	Project: Dales Manor Business Park Project ID: 775322 Location: Sawston Client: Salmon Harvester Properties Limited Project Engineer: L. Liness	Method: CP Start: 05/07/2017 Finish: 05/07/2017 Level (mOD): 22.03 Co-ordinates: 549074.03E - 250436.61N	1:50 Sheet 2 of 2 Logged by: A.W.	CP203

Depth (m)	SPT Results (Type)	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Inst'/ Backfill	Water (m)
			7.03	15.00		End of borehole at 15.00 m			

General Notes
1. Shear Strengths determined by hand shear vane.
2. See key sheet for explanation of symbols

Remarks

Water Strike Details. Recorded in metres below ground level (m bgl)

Date	Depth Encountered	Casing Depth	Inflow Remarks	Depth to water after 20 mins (m)
	4.10			3.70

MLM. Group	Project: Dales Manor Business Park Project ID: 775322 Location: Sawston Client: Salmon Harvester Properties Limited Project Engineer: L. Liness	Method: WLS Start: 05/07/2017 Finish: 05/07/2017	Level (mOD): 21.65 Co-ordinates: 548958.97E - 250424.01N	1:50 Sheet 1 of 1 Logged by: W.F.	WS201

Depth (m)	SPT Results (Type)	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Inst'/ Backfill	Water (m)
			21.45	0.20		CONCRETE. Re-bar absent.	0.20		
						CONCRETE	0.10		
			21.35	0.30		Grey brown clayey gravelly fine to coarse SAND. Gravel is brick, concrete and limestone. MADE GROUND			
ES1 : 1.00 - 2.00m						Soft to firm brown and dark grey silty slightly sandy gravelly CLAY. Gravel is fine to coarse angular to rounded chert, flint and chalk with gravel sized fragments of brick, concrete, ash and clinker. Occasional cobbles form 1.8m to 1.9m. Organic odour. MADE GROUND	1.70		
			19.65	2.00		Dark grey clayey slightly gravelly organic SILT. Gravel is fine to medium chalk and flint. Frequent decayed rootlets. Organic odour. ALLUVIUM	0.50		
			19.15	2.50		Recovered as grey white patched yellow structureless CHALK composed of firm moist very silty gravelly CLAY (marly chalk). Clasts are weak to moderately strong fine to coarse angular to sub-rounded. Flints absent. Occasional decayed rootlets. (Grade Dm) ZIG ZAG CHALK FORMATION	2.50		
			16.65	5.00		End of borehole at 5.00 m			

General Notes
1. Shear Strengths determined by hand shear vane.
2. See key sheet for explanation of symbols

Remarks
Borehole dry and stable.

Water Strike Details. Recorded in metres below ground level (m bgl)

Date	Depth Encountered	Casing Depth	Inflow Remarks	Depth to water after 20 mins (m)

MLM. Group	Project: Dales Manor Business Park Project ID: 775322 Location: Sawston Client: Salmon Harvester Properties Limited Project Engineer: L. Liness	Method: WLS Start: 05/07/2017 Finish: 05/07/2017	WS202		
		Level (mOD): 21.93 Co-ordinates: 549002.38E - 250422.26N	1:50 Sheet 1 of 1 Logged by: W.F.		

Depth (m)	SPT Results (Type)	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Inst'/ Backfill	Water (m)
			21.88	0.05		MACADAM MADE GROUND	0.25		
			21.63	0.30		CONCRETE. Re-bar absent. CONCRETE Soft to firm brown and dark grey silty slightly sandy gravelly CLAY. Gravel is fine to coarse angular to rounded chert, flint and chalk with gravel sized fragments of brick, concrete, ash and clinker. Organic odour. MADE GROUND	1.70		
			19.93	2.00		Dark grey clayey slightly gravelly organic SILT. Gravel is fine to medium chalk and flint. Frequent decayed rootlets. Organic odour. ALLUVIUM	0.40		
			19.53	2.40		Firm light grey and yellow very silty gravelly CLAY. Gravel is weak to moderately strong fine to coarse angular to sub-rounded chalk. ZIG ZAG CHALK FORMATION	0.60		
			18.93	3.00		Recovered as grey white patched yellow structureless CHALK composed of firm moist very silty gravelly CLAY (marly chalk). Clasts are weak to moderately strong fine to coarse angular to sub-rounded. Flints absent. Occasional decayed rootlets. (Grade Dm) ZIG ZAG CHALK FORMATION	2.00		
			16.93	5.00		End of borehole at 5.00 m			

General Notes
1. Shear Strengths determined by hand shear vane.
2. See key sheet for explanation of symbols

Remarks
Borehole dry and stable.

Water Strike Details. Recorded in metres below ground level (m bgl)

Date	Depth Encountered	Casing Depth	Inflow Remarks	Depth to water after 20 mins (m)

MLM. Group	Project: Dales Manor Business Park Project ID: 775322 Location: Sawston Client: Salmon Harvester Properties Limited Project Engineer: L. Liness	Method: WLS Start: 05/07/2017 Finish: 05/07/2017	WS203		
		Level (mOD): 22.05 Co-ordinates: 549071.90E - 250344.79N	1:50 Sheet 1 of 1 Logged by: W.F.		

Depth (m)	SPT Results (Type)	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Inst'/ Backfill	Water (m)
			21.92	0.13		CONCRETE. Re-bar absent.	0.13		
			21.86	0.19		CONCRETE	0.06		
			21.75	0.30		Light grey CONCRETE. Re-bar absent	0.11		
			21.55	0.50		CONCRETE	0.20		
						Grey clayey sandy fine to coarse angular to sub-rounded flint, chert and limestone GRAVEL. MADE GROUND			
						Very stiff dark grey silty gravelly CLAY. Gravel is fine to coarse angular to sub-rounded chert and flint with gravel sized fragments of brick and ash. MADE GROUND	1.10		
			20.45	1.60		Buff very silty gravelly fine to medium SAND. Gravel is fine to coarse angular to sub-angular flint. Rare angular flint cobble at 0.9m. ZIG ZAG CHALK FORMATION			
						Recovered as off-white patched yellow structureless CHALK composed of silty GRAVEL in a clayey silt matrix. Clasts are weak to moderately strong fine to coarse angular to sub-rounded. Flints absent. (Grade Dc) ZIG ZAG CHALK FORMATION	2.40		
			18.05	4.00		End of borehole at 4.00 m			

General Notes
1. Shear Strengths determined by hand shear vane.
2. See key sheet for explanation of symbols

Remarks
Refusal at 4.0m on hard chalk. Borehole dry and stable.

Water Strike Details. Recorded in metres below ground level (m bgl)

Date	Depth Encountered	Casing Depth	Inflow Remarks	Depth to water after 20 mins (m)

MLM. Group	Project: Dales Manor Business Park Project ID: 775322 Location: Sawston Client: Salmon Harvester Properties Limited Project Engineer: L. Liness	Method: WLS Start: 05/07/2017 Finish: 05/07/2017	WS204		
		Level (mOD): 22.06 Co-ordinates: 549071.44E - 250499.44N	1:50 Sheet 1 of 1 Logged by: W.F.		

Depth (m)	SPT Results (Type)	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Inst'/ Backfill	Water (m)
			21.86	0.20		CONCRETE. Re-bar absent.	0.20		
						CONCRETE	0.10		
			21.76	0.30		Light brown clayey sandy fine to coarse brick, concrete and limestone GRAVEL. MADE GROUND	0.50		
			21.26	0.80		Dark grey silty slightly sandy gravelly CLAY. Gravel is fine to coarse brick, concrete, ash, clinker, chert and chalk. MADE GROUND	0.30		
			20.96	1.10		Light brown clayey gravelly fine to coarse SAND. Gravel is fine to coarse angular to sub-rounded chalk and chert. MADE GROUND	0.30		
			20.66	1.40		Off-white and yellow brown silty gravelly clayey CHALK. Gravel is weak fine to coarse angular to sub-rounded chalk. MADE GROUND	0.80		
			19.86	2.20		Dark grey and black clayey slightly gravelly organic SILT. Gravel is fine to medium chalk, chert and flint. Frequent decayed rootlets and wood fragments. Organic odour. ALLUVIUM			
						Recovered as grey white patched yellow structureless CHALK composed of firm moist very silty gravelly CLAY (marly chalk). Clasts are weak to moderately strong fine to coarse angular to sub-rounded. Flints absent. Occasional decayed rootlets. (Grade Dm) ZIG ZAG CHALK FORMATION	2.20		
			17.66	4.40		Recovered as grey white structureless CHALK composed of clayey silty GRAVEL. Clasts are weak to moderately strong fine to coarse angular to sub-rounded. Flints absent. (Grade Dc) ZIG ZAG CHALK FORMATION	0.60		
			17.06	5.00		End of borehole at 5.00 m			

General Notes
1. Shear Strengths determined by hand shear vane.
2. See key sheet for explanation of symbols

Remarks
Borehole dry and stable.

Water Strike Details. Recorded in metres below ground level (m bgl)

Date	Depth Encountered	Casing Depth	Inflow Remarks	Depth to water after 20 mins (m)

MLM. Group

Project:	Dales Manor Business Park	Method:	WLS
Project ID:	775322	Start:	05/07/2017
Location:	Sawston	Finish:	05/07/2017
Client:	Salmon Harvester Properties Limited	Level (mOD):	22.10
Project Engineer:	L. Liness	Co-ordinates:	549124.25E - 250454.07N

WS205

1:50

Sheet 1 of 1

Logged by: W.F.

Depth (m)	SPT Results (Type)	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Inst'/ Backfill	Water (m)
			21.90	0.20		CONCRETE. Re-bar absent.	0.20		
						CONCRETE	0.05		
			21.85	0.25		Light brown and pink sandy brick and concrete GRAVEL. MADE GROUND	0.25		
			21.60	0.50		Off-white and grey clayey gravelly silty CHALK. Gravel is weak fine to coarse angular to sub-rounded chalk and chert. MADE GROUND	0.40		
			21.20	0.90		Dark grey silty sandy gravelly CLAY. Gravel is fine to coarse brick and ash. MADE GROUND	0.30		
			20.90	1.20		Dark brown very silty organic CLAY. Frequent decayed rootlets ALLUVIUM			
						Buff and yellow sandy gravelly SILT. Gravel is fine to coarse angular to sub-rounded chalk. Yellow brown sand lense at 1.5m to 1.9m. ZIG ZAG CHALK FORMATION	1.10		
			19.80	2.30		Recovered as off-white patched yellow structureless CHALK composed of gravelly SILT. Clasts are weak to moderately strong fine to coarse angular to sub-rounded. Flints absent. (Grade Dm) ZIG ZAG CHALK FORMATION	1.10		
			18.70	3.40		End of borehole at 3.40 m			

General Notes
1. Shear Strengths determined by hand shear vane.
2. See key sheet for explanation of symbols

Remarks
Refusal at 3.40m on hard chalk. Borehole dry and stable.

Water Strike Details. Recorded in metres below ground level (m bgl)

Date	Depth Encountered	Casing Depth	Inflow Remarks	Depth to water after 20 mins (m)

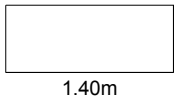
MLM. Group	Project: Dales Manor Business Park Project ID: 775322 Location: Sawston Client: Salmon Harvester Properties Limited Project Engineer: L. Liness	Method: TP Start: 04/07/2017 Finish: 04/07/2017	TP201		
		Level (mOD): 21.79 Co-ordinates: 548973.56E - 250441.41N	1:25 Sheet 1 of 1 Logged by: W.F.		

INSITU TEST/SAMPLING			STRATA						
Depth (m)	Sample Ref.	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Water (m)
			21.69	0.10		MACADAM MADE GROUND	0.10	
			21.49	0.30		CONCRETE. Re-bar absent. CONCRETE	0.20	
0.50	ES1					Firm dark grey silty gravelly CLAY with frequent fine to medium sand lenses. Gravel is fine to coarse angular to rounded chert with gravel sized fragments of brick, concrete, ash, clinker and wood. Occasional brick and concrete cobbles. Organic odour. MADE GROUND	0.70	
			20.79	1.00		Firm dark grey and light grey very silty gravelly CLAY. Gravel is fine to coarse angular to rounded chert with gravel sized fragments of brick, concrete and ash. Strong organic odour. MADE GROUND	1.00	
			19.79	2.00		End of trial pit at 2.00 m		

Notes:
Shear strengths recorded using Pilicon Hand Shear Vane

Remarks
Trial pit dry and stable.

Dimensions:



Stability:
Plant Used:
Mechanical Excavator

MLM. Group

Project:	Dales Manor Business Park	Method:	TP
Project ID:	775322	Start:	04/07/2017
Location:	Sawston	Finish:	04/07/2017
Client:	Salmon Harvester Properties Limited	Level (mOD):	22.07
Project Engineer:	L. Liness	Co-ordinates:	549106.86E - 250457.88N

TP202

1:25

Sheet 1 of 1

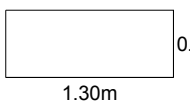
Logged by: W.F.

INSITU TEST/SAMPLING			STRATA						
Depth (m)	Sample Ref.	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Water (m)
			21.92	0.15		Reinforced CONCRETE. CONCRETE	0.15	
						Grey brown silty gravelly CLAY. Gravel is fine to coarse angular to rounded chert with gravel sized fragments of brick, concrete and macadam.Electrical cable and ducting running east to west encountered at 0.7m in south side of pit. MADE GROUND	0.55	
			21.37	0.70		End of trial pit at 0.70 m		

Notes:
Shear strengths recorded using Pilicon Hand Shear Vane

Remarks
Trial pit dry and slightly unstable. Trial pit terminated at 0.7m bgl due to power cable.

Dimensions:



Stability:

Plant Used:
Mechanical Excavator

MLM. Group

Project:	Dales Manor Business Park	Method:	TP
Project ID:	775322	Start:	04/07/2017
Location:	Sawston	Finish:	04/07/2017
Client:	Salmon Harvester Properties Limited	Level (mOD):	22.11
Project Engineer:	L. Liness	Co-ordinates:	549102.23E - 250454.91N

TP202A

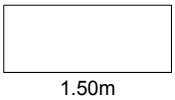
1:25 | Sheet 1 of 1 | Logged by: W.F.

INSITU TEST/SAMPLING			STRATA					
Depth (m)	Sample Ref.	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Water (m)
			21.86	0.25		Reinforced CONCRETE. CONCRETE	0.25	
0.40	ES1		21.61	0.50		Dark grey silty gravelly CLAY. Gravel is fine to coarse angular to rounded chert with gravel sized fragments of brick, concrete, ash and clinker. MADE GROUND	0.25	
			21.11	1.00		Stiff light grey and white silty gravelly CLAY. Gravel is fine to coarse angular to rounded flint and chert with gravel sized fragments of brick, concrete and clinker. Occasional brick cobbles. Cobble and boulder sized wood fragments from 0.9m. MADE GROUND	0.50	
			20.11	2.00		Friable dark brown grey gravelly very clayey organic SILT. Gravel is fine to medium angular to sub-rounded flint, chert and chalk. Organic odour. ALLUVIUM	1.00	
						End of trial pit at 2.00 m		

Notes:
Shear strengths recorded using Pilicon Hand Shear Vane

Remarks
Trial pit dry and stable. Soakaway test undertaken - see separate results sheet.

Dimensions:



Stability:
Plant Used:
Mechanical Excavator

MLM. Group

Project:	Dales Manor Business Park	Method:	TP
Project ID:	775322	Start:	04/07/2017
Location:	Sawston	Finish:	04/07/2017
Client:	Salmon Harvester Properties Limited	Level (mOD):	21.70
Project Engineer:	L. Liness	Co-ordinates:	548991.64E - 250389.57N

TP203

1:25

Sheet 1 of 1

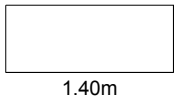
Logged by: W.F.

INSITU TEST/SAMPLING			STRATA						
Depth (m)	Sample Ref.	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Water (m)
			21.60	0.10		BLOCK PAVING MADE GROUND	0.10	
			21.50	0.20		Yellow brown cobbly medium to coarse SAND. Cobbles are brick. Frequent rootlets. MADE GROUND	0.10	
			21.30	0.40		Yellow brown and orange very cobbly medium to coarse SAND. Cobbles are brick. MADE GROUND	0.20	
			21.10	0.60		Firm to stiff dark grey gravelly CLAY. Gravel is fine to coarse brick, concrete and chalk. MADE GROUND	0.20	
			20.90	0.80		Light grey very gravelly SILT. Gravel is fine to medium chalk. MADE GROUND	0.20	
						Friable dark grey very silty gravelly organic CLAY. Gravel is fine to medium chert with gravel sized fragments of brick. Occasional brick and clinker cobbles. Organic odour. ALLUVIUM	1.20	
			19.70	2.00		End of trial pit at 2.00 m		

Notes:
Shear strengths recorded using Pilicon Hand Shear Vane

Remarks
Trial pit dry and stable.

Dimensions:



Stability:

Plant Used:
Mechanical Excavator

MLM. Group

Project:	Dales Manor Business Park	Method:	TP
Project ID:	775322	Start:	04/07/2017
Location:	Sawston	Finish:	04/07/2017
Client:	Salmon Harvester Properties Limited	Level (mOD):	22.38
Project Engineer:	L. Liness	Co-ordinates:	549068.32E - 250335.71N

TP204

1:25

Sheet 1 of 1

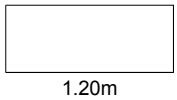
Logged by: W.F.

INSITU TEST/SAMPLING			STRATA						
Depth (m)	Sample Ref.	Strength Shear (kPa)	Level (mAOD)	Depth (m)	Legend	Description of Strata	Thickness (m)	Water (m)
			22.28	0.10		BLOCK PAVING MADE GROUND	0.10	
						Yellow brown medium to coarse SAND. Frequent rootlets. MADE GROUND	0.20	
			22.08	0.30		Densely compacted dark grey sandy fine to coarse brick, concrete and clinker GRAVEL and COBBLES. MADE GROUND	0.30	
			21.78	0.60		Very stiff light blue grey and buff very silty CLAY. Occasional brick gravel fragments. MADE GROUND	0.20	
			21.58	0.80		Recovered as off-white and buff structureless CHALK composed of clayey very gravelly cobbly SILT. Clasts are weak to moderately strong fine to coarse angular to sub-rounded. Flints absent. (Grade Dm) ZIG ZAG CHALK FORMATION	1.00	
			20.58	1.80		End of trial pit at 1.80 m		

Notes:
Shear strengths recorded using Pilicon Hand Shear Vane

Remarks
Trial pit dry and stable. Soakaway test undertaken - see separate results sheet.

Dimensions:



Stability:
Plant Used:
Mechanical Excavator

KEY TO BOREHOLE, TRIAL PIT AND WINDOW SAMPLE LOGS

SOIL STRATA

STRATA


MADE GROUND / FILL


TOPSOIL


COBBLES AND BOULDERS


GRAVEL


SAND


SILT


CLAY


PEAT

WATER


WATER STRIKE


WATER STANDING

BACKFILL / INSTALLATIONS

Backfill Details

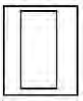

CONCRETE


BENTONITE


FILTER/GRAVEL


ARISINGS BACKFILL

Pipe Details


PLAIN PIPE


SLOTTED PIPE


PIEZOMETER TIP

SAMPLES

U100	OPEN DRIVE TUBE SAMPLE (100 mm NOMINAL DIAMETER)
UT100	OPEN DRIVE THIN WALL TUBE SAMPLE (100 mm NOMINAL DIAMETER)
U38	OPEN DRIVE TUBE SAMPLE (38 mm NOMINAL DIAMETER)
P	PISTON SAMPLE (100 mm NOMINAL DIAMETER UNLESS NOTED OTHERWISE)
D	SMALL DISTURBED SAMPLE
B	BULK DISTURBED SAMPLE
BLK	BLOCK SAMPLE
C	ROTARY CORE SAMPLE
G	GAS SAMPLE
U	UNDISTURBED SAMPLE
UT	TUBE SAMPLE
ES	ENVIRONMENTAL SAMPLE
W	WATER SAMPLE
SPTLS	STANDARD PENETRATION TEST LINER SAMPLE

IN SITU TESTING

S	STANDARD PENETRATION TEST USING THE SPLIT SPOON SAMPLER
C	STANDARD PENETRATION TEST USING A SOLID CONE

WHERE A TEST HAS BEEN COMPLETED THE TYPE OF TEST AND THE N-VALUE WILL BE REPORTED.

WHERE THE FULL 300 mm PENETRATION OF THE MAIN DRIVE HAS NOT BEEN COMPLETED, THE NUMBER OF BLOWS (NOT AN N-VALUE) WILL BE REPORTED.

THE FIELD RECORDS COLUMN ON THE LOG WILL SHOW EACH SET OF BLOW COUNTS PER 75 mm OF PENETRATION INCLUDING SEATING BLOWS AND WILL ALSO INDICATE THE PARTIAL PENETRATION ACHIEVED (mm) FOR INCOMPLETE TESTS.

MLM. Group

Appendix B - Gas and Groundwater Monitoring Results

GAS/GROUND WATER MONITORING RESULTS

Project: Dales Manor Business Park
Location: Sawston
Project No. 721750
Operator: Ross Blake

Instruments Used:
Geotechnical Instruments GA2000
Tape Dipmeter
Phocheck 3000 PID

Date: **3-Oct-07**
Barometric Pressure (mb): **Start:** 1017
Finish: 1016

Position Number	Methane (% Vol)	Carbon Dioxide (% Vol)	Oxygen (% Vol)	Organic Vapours (ppm)	Gas Flow (Litres/hr)	Water Level (m bgl)
WS3	25.4	0.1	4.0	0	-0.1	3.26
WS5	0.1	3.9	13.7	2	0.0	1.98
WS6	3.0	0.0	10.6	1	0.1	2.54
WS7	30.5	1.0	11.7	1	0.0	DRY
WS10	0.0	5.6	8.7	2	0.1	DRY
WS11						Covered over

GAS/GROUND WATER MONITORING RESULTS

Project: Dales Manor Business Park
Location: Sawston
Project No. 721750
Operator: Ross Blake

Instruments Used:
Geotechnical Instruments GA2000
Tape Dipmeter
Phocheck 3000 PID

Date: **17-Oct-07**
Barometric Pressure (mb): **Start:** 1014
Finish: 1013

Position Number	Methane (% Vol)	Carbon Dioxide (% Vol)	Oxygen (% Vol)	Organic Vapours (ppm)	Gas Flow (Litres/hr)	Water Level (m bgl)
WS5	0.1	4.6	9.1	0	0.8	1.81
WS6	6.2	0.0	3.0	0	0.8	2.48
WS7	49.7	1.4	8.0	0	0.1	2.42
WS10	0.1	0.1	19.9	0	0.3	3.00
BH1	0.1	0.1	20.0	0	0.1	End cap jammed
WS11	*					Covered over
WS3	*					Covered over

GAS/GROUND WATER MONITORING RESULTS

Project: Dales Manor Business Park
Location: Sawston
Project No. 721750
Operator: Ross Blake

Instruments Used:
Geotechnical Instruments GA2000
Tape Dipmeter
Phocheck 3000 PID

Date: **24-Oct-07**
Barometric Pressure (mb): **Start:** 1029
Finish: 1029

Position Number	Methane (% Vol)	Carbon Dioxide (% Vol)	Oxygen (% Vol)	Organic Vapours (ppm)	Gas Flow (Litres/hr)	Water Level (m bgl)
WS3	67.2	0.0	2.6	3	0.2	DRY
WS5	0.1	5.3	10.1	1	0.2	2.15
WS6	19.2	0.0	1.6	0	0.2	2.80
WS7	81.8	2.8	2.1	0	0.2	DRY
WS10	0.1	5.7	10.2	1	0.3	3.00
WS11	-	-	-	-	-	Covered over
BH1	0.1	0.4	18.5	6.3	0.1	-

GAS/GROUND WATER MONITORING RESULTS

Project: Dales Manor Business Park
Location: Sawston
Project No. 721750
Operator: Ross Blake

Instruments Used:
Geotechnical Instruments GA2000
Tape Dipmeter
Phocheck 3000 PID

Date: **29-Oct-07**
Barometric Pressure (mb): **Start:** 1013
Finish: 1013

Position Number	Methane (% Vol)	Carbon Dioxide (% Vol)	Oxygen (% Vol)	Organic Vapours (ppm)	Gas Flow (Litres/hr)	Water Level (m bgl)
WS3	64.8	0.0	0.8	3	0.2	2.74
WS5	0.1	5.3	9.5	0	0.1	2.11
WS6	14.6	0.0	3.8	0	0.0	2.80
WS7	56.1	2.2	5.6	0	0.3	DRY
WS10	0.1	5.8	8.9	0	0.2	3.00
BH1	0.1	0.1	19.4	1	0.2	-

GAS/GROUND WATER MONITORING RESULTS

Project: Dales Manor Business Park
Location: Sawston
Project No. 721750
Operator: Ross Blake

Instruments Used:
Geotechnical Instruments GA2000
Tape Dipmeter
Phocheck 3000 PID

Date: **3-Oct-07**
Barometric Pressure (mb): **Start:** 1017
Finish: 1016

Position Number	Methane (% Vol)	Carbon Dioxide (% Vol)	Oxygen (% Vol)	Organic Vapours (ppm)	Gas Flow (Litres/hr)	Water Level (m bgl)
WS3	25.4	0.1	4.0	0	-0.1	3.26
WS5	0.1	3.9	13.7	2	0.0	1.98
WS6	3.0	0.0	10.6	1	0.1	2.54
WS7	30.5	1.0	11.7	1	0.0	DRY
WS10	0.0	5.6	8.7	2	0.1	DRY
WS11						Covered over

GAS/GROUND WATER MONITORING RESULTS

Project: Dales Manor Business Park
Location: Sawston
Project No. 721750
Operator: Ross Blake

Instruments Used:
Geotechnical Instruments GA2000
Tape Dipmeter
Phocheck 3000 PID

Date: **17-Oct-07**
Barometric Pressure (mb): **Start:** 1014
Finish: 1013

Position Number	Methane (% Vol)	Carbon Dioxide (% Vol)	Oxygen (% Vol)	Organic Vapours (ppm)	Gas Flow (Litres/hr)	Water Level (m bgl)
WS5	0.1	4.6	9.1	0	0.8	1.81
WS6	6.2	0.0	3.0	0	0.8	2.48
WS7	49.7	1.4	8.0	0	0.1	2.42
WS10	0.1	0.1	19.9	0	0.3	3.00
BH1	0.1	0.1	20.0	0	0.1	End cap jammed
WS11	*					Covered over
WS3	*					Covered over

GAS/GROUND WATER MONITORING RESULTS

Project: Dales Manor Business Park
Location: Sawston
Project No. 721750
Operator: Ross Blake

Instruments Used:
Geotechnical Instruments GA2000
Tape Dipmeter
Phocheck 3000 PID

Date: **24-Oct-07**
Barometric Pressure (mb): **Start:** 1029
Finish: 1029

Position Number	Methane (% Vol)	Carbon Dioxide (% Vol)	Oxygen (% Vol)	Organic Vapours (ppm)	Gas Flow (Litres/hr)	Water Level (m bgl)
WS3	67.2	0.0	2.6	3	0.2	DRY
WS5	0.1	5.3	10.1	1	0.2	2.15
WS6	19.2	0.0	1.6	0	0.2	2.80
WS7	81.8	2.8	2.1	0	0.2	DRY
WS10	0.1	5.7	10.2	1	0.3	3.00
WS11	-	-	-	-	-	Covered over
BH1	0.1	0.4	18.5	6.3	0.1	-

GAS/GROUND WATER MONITORING RESULTS

Project: Dales Manor Business Park
Location: Sawston
Project No. 721750
Operator: Ross Blake

Instruments Used:
Geotechnical Instruments GA2000
Tape Dipmeter
Phocheck 3000 PID

Date: **29-Oct-07**
Barometric Pressure (mb): **Start:** 1013
Finish: 1013

Position Number	Methane (% Vol)	Carbon Dioxide (% Vol)	Oxygen (% Vol)	Organic Vapours (ppm)	Gas Flow (Litres/hr)	Water Level (m bgl)
WS3	64.8	0.0	0.8	3	0.2	2.74
WS5	0.1	5.3	9.5	0	0.1	2.11
WS6	14.6	0.0	3.8	0	0.0	2.80
WS7	56.1	2.2	5.6	0	0.3	DRY
WS10	0.1	5.8	8.9	0	0.2	3.00
BH1	0.1	0.1	19.4	1	0.2	-

GAS/GROUND WATER MONITORING RESULTS

Project: Dales Manor Business Park
Location: Sawston
Project No. 721750
Operator: CM

Instruments Used:
Geotechnical Instruments GA2000
Tape Dipmeter
Phocheck 3000 PID

Date: **16-Jul-08**
Barometric Pressure (mb): **Start:** 1020
Finish: 1016

Position Number	Methane (% Vol)	Carbon Dioxide (% Vol)	Oxygen (% Vol)	Organic Vapours (ppm)	Gas Flow (Litres/hr)	Water Level (m bgl)
WS3	48.2	0.0	7.3	0	0.4	3.13
WS5	0.1	3.8	12.0	0	0.8	1.87
WS6	10.5	0.0	11.1	0	0.5	2.52
WS7	44.3	1.3	9.7	0	0.7	2.38
WS10	0.1	0.0	20.8	0	1.0	2.99
BH1	0.2	0.1	21.0	0	0.1	3.14
WS101	0	0.1	18.2	0	0.7	1.82
WS103	0.1	0.3	18.8	0.4	1	2.25
WS104	0.1	0	20.3	0.8	1	DRY
WS105	0.2	0	20.1	0	2.5	1.08
WS11	-	-	-	-	-	-
WS108	73	4.3	0.9	0	0.5	DRY
WS112	19.6	0	15	0	0.4	2.14

GAS/GROUND WATER MONITORING RESULTS

Project: Dales Manor Business Park
Location: Sawston
Project No. 721750
Operator: HC

Instruments Used:
Geotechnical Instruments GA2000
Tape Dipmeter
Phocheck 3000 PID

Date: **23-Jul-08**
Barometric Pressure (mb): **Start:** 1020
Finish: 1014

Position Number	Methane (% Vol)	Carbon Dioxide (% Vol)	Oxygen (% Vol)	Organic Vapours (ppm)	Gas Flow (Litres/hr)	Water Level (m bgl)
WS3	57.3	0.0	6.3	0	0.4	3.20
WS5	0.3	3.4	12.4	0	0.8	1.93
WS6	10.5	0.0	11.1	0	0.5	2.52
WS7	62.7	2.7	3.3	0	0.7	2.41
WS10	0.1	0.0	20.8	0	0.7	2.99
BH1	0.6	0.2	20.4	33	0.1	3.23
WS101	0.3	0.3	15.3	0	0.7	1.85
WS103	0.5	0.4	17.8	0.4	0.8	2.33
WS104	0.3	0	20.1	0.8	0.7	DRY
WS105	0.5	0	18.8	5	0.9	1.19
WS108	43.6	3.2	3.4	9	0.5	DRY
WS112	12.2	0	17.8	0	0.4	2.1

GAS/GROUND WATER MONITORING RESULTS

Project: Dales Manor Business Park
Location: Sawston
Project No. 721750
Operator: MCC

Instruments Used:
Geotechnical Instruments GA2000
Tape Dipmeter
Phocheck 3000 PID

Date: **28-Jul-08**
Barometric Pressure (mb): **Start:** 1007
Finish: 1008

Position Number	Methane (% Vol)	Carbon Dioxide (% Vol)	Oxygen (% Vol)	Organic Vapours (ppm)	Gas Flow (Litres/hr)	Water Level (m bgl)	Sample Taken	Notes
WS3	62.2	0.0	4.4	-	0.8	3.10	N	Depth 4.0m
WS5	0.1	4.0	11.9	-	0.1	1.98	N	Depth 4.0m
WS6	-	-	-	-	-	-	N	Could not locate.
WS7	-	-	-	-	-	-	N	Covered over.
WS10	0.2	3.9	10.3	-	0.3	3.01	N	Depth 3.1m
WS11	-	-	-	-	-	-	N	Could not locate.
BH1	0.1	0.0	20.5	-	0.2	3.14	N	Depth 13.7m
WS101	0.1	0.5	15.2	-	0.3	1.77	N	Depth 1.85m
WS103	0.1	0.8	15.8	-	0.1	2.26	N	Depth 3.15m
WS104	1.5	1.7	16.3	-	0.2	Dry	N	Depth 3.0m
WS105	0.2	0.0	19.8	-	0.1	1.07	N	Depth 2.55m
WS108	72.1	3.2	0.8	-	0.4	3.03	N	Depth 3.13m
WS112	31.1	0.0	13.5	-	0.4	1.93	N	Depth 3.05m

GAS/GROUND WATER MONITORING RESULTS

Project: Dales Manor Business Park
Location: Sawston
Project No. 721750
Operator: MCC

Instruments Used:
Geotechnical Instruments GA2000
Tape Dipmeter
Phocheck 3000 PID

Date: **5-Aug-08**
Barometric Pressure (mb): **Start:** 1012
Finish: 1011

Position Number	Methane (% Vol)	Carbon Dioxide (% Vol)	Oxygen (% Vol)	Organic Vapours (ppm)	Gas Flow (Litres/hr)	Water Level (m bgl)	Sample Taken	Notes
WS3	78.1	0.0	0.4	0.3	0.4	3.21	N	Depth 4.0m
WS5	0.1	5.7	9.4	0.0	0.3	2.19	N	Depth 4.0m
WS6	20.9	0.0	0.5	0.1	0.2	2.51	N	Depth 4.0m
WS7	-	-	-	-	-	-	N	Covered over.
WS10	0.1	5.8	9.1	0.0	0.3	3.02	N	Depth 3.1m
WS11	-	-	-	-	-	-	N	Could not locate.
BH1	0.1	0.0	20.1	0.0	0.2	3.21	N	Depth 13.7m
WS101	0.1	0.5	14.9	0.0	0.2	1.79	N	Depth 1.85m
WS103	0.0	0.9	18.5	2.4	0.5	1.35	N	Depth 3.15m
WS104	0.1	0.1	20.2	1.4	0.7	Dry	N	Depth 3.0m
WS105	0.1	0.0	20.6	0.0	0.3	1.03	N	Depth 2.55m
WS108	-	-	-	-	-	-	N	Cover stuck.
WS112	43.0	0.0	14.9	0.1	0.3	1.90	N	Depth 3.05m

GAS AND GROUNDWATER MONITORING RECORD SHEET

PROJECT	Dales Manor Business Park, Sawston			**MLM REF.**	775322
DATE OF MONITORING	11/07/17	TIME	12:00	TECHNICIAN	SHEET NO. 1 OF 6
WEATHER	Dry, cloudy		EQUIPMENT USED	GFM 435, DIP METER, PID	

Well No. / Location	Methane (%)		Carbon Dioxide (%)		Oxygen (%)		Hydrogen Sulphide (%)		Pressure (mb)	Flow (l/hr)	VOC (ppm)	Depth to Water (mbgl)	Depth to Base (mbgl)	Comments
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
CP201	51.0	51.0	2.1	2.1	2.1	2.1	–	–	1007	<0.1	<0.1	3.78	15.00	
CP202	0.1	0.1	<0.1	<0.1	21.2	21.2	–	–	1007	<0.1	<0.1	3.33	15.00	
CP203	2.1	2.1	0.4	0.4	17.5	17.5	–	–	1006	<0.1	0.3	3.64	15.00	
WS201	60.8	60.8	2.4	2.4	0.5	0.5	–	–	1007	<0.1	<0.1	3.32	5.00	
WS202	21.6	21.6	0.4	0.4	4.9	4.9	–	–	1006	<0.1	<0.1	3.64	5.00	
WS203	0.1	0.1	3.1	3.1	11.0	11.0	–	–	1006	<0.1	<0.1	3.70	4.00	
WS204	3.0	3.0	3.6	3.6	0.9	0.9	–	–	1007	<0.1	<0.1	3.60	5.00	
WS205	0.1	0.1	4.1	4.1	9.9	9.9	–	–	1006	<0.1	0.3	Dry	3.40	

GAS AND GROUNDWATER MONITORING RECORD SHEET

PROJECT	Dales Manor Business Park, Sawston				**MLM REF.**	775322
DATE OF MONITORING	27/07/17	TIME	12:00	TECHNICIAN	**LL**	SHEET NO. 2 OF 6
WEATHER	Cloudy with showers		EQUIPMENT USED	GFM 435, DIP METER, PID		

Well No. / Location	Methane (%)		Carbon Dioxide (%)		Oxygen (%)		Hydrogen Sulphide (%)		Pressure (mb)	Flow (l/hr)	VOC (ppm)	Depth to Water (mbgl)	Depth to Base (mbgl)	Comments
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
CP201														Well flooded at surface
CP202	<0.1	<0.1	0.2	0.2	20.4	20.4	–	–	1002	<0.1	<0.1	3.30	15.00	
CP203														Well flooded at surface
WS201	65.5	65.5	2.7	2.7	<0.1	<0.1	–	–	1002	<0.1	<0.1	3.33	5.00	
WS202	40.2	40.2	1.5	1.5	<0.1	<0.1	–	–	1002	<0.1	<0.1	3.60	5.00	
WS203	<0.1	<0.1	3.2	3.2	11.1	11.1	–	–	1002	<0.1	<0.1	3.64	4.00	
WS204	2.0	2.0	3.1	3.1	1.9	1.9	–	–	1002	<0.1	<0.1	3.37	5.00	
WS205							–	–						Well flooded at surface

GAS AND GROUNDWATER MONITORING RECORD SHEET

PROJECT	Dales Manor Business Park, Sawston					**MLM REF.**	775322
DATE OF MONITORING	01/08/17	TIME	12:00	TECHNICIAN	**LL**	SHEET NO.	3 OF 6
WEATHER	Dry, sunny		EQUIPMENT USED	GFM 435, DIP METER, PID			

Well No. / Location	Methane (%)		Carbon Dioxide (%)		Oxygen (%)		Hydrogen Sulphide (%)		Pressure (mb)	Flow (l/hr)	VOC (ppm)	Depth to Water (mbgl)	Depth to Base (mbgl)	Comments
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
CP201														Well flooded at surface
CP202	<0.1	<0.2	0.2	0.2	20.6	21.6	–	–	1011	<0.1	<0.1	3.28	15.00	Sample collected
CP203														Well flooded at surface
WS201	65.5	65.5	2.7	2.7	<0.1	<0.1	–	–	1011	<0.1	<0.1	3.29	5.00	Sample collected, minor sediment in sample
WS202	45.1	45.1	2.0	2.0	<0.1	<0.1	–	–	1011	<0.1	<0.1	3.59	5.00	Sample collected, sediment in sample
WS203	<0.1	<0.2	3.2	3.2	10.8	10.8	–	–	1011	<0.1	<0.1	3.64	4.00	Insufficient water to sample
WS204	2.5	3.5	2.9	2.9	0.8	0.8	–	–	1012	<0.1	<0.1	3.52	5.00	Sample collected, minor sediment in sample
WS205	<0.1	<0.2	4.9	4.9	5.5	5.5	–	–	1012	<0.1	<0.1	Dry	3.40	

GAS AND GROUNDWATER MONITORING RECORD SHEET

PROJECT	Dales Manor Business Park, Sawston					**MLM REF.**	775322
DATE OF MONITORING	11/08/17	TIME	10:00	TECHNICIAN	**LL**	SHEET NO.	4 OF 6
WEATHER	Dry, sunny		EQUIPMENT USED	GFM 435, DIP METER, PID			

Well No. / Location	Methane (%)		Carbon Dioxide (%)		Oxygen (%)		Hydrogen Sulphide (%)		Pressure (mb)	Flow (l/hr)	VOC (ppm)	Depth to Water (mbgl)	Depth to Base (mbgl)	Comments
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
CP201														Well flooded at surface
CP202	<0.1		0.2		20.5		–	–	1016	<0.1	<0.1	3.10	15.00	
CP203														Well flooded at surface
WS201	66.0		2.9		<0.1		–	–	1016	4.8	<0.1	3.17	5.00	
WS202														Unable to access well due to site clearance works being undertaken
WS203														
WS204	3.3		2.1		0.9		–	–	1016	<0.1	<0.1	2.48	5.00	
WS205	<0.1		5.2		3.2		–	–	1016	<0.1	<0.1	Dry	3.40	

GAS AND GROUNDWATER MONITORING RECORD SHEET

PROJECT	Dales Manor Business Park, Sawston					**MLM REF.**	775322
DATE OF MONITORING	15/08/17	TIME	09:00	TECHNICIAN	**LL**	SHEET NO.	5 OF 6
WEATHER	Dry, cloudy		EQUIPMENT USED	GFM 435, DIP METER, PID			

Well No. / Location	Methane (%)		Carbon Dioxide (%)		Oxygen (%)		Hydrogen Sulphide (%)		Pressure (mb)	Flow (l/hr)	VOC (ppm)	Depth to Water (mbgl)	Depth to Base (mbgl)	Comments
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
CP201	59.1	60.1	1.5	1.5	<0.1	<0.2	–	–	1011	<0.1	<0.1	3.59	15.00	
CP202	<0.1	<0.2	0.2	0.2	20.5	21.5	–	–	1012	<0.1	<0.1	3.10	15.00	
CP203														Well flooded at surface
WS201	65.9	65.9	2.8	2.8	<0.1	<0.1	–	–	1012	<0.1	<0.1	3.14	5.00	
WS202														Unable to access well due to site clearance works
WS203														Well destroyed during site clearance works
WS204	3.6	3.6	3.7	3.7	<0.1	<0.1	–	–	1011	<0.1	<0.1	3.42	5.00	
WS205	<0.1	<0.2	5.4	5.4	4.3	5.3	–	–	1011	<0.1	<0.1	Dry	3.40	

GAS AND GROUNDWATER MONITORING RECORD SHEET

PROJECT	Dales Manor Business Park, Sawston					**MLM REF.**	775322
DATE OF MONITORING	22/08/17	TIME	10:00	TECHNICIAN	**LL**	SHEET NO.	6 OF 6
WEATHER	Dry, sunny		EQUIPMENT USED	GFM 435, DIP METER, PID			

Well No. / Location	Methane (%)		Carbon Dioxide (%)		Oxygen (%)		Hydrogen Sulphide (%)		Pressure (mb)	Flow (l/hr)	VOC (ppm)	Depth to Water (mbgl)	Depth to Base (mbgl)	Comments
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady						
CP201	59.7	59.7	1.5	1.5	<0.1	<0.2	–	–	1018	<0.1	<0.1	3.54	15.00	
CP202														Well destroyed during site clearance works
CP203														Well flooded at surface
WS201														Well destroyed during site clearance works
WS202														Well destroyed during site clearance works
WS203														Well destroyed during site clearance works
WS204	3.3	3.3	3.5	3.5	0.7	0.7	–	–	1018	<0.1	<0.1	3.38	5.00	
WS205	<0.1	<0.2	5.8	5.8	5.8	5.8	–	–	1018	<0.1	<0.1	Dry	3.40	

Appendix C - Geotechnical Test Results

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 PAGE 3 of 10

Contract: Dales Manor, SAWSTON.

Serial No. S20340

UKAS TESTING 0998

SUMMARY OF MOISTURE CONTENT, LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index (%)	SAMPLE PREPARATION				Description	CLASS
								Method S/N	Ret'd 0.425um (%)	Corr'd M/C <0.425um	Curing Time (hrs.)		
WS1	1.00	D2	21	42	20	22	0.14*	S	10(M)	23	73	Stiff mottled dark yellowish brown and light yellowish brown slightly gravelly slightly sandy CLAY. Gravel is fine and medium chalk and flint	CI
WS2	1.10	D2	15	23	17	6.0		S	38(M)		98	Mottled yellow and light grey chalky CLAY/CHALK with occasional pale yellow pockets and intact chalk fragments	ML
WS4	1.30	D2	21	39	22	17	0.29*	S	23(M)	27	97	Stiff mottled light brownish grey and very dark greyish brown slightly gravelly CLAY with occasional dark brown and light grey pockets. Gravel is flint, chalk and mudstone	CI
WS5	1.30	D2	17	24	14	10	1.10*	S	31(M)	25	42	Soft dark brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse chalk and flint	CL
WS9	1.10	D3	12	18	13	5.0	0.40*	S	20(M)	15	97	Orange gravelly very clayey chalky fine and medium SAND. Gravel is fine and medium chalk and rare flint	ML
WS10	1.00	D3	14	30	16	14	-0.07*	S	9(M)	15	69	Stiff dark brown slightly gravelly sandy CLAY with occasional dark orangey brown mottling. Gravel is fine and medium rounded to subangular chalk and flint	CL

METHOD OF PREPARATION : BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2 S = Wet Sieved Specimen N = prepared from Natural

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter. A = Assumed, M = Measured

COMMENTS :

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

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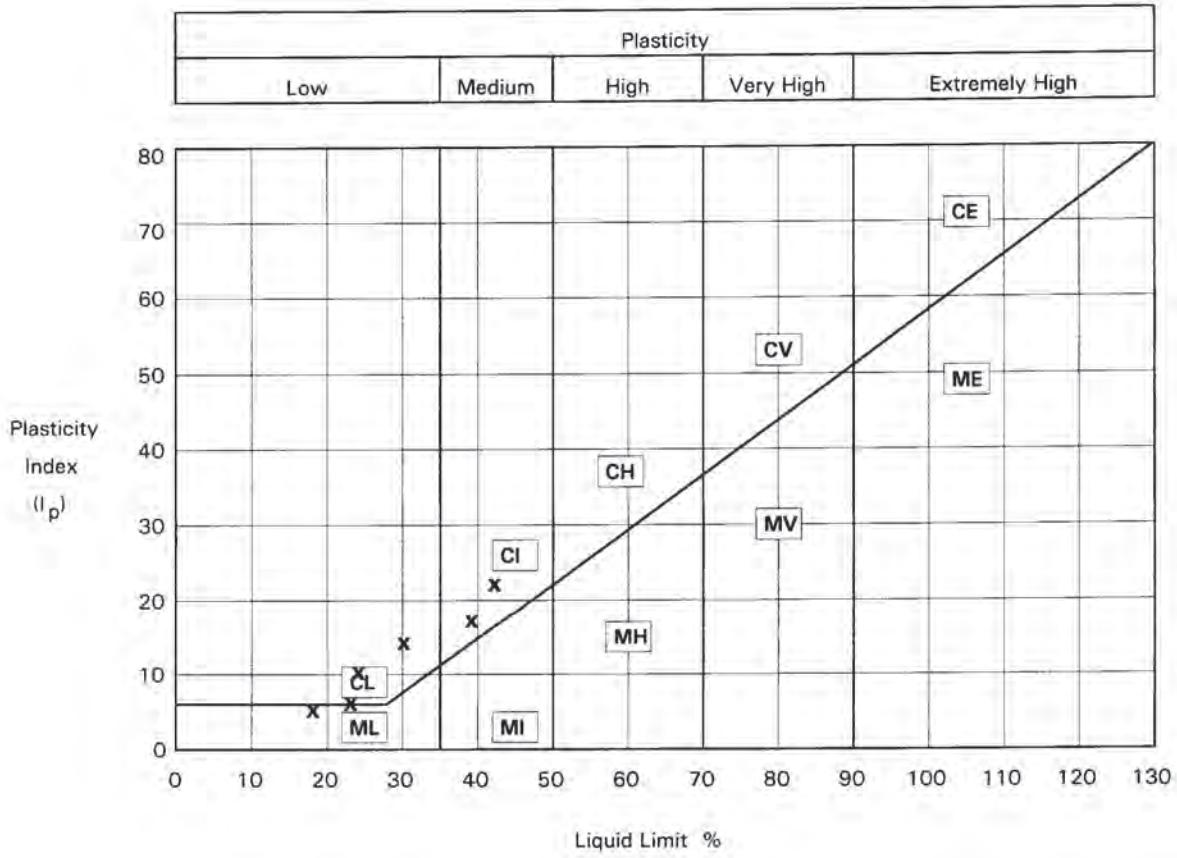
Contract
Dales Manor, SAWSTON.

Serial No.
S20340

PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT USING CASAGRANDE CLASSIFICATION CHART



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1

Contract: Dales Manor, SAWSTON.

Serial No. S20340

UKAS TESTING 0998

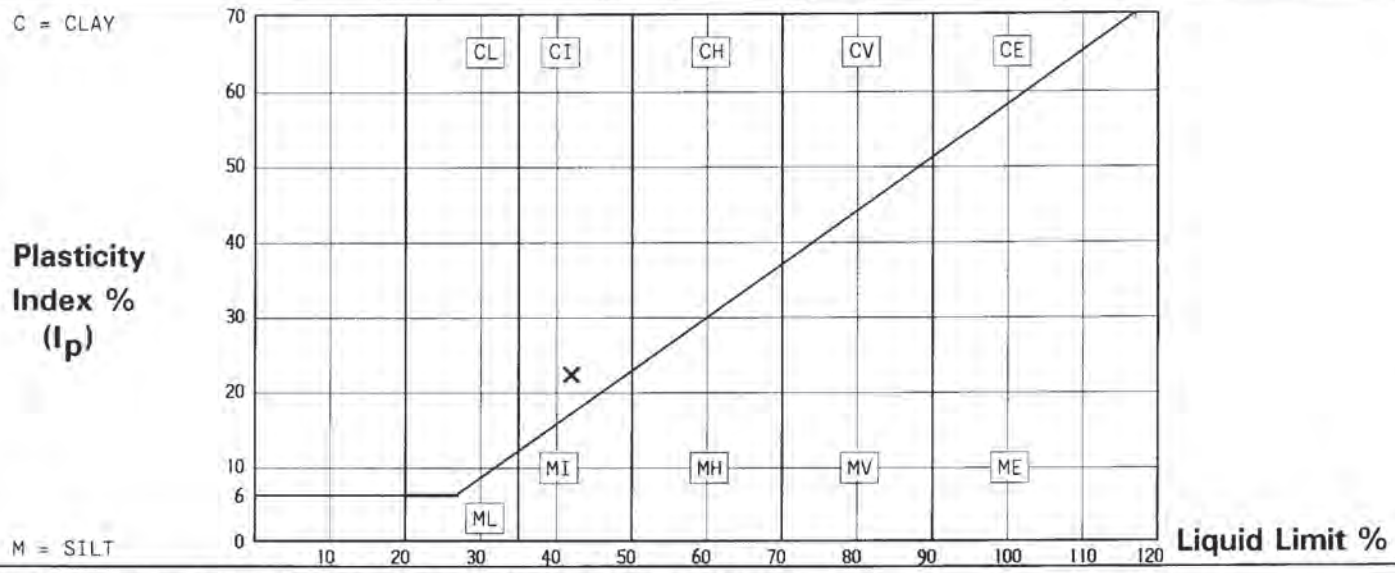
DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
WS1	1.00	D2	21	Stiff mottled dark yellowish brown and light yellowish brown slightly gravelly slightly sandy CLAY. Gravel is fine and medium chalk and flint	

PREPARATION

Method of Preparation	Sieved Specimen
Sample retained 0.425 sieve (Measured)	10 %
Corrected moisture content for material passing 0.425mm	23 %
Curing Time	73 Hours

Liquid Limit	42 %
Plastic Limit	20 %
Plasticity Index	22 %
Liquidity Index	0.14
Clay Content	Not analysed. %
Derived Activity (PI/CC)	Not analysed.



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18
Corrected moisture content and calculated liquidity index assume material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1.

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 PAGE 6 of 10

Contract: Dales Manor, SAWSTON.

Serial No. S20340

UKAS TESTING 0998

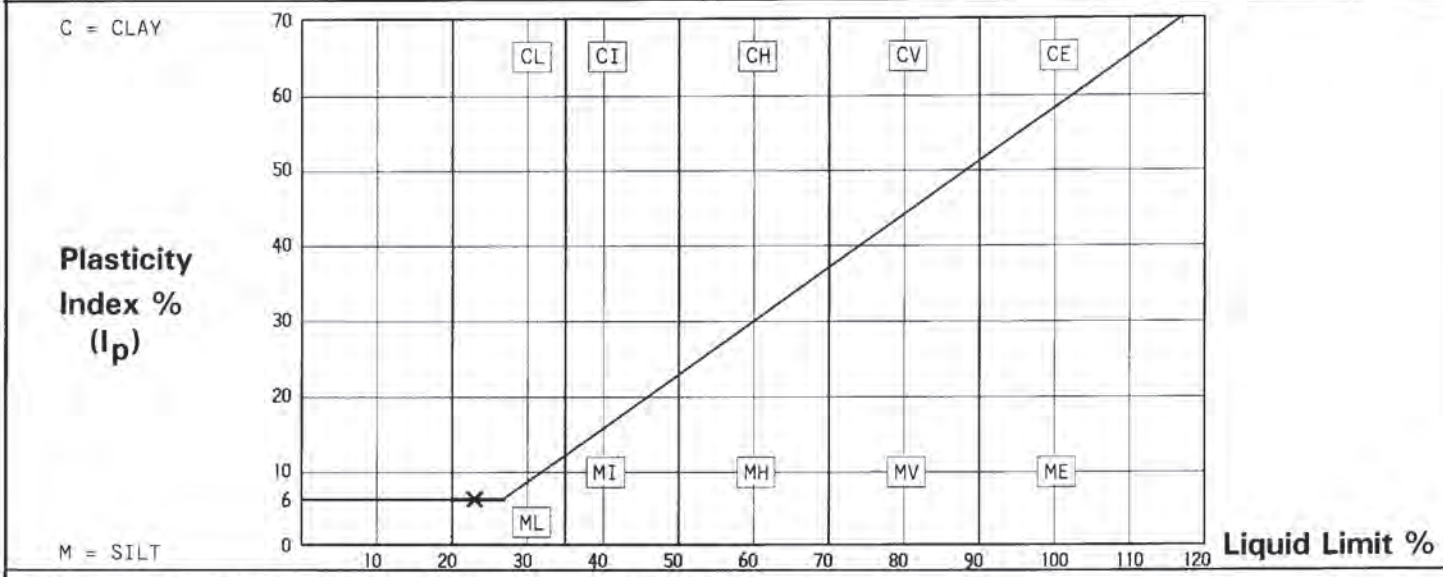
DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
WS2	1.10	D2	15	Mottled yellow and light grey chalky CLAY/CHALK with occasional pale yellow pockets and intact chalk fragments	

PREPARATION

Method of Preparation	Sieved Specimen
Sample retained 0.425 sieve (Measured)	38 %
Corrected moisture content for material passing 0.425mm	%
Curing Time	98 Hours

Liquid Limit	23 %
Plastic Limit	17 %
Plasticity Index	6.0 %
Liquidity Index	
Clay Content	Not analysed. %
Derived Activity (PI/CC)	Not analysed.



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18
CORRECTED MOISTURE CONTENT AND LIQUIDITY INDEX NOT REPORTED DUE TO MATERIAL TYPE

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 PAGE 7 of 10

Contract: Dales Manor, SAWSTON.

Serial No. S20340

UKAS TESTING 0998

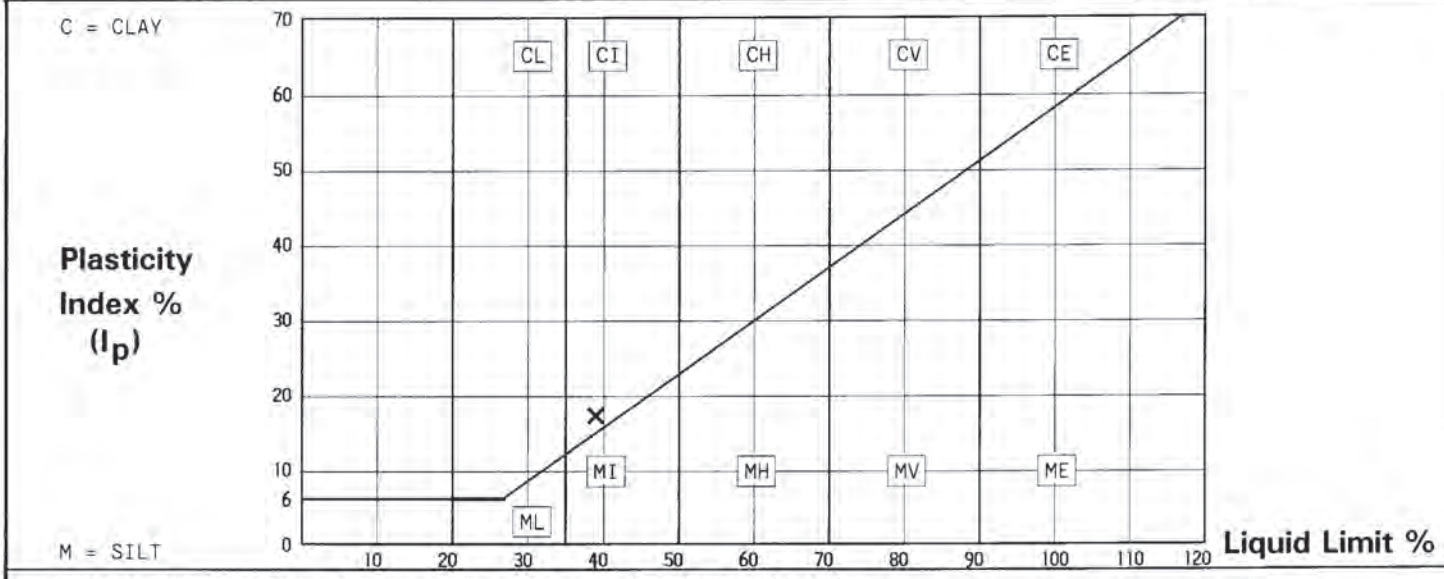
DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
WS4	1.30	D2	21	Stiff mottled light brownish grey and very dark greyish brown slightly gravelly CLAY with occasional dark brown and light grey pockets. Gravel is flint, chalk and mudstone	Strong smell of rubber

PREPARATION

Method of Preparation	Sieved Specimen
Sample retained 0.425 sieve (Measured)	23 %
Corrected moisture content for material passing 0.425mm	27 %
Curing Time	97 Hours

Liquid Limit	39 %
Plastic Limit	22 %
Plasticity Index	17 %
Liquidity Index	0.29
Clay Content	Not analysed. %
Derived Activity (PI/CC)	Not analysed.



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18
Corrected moisture content and calculated liquidity index assume material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1.

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 PAGE 8 of 10

Contract: Dales Manor, SAWSTON.

Serial No. S20340

UKAS TESTING 0998

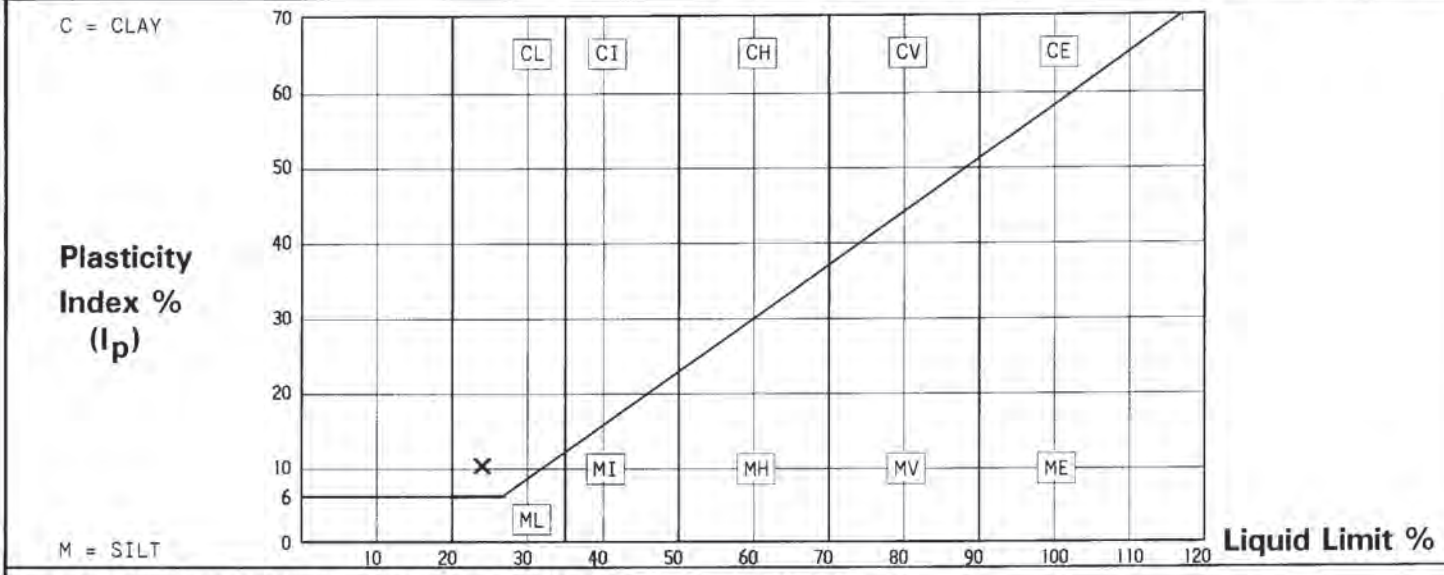
DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
WS5	1.30	D2	17	Soft dark brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse chalk and flint	

PREPARATION

Method of Preparation	Sieved Specimen
Sample retained 0.425 sieve (Measured)	31 %
Corrected moisture content for material passing 0.425mm	25 %
Curing Time	42 Hours

Liquid Limit	24 %
Plastic Limit	14 %
Plasticity Index	10 %
Liquidity Index	1.10
Clay Content	Not analysed. %
Derived Activity (PI/CC)	Not analysed.



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18
Corrected moisture content and calculated liquidity index assume material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1.

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 PAGE 9 of 10

Contract
Dales Manor, SAWSTON.

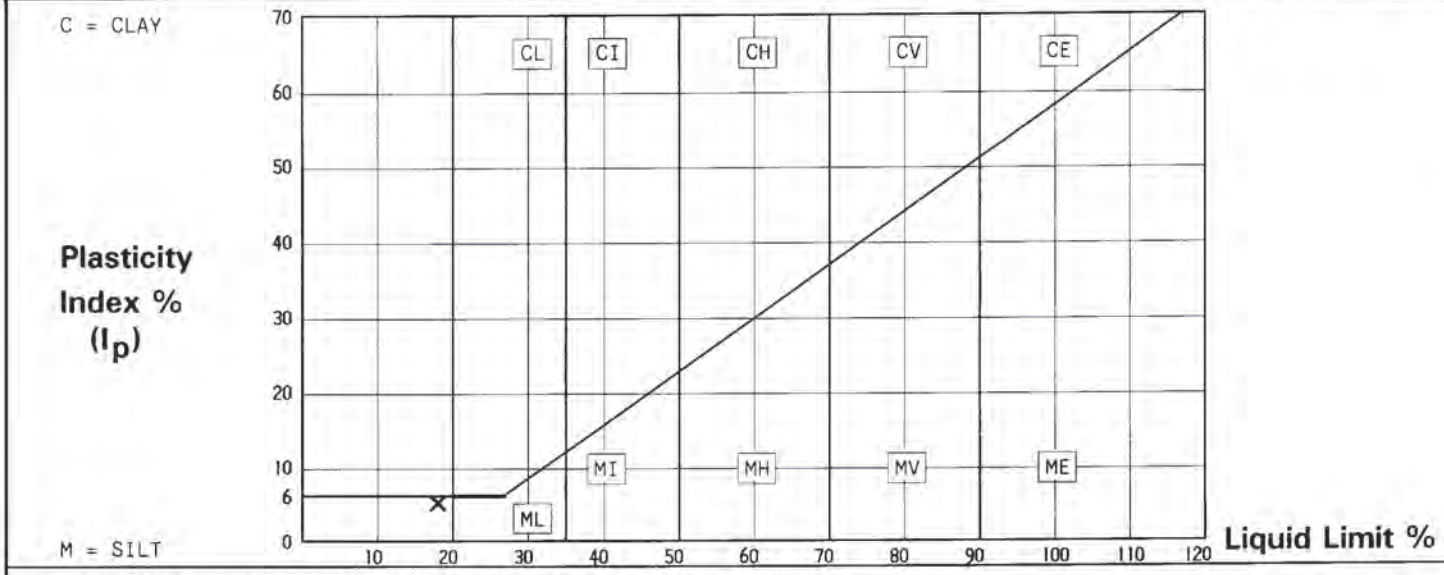
Serial No.
S20340

UKAS TESTING
0998

DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
WS9	1.10	D3	12	Orange gravelly very clayey chalky fine and medium SAND. Gravel is fine and medium chalk and rare flint	Unknown odour noted

PREPARATION			
Method of Preparation	Sieved Specimen	Liquid Limit	18 %
Sample retained 0.425 sieve (Measured)	20 %	Plasticity Index	5.0 %
Corrected moisture content for material passing 0.425mm	15 %	Liquidity Index	0.40
Curing Time	97 Hours	Clay Content	Not analysed. %
		Derived Activity (PI/CC)	Not analysed.



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18
Corrected moisture content and calculated liquidity index assume material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1.

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

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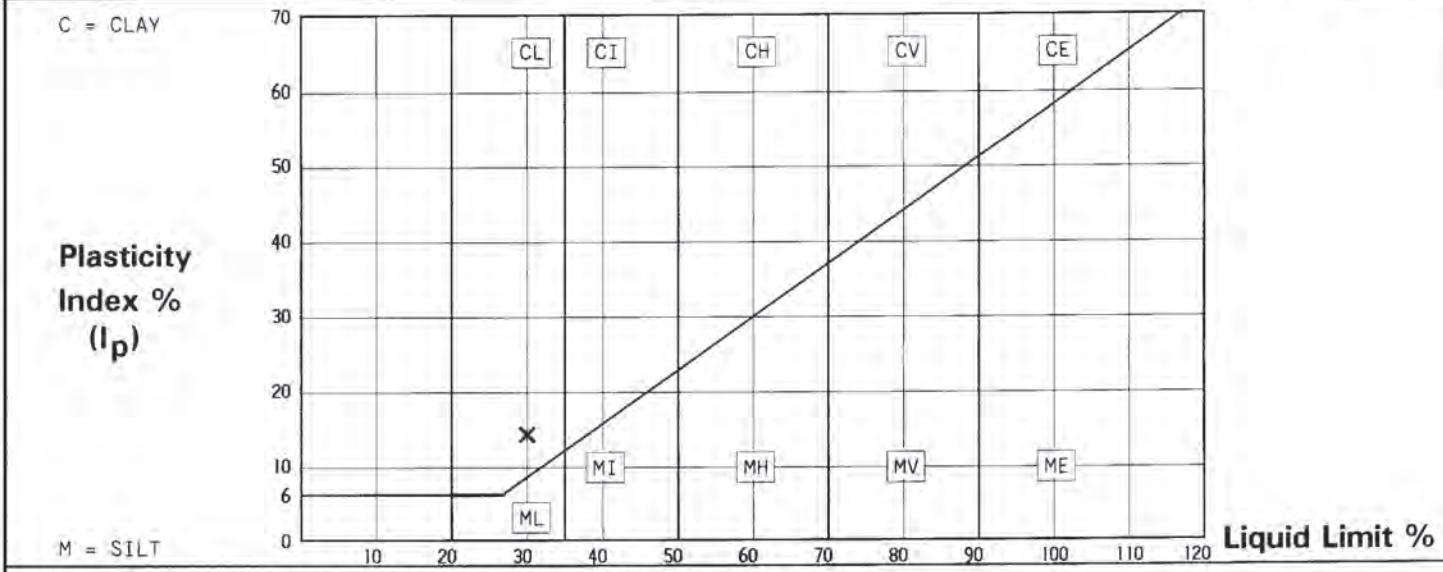
Serial No. S20340

UKAS TESTING 0998

DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole/ Pit No.	Depth m.	Sample	Moisture Content %	Description	Remarks
WS10	1.00	D3	14	Stiff dark brown slightly gravelly sandy CLAY with occasional dark orangey brown mottling. Gravel is fine and medium rounded to subangular chalk and flint	

PREPARATION			
Method of Preparation	Sieved Specimen	Liquid Limit	30 %
Sample retained 0.425 sieve (Measured)	9 %	Plastic Limit	16 %
Corrected moisture content for material passing 0.425mm	15 %	Plasticity Index	14 %
Curing Time	69 Hours	Liquidity Index	-0.07
		Clay Content	Not analysed. %
		Derived Activity (PI/CC)	Not analysed.



METHOD OF PREPARATION: BS 1377:PART 1:1990:7.4 & PART 2:1990:4.2

METHOD OF TEST : BS 1377:PART 2:1990:3.2, 4.4, 5.3, 5.4

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : PLASTICITY CHART BS5930:1999:Figure 18
Corrected moisture content and calculated liquidity index assume material greater than 0.425mm non porous. See BS1377:Part2:1990 Clause 3 Note 1.

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1

Contract
Dales Manor, SAWSTON.

Serial No.
S20340-S

DETERMINATION OF THE SULPHATE CONTENT OF SOIL AND GROUNDWATER

Borehole/ Pit No.	Depth m.	Sample	Concentration of Soluble Sulphate: Soil: Acid Soluble SO3 %	Concentration of Soluble Sulphate: Soil: Water Soluble 2:1 SO3 g/l	Concentration of Soluble Sulphate: Groundwater g/l	% of sample passing 2mm sieve	Description	Remarks
WS1	1.00	D2		0.02		100	Stiff mottled dark yellowish brown and light yellowish brown slightly gravelly slightly sandy CLAY. Gravel is fine and medium chalk and flint	Gravel crushed to pass 2mm sieve
WS2	1.10	D2		<0.01		77	Mottled yellow and light grey chalky CLAY/CHALK with occasional pale yellow pockets and intact chalk fragments	
WS4	1.30	D2		0.06		98	Stiff mottled light brownish grey and very dark greyish brown slightly gravelly CLAY with occasional dark brown and light grey pockets. Gravel is flint, chalk and mudstone	Strong smell of rubber
WS9	1.10	D3		< 0.01		92	Orange gravelly very clayey chalky fine and medium SAND. Gravel is fine and medium chalk and rare flint	Unknown odour noted

METHOD OF PREPARATION: BS 1377:PART 1:1990:7.5 BS1377:PART 3:1990:5.2 Acid Soluble, 5.3 Soil/Water Extract :5.4 Groundwater

METHOD OF TEST : BS 1377:PART 3:1990:5.5

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : Test not UKAS accredited.

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.

TEST REPORT.

ISSUED BY : SOIL PROPERTY TESTING LTD.

DATE OF ISSUE : As page 1 PAGE 4 of 4

Contract
Dales Manor, SAWSTON.

Serial No.
S20340-S

DETERMINATION OF THE pH VALUE

Borehole/ Pit No.	Depth m.	Sample	pH Value	Description	Remarks
WS1	1.00	D2	7.9	Stiff mottled dark yellowish brown and light yellowish brown slightly gravelly slightly sandy CLAY. Gravel is fine and medium chalk and flint	Gravel crushed to pass 2mm sieve
WS2	1.10	D2	8.1	Mottled yellow and light grey chalky CLAY/CHALK with occasional pale yellow pockets and intact chalk fragments	
WS4	1.30	D2	7.7	Stiff mottled light brownish grey and very dark greyish brown slightly gravelly CLAY with occasional dark brown and light grey pockets. Gravel is flint, chalk and mudstone	Strong smell of rubber
WS9	1.10	D3	8.3	Orange gravelly very clayey chalky fine and medium SAND. Gravel is fine and medium chalk and rare flint	Unknown odour noted

METHOD OF PREPARATION: BS 1377:PART 1:1990:7 BS 1377:PART 3:1990:9.4

METHOD OF TEST : BS 1377:PART 3:1990:9.5

TYPE OF SAMPLE KEY : U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter

COMMENTS : Test not UKAS accredited.

REMARKS TO INCLUDE : Sample disturbance, loss of moisture, variation from test procedure, location and origin of test specimen within original sample. Oven drying temperature if not 105-110 deg C.

Appendix D - Chemical Analysis Results

MLM Environmental Ltd
7200 Cambridge Research Park
Cambridge

CB25 9TL

FAO M Henderson

LABORATORY TEST REPORT

Results of analysis of 19 samples
received 01 October 2007

Dales Manor Business Park, Sawston

Chemtest

Report Date
09 October 2007

Login Batch No					71060							
Chemtest LIMS ID					AC36458	AC36460	AC36461	AC36462	AC36463	AC36464	AC36465	AC36468
Sample ID					WS1	WS2	WS2	WS3	WS3	WS3	WS4	WS5
Sample No					D1	D1	D3	D1	D2	D3	D1	D1
Depth					0.3m	0.4m	2.8m	0.7m	1.5m	2.7m	0.7m	0.7m
Matrix					*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
SOP↓	Determinand↓	CAS No↓	Units↓	*								
2630	Total Organic Carbon		%	M				1.2			0.60	2.1
2210	Sulfate (2:1 water soluble)	14808798	g l-1	M								
2450	Arsenic	7440382	mg kg-1	M	14	17		22			14	17
	Cadmium	7440439	mg kg-1	M	0.20	<0.1		0.25			0.13	0.48
	Chromium	7440473	mg kg-1	U	19	2.1		27			17	37
	Copper	7440508	mg kg-1	M	13	<5		26			16	77
	Mercury	7439976	mg kg-1	M	<0.1	<0.1		0.48			0.30	0.24
	Nickel	7440020	mg kg-1	M	19	5.7		25			19	32
	Lead	7439921	mg kg-1	M	33	6.1		83			30	75
	Selenium	7782492	mg kg-1	U	<0.1	<0.1		<0.1			<0.1	<0.1
	Zinc	7440666	mg kg-1	M	45	11		88			35	580
2670	Total Petroleum Hydrocarbons		mg kg-1	M					<20	<20		
2673	TPH >C6-C10		mg kg-1	U		<1	<1	<1				
	TPH >C10-C21		mg kg-1	M		<1	<1	60				
	TPH >C21-C40		mg kg-1	M		<1	<1	26				
	Total Petroleum Hydrocarbons		mg kg-1	M		<20	<20	86				
2700	Naphthalene	91203	mg kg-1	M				0.6			<0.1	0.1
	Acenaphthylene	208968	mg kg-1	M				3.1			0.2	2.4
	Acenaphthene	83329	mg kg-1	M				0.6			<0.1	<0.1
	Fluorene	86737	mg kg-1	M				1			<0.1	<0.1
	Phenanthrene	85018	mg kg-1	M				0.9			3	0.2
	Anthracene	120127	mg kg-1	M				<0.1			0.9	<0.1
	Fluoranthene	206440	mg kg-1	M				3.8			4.1	0.2
	Pyrene	129000	mg kg-1	M				1.6			2.7	1.1
	Benzo[a]anthracene	56553	mg kg-1	M				0.6			1.1	<0.1
	Chrysene	218019	mg kg-1	M				0.6			1.3	<0.1
	Benzo[b]fluoranthene	205992	mg kg-1	M				0.9			1	0.5
	Benzo[k]fluoranthene	207089	mg kg-1	M				0.7			1	0.7
	Benzo[a]pyrene	50328	mg kg-1	M				0.8			1.1	<0.1
	Dibenzo[a,h]anthracene	53703	mg kg-1	M				0.6			0.7	<0.1

All tests undertaken between 04-Oct-2007 and 9-Oct-2007

* Accreditation status

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

MLM Environmental Ltd
7200 Cambridge Research Park
Cambridge

CB25 9TL

FAO M Henderson

LABORATORY TEST REPORT

Results of analysis of 19 samples
received 01 October 2007

Dales Manor Business Park, Sawston

Chemtest

Report Date
09 October 2007

Login Batch No					71060							
Chemtest LIMS ID					AC36472	AC36474	AC36477	AC36479	AC36481	AC36483	AC36485	AC36488
Sample ID					WS6	WS6	WS7	WS8	WS8	WS9	WS10	WS10
Sample No					D1	D3	D1	D1	D3	D2	D1	D5
Depth					0.6m	2.0m	0.5m	0.8m	3.5m	0.6m	0.2m	2.7m
Matrix					*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
SOP↓	Determinand↓	CAS No↓	Units↓	*								
2630	Total Organic Carbon		%	M	0.58		0.23					
2210	Sulfate (2:1 water soluble)	14808798	g l-1	M								
2450	Arsenic	7440382	mg kg-1	M	18		8.4	21		22		
	Cadmium	7440439	mg kg-1	M	0.13		<0.1	0.20		0.16		
	Chromium	7440473	mg kg-1	U	25		6.9	14		9.0		
	Copper	7440508	mg kg-1	M	16		<5	15		12		
	Mercury	7439976	mg kg-1	M	0.44		<0.1	0.19		0.23		
	Nickel	7440020	mg kg-1	M	24		8.7	19		13		
	Lead	7439921	mg kg-1	M	66		6.4	62		100		
	Selenium	7782492	mg kg-1	U	<0.1		<0.1	0.18		<0.1		
	Zinc	7440666	mg kg-1	M	58		11	35		52		
2670	Total Petroleum Hydrocarbons		mg kg-1	M		<20		<20	<20			
2673	TPH >C6-C10		mg kg-1	U	<1						<1	<1
	TPH >C10-C21		mg kg-1	M	910						<1	<1
	TPH >C21-C40		mg kg-1	M	150						<1	<1
	Total Petroleum Hydrocarbons		mg kg-1	M	1100						<20	<20
2700	Naphthalene	91203	mg kg-1	M			<0.1					
	Acenaphthylene	208968	mg kg-1	M			0.1					
	Acenaphthene	83329	mg kg-1	M			<0.1					
	Fluorene	86737	mg kg-1	M			0.5					
	Phenanthrene	85018	mg kg-1	M			0.2					
	Anthracene	120127	mg kg-1	M			<0.1					
	Fluoranthene	206440	mg kg-1	M			0.6					
	Pyrene	129000	mg kg-1	M			<0.1					
	Benzo[a]anthracene	56553	mg kg-1	M			<0.1					
	Chrysene	218019	mg kg-1	M			<0.1					
	Benzo[b]fluoranthene	205992	mg kg-1	M			<0.1					
	Benzo[k]fluoranthene	207089	mg kg-1	M			<0.1					
	Benzo[a]pyrene	50328	mg kg-1	M			<0.1					
	Dibenzo[a,h]anthracene	53703	mg kg-1	M			<0.1					

All tests undertaken between 04-Oct-2007 and 9-Oct-2007

* Accreditation status

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

MLM Environmental Ltd
7200 Cambridge Research Park
Cambridge

CB25 9TL

FAO M Henderson

LABORATORY TEST REPORT

Results of analysis of 19 samples
received 01 October 2007

Dales Manor Business Park, Sawston

Chemtest

Report Date
09 October 2007

Login Batch No					71060		
Chemtest LIMS ID					AC36489	AC36490	AC36492
Sample ID					WS11	WS11	WS11
Sample No					D1	D2	D4
Depth					0.5m	1.3m	3.8m
Matrix					*SOIL*	*SOIL*	*SOIL*
SOP↓	Determinand↓	CAS No↓	Units↓	*			
2630	Total Organic Carbon		%	M			
2210	Sulfate (2:1 water soluble)	14808798	g l-1	M	0.46		
2450	Arsenic	7440382	mg kg-1	M	19	19	13
	Cadmium	7440439	mg kg-1	M	0.11	<0.1	<0.1
	Chromium	7440473	mg kg-1	U	26	17	3.5
	Copper	7440508	mg kg-1	M	15	19	<5
	Mercury	7439976	mg kg-1	M	0.13	1.1	<0.1
	Nickel	7440020	mg kg-1	M	24	23	7.7
	Lead	7439921	mg kg-1	M	57	72	<5
	Selenium	7782492	mg kg-1	U	<0.1	<0.1	0.17
	Zinc	7440666	mg kg-1	M	96	62	11
2670	Total Petroleum Hydrocarbons		mg kg-1	M			
2673	TPH >C6-C10		mg kg-1	U			<1
	TPH >C10-C21		mg kg-1	M			<1
	TPH >C21-C40		mg kg-1	M			<1
	Total Petroleum Hydrocarbons		mg kg-1	M			<20
2700	Naphthalene	91203	mg kg-1	M	<0.1		
	Acenaphthylene	208968	mg kg-1	M	2		
	Acenaphthene	83329	mg kg-1	M	0.3		
	Fluorene	86737	mg kg-1	M	2.2		
	Phenanthrene	85018	mg kg-1	M	<0.1		
	Anthracene	120127	mg kg-1	M	<0.1		
	Fluoranthene	206440	mg kg-1	M	0.6		
	Pyrene	129000	mg kg-1	M	<0.1		
	Benzo[a]anthracene	56553	mg kg-1	M	<0.1		
	Chrysene	218019	mg kg-1	M	<0.1		
	Benzo[b]fluoranthene	205992	mg kg-1	M	<0.1		
	Benzo[k]fluoranthene	207089	mg kg-1	M	<0.1		
	Benzo[a]pyrene	50328	mg kg-1	M	<0.1		
	Dibenzo[a,h]anthracene	53703	mg kg-1	M	<0.1		

All tests undertaken between 04-Oct-2007 and 9-Oct-2007

* Accreditation status

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

MLM Environmental Ltd
7200 Cambridge Research Park
Cambridge

CB25 9TL

FAO M Henderson

LABORATORY TEST REPORT

Results of analysis of 19 samples
received 01 October 2007

Dales Manor Business Park, Sawston

Chemtest

Report Date
09 October 2007

					71060							
					AC36458	AC36460	AC36461	AC36462	AC36463	AC36464	AC36465	AC36468
					WS1	WS2	WS2	WS3	WS3	WS3	WS4	WS5
					D1	D1	D3	D1	D2	D3	D1	D1
					0.3m	0.4m	2.8m	0.7m	1.5m	2.7m	0.7m	0.7m
					SOIL	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
2700	Indeno[1,2,3-cd]pyrene	193395	mg kg-¹	M				0.7			0.8	<0.1
	Benzo[g,h,i]perylene	191242	mg kg-¹	M				0.1			0.4	<0.1
	Total (of 16) PAHs		mg kg-¹	M				17			18	5.3
2010	pH		-	M				12.1			9.8	9.9

All tests undertaken between 04-Oct-2007 and 9-Oct-2007

* Accreditation status

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

MLM Environmental Ltd
7200 Cambridge Research Park
Cambridge

CB25 9TL

FAO M Henderson

LABORATORY TEST REPORT

Results of analysis of 19 samples
received 01 October 2007

Dales Manor Business Park, Sawston

Chemtest

Report Date
09 October 2007

					71060							
					AC36472	AC36474	AC36477	AC36479	AC36481	AC36483	AC36485	AC36488
					WS6	WS6	WS7	WS8	WS8	WS9	WS10	WS10
					D1	D3	D1	D1	D3	D2	D1	D5
					0.6m	2.0m	0.5m	0.8m	3.5m	0.6m	0.2m	2.7m
					SOIL	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
2700	Indeno[1,2,3-cd]pyrene	193395	mg kg-¹	M			<0.1					
	Benzo[g,h,i]perylene	191242	mg kg-¹	M			<0.1					
	Total (of 16) PAHs		mg kg-¹	M			<2					
2010	pH		-	M	11.9		9.4					

All tests undertaken between 04-Oct-2007 and 9-Oct-2007

* Accreditation status

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

MLM Environmental Ltd
7200 Cambridge Research Park
Cambridge

CB25 9TL

FAO M Henderson

LABORATORY TEST REPORT

Results of analysis of 19 samples
received 01 October 2007

Dales Manor Business Park, Sawston

Chemtest

Report Date
09 October 2007

					71060		
					AC36489	AC36490	AC36492
					WS11	WS11	WS11
					D1	D2	D4
					0.5m	1.3m	3.8m
					SOIL	*SOIL*	*SOIL*
2700	Indeno[1,2,3-cd]pyrene	193395	mg kg-¹	M	<0.1		
	Benzo[g,h,i]perylene	191242	mg kg-¹	M	<0.1		
	Total (of 16) PAHs		mg kg-¹	M	5.1		
2010	pH		-	M	11.8		

All tests undertaken between 04-Oct-2007 and 9-Oct-2007

* Accreditation status

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

MLM Environmental Ltd
7200 Cambridge Research Park
Cambridge

CB25 9TL

FAO Mark Henderson

LABORATORY TEST REPORT

Results of analysis of 8 samples
received 16 October 2007

Dales Manor Business Park, Sawston

Chemtest

Report Date
24 October 2007

Login Batch No					54093							
Chemtest LIMS ID					AC40836	AC40837	AC40838	AC40839	AC40840	AC40841	AC40842	AC40843
Sample ID					WS1	WS3	WS3	WS5	WS5	WS6	WS7	WS11
Sample No					D3	D1	D3	D1	D3	D1	D1	D3
Depth					2.5m	0.7m	2.7m	0.7m	2.5m	0.6m	0.5m	2.0m
Matrix					*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
SOP↓	Determinand↓	CAS No↓	Units↓	*								
2210	Sulfate (2:1 water soluble)	14808798	g l-1	M	<0.01	0.34	0.06	0.17	<0.01	0.13	0.02	0.03
2450	Arsenic	7440382	mg kg-1	M					3.5			
	Cadmium	7440439	mg kg-1	M					<0.1			
	Chromium	7440473	mg kg-1	U					8.2			
	Copper	7440508	mg kg-1	M					6.6			
	Mercury	7439976	mg kg-1	M					<0.1			
	Nickel	7440020	mg kg-1	M					7.9			
	Lead	7439921	mg kg-1	M					6.0			
	Selenium	7782492	mg kg-1	U					0.39			
	Zinc	7440666	mg kg-1	M					11			
2670	Total Petroleum Hydrocarbons		mg kg-1	M					<20			
2700	Naphthalene	91203	mg kg-1	M					<0.1			
	Acenaphthylene	208968	mg kg-1	M					<0.1			
	Acenaphthene	83329	mg kg-1	M					<0.1			
	Fluorene	86737	mg kg-1	M					<0.1			
	Phenanthrene	85018	mg kg-1	M					<0.1			
	Anthracene	120127	mg kg-1	M					<0.1			
	Fluoranthene	206440	mg kg-1	M					<0.1			
	Pyrene	129000	mg kg-1	M					<0.1			
	Benzo[a]anthracene	56553	mg kg-1	M					<0.1			
	Chrysene	218019	mg kg-1	M					<0.1			
	Benzo[b]fluoranthene	205992	mg kg-1	M					<0.1			
	Benzo[k]fluoranthene	207089	mg kg-1	M					<0.1			
	Benzo[a]pyrene	50328	mg kg-1	M					<0.1			
	Dibenzo[a,h]anthracene	53703	mg kg-1	M					<0.1			
	Indeno[1,2,3-cd]pyrene	193395	mg kg-1	M					<0.1			
	Benzo[g,h,i]perylene	191242	mg kg-1	M					<0.1			
	Total (of 16) PAHs		mg kg-1	M					<2			
2010	pH		-	M	8.4		8.1		8.4			8.6

All tests undertaken between 18-Oct-2007 and 24-Oct-2007

* Accreditation status

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

MLM Environmental Ltd
7200 Cambridge Research Park
Cambridge

CB25 9TL

FAO M.Henderson

LABORATORY TEST REPORT

Results of analysis of 3 samples
received 05 October 2007

Dales Manor Business Park, Sawston

Chemtest

Report Date
15 October 2007

Login Batch No					45412		
Chemtest LIMS ID					AC38527	AC38528	AC38529
Sample ID					WS3	WS5	WS6
Sample No							
Depth							
Matrix					*WATER*	*WATER*	*WATER*
SOP↓	Determinand↓	CAS No↓	Units↓	*			
1010	pH	PH	-	U			7.9
1450	Arsenic	7440382	µg l⁻¹	U	13	2	3.4
	Boron	7440428	µg l⁻¹	U	190	110	69
	Cadmium	7440439	µg l⁻¹	U	<0.5	<0.5	<0.5
	Chromium	7440473	µg l⁻¹	U	9.6	4.3	9.4
	Copper	7440508	µg l⁻¹	U	100	3.2	9.9
	Lead	7439921	µg l⁻¹	U	5.4	<1	<1
	Mercury	7439976	µg l⁻¹	U	4.1	4.4	2.1
	Nickel	7440020	µg l⁻¹	U	4.6	3.6	7.7
	Selenium	7782492	µg l⁻¹	U	14	1.6	4.9
	Zinc	7440666	µg l⁻¹	U	22	30	23
1673	TPH >C6-C10		µg l⁻¹	U	<0.1	<0.1	
	TPH >C10-C21		µg l⁻¹	U	<0.1	<0.1	
	TPH >C21-C40		µg l⁻¹	U	<0.1	<0.1	
	Total Petroleum Hydrocarbons		µg l⁻¹	U	<10	<10	

All tests undertaken between 15-Oct-2007 and 15-Oct-2007

* Accreditation status

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

MLM Environmental Ltd
7200 Cambridge Research Park
Cambridge

CB25 9TL

FAO M Henderson

LABORATORY TEST REPORT

Results of analysis of 2 samples
received 05 November 2007

Dales Manor Business Park, Sawston

Chemtest

Report Date
09 November 2007

Login Batch No					45638	
Chemtest LIMS ID					AC47552	AC47553
Sample ID					WS6	BH1
Sample No						
Depth						
Matrix					*WATER*	*WATER*
SOP↓	Determinand↓	CAS No↓	Units↓	*		
1675	TPH >C5-C7		µg l-¹	U	<0.1	<0.1
	TPH >C7-C8		µg l-¹	U	<0.1	<0.1
	TPH >C8-C10		µg l-¹	U	<0.1	<0.1
	TPH >C10-C12		µg l-¹	U	<0.1	<0.1
	TPH >C12-C16		µg l-¹	U	<0.1	<0.1
	TPH >C16-C21		µg l-¹	U	<0.1	<0.1
	TPH >C21-C35		µg l-¹	U	<0.1	<0.1
	Total Petroleum Hydrocarbons		µg l-¹	U	<10	<10

All tests undertaken between 08-Nov-2007 and 8-Nov-2007

* Accreditation status

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

MLM Environmental Ltd
7200 Cambridge Research Park
Cambridge

CB25 9TL

FAO Hester Carter

AMENDED LABORATORY TEST REPORT

Results of analysis of 11 samples
received 18 July 2008

Dales Manor Business Park, Sawston 721750

Chemtest

Report Date
04 August 2008

Login Batch No					100436							
Chemtest LIMS ID					AD25574	AD25575	AD25576	AD25577	AD25578	AD25579	AD25580	AD25581
Sample ID					TP1	WS101	WS101	WS104	WS105	WS107	WS107	WS110
Sample No					1	1	4	1	2	1	2	1
Depth					0.3	0.9	3.9	0.7	1.9	0.3	0.9	0.5
Matrix					*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
SOP↓	Determinand↓	CAS No↓	Units↓	*								
2450	Arsenic	7440382	mg kg⁻¹	M			4.4			9.1	9.8	17
	Cadmium	7440439	mg kg⁻¹	M			<0.1			0.10	0.16	0.30
	Chromium	7440473	mg kg⁻¹	M			5.2			16	18	20
	Copper	7440508	mg kg⁻¹	M			<5			9.6	18	46
	Mercury	7439976	mg kg⁻¹	M			<0.1			<0.1	0.24	10
	Nickel	7440020	mg kg⁻¹	M			6.3			16	18	26
	Lead	7439921	mg kg⁻¹	M			<5			10	32	200
	Selenium	7782492	mg kg⁻¹	M			<0.2			<0.2	<0.2	<0.2
	Zinc	7440666	mg kg⁻¹	M			<10			25	45	82
2670	TPH >C6-C10		mg kg⁻¹	N	5	< 1	< 1	< 1	< 1	1		
	TPH >C10-C21		mg kg⁻¹	N	380	< 1	< 1	750	7	3300		
	TPH >C21-C40		mg kg⁻¹	N	23	< 1	< 1	100	34	330		
	Total Petroleum Hydrocarbons		mg kg⁻¹	M	410	< 10	< 10	850	41	3700		
2700	Naphthalene	91203	mg kg⁻¹	M						0.2		
	Acenaphthylene	208968	mg kg⁻¹	M						23		
	Acenaphthene	83329	mg kg⁻¹	M						36		
	Fluorene	86737	mg kg⁻¹	M						40		
	Phenanthrene	85018	mg kg⁻¹	M						1.4		
	Anthracene	120127	mg kg⁻¹	M						38		
	Fluoranthene	206440	mg kg⁻¹	M						1.4		
	Pyrene	129000	mg kg⁻¹	M						0.5		
	Benzo[a]anthracene	56553	mg kg⁻¹	M						0.2		
	Chrysene	218019	mg kg⁻¹	M						0.2		
	Benzo[b]fluoranthene	205992	mg kg⁻¹	M						0.2		
	Benzo[k]fluoranthene	207089	mg kg⁻¹	M						<0.1		
	Benzo[a]pyrene	50328	mg kg⁻¹	M						<0.1		
	Dibenzo[a,h]anthracene	53703	mg kg⁻¹	M						<0.1		
	Indeno[1,2,3-cd]pyrene	193395	mg kg⁻¹	M						<0.1		
	Benzo[g,h,i]perylene	191242	mg kg⁻¹	M						0.1		
	Total (of 16) PAHs		mg kg⁻¹	M						140		

All tests undertaken between 24-Jul-2008 and 28-Jul-2008

* Accreditation status

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

MLM Environmental Ltd
7200 Cambridge Research Park
Cambridge

CB25 9TL

FAO Hester Carter

AMENDED LABORATORY TEST REPORT

Results of analysis of 11 samples
received 18 July 2008

Dales Manor Business Park, Sawston 721750

Chemtest

Report Date
04 August 2008

Login Batch No					100436	
Chemtest LIMS ID					AD25582	AD25583
Sample ID					WS112	WS113
Sample No					1	1
Depth					0.3	0.4
Matrix					*SOIL*	*SOIL*
SOP↓	Determinand↓	CAS No↓	Units↓			
2450	Arsenic	7440382	mg kg-1	M	11	10
	Cadmium	7440439	mg kg-1	M	0.20	0.14
	Chromium	7440473	mg kg-1	M	19	19
	Copper	7440508	mg kg-1	M	14	13
	Mercury	7439976	mg kg-1	M	0.12	<0.1
	Nickel	7440020	mg kg-1	M	18	19
	Lead	7439921	mg kg-1	M	19	10
	Selenium	7782492	mg kg-1	M	<0.2	<0.2
	Zinc	7440666	mg kg-1	M	39	90
2670	TPH >C6-C10		mg kg-1	N		1900
	TPH >C10-C21		mg kg-1	N		16000
	TPH >C21-C40		mg kg-1	N		1100
	Total Petroleum Hydrocarbons		mg kg-1	M		20000
2700	Naphthalene	91203	mg kg-1	M		0.9
	Acenaphthylene	208968	mg kg-1	M		29
	Acenaphthene	83329	mg kg-1	M		56
	Fluorene	86737	mg kg-1	M		58
	Phenanthrene	85018	mg kg-1	M		4.8
	Anthracene	120127	mg kg-1	M		51
	Fluoranthene	206440	mg kg-1	M		0.6
	Pyrene	129000	mg kg-1	M		<0.1
	Benzo[a]anthracene	56553	mg kg-1	M		<0.1
	Chrysene	218019	mg kg-1	M		0.1
	Benzo[b]fluoranthene	205992	mg kg-1	M		<0.1
	Benzo[k]fluoranthene	207089	mg kg-1	M		<0.1
	Benzo[a]pyrene	50328	mg kg-1	M		<0.1
	Dibenzo[a,h]anthracene	53703	mg kg-1	M		<0.1
	Indeno[1,2,3-cd]pyrene	193395	mg kg-1	M		<0.1
	Benzo[g,h,i]perylene	191242	mg kg-1	M		<0.1
	Total (of 16) PAHs		mg kg-1	M		200

All tests undertaken between 24-Jul-2008 and 28-Jul-2008

MLM Environmental Ltd
7200 Cambridge Research Park
Cambridge

CB25 9TL

FAO Hester Carter

AMENDED LABORATORY TEST REPORT

Results of analysis of 11 sample
received 18 July 2008

Dales Manor Business Park, Sawston 721750

Chemtest

Report Date
04 August 2008

Login Batch No					**100436**
Chemtest LIMS ID					AD25584
Sample ID					WS113
Sample No					1
Depth					0.51
Matrix					*WATER*
SOP↓	Determinand↓	CAS No↓	Units↓	*	
1450	Arsenic	7440382	µg l-1	U	26.6
	Boron	7440428	µg l-1	U	<20
	Cadmium	7440439	µg l-1	U	<0.5
	Chromium	7440473	µg l-1	U	<1
	Copper	7440508	µg l-1	U	80.8
	Lead	7439921	µg l-1	U	<1
	Mercury	7439976	µg l-1	U	<0.5
	Nickel	7440020	µg l-1	U	69.7
	Selenium	7782492	µg l-1	U	9.3
	Zinc	7440666	µg l-1	U	15.2
1673	TPH >C6-C10		µg l-1	U	2500
	TPH >C10-C21		µg l-1	U	2600
	TPH >C21-C40		µg l-1	U	62
	TPH (Aqueous Phase)		µg l-1	U	5200

All tests undertaken between 24-Jul-2008 and 28-Jul-2008

* Accreditation status

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

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report No.:	17-17565-1
Initial Date of Issue:	17-Jul-2017
Client	MLM
Client Address:	Building 7200 IQ Cambridge Cambridge Cambridgeshire CB25 9TL
Contact(s):	Lindsay Liness
Project	775322 - Dales Manor Business Park

Quotation No.:		**Date Received:**	07-Jul-2017
Order No.:		**Date Instructed:**	07-Jul-2017
No. of Samples:	2		
Turnaround (Wkdays):	6	**Results Due:**	14-Jul-2017
Date Approved:	17-Jul-2017		

Approved By:

Details: Martin Dyer, Laboratory Manager

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 775322 - Dales Manor Business Park

Client: MLM			**Chemtest Job No.:**		17-17565	17-17565
Quotation No.:			**Chemtest Sample ID.:**		480970	480972
Order No.:			Client Sample Ref.:		TP201	TP202A
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.50	0.40
			Date Sampled:		04-Jul-2017	04-Jul-2017
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Moisture	N	2030	%	0.020	18	12
Chromatogram (TPH)	N			N/A	See Attached	See Attached
pH	U	2010		N/A	8.5	8.3
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.057	0.074
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	U	2325	mg/kg	0.50	9.7	10
Arsenic	U	2450	mg/kg	1.0	29	23
Boron	N	2450	mg/kg	0.40	21	13
Cadmium	U	2450	mg/kg	0.10	0.30	0.12
Chromium	U	2450	mg/kg	1.0	18	13
Copper	U	2450	mg/kg	0.50	43	14
Mercury	U	2450	mg/kg	0.10	0.51	0.16
Nickel	U	2450	mg/kg	0.50	28	15
Lead	U	2450	mg/kg	0.50	32	42
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20
Zinc	U	2450	mg/kg	0.50	60	35
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	6.7	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	28	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	33	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	68	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	1.5	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	5.1	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	5.6	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	12	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	80	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10

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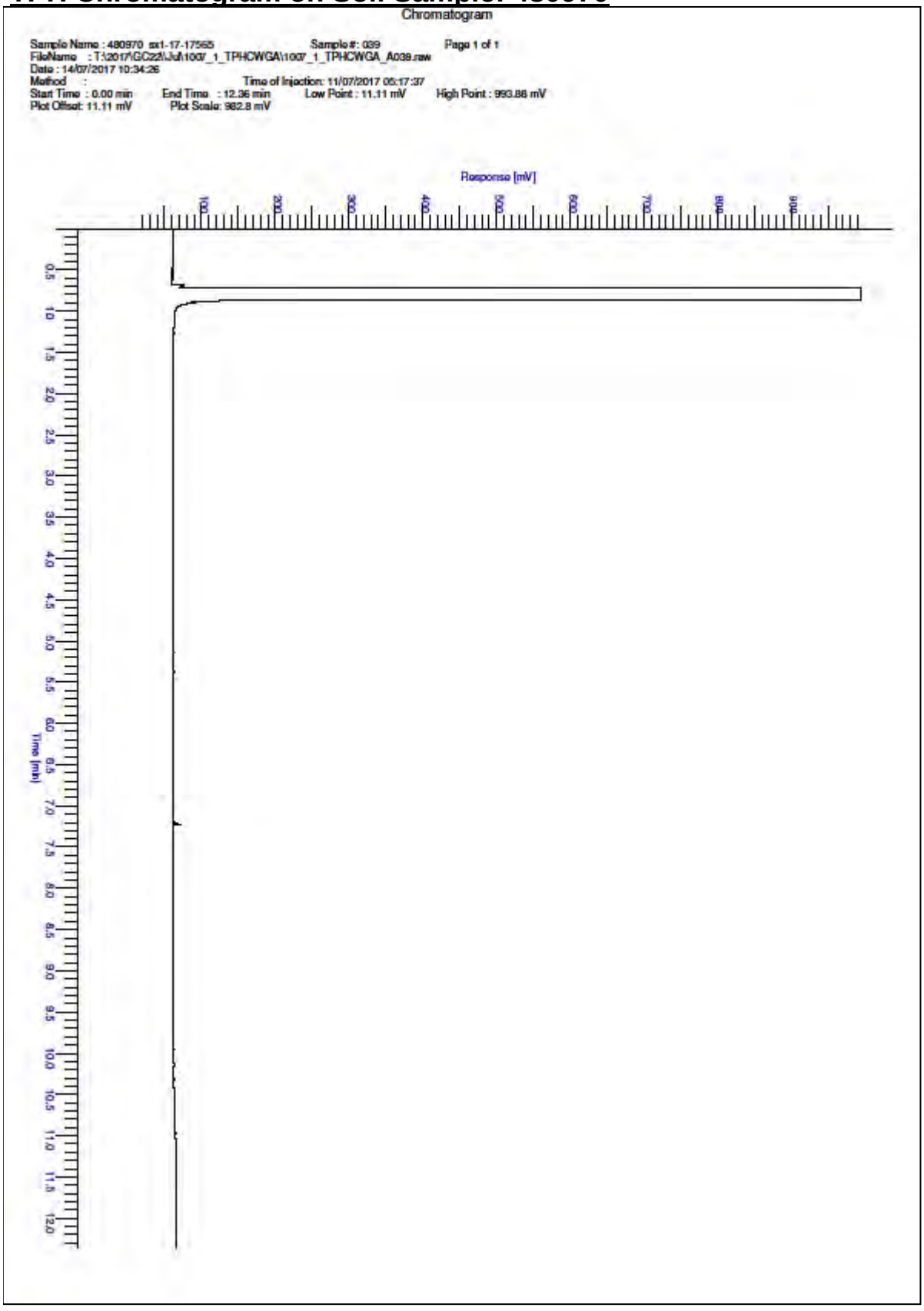
Results - Soil

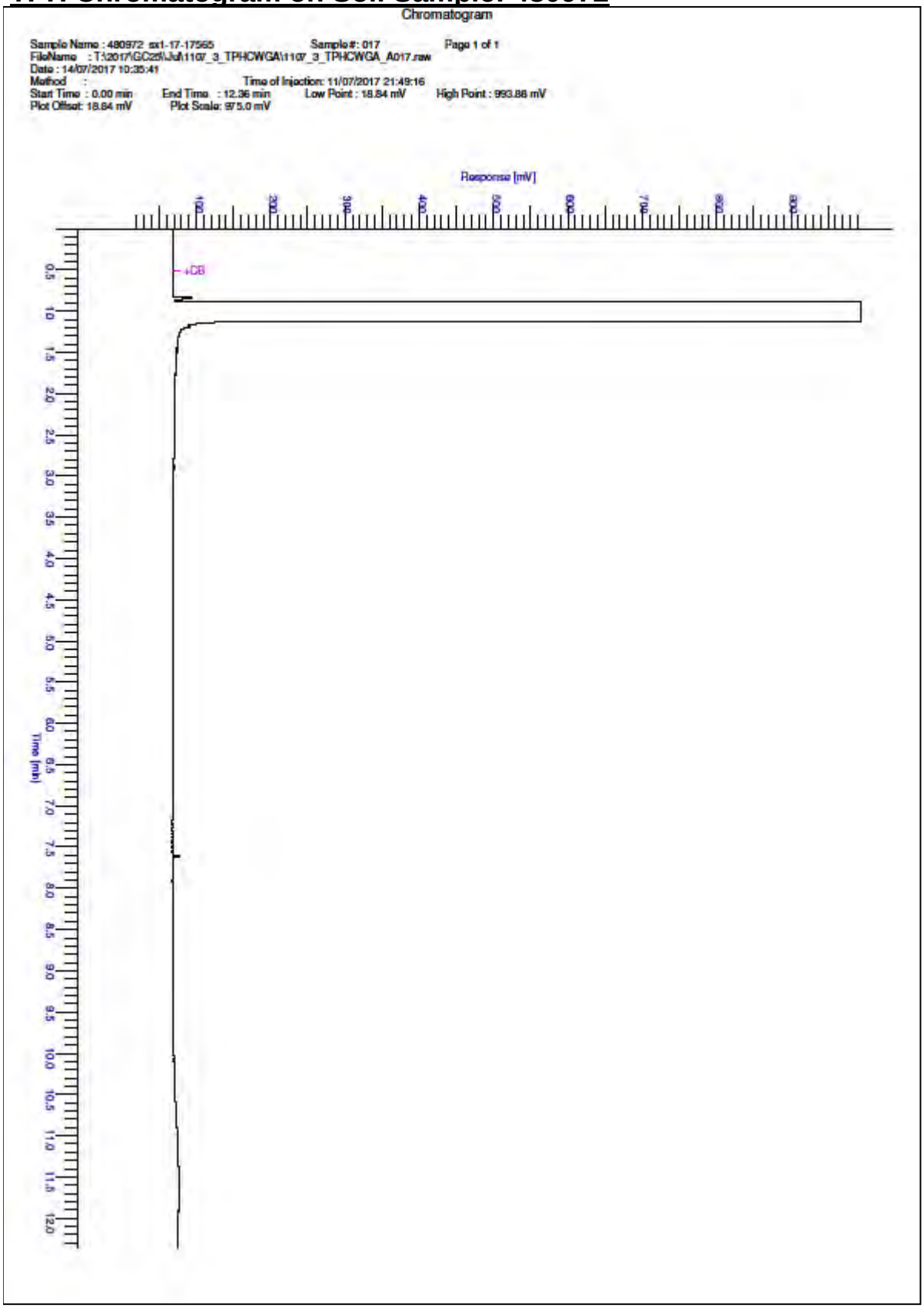
Project: 775322 - Dales Manor Business Park

Client: MLM		**Chemtest Job No.:**			17-17565	17-17565
Quotation No.:		**Chemtest Sample ID.:**			480970	480972
Order No.:		Client Sample Ref.:			TP201	TP202A
		Sample Type:			SOIL	SOIL
		Top Depth (m):			0.50	0.40
		Date Sampled:			04-Jul-2017	04-Jul-2017
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Phenanthrene	U	2700	mg/kg	0.10	0.49	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	0.85	< 0.10
Pyrene	U	2700	mg/kg	0.10	0.81	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	0.52	< 0.10
Chrysene	U	2700	mg/kg	0.10	0.49	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	3.2	< 2.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30

TPH Chromatogram on Soil Sample: 480970



TPH Chromatogram on Soil Sample: 480972



Results - Single Stage WAC

Project: 775322 - Dales Manor Business Park

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	17-17565						
Chemtest Sample ID:	480970						
Sample Ref:	TP201						
Sample ID:							
Top Depth(m):	0.50						
Bottom Depth(m):							
Sampling Date:	04-Jul-2017						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	0.59	3	5	6
Loss On Ignition	2610	U	%	3.3	--	--	10
Total BTEX	2760	U	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	110	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	3.2	100	--	--
pH	2010	U		8.5	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.083	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
Arsenic	1450	U	0.0028	< 0.050	0.5	2	25
Barium	1450	U	0.031	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	0.011	0.11	0.5	10	70
Copper	1450	U	0.019	0.19	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0035	< 0.050	0.5	10	30
Nickel	1450	U	0.0034	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	0.0046	0.046	0.06	0.7	5
Selenium	1450	U	0.0037	0.037	0.1	0.5	7
Zinc	1450	U	0.0038	< 0.50	4	50	200
Chloride	1220	U	10	100	800	15000	25000
Fluoride	1220	U	3.6	36	10	150	500
Sulphate	1220	U	75	750	1000	20000	50000
Total Dissolved Solids	1020	N	410	4100	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	18	180	500	800	1000

Soild Information	
Dry mass of test portion/kg	0.090
Moisture (%)	18

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 775322 - Dales Manor Business Park

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	17-17565						
Chemtest Sample ID:	480972						
Sample Ref:	TP202A						
Sample ID:							
Top Depth(m):	0.40						
Bottom Depth(m):							
Sampling Date:	04-Jul-2017						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	0.67	3	5	6
Loss On Ignition	2610	U	%	2.3	--	--	10
Total BTEX	2760	U	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	< 2.0	100	--	--
pH	2010	U		8.3	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.23	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
Arsenic	1450	U	0.022	0.22	0.5	2	25
Barium	1450	U	0.014	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	0.0023	< 0.050	0.5	10	70
Copper	1450	U	0.020	0.20	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.013	0.13	0.5	10	30
Nickel	1450	U	0.0052	0.052	0.4	10	40
Lead	1450	U	0.0013	0.013	0.5	10	50
Antimony	1450	U	0.0032	0.032	0.06	0.7	5
Selenium	1450	U	0.0032	0.032	0.1	0.5	7
Zinc	1450	U	0.0039	< 0.50	4	50	200
Chloride	1220	U	13	130	800	15000	25000
Fluoride	1220	U	0.42	4.2	10	150	500
Sulphate	1220	U	22	220	1000	20000	50000
Total Dissolved Solids	1020	N	140	1400	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	21	210	500	800	1000

Soild Information	
Dry mass of test portion/kg	0.090
Moisture (%)	12

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID

Test Methods

SOP	Title	Parameters included	Method summary
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report No.:	17-20058-1
Initial Date of Issue:	07-Aug-2017
Client	MLM
Client Address:	Building 7200 IQ Cambridge Cambridge Cambridgeshire CB25 9TL
Contact(s):	Lindsay Liness
Project	775322 Dales Manor Business Park Sawston

Quotation No.:		**Date Received:**	01-Aug-2017
Order No.:	775322	**Date Instructed:**	01-Aug-2017
No. of Samples:	4		
Turnaround (Wkdays):	5	**Results Due:**	07-Aug-2017
Date Approved:	07-Aug-2017		

Approved By:

Details: Glynn Harvey, Laboratory Manager

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Results - Water

Project: 775322 Dales Manor Business Park Sawston

Client: MLM					**Chemtest Job No.:**	17-20058	17-20058	17-20058	17-20058
Quotation No.:					**Chemtest Sample ID.:**	491340	491341	491342	491343
Order No.: 775322					Client Sample Ref.:	CP202	WS201	WS202	WS204
					Client Sample ID.:	W1	W1	W1	W1
					Sample Type:	WATER	WATER	WATER	WATER
					Top Depth (m):	3.28	3.29	3.59	3.52
					Date Sampled:	01-Aug-2017	01-Aug-2017	01-Aug-2017	01-Aug-2017
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Chromatogram (TPH)	N			N/A	See Attached	See Attached	See Attached	See Attached
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050
Total Hardness as CaCO3	U	1270	mg/l	15	340	370	350	280
Boron (Dissolved)	U	1450	µg/l	20	66	130	140	300
Arsenic (Total)	U	1450	µg/l	1.0	1.1	7.1	4.2	8.3
Cadmium (Total)	U	1450	µg/l	0.080	< 0.080	< 0.080	< 0.080	< 0.080
Chromium (Total)	U	1450	µg/l	1.0	7.1	1.5	< 1.0	< 1.0
Copper (Total)	U	1450	µg/l	1.0	2.3	< 1.0	< 1.0	< 1.0
Mercury (Total)	U	1450	µg/l	0.50	< 0.50	< 0.50	1.1	< 0.50
Nickel (Total)	U	1450	µg/l	1.0	4.9	7.7	7.3	5.4
Lead (Total)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Selenium (Total)	U	1450	µg/l	1.0	3.3	12	18	2.9
Zinc (Total)	U	1450	µg/l	1.0	10	4.7	3.1	< 1.0
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20	< 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10	< 10
Naphthalene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10

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Results - Water

Project: 775322 Dales Manor Business Park Sawston

Client: MLM			**Chemtest Job No.:**		17-20058	17-20058	17-20058	17-20058
Quotation No.:			**Chemtest Sample ID.:**		491340	491341	491342	491343
Order No.: 775322			Client Sample Ref.:		CP202	WS201	WS202	WS204
			Client Sample ID.:		W1	W1	W1	W1
			Sample Type:		WATER	WATER	WATER	WATER
			Top Depth (m):		3.28	3.29	3.59	3.52
			Date Sampled:		01-Aug-2017	01-Aug-2017	01-Aug-2017	01-Aug-2017
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1700	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Trichloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10	< 10	< 10	< 10
Bromodichloromethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10	< 10
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10	< 10	< 10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0

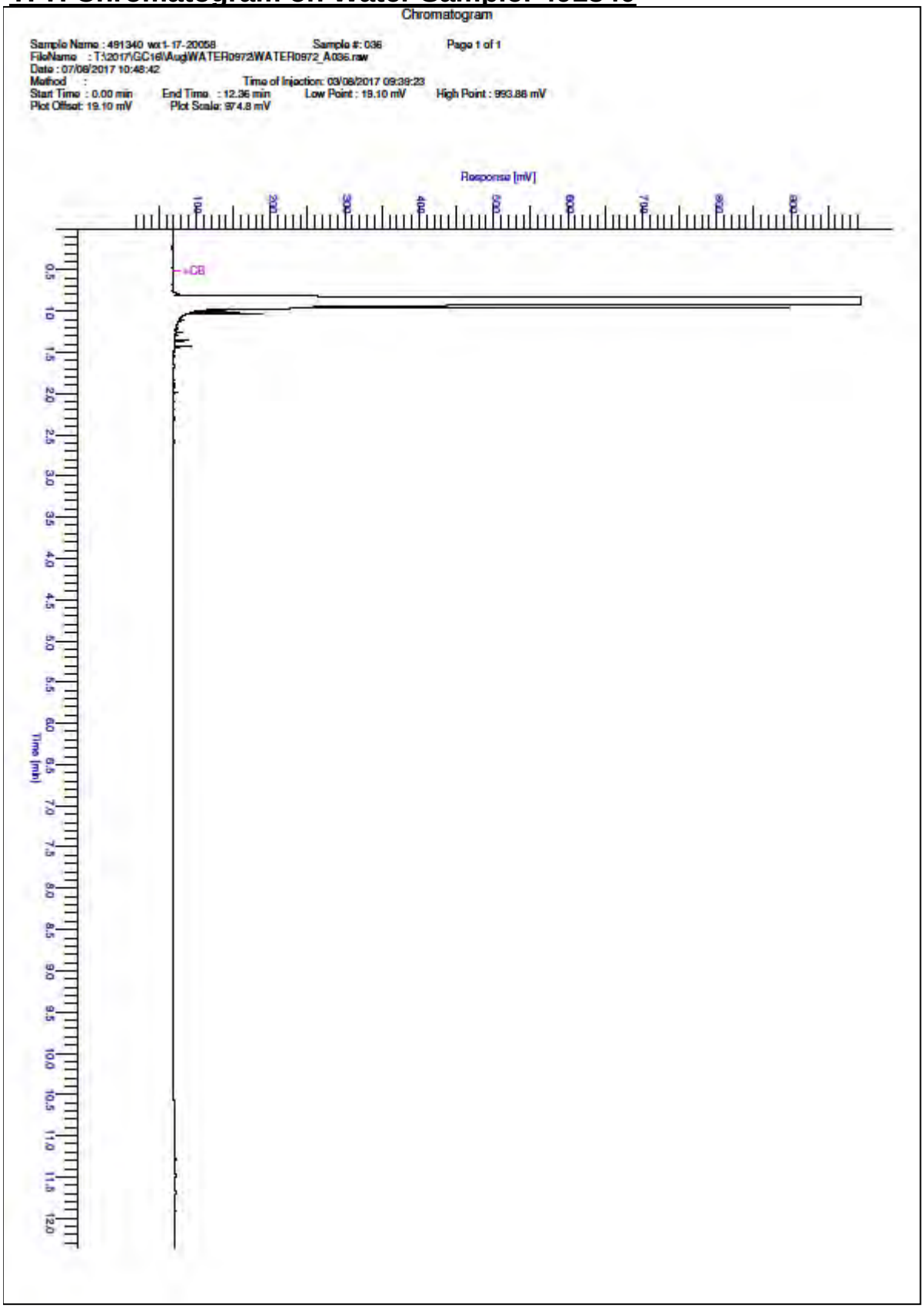
Chemtest
The right chemistry to deliver results

Results - Water

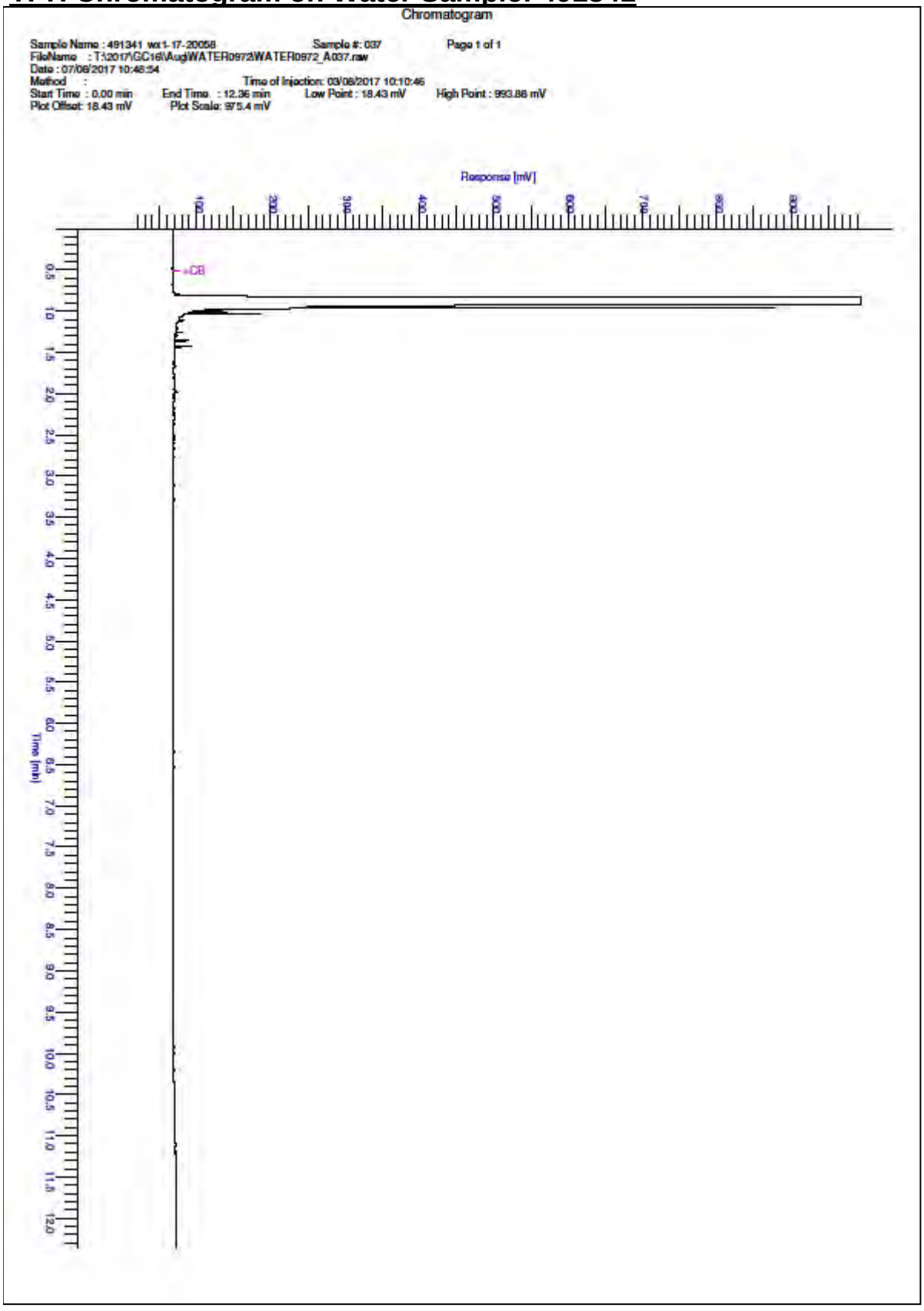
Project: 775322 Dales Manor Business Park Sawston

Client: MLM			**Chemtest Job No.:**		17-20058	17-20058	17-20058	17-20058
Quotation No.:			**Chemtest Sample ID.:**		491340	491341	491342	491343
Order No.: 775322			Client Sample Ref.:		CP202	WS201	WS202	WS204
			Client Sample ID.:		W1	W1	W1	W1
			Sample Type:		WATER	WATER	WATER	WATER
			Top Depth (m):		3.28	3.29	3.59	3.52
			Date Sampled:		01-Aug-2017	01-Aug-2017	01-Aug-2017	01-Aug-2017
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10	< 10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50	< 50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030	< 0.030

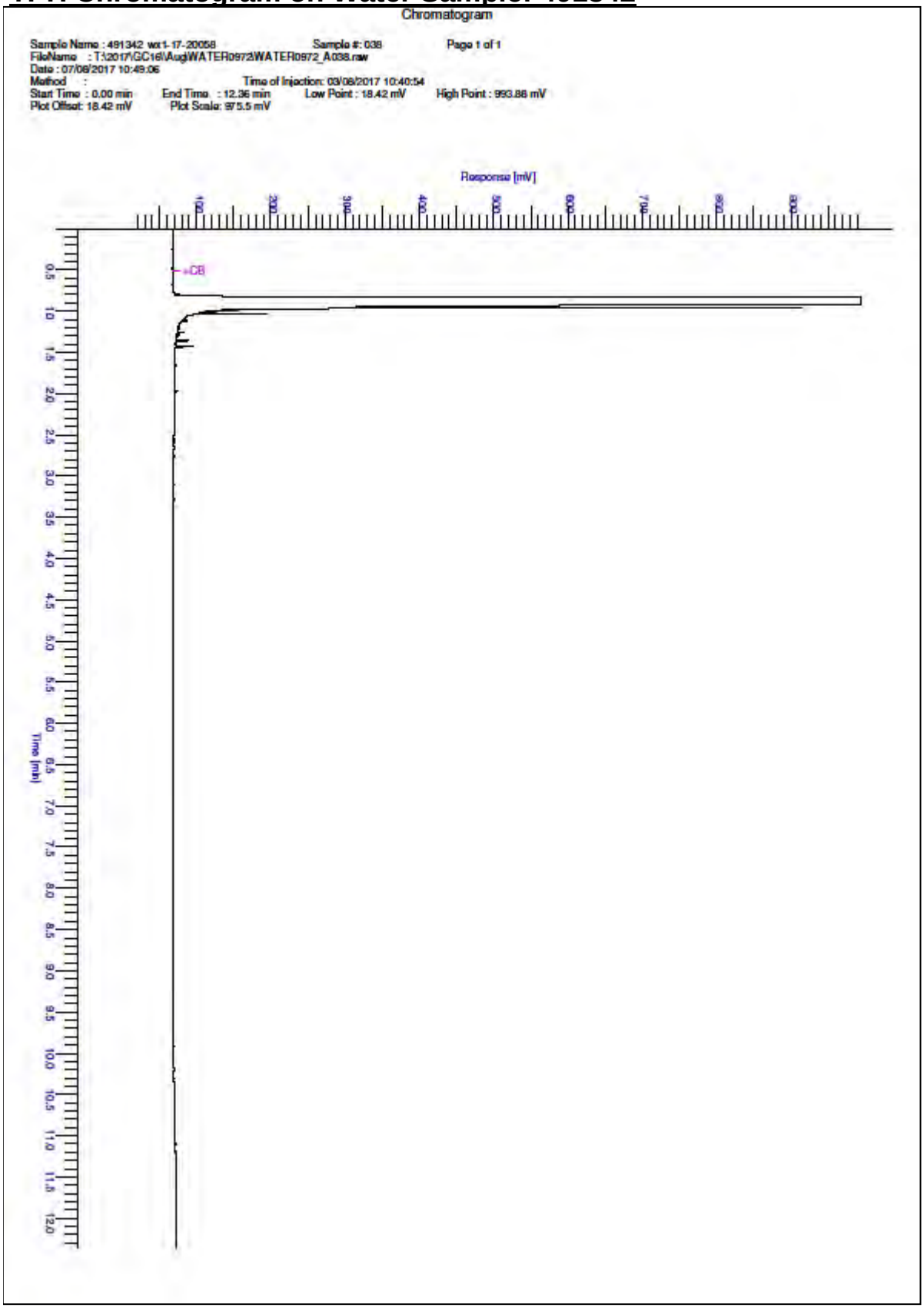
TPH Chromatogram on Water Sample: 491340



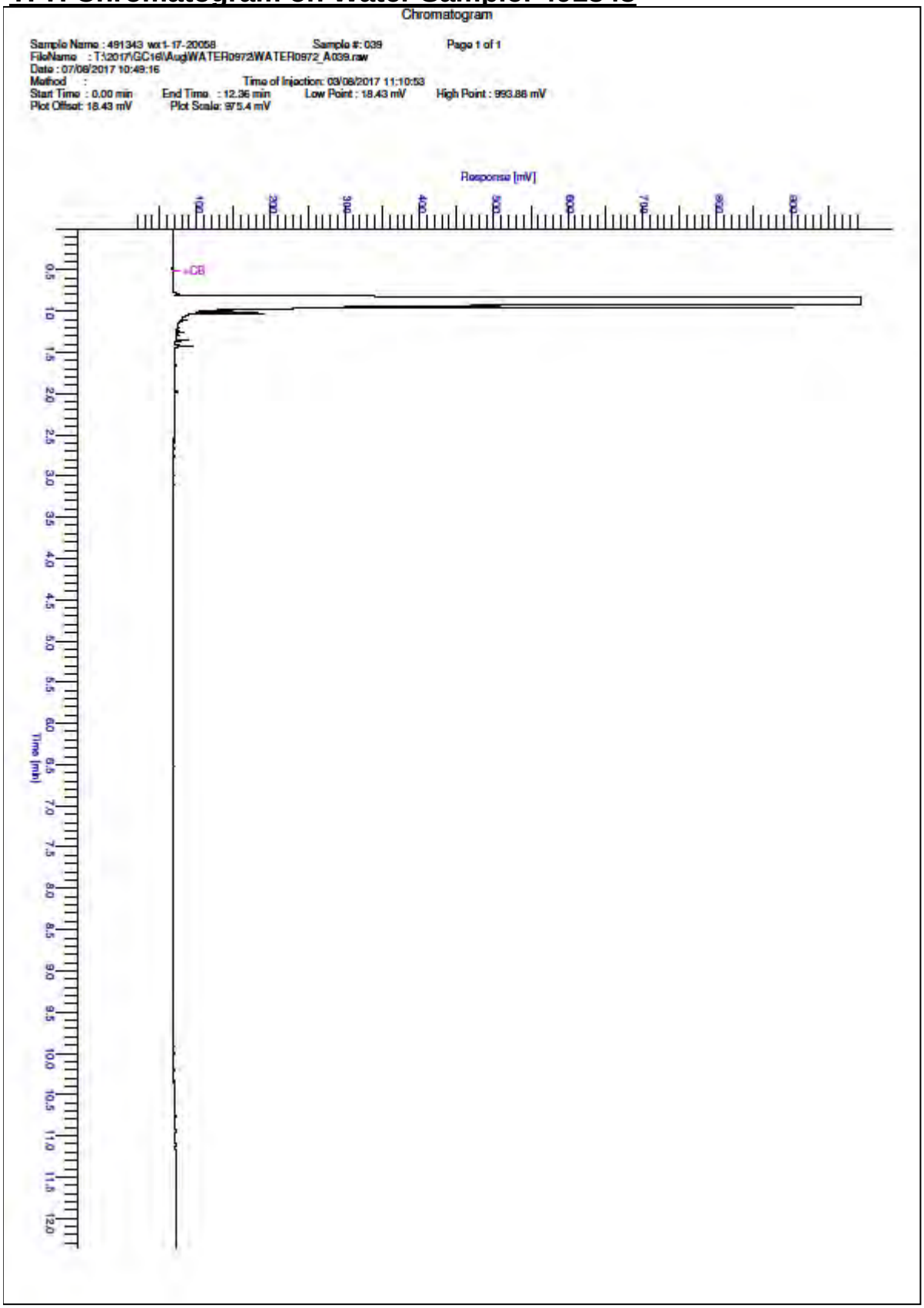
TPH Chromatogram on Water Sample: 491341



TPH Chromatogram on Water Sample: 491342



TPH Chromatogram on Water Sample: 491343



Test Methods

SOP	Title	Parameters included	Method summary
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Appendix E - Soakaway Test Results

SOAKAWAY TEST RESULTS

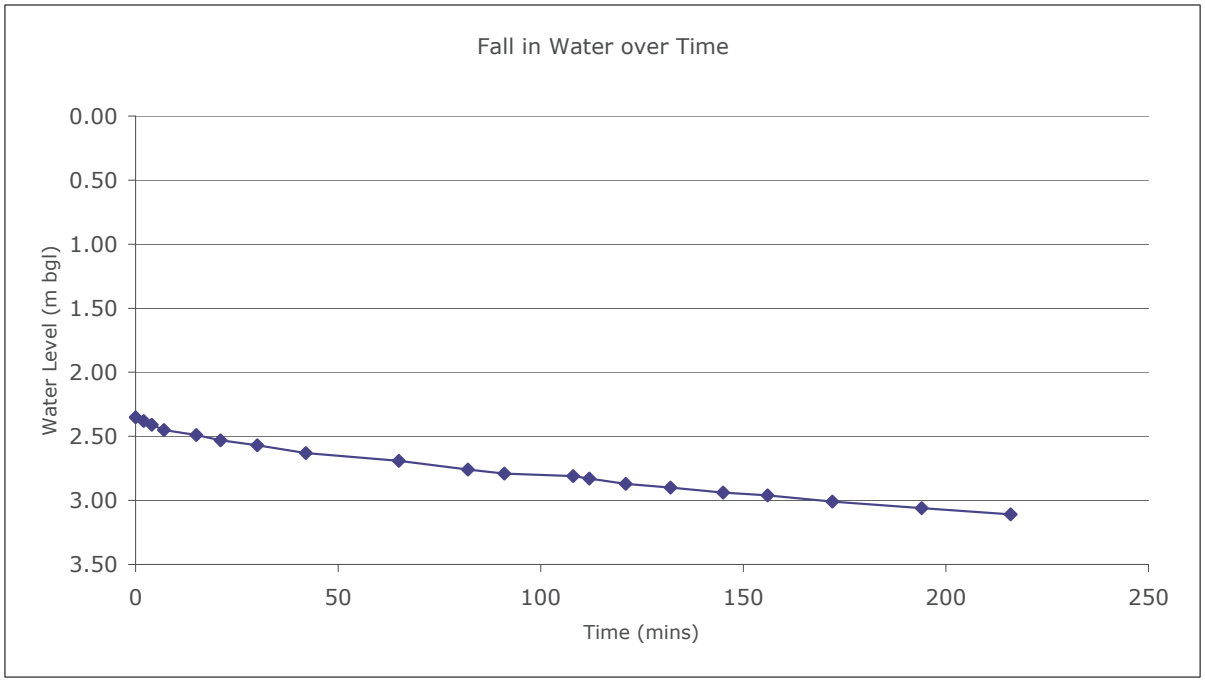
Project Name: Dales Manor Business Park
Location: Sawston
Project Ref: 721750

Test Location: **SA1**

Trial Pit Dimensions (m)

Top Length:	1.60	Top Width:	0.60
Bottom Length:	1.60	Bottom Width:	0.60

Time (mins)	Water Level (m bgl)
0	2.35
2	2.38
4	2.41
7	2.45
15	2.49
21	2.53
30	2.57
42	2.63
65	2.69
82	2.76
91	2.79
108	2.81
112	2.83
121	2.87
132	2.9
145	2.94
156	2.96
172	3.01
194	3.06
216	3.11



Soil Infiltration Rate
1.6x10-5m/s

Remarks
1. Test Undertaken in general accordance with BRE Digest 365.
2. Trial pit was not filled with aggregate.
3. Stability was variable
4. Results were extrapolated to ensure water level reached 75% effective depth.

SOAKAWAY TEST RESULTS

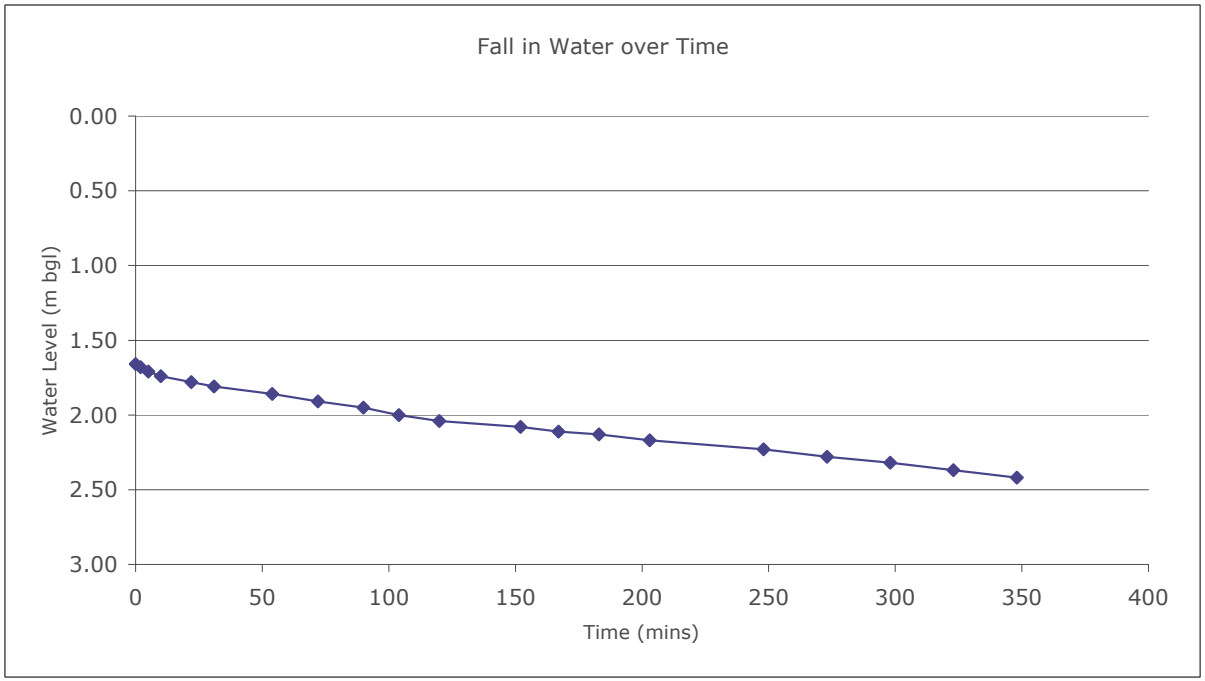
Project Name: Dales Manor Business Park
Location: Sawston
Project Ref: 721750

Test Location: **SA2**

Trial Pit Dimensions (m)

Top Length:	1.70	Top Width:	0.70
Bottom Length:	1.70	Bottom Width:	0.70

Time (mins)	Water Level (m bgl)
0	1.66
2	1.68
5	1.71
10	1.74
22	1.78
31	1.81
54	1.86
72	1.91
90	1.95
104	2.00
120	2.04
152	2.08
167	2.11
183	2.13
203	2.17
248	2.23
273	2.28
298	2.32
323	2.37
348	2.42



Soil Infiltration Rate
1x10-5m/s

Remarks
1. Test Undertaken in general accordance with BRE Digest 365.
2. Trial pit was not filled with aggregate.
3. Stability was variable.
4. Results were extrapolated to ensure water level reached 75% effective depth.

SOAKAWAY TEST RESULTS

Based on BRE Digest 365: Soakaway Design (2007)

Project Name: Dales Manor Business Park
Location: Sawston
Project Ref: 775322

Test Location: **TP202A - Test 1**

Readings:

Time (mins)	Water Level (m bgl)
0	1.03
2	1.26
3	1.31
4	1.35
5	1.39
6	1.42
7	1.46
8	1.49
9	1.53
10	1.58
15	1.69
20	1.79
25	1.88
32	1.92
37	1.92

Trial Pit Dimensions (m)

Length	1.50
Width	0.35
Depth	2.00

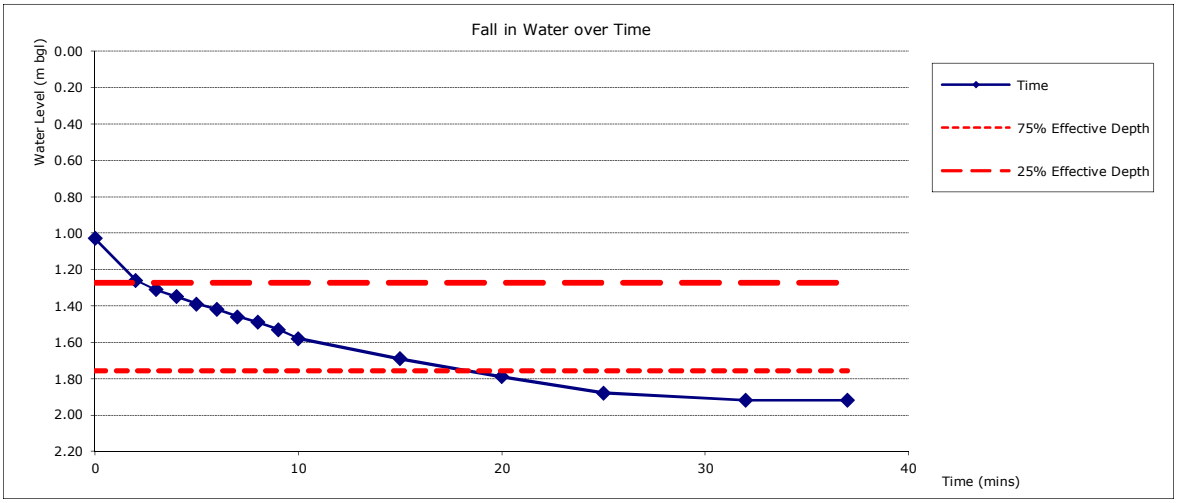
Assumed Invert Level (m bgl)	0.79

Was trial pit filled with gravel (Yes/No):	Yes

Assumed fill porosity (CIRIA 156)	30

Ground Conditions:

	Refer to engineers logs



Soil Infiltration Rate (m/sec) $f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

Soil Infiltration Rate (m/sec) f 3.59E-05

Remarks

1. The soil infiltration rate has been calculated using the BRESOAK Program version 1.0.4

SOAKAWAY TEST RESULTS

Based on BRE Digest 365: Soakaway Design (2007)

Project Name: Dales Manor Business Park
Location: Sawston
Project Ref: 775322

Test Location: **TP202A - Test 2**

Readings:

Time (mins)	Water Level (m bgl)
0	0.85
1	1.02
2	1.11
3	1.15
4	1.20
5	1.23
10	1.33
15	1.40
20	1.45
30	1.55
45	1.68
60	1.76

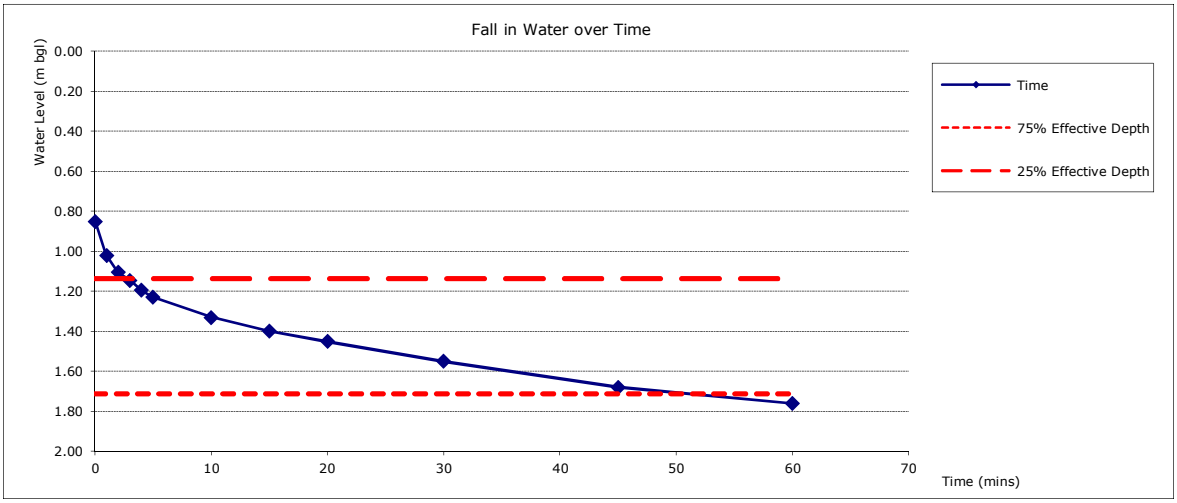
Trial Pit Dimensions (m)

Length	1.50
Width	0.35
Depth	2.00

Assumed Invert Level (m bgl)	0.85
Was trial pit filled with gravel (Yes/No):	Yes
Assumed fill porosity (CIRIA 156)	30

Ground Conditions:

	Refer to engineers logs



Soil Infiltration Rate (m/sec) $f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

Soil Infiltration Rate (m/sec) f 1.18E-05

Remarks

1. The soil infiltration rate has been calculated using the BRESOAK Program version 1.0.4

SOAKAWAY TEST RESULTS

Based on BRE Digest 365: Soakaway Design (2007)

Project Name: Dales Manor Business Park
Location: Sawston
Project Ref: 775322

Test Location: **TP202A - Test 3**

Readings:

Time (mins)	Water Level (m bgl)
0	0.79
1	0.92
2	1.01
3	1.08
4	1.14
5	1.18
10	1.30
15	1.36
20	1.42
30	1.52
45	1.66
60	1.76
103	1.91

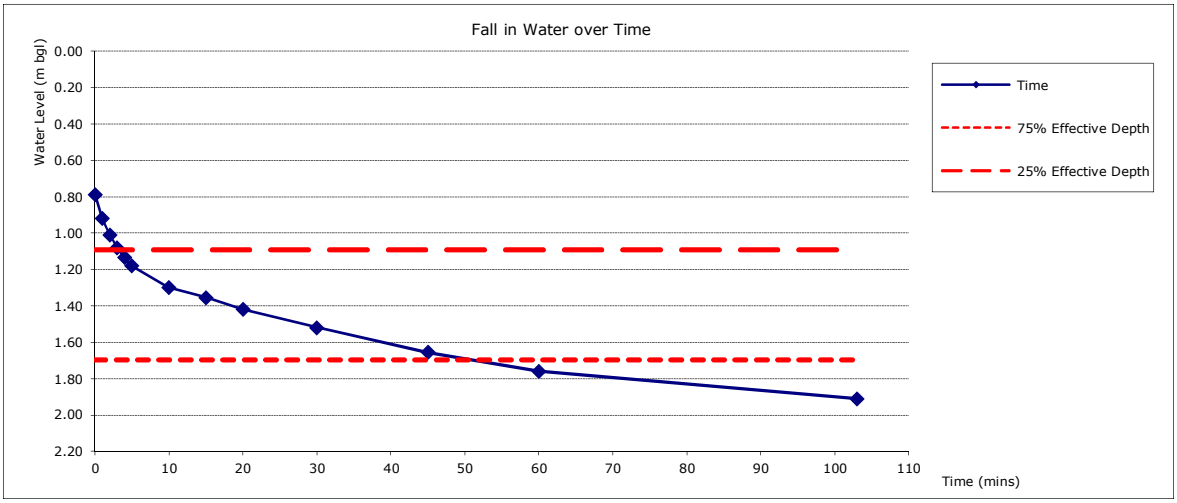
Trial Pit Dimensions (m)

Length	1.50
Width	0.35
Depth	2.00

Assumed Invert Level (m bgl)	0.79
Was trial pit filled with gravel (Yes/No):	Yes
Assumed fill porosity (CIRIA 156)	30

Ground Conditions:

	Refer to engineers logs



Soil Infiltration Rate (m/sec) $f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

Soil Infiltration Rate (m/sec) f 1.22E-05

Remarks

1. The soil infiltration rate has been calculated using the BRESOAK Program version 1.0.4

SOAKAWAY TEST RESULTS

Based on BRE Digest 365: Soakaway Design (2007)

Project Name: Dales Manor Business Park
Location: Sawston
Project Ref: 775322

Test Location: **TP204 - Test 1**

Readings:

Time (mins)	Water Level (m bgl)
0	1.03
1	1.47
2	1.66
3	1.70
4	1.71
5	1.71
10	1.72
15	1.72
20	1.72
60	1.72

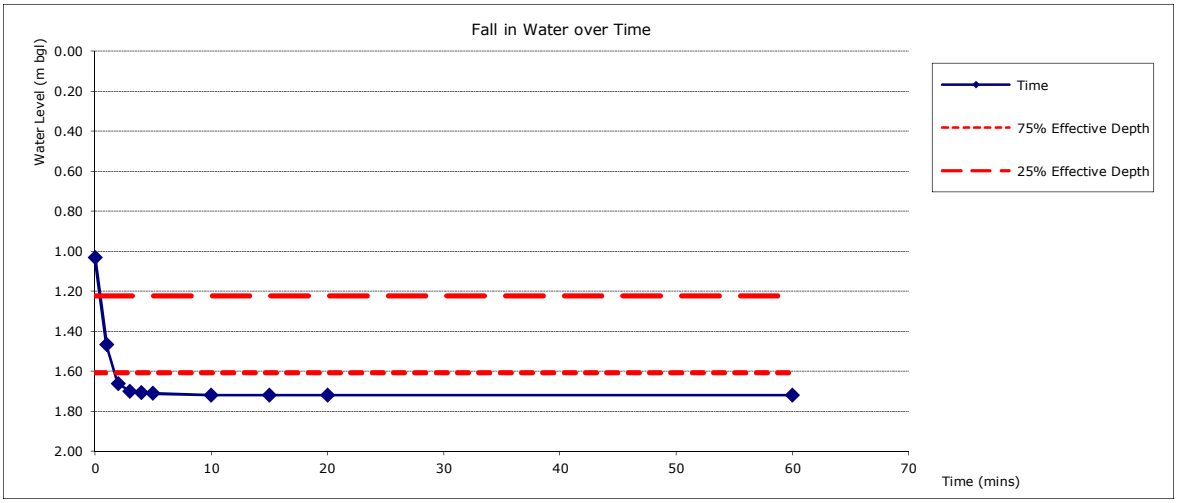
Trial Pit Dimensions (m)

Length	1.20
Width	0.35
Depth	1.80

Assumed Invert Level (m bgl)	1.00
Was trial pit filled with gravel (Yes/No):	Yes
Assumed fill porosity (CIRIA 156)	30

Ground Conditions:

	Refer to engineers logs



Soil Infiltration Rate (m/sec) $f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

Soil Infiltration Rate (m/sec) f 3.97E-04

Remarks

1. The soil infiltration rate has been calculated using the BRESOAK Program version 1.0.4

SOAKAWAY TEST RESULTS

Based on BRE Digest 365: Soakaway Design (2007)

Project Name: Dales Manor Business Park
Location: Sawston
Project Ref: 775322

Test Location: **TP204 - Test 2**

Readings:

Time (mins)	Water Level (m bgl)
0	1.00
1	1.50
2	1.65
3	1.69
4	1.70
5	1.71
10	1.72

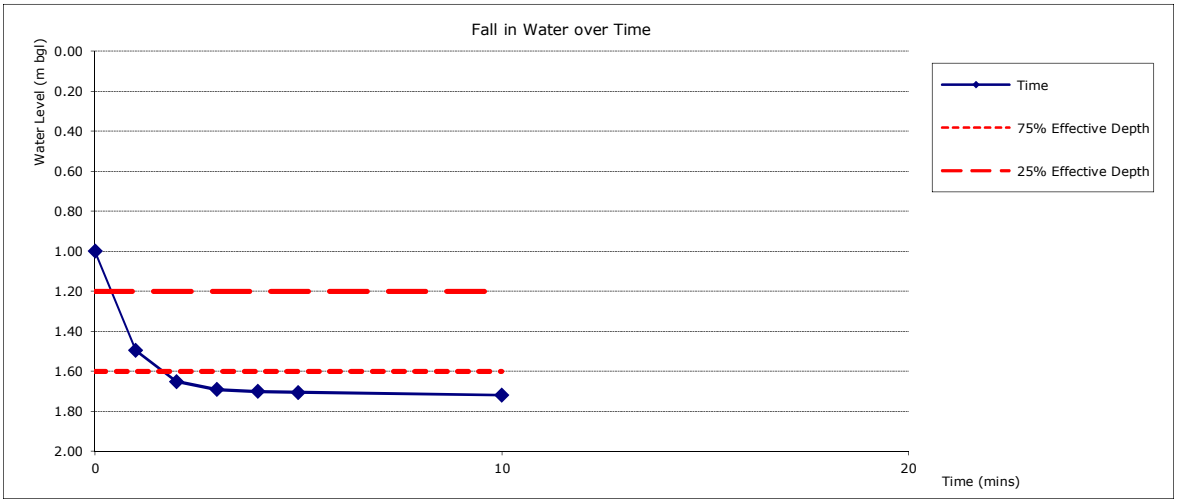
Trial Pit Dimensions (m)

Length	1.20
Width	0.35
Depth	1.80

Assumed Invert Level (m bgl)	1.00
Was trial pit filled with gravel (Yes/No):	Yes
Assumed fill porosity (CIRIA 156)	30

Ground Conditions:

	Refer to engineers logs



Soil Infiltration Rate (m/sec) $f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

Soil Infiltration Rate (m/sec) f 4.03E-04

Remarks

1. The soil infiltration rate has been calculated using the BRESOAK Program version 1.0.4

SOAKAWAY TEST RESULTS

Based on BRE Digest 365: Soakaway Design (2007)

Project Name: Dales Manor Business Park
Location: Sawston
Project Ref: 775322

Test Location: **TP204 - Test 1**

Readings:

Time (mins)	Water Level (m bgl)
0	1.13
1	1.46
2	1.62
3	1.69
4	1.69
5	1.70
10	1.72

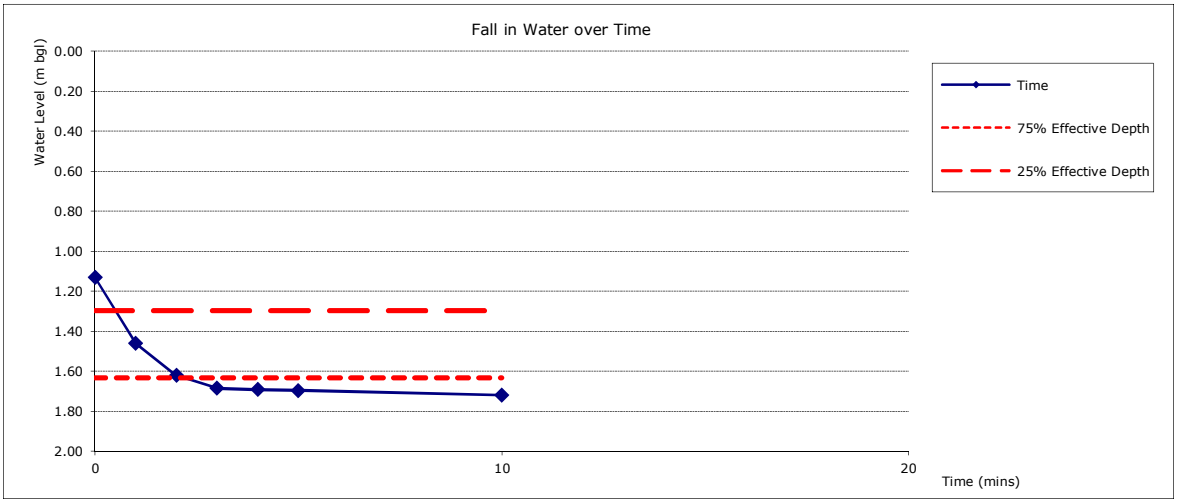
Trial Pit Dimensions (m)

Length	1.20
Width	0.35
Depth	1.80

Assumed Invert Level (m bgl)	1.00
Was trial pit filled with gravel (Yes/No):	Yes
Assumed fill porosity (CIRIA 156)	30

Ground Conditions:

	Refer to engineers logs



Soil Infiltration Rate (m/sec) $f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

Soil Infiltration Rate (m/sec) f 3.05E-04

Remarks

1. The soil infiltration rate has been calculated using the BRESOAK Program version 1.0.4

Appendix F - Generic Screening Levels

Screening Levels – Human Health (soil)

LQM/CIEH S4UL (except allotments)	**Residential**		**Allotments**	**Commercial**	**Public Open Space (residential)**	**Public Open Space (park)**
	With homegrown produce	**Without homegrown produce**				
	Metals and semi-metals (based on sandy loam soil with SOM 6%)					
Arsenic (inorganic)	37	40	43	640	79	170
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	1.1e+4	45	2.4e+5	2.1e+4	4.6e+4
Cadmium	11	85	1.9	190	120	532
Chromium III (or total)	910	910	18000	8600	1500	3.3e+4
Chromium VI (hexavalent)	6	6	1.8	33	7.7	220
Copper	2400	7100	520	6.8e+4	1.2e+4	4.4e+4
Mercury (inorganic)	40	56	19	1100	120	240
Nickel	180	180	230	980	230	3400
Selenium	250	430	88	1.2e+4	1100	1800
Vanadium	410	1200	91	9000	2000	5000
Zinc	3700	4.0e+4	620	7.3e+5	8.1e+4	1.7e+5
Lead (Defra C4SL used in the absence of a published S4UL)	200	310	80	2330	630	1300
	Polycyclic Aromatic Hydrocarbons (based on sandy loam soil with SOM 1%, 2.5% or 6%)					
Acenaphthene	210 510 1100	3000 4700 6000	34 85 200	8.4e+4 9.7e+4 1.0e+5	1.5e+4	2.9e+4 3.0e+4 3.0e+4
Acenaphthylene	170 420 920	2900 4600 6000	28 69 160	8.3e+4 9.7e+4 1.0e+5	1.5e+4	2.9e+4 3.0e+4 3.0e+4
Anthracene	2400 5400 1.1e+4	3.1e+4 vap (1.17) 3.5e+4 3.7e+4	380 950 2200	5.2e+5 5.4e+5 5.4e+5	7.4e+4	1.5e+5
Benzo[a]anthracene	7.2 11 13	11 14 15	2.9 6.5 13	170 170 180	29	49 56 62
Benzo[a]pyrene	2.2 2.7 3.0	3.2	0.97 2.0 3.5	35 35 36	5.7	11 12 13
Benzo[b]fluoranthene	2.6 3.3 3.7	3.9 4.0 4.0	0.99 2.1 3.9	44 44 45	7.1 7.2 7.2	13 15 16
Benzo[ghi]perylene	320 340 350	360	290 470 640	3900 4000 4000	640	1400 1500 1600
Benzo[k]fluoranthene	77 93 100	110	37 75 130	1200	190	370 410 440
Chrysene	15 22 27	30 31 32	4.1 9.4 19	350	57	93 110 120
Dibenzo[ah]anthracene	0.24 0.28 0.30	0.31 0.32 0.32	0.14 0.27 0.43	3.5 3.6 3.6	0.57 0.57 0.58	1.1 1.3 1.4
Fluoranthene	280 560 890	1500 1600 1600	52 130 290	2.3e+4	3100	6300 6300 6400
Fluorene	170 400 860	2800 3800 4500	27 67 160	6.3+4 6.8e+4 7.1e+4	9900	2.0e+4
Indeno[123-cd]pyrene	27 36 41	45 46 46	9.5 21 39	500 510 510	82	150 170 180
Naphthalene	2.3 5.6 13	2.3 5.6 13	4.1 10 24	190 460 1100	4900	1200 1900 3000
Phenanthrene	95 220 440	1300 1500 1500	15 38 90	2.2e+4 2.2e+4 2.3e+4	3100	6200 6200 6300
Pyrene	620 1200 2000	3700 3800 3800	110 270 620	5.4e+4	7400	1.5e+4

Screening Levels – Human Health (soil)

LQM/CIEH S4UL (except allotments)	**Residential**		**Allotments**	**Commercial**	**Public Open Space (residential)**	**Public Open Space (park)**
	With homegrown produce	**Without homegrown produce**				
	BTEX (based on sandy loam soil with SOM 1%, 2.5% or 6%)					
Benzene	0.087 0.17 0.37	0.38 0.7 1.4	0.017 0.034 0.075	27 47 90	72 72 73	90 100 110
Toluene	130 290 660	880(vap 869) 1900 3900	22 51 120	5.6e+4vap (869) 1.1e+5vap (1920) 1.8e+5vap (4360)	5.6e+4 5.6e+4 5.6e+4	8.7e+4vap (869) 9.5e+4vap (1920) 1.0e+5vap (4360)
Ethylbenzene	47 110 260	83 190 440	16 39 91	5700vap (518) 1.3e+4vap (1220) 2.7e+4vap (2840)	2.4e+4 2.4e+4 2.5e+4	1.7e+4vap (518) 2.2e+4vap (1220) 2.7e+4vap (2840)
m- & p-xylene	56 130 310	79 180 430	29 69 160	5900 1.4e+4 3.0e+4	4.1e+4 4.2e+4 4.3e+4	1.7e+4 2.3e+4 3.1e+4
o-xylene	60 140 330	88 210 480	28 67 160	6600 1.5e+4 3.3e+4	4.1e+4 4.2e+4 4.3e+4	1.7e+4 2.3e+4 3.3e+4
	Petroleum Hydrocarbons (based on sandy loam soil with SOM 1%, 2.5% or 6%)					
TPH aliphatic EC>5-6	42 78 160	42 78 160	730 1700 3900	3200 5900 1.2e+4	5.7e+5 5.9e+5 6.0e+5	9.5e+4 1.3e+5 1.8e+5
TPH aliphatic EC>6-8	100 230 530	100 230 530	2300 5600 1.3e+4	7800 1.7e+4 4.0e+4	6.0e+5 6.1e+5 6.2e+5	1.5e+5 2.2e+5 3.2e+5
TPH aliphatic EC>8-10	27 65 150	27 65 150	320 770 1700	2000 4800vap (190) 1.1e+4vap (451)	1.3e+4	1.4e+4 1.8e+4vap (190) 2.1e+4vap (451)
TPH aliphatic EC>10-12	130vap (48) 330vap (118) 760vap (283)	130vap (48) 330vap (118) 770vap (283)	2200 4400 7300	9700 2.3e+4vap (118) 4.7e+4vap (283)	1.3e+4	2.1e+4 2.3e+4vap (118) 2.4e+4vap (283)
TPH aliphatic EC>12-16	1100 2400 4300	1100 2400 4400	1.1e+4 1.3e+4 1.3e+4	5.9e+4 8.2e+4 9.0e+4[S]	1.3e+4	2.5e+4 2.5e+4 2.6e+4
TPH aliphatic EC>16-35	6.5e+4 9.2e+4 1.1e+5	6.5e+4 9.2e+4 1.1e+5	2.6e+5 2.7e+5 2.7e+5	1.6e+6 1.7e+6 1.8e+6	2.5e+5	4.5e+5 4.8e+5 4.9e+5
TPH aliphatic EC>35-44	6.5e+4 9.2e+4 1.1e+5	6.5e+4 9.2e+4 1.1e+5	2.6e+5 2.7e+5 2.7e+5	1.6e+6 1.7e+6 1.8e+6	2.5e+5	4.5e+5 4.8e+5 4.9e+5
TPH aromatic EC>5-7	70 140 300	370 690 1400	13 27 57	2.6e+4 4.6e+4 8.6e+4	5.6e+4	7.6e+4 8.4e+4 9.2e+4[S]
TPH aromatic EC>7-8	130 290 660	860 1800 3900	22 51 120	5.6e+4vap (869) 1.1e+5 1.8e+5vap (4360)	5.6e+4	8.7e+4vap (869) 9.5e+4 1.0e+5vap (4360)
TPH aromatic EC>8-10	34 83 190	47 110 270	8.6 21 51	3500vap (613) 8100vap (1500) 1.7e+4vap (3580)	5000	7200vap (613) 8500vap (1500) 9300vap (3580)
TPH aromatic EC>10-12	74 180 380	250 590 1200	13 31 74	1.6e+4 2.8e+4 3.4e+4	5000	9200 9700 1.0e+4
TPH aromatic EC>12-16	140 330 660	1800 2300 2500	23 57 130	3.6e+4 3.7e+4 3.8e+4	5100 5100 5000	1.0e+4
TPH aromatic EC>16-21	260 540 930	1900	46 110 260	2.8e+4	3800	7600 7700 7800
TPH aromatic EC>21-35	1100 1500 1700	1900	370 820 1600	2.8e+4	3800	7800 7800 7900
TPH aromatic EC>35-44	1100 1500 1700	1900	370 820 1600	2.8e+4	3800	7800 7800 7900
	Phenols (based on sandy loam soil with SOM 1%, 2.5% or 6%)					
Phenol	120 200 380	440 690 1200	23 42 83	440 690 1300	440 690 1300	440 690 1300
Chlorophenols (except pentachlorophenol)	0.87 2.0 4.5	94 150 210	0.13 0.30 0.70	3500 4000 4300	620	1100
Pentachlorophenol	0.22 0.52 1.2	27vap (16.4) 29 31	0.03 0.08 0.19	400	60	110 120 120

Screening Levels – Human Health (soil)

LQM/CIEH S4UL (except allotments)	**Residential**		**Allotment**	**Commercial**	**Public Open Space (residential)**	**Public Open Space (park)**
	With homegrown produce	**Without homegrown produce**				
	Volatile Organic Compounds (based on sandy loam soil with SOM 1%, 2.5% or 6%)					
1,2-Dichloroethane	0.0071 0.011 0.019	0.0092 0.013 0.023	0.0046 0.0083 0.016	0.67 0.97 1.7	29	21 24 28
1,1,1-Trichloroethane	8.8 18 39	9.0 18 40	48 110 240	660 1300 3000	1.4e+5	5.7e+4 vap (1425) 7.6e+4 vap (2915) 1.0e+5 vap (6392)
1,1,2,2-Tetrachloroethane	1.6 3.4 7.5	3.9 8.0 17	0.41 0.89 2.0	270 550 1100	1400	1800 2100 2300
1,1,1,2-Tetrachloroethane	1.2 2.8 6.4	1.5 3.5 8.2	0.79 1.9 4.4	110 250 560	1400	1500 1800 2100
Tetrachloroethene (PCE)	0.18 0.39 0.90	0.18 0.40 0.92	0.65 1.5 3.6	19 42 95	1400	810 1100 1500
Tetrachloromethane	0.026 0.056 0.13	0.026 0.056 0.13	0.45 1.0 2.4	2.9 6.3 14	890 920 950	190 270 400
Trichloroethene (TCE)	0.016 0.034 0.075	0.017 0.036 0.080	0.041 0.091 0.21	1.2 2.6 5.7	120	70 91 120
Trichloromethane (chloroform)	0.91 1.7 3.4	1.2 2.1 4.2	0.42 0.83 1.7	99 170 350	2500	2600 2800 3100
Chloroethene (vinyl chloride)	0.00064 0.00087 0.0014	0.00077 0.0010 0.0015	0.00055 0.0010 0.0018	0.059 0.077 0.12	3.5	4.8 5.0 5.4
Chlorobenzene	0.46 1.0 2.4	0.46 1.0 2.4	5.9 14 32	56 130 290	1.1e+4 1.3e+4 1.4e+4	1300 2000 2900
1,2-Dichlorobenzene	23 55 130	24 57 130	94 230 540	2000 4800 1.1e+4	9.0e+4 9.5e+4 9.8e+4	2.4e+4 3.6e+4 5.1e+4
1,3-Dichlorobenzene	0.4 1.0 2.3	0.44 1.1 2.5	0.25 0.6 1.5	30 73 170	300	390 440 470
1,4-Dichlorobenzene	61 150 350	61 150 350	15 37 88	4400 vap (224) 1.0e+4 vap (540) 2.5e+4 vap (1280)	1.7e+4	3.6e+4 vap (224) 3.6e+4 vap (540) 3.6e+4 vap (1280)
1,2,3-Trichlorobenzene	1.5 3.6 8.6	1.5 3.7 8.8	4.7 12 28	102 250 590	1800	770 vap (134) 1100 vap (330) 1600 vap (789)
1,2,4-Trichlorobenzene	2.6 6.4 15	2.6 6.4 15	55 140 320	220 530 1300	1.5e+4 1.7e+4 1.9e+4	1700 vap (318) 2600 vap (786) 4000 vap (1880)
1,3,5-Trichlorobenzene	0.33 0.81 1.9	0.33 0.81 1.9	4.7 12 28	23 55 130	1700 1700 1800	380 vap (37) 580 vap (91) 860 vap (217)
1,2,3,4-Tetrachlorobenzene	15 36 78	24 56 120	4.4 11 26	1700 vap (122) 3080 vap (304) 4400 vap (728)	830	1500 vap (122) 1600 1600
1,2,3,5-Tetrachlorobenzene	0.66 1.6 3.7	0.75 1.9 4.3	0.38 0.90 2.2	49 vap (39) 120 vap (98) 240 vap (235)	78 79 79	110 vap (39) 120 130
1,2,4,5-Tetrachlorobenzene	0.33 0.77 1.6	0.73 1.7 3.5	0.06 0.16 0.37	42 72 96	13	25 26 26
Pentachlorobenzene	5.8 12 22	19 30 38	1.2 3.1 7.0	640 770 830	100	190
Hexachlorobenzene	1.8 vap (0.2) 3.3 vap (0.5) 4.9	4.1 vap (0.2) 5.7 vap (0.5) 6.7	0.47 1.1 2.5	110 vap (0.2) 120 vap (0.5) 120	16	30
Carbon disulphide	0.14 0.29 0.62	0.14 0.29 0.62	4.8 10 23	11 22 47	1.1e+4 1.1e+4 1.2e+4	1300 1900 2700
Hexachlorobutadiene	0.29 0.7 1.6	0.32 0.78 1.8	0.25 0.61 1.4	31 66 120	25	48 50 51

Screening Levels – Human Health (soil)

	Pesticides (based on sandy loam soil with SOM 1%, 2.5% or 6%)					
Aldrin	5.7 6.6 7.1	7.3 7.4 7.5	3.2 6.1 9.6	170	18	30 31 31
Dieldrin	0.97 2.0 3.5	7.0 7.3 7.4	0.17 0.41 0.96	170	18	30 30 31
Atrazine	3.3 7.6 17.4	610 620 620	0.50 1.2 2.7	9300 9400 9400	1200	2300 2400 2400
Dichlorvos	0.032 0.066 0.14	6.4 6.5 6.6	0.0049 0.010 0.022	140	16	26 26 27
Endosulfan	7.4 18 41	160 280 410	1.2 2.9 6.8	5600 7400 8400	1200	2400 2400 2500
HCH (including Lindane)	0.23 0.55 1.2	6.9 9.2 11	0.035 0.087 0.21	170 180 180	24	47 48 48
	Explosives (based on sandy loam soil with SOM 1%, 2.5% or 6%)					
2,4,6-Trinitrotoluene	1.6 3.7 8.1	65 66 66	0.24 0.58 1.40	1000	130	260 270 270
RDX	120 250 540	1.3e+4	17 38 85	2.1e+5	2.6e+4 2.6e+4 2.7e+4	4.9e+4 5.1e+4 5.3e+4
HMX	5.7 13 26	6700	0.86 1.9 3.9	1.1e+5	1.3e+4	2.3e+4 vap (0.35) 2.3e+4 vap (0.39) 2.4e+4 vap (0.48)

Assessment Criteria – Controlled Waters

Substance	EQS			DWS	Substance	EQS	DWS
List 1							
	Fresh	Estuary	Marine				
Mercury	1	0.5	0.3	1	Endrin	0.005	0.1 *
Cadmium	5	5	2.5	5	Total 'Drins	0.03	-
Hexachlorocyclohexane	0.1	0.02	0.02	-	Hexachlorobenzene	0.03	-
Carbon tetrachloride	12			-	Hexachlorobutadiene	0.1	-
Total DDT	0.025			0.5 *	Chloroform	12	-
pp DDT	0.01			-	1,2-dichloroethane	10	-
Pentachlorophenol	2			0.1 *	Trichlorethylene	10	-
Dieldrin	0.01			0.03	Perchlorethylene	10	-
Isodrin	0.005			0.1 *	Trichlorobenzene	0.4	-
Aldrin	0.01			0.03			
List 2							
1,1,1-Trichloroethane	100			-	Fenitrothion	0.01	0.1 *
1,1,2-Trichloroethane	400			-	Flucofuron	1	0.1 *
2,4-D (ester)	1			-	Iron	1000	200
2,4-D (non-ester)	40			-	Linuron	2	0.1 *
2,4-Dichlorophenol	20			-	Malathion	0.01	0.1 *
2-Chlorophenol	50			-	Mecoprop	20	0.1 *
4-Chloro-3-methyl-phenol	40			-	Mevinphos	0.02	0.1 *
Arsenic	50			10	Naphthalene	10	0.1 *
Atrazine &Simazine	2			0.1 *	Omethoate	0.01	0.1 *
Azinphos-methyl	0.01			0.1 *	PCSDs	0.05	0.1 *
Bentazone	500			0.1 *	Permethrin	0.01	0.1 *
Benzene	30			1	pH	6 - 9	6.5 - 9.5
Biphenyl	25			-	Sulcofuron	25	0.1 *
Boron	2000			1000	Toluene	50	0.1 *
Chloronitrotoluenes	10			-	Triazaphos	0.005	0.1 *
Cyfluthrin	0.001			0.1 *	Tributyltin	0.02	0.1 *
Demeton	0.5			0.1 *	Trifluralin	0.1	0.1 *
Dichlorvos	0.001			0.1 *	Triphenyltin	0.02	0.1 *
Dimethoate	1			0.1 *	Xylene (m and p, o)	30	-
Endosulphan	0.003			0.1 *	TPH	30	10 *

List 2 (hardness related)							
Hardness ($mg/l\ CaCO_3$)	0-50	>50 -100	>100 -150	>150 -200	>200 -250	>250	
Suitable for all fish							
Copper	1	6	10	10	10	28	2000
Nickel	50	100	150	150	200	200	20
Vanadium	20	20	20	20	60	60	-
Suitable for salmonid (game) fish							
Chromium	5	10	20	20	50	50	50
Lead	4	10	10	20	20	20	10
Zinc	8	50	75	75	75	125	-
Suitable for Cyprinid (coarse) fish							
Chromium	150	175	200	200	250	250	50
Lead	20	125	125	250	250	250	10
Zinc	75	175	250	250	250	500	-

Other Compounds			
Acrylamide	0.1	Tetrachloroethene and Trichloroethene	10
Antimony	5	Trihalomethanes(ii)	100
Benzo(a)pyrene	0.01	Vinyl chloride	0.5
Bromate	10	Aluminium	200
Cyanide	50	Iron	200
1, 2-dichloroethane	3	Manganese	50
Epichlorohydrin	0.1	Sodium	200
Fluoride	1.5 mg/l	Tetrachloromethane	3
Heptachlor	0.03	Ammonium	0.5 mg/l
Heptachlor epoxide (iii)	0.03	Nitrate	50 mg/l
Other pesticides	0.1	Nitrite	0.5 mg/l
Pesticides (total)	0.5	Chloride	250 mg/l
PAHs(i)	0.1	Sulphate	250 mg/l
Selenium	10	TPH	10 *

Notes:
* Values taken from 1989 Regs
i. Specified compounds are benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]-perylene, indeno[1,2,3-c,d]pyrene.
ii. Specified compounds are chloroform, bromoform, dibromochloromethane, bromodichloro-methane.

Unless stated otherwise all units $\mu g\ l^{-1}$

Assessment Criteria –Water Supply Pipes

Substance [1]	UK WIR	
	PE	**PVC**
Organic compounds		
TPH	-	
TPH >C5-C10	2	1.4
TPH >C11-C20	10	NL
TPH >C21-C40	500	NL
Extended VOC suite	0.5	0.125
Extended SVOC suite	2	1.4
BTEX + MTBE	0.1	0.03
Aromatic hydrocarbons		
Benzene	0.1	0.03
Ethylbenzene	0.1	0.03
Toluene	0.1	0.03
Xylenes	0.1	0.03
Phenol	2	0.4
Cresol	2	0.04
Chlorinated phenols		
Total	2	0.04
Polyaromatic hydrocarbons		
Total	2	1.4
Other organic compounds		
Ethers	0.5	1
Nitrobenzene	0.5	0.4
Ketones	0.5	0.02
Aldehydes	0.5	0.02
Amines	Detected	NL

Notes:
1. All units mg/kg in soil.
2 The threshold for TPH is 1000mg/kg provided no other organic compounds are present. If the TPH level exceeds 50mg/kg then the sum of TPH plus other organic compounds must not be greater than the upper threshold. If the other compounds are not tested for then the threshold for TPH must be set at the lower threshold.
3. All UKWIR TV's (except BTEX and MTBE) are based on taste and odour detection threshold.
4. PE – polyethylene; PVC – polyvinyl chloride

Assessment Criteria –Phytotoxicity

Potentially phytotoxic elements [1]	BS3882:2015		
	Soil pH <6.0	Soil pH 6.0 – 7.0	Soil pH >7.0
Zinc	<200	<200	<300
Copper	<100	<135	<200
Nickel	<60	<75	<110

Notes:
1. All units mg/kg dry solids.

Appendix G - Defining Risk

Identification of Unacceptable Risk

The method for risk evaluation is qualitative and is developed from the model provided in CIRIA C552 *Contaminated Land Risk Assessment – a guide to good practice* (DETR 2001). It involves classifying risk in terms of (a) magnitude of the potential consequence (severity) of occurrence and (b) the probability (likelihood) of occurrence. The risk rating derived is used to determine what action, if any, is needed to further investigate that risk and/or remediate to reduce risk to an acceptable level.

Task 1: Classification of Consequence

Classification	Definition	Examples
Severe	• Short-term (acute) risk to human health likely to result in "significant harm" (as defined in EPA90 Part 2a) • Short-term (acute) risk of pollution of sensitive water resource. • Short-term (acute) risk to an ecosystem, or organism forming part of an ecosystem.	Unusually high concentration of toxic substance on the surface of a garden or recreation area. Major spillage of contamination from the site into controlled waters. EA Category 1 pollution incident. Closure of an abstraction point. Explosion, causing building collapse (and death if occupied).
Medium	• Chronic damage to human health likely to result in "significant harm". • Pollution of sensitive water resource. • Significant change in a particular ecosystem, or organism forming part of such ecosystem.	Concentration of contaminant from site exceeds generic or site-specific assessment criteria for human health or water supply pipes. Presence of asbestos. Leaching of contaminants from a site to a principal or secondary (A) aquifer. Concentration exceeds DWS or EQS in Inner Source Protection Zone (SPZ1). EA Category 2 pollution incident. Death of a species or loss of habitat within an area of national importance.
Mild	• Exposure is unlikely to result in "significant harm" to human health. • Pollution of non-sensitive water resource. • Damage to sensitive buildings, structures and services or the environment.	Concentration of contaminant from site below generic or site-specific assessment criteria. Pollution of secondary (B or undifferentiated) aquifer. EA Category 3 pollution incident. Damage to a building rendering it unsafe to occupy. Death of a species or loss of habitat within an area of local importance. Loss of plants in garden or landscape areas (BS3882 limits exceeded).

Classification	Definition	Examples
Minor	• Harm (but not significant harm) resulting in a financial loss or expenditure to resolve. • Non-permanent human health effects. • Easily repairable damage to buildings, structures and services.	Pollution of unproductive strata.

Task 2: Classification of Probability

Classification	Definition
High Likelihood	There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term or there is actual evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur in the very long term.

Task 3: Risk Estimation

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	**Very high risk**	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Low risk	Low risk
	Low Likelihood	Moderate risk	Low risk	Low risk	Very low risk
	Unlikely	Low risk	Low risk	Very low risk	Very low risk
	No linkage	No risk			

Task 4: Description of the Estimated Risks and Likely Action Required

Risk	Action
Very high risk	There is a high probability that severe harm could arise or there is evidence that severe harm is currently happening. This risk, if realised, is likely to result in substantial liability. **Urgent investigation and remediation are required for the site in its existing state and for development.**
High risk	Harm is likely to arise. Realisation of the risk is likely to present a significant liability. **Urgent investigation is required and remedial works may be necessary in the short term and are likely over the long term. Remediation will be required for development.**

Risk	Action
Moderate risk	A potential linkage is identifiable. However, it is either relatively unlikely that harm would be severe or, if any harm were to occur, it is more likely that the harm would be relatively mild. **Investigation is required to quantify the risk and determine potential liability. Remediation will be required for development.**
Low risk	It is possible that harm could arise but it is likely that this harm, if realised, would at worst normally be mild. **Investigation is not normally required but could be useful to confirm a preliminary assessment. Remedial works are unlikely to be required or will be limited.**
Very low risk	There is a low possibility that harm could arise. In the event of such harm being realised it is not likely to be severe. Site is not capable of being determined under Part 2a. **No further action recommended.**

T +44 1223 632 800
A Building 7200
Cambridge Research Park
Cambridge, CB25 9TL

www.mlmgroup.com