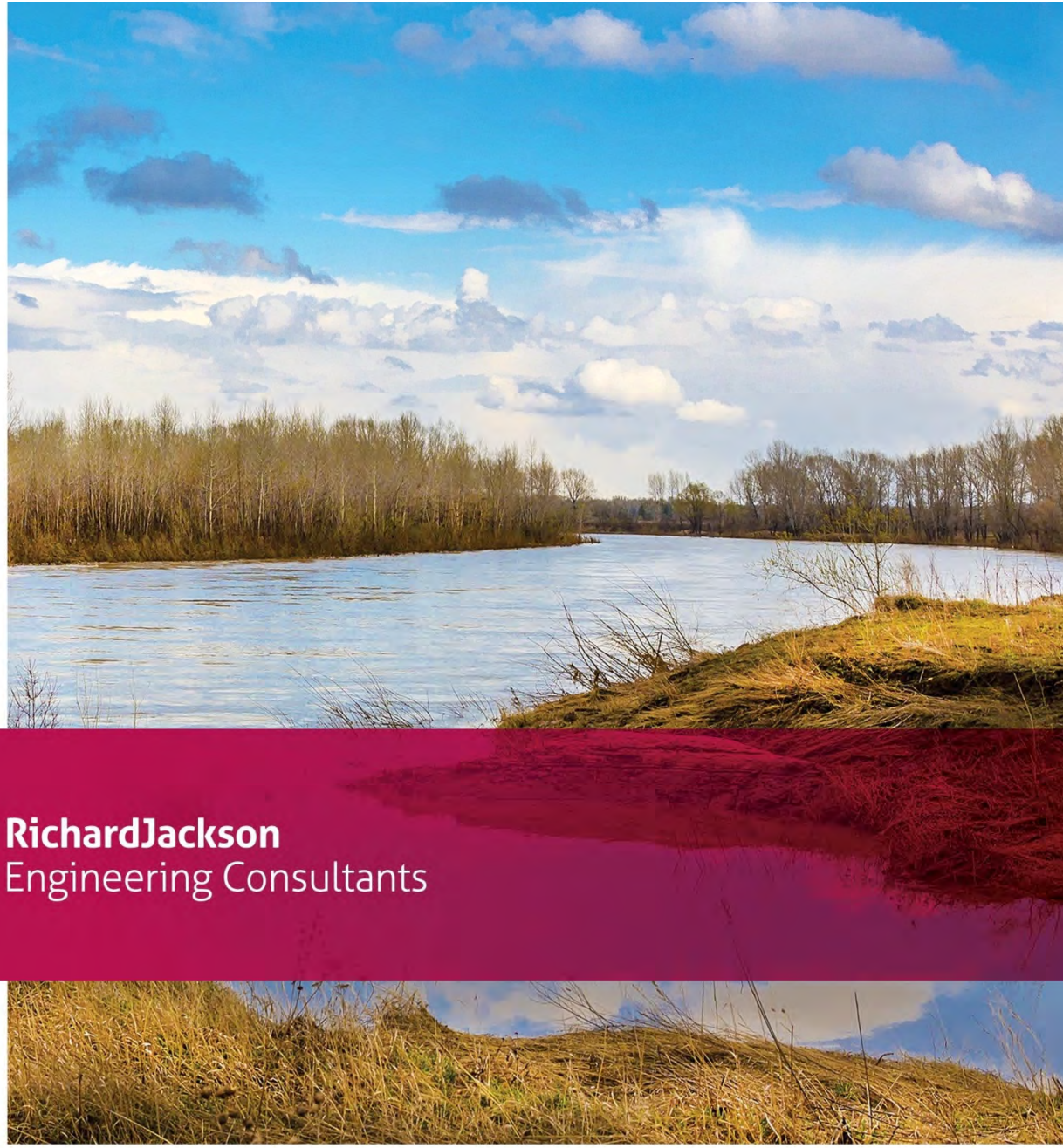

RichardJackson
Engineering Consultants

REVISION A - GROUND INVESTIGATION REPORT

Home Farm, Bedfield, Suffolk, IP13 7EE

Chapter Build Group Ltd

July 2022

Project no: 61647

RichardJackson
Engineering Consultants

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Document prepared by: -	*Camilla Watson* on behalf of Richard Jackson Ltd
Date: -	05 / 05 / 2022
Document checked by: -	*Kay O'Reilly* on behalf of Richard Jackson Ltd
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Rev A	July '22	May 2022 Geo-Environmental Assessment updated to include a geotechnical assessment.	KO	BF	BF

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EXECUTIVE SUMMARY

Purpose:	Intrusive ground investigation to establish the prevailing ground conditions, recover soil samples, and assess the contamination status of the site.
Site Status:	At the time of investigation, the site was occupied by disused industrial buildings connected with a former engineering business, together with associated hard standing yard areas and stockpiled materials in the north. Overgrown vegetation and exposed soils were present in the south.
Review of Previous Investigations:	The Geo-Environmental Desk Study Report completed by Goldfinch Environmental Ltd (May 2021) indicated the site to be occupied by disused one-storey industrial buildings, with a concrete yard and driveway sloping on to Bedfield Road, and a soft soil landscape and overgrown vegetation in the south, with boundaries formed by trees, hedges, and wooden fences. Since the first Ordnance Survey map reviewed (1888), on-site development mainly occurred in the early 1900's, with little change since. Off-site development progressed only in the south and east from agricultural land to residential properties in the 1950s to 1970s, with the north and west staying agricultural until present day. No readily identifiable sources of contamination were reported, and a low risk of contamination was concluded.
Fieldwork:	The fieldwork comprised the formation of 10no. windowless sampler (WLS) boreholes and 2no. trial pits, together with associated soil sampling and the installation of monitoring standpipes.
Ground Conditions:	The following ground conditions were encountered during this investigation: • Surface Materials / Made Ground – max depth 1.70m below ground level (bgl); • Superficial Deposit (unspecified) – max depth 1.80m bgl; • Lowestoft Formation – base unproven in this investigation. Groundwater was encountered at depths 0.9m bgl (WS01) to 3.0m bgl (WS03), with standing water levels at depths 0.6m bgl (WS04) to 3.85m bgl (WS03).
Soil Contamination:	Elevated concentrations of Arsenic and Lead were encountered in the Made Ground beneath the site in a limited number of locations, and remediation of soft landscaping in corresponding development plots will be required.
Structural Foundations:	Shallow mass concrete foundations bearing onto the Lowestoft Formation were considered appropriate for at the site. A safe bearing pressure of 150kN/m^2 has been determined for a 0.6m wide strip footing at 1.50m and 2.00m bgl.
Ground Floor Construction:	Fully suspended floor slabs with a subfloor void appropriate to medium volume change potential soils will be required at the site.
Concrete Grade:	A design sulphate class of DS-2 is considered appropriate for use on site, with an aggressive chemical environment for concrete (ACEC) classification of AC-2 recommended.
Pavement Design:	A design CBR value of 1% is recommended where the sub-base comprises the Superficial Deposits (undifferentiated) with a design CBR value of 1% recommended where the sub-base comprises

	made ground. Stabilization of sub-base materials through the use of a geogrid product or similar may be necessary in some areas of the site to limit the effects of differential settlement.
Further Works:	Further works for geo-environmental purposes are recommended, which include: • Completion of a gas monitoring programme to fully assess the gassing regime; • Preparation of a Remediation Method Statement (RMS); • Validation works and preparation of a verification report.

1. Introduction

Richard Jackson Ltd received an instruction to undertake ground investigation works in connection with the proposed redevelopment at Home Farm, Bedfield, Suffolk, IP13 7EE.

The works were instructed by Client Chapter Build Group Ltd and were carried out in accordance with our fee proposal from 6th January 2022, reference KO/61647/GFQ. A Geo-Environmental Assessment was prepared dated May 2022, reference 61647, this report supersedes that & includes the geotechnical assessment.

A geo-environmental desk study report has previously been prepared for the site by Goldfinch Environmental Ltd, report reference 0772/1, dated May 2021. This is briefly reviewed in this report.

The above referenced geo-environmental desk study report was submitted to support a Mid Suffolk District Council planning application (reference DC/21/03606, received 24th June 2021), and it should be noted that comments within the planning permission required intrusive ground investigation to be undertaken to assess the contamination risk to receptors.

Intrusive investigations have also previously been undertaken by Richard Jackson Ltd as part of an infiltration assessment, reference SB/61647/SLR, dated 3rd May 2022. The pertinent findings of these works are also briefly reviewed in this report.

The intrusive investigation, on which this report is based, comprised the formation of 10no. windowless sampler (WLS) boreholes, and 2no. trial pits (excavated for the infiltration assessment). In-situ testing and soil sampling were also undertaken. Semi-permanent monitoring standpipes were installed in 7no. WLS boreholes (WS01, WS03–WS04, WS06, WS08–WS10) to facilitate future monitoring programmes as required.

Chemical analyses have been undertaken in order that the contamination status of the site may be determined and the need for further investigation or remediation assessed.

This report shall be read in conjunction with the limitations of use provided in Appendix F.

2. Site Location and Description

The site was located at Home Farm, to the south of Bedfield Road, Bedfield, Suffolk, IP13 7EE. The approximate Ordnance Survey grid reference for the centre of the site was TM 229 655. A site location plan is presented as Figure 1 in Appendix A.

The site was roughly level at approximately ~61.5m aOD. It was irregularly shaped with maximum dimensions approximately ~75m southwest to northeast, and ~70m northwest to southeast, and a total area of ~0.34 hectares.

At the time of the ground investigation, the site comprised an abandoned gathering of double-height barns with corrugated iron rooves, constructed over concrete floor slabs in the north. According to the Goldfinch Environmental Ltd desk study report, these buildings were relatively unchanged since 1999. The concrete hardstanding, creating the yard in the western sector, formed the driveway to the public Bedfield Road and indicated few signs of deterioration, with overgrown vegetation encroaching the buildings and multiple possible prior locations of above-ground oil tanks noted. The south of the site was soft landscaping with dense bramble growth, lined by hedges, trees, and wooden fencing. Rubble and scrap metal were found in the north-western corner of the site.

A detailed site description is presented as Section 4 of Goldfinch Environmental Ltd Geo-Environmental Desk Study report, reference 0772/1, dated May 2021.

3. Review of Previous Investigations

As mentioned in Section 1, previous investigations have been undertaken at the site. These are summarised in the following section.

3.1. Goldfinch Environmental Ltd, Geo-Environmental Desk Study Report, ref. 0772/1, May 2021

At the time of site walkover, the site was capped with a series of closely located buildings over concrete floor slabs in the northern half of site, concrete hard cover in the west, with soft soils and dense tree growth in the southern third of site. Buildings were recorded to be of variable construction type with little to no evidence of deterioration or staining from contamination or leaching of containerised fluids or industrial activities.

Off-site a disused wind pump was recorded to the southeast with residential properties beyond, Home Farm buildings and associated farmland to the northwest on the opposite side of the Bedfield Road, agricultural land to the southwest, and a series of residential properties to the northeast.

The report recorded the site to have comprised a sparsely developed rural plot from the first historic Ordnance Survey map examined (1888), with further development noted in the early 1900s and some possible further minor expansion/reconfiguration recorded in the early 2000s.

The superficial deposits were identified as Lowestoft Formation, listed as a Secondary Aquifer, with the underlying Crag Group (Sand), listed as a Principal Aquifer.

No readily identifiable sources of contamination were reported.

The report concluded that on the basis of the low risk presented by contamination an intrusive investigation may be considered unwarranted.

3.2. Richard Jackson Ltd, Infiltration Assessment, ref. SB/61647/SLR, May 2022

After the mechanical excavation of 2no. trial pits (TP01, TP02) to 2.05m bgl (below ground level) and 2.0m bgl respectively, disturbed samples were recovered, and soakage tests were completed in accordance with BRE Digest 365 (2016).

The investigation disclosed surface materials (Topsoil / Concrete) overlying in turn Made Ground, Superficial Deposits (Unspecified), and the Lowestoft Formation. The Lowestoft Formation was encountered as a firm light brown-light grey sandy gravelly clay, with gravel of chalk and occasional flint.

The soakage tests were recorded to be unsuccessful due to insufficient infiltration during the period of testing, and therefore no infiltration rate was established.

The site was not considered appropriate for the adoption of infiltration drainage, and therefore alternative methods of surface water disposal should be investigated.

4. Proposed Development

The proposed development scheme is to comprise the demolition of existing structures and the construction of 7no. new residential dwellings with associated gardens, drives/parking, access roads and infrastructure.

A proposed development plan is presented as Figure 3 in Appendix A.

5. Factual Ground Investigation Information

The findings of the factual ground investigation are provided in the following sections.

5.1. Fieldwork

The fieldwork on which the report is based was undertaken on 30th - 31st March 2022 and comprised the following:

- The formation of 10no. small diameter windowless sampler (WLS) boreholes – (WS01-WS10);
- The excavation of 2no. trial pits (TP01-TP02) for use in infiltration testing.

An exploratory hole location plan is presented as Figure 2 in Appendix A.

Exploratory hole logs are presented in Appendix B and give descriptions and depths of strata encountered, together with details of samples taken, in-situ tests, well installations and other relevant information.

Soil samples were recovered from throughout the depth of exploratory holes for chemical analyses, geotechnical testing and record keeping purposes.

Samples recovered for chemical analyses were stored in airtight plastic containers and amber glass jars.

Samples recovered for chemical analysis were transported to the analytical laboratory, Envirolabs Ltd, in cool boxes under chain of custody protocols.

Where applicable, investigative techniques, sampling, logging of soils and in-situ testing complied with the requirements of British Standard BS5930:2015- 'Code of Practice for Site Investigations'.

5.1.1. Windowless Sampling

The windowless sampling (WLS) utilised a track-mounted hydraulic power-pack and percussive hammer to drive a series of small diameter windowless tubes into the ground.

The 10no. WLS boreholes were formed to depths of between 2.0m bgl (WS04) and 5.0m bgl (WS10). The WLS boreholes were positioned to provide a representative site coverage, whilst targeting observed sources of contamination.

In-situ standard penetration tests (SPTs) were undertaken throughout the depth of the WLS boreholes to provide an indication of the soil density / stiffness. The number of blows required to advance a standard split spoon over the final 300mm of a 450mm total drive was recorded as the 'N' value theses values were presented on the borehole logs.

Where cohesive soils were encountered, a hand shear vane was used to assess the undrained shear strength of the encountered soils. The results of these tests are recorded as the 'IVN' values and are presented on the logs in Appendix B.

On completion of 6no. of the WLS boreholes (WS01, WS03–WS04, WS06 & WS08), semi-permanent 50mm diameter HDPE gas and groundwater monitoring standpipes were installed to a maximum depth of 5.0m bgl (WS10).

5.1.2. Trial Pitting

A mechanical excavator was used to form 2no. trial pits to depths of 2.04m bgl (TP01) and 2.05m bgl respectively (TP02). The trial pits were positioned to provide representative coverage of the site.

Soakage tests were undertaken in the 2no. trial pit locations in accordance with BRE Digest 365 (2016), as discussed in the Infiltration Assessment by Richard Jackson Ltd, ref. SB/61647/SLR, May 2022.

5.2. Laboratory Testing

5.2.1. Geo-Environmental Testing

Chemical analyses were undertaken on a number of soil samples recovered from the site. Details of chemical analyses undertaken are provided in Section 6. Results of chemical analyses are presented in full in Appendix C.

5.2.2. Geotechnical Testing

Disturbed and undisturbed soil samples recovered from the exploratory holes were sent to a UKAS accredited soil testing laboratory Soil Property Testing (SPT) Ltd. The following tests were carried out in accordance with BS EN ISO: 17892-2:2014 & BS1377:1990:

- 29no. water content determinations;
- 9no. Atterberg limit tests (four-point liquid limit cone method);
- 16no. pH value and sulphate content (2:1 water soil extract) determinations*;

**Some of these tests were undertaken by the UKAS and MCerts accredited laboratory Envirolab Ltd*

The results of these tests are presented in Appendices C & D.

5.3. Ground Conditions

The British Geological Survey (BGS) 1:50,000 scale series online mapping of the area indicates the Lowestoft Formation to exist beneath the site, underlain by the Crag Group. The deposits encountered in this investigation comprised the following sequence:

- Surface Materials / Made Ground
- Superficial Deposits (unspecified)
- Lowestoft Formation

5.3.1. Surface Materials / Made Ground

Topsoil was encountered from ground level in 2no. exploratory holes (TP02 & WS09) to a maximum depth of 0.40m bgl (WS09). The Topsoil was encountered as a dark brown slightly gravelly sandy clay with roots and rootlets. The gravel was angular to subangular, fine to medium flint and occasional chalk.

Concrete was encountered from ground level in 8no. of the 12no. exploratory holes (TP01 & WS01-WS07), the thickness of which ranged from 0.10m bgl (WS05) to 0.25m bgl (WS06). A 0.03m thickness of orange sand was recorded from ground level in WS08, overlying concrete to 0.15m bgl.

Made Ground was encountered from ground level in WS10 and beneath the surface materials in 8no. locations (TP01, WS01-WS05, WS07 & WS08). The

base of the Made Ground, where proven, ranged from 0.20m bgl (TP10) to 1.70m bgl (WS08), and remained unproven at 2.00m bgl in WS04. The Made Ground was encountered as a variable material, typically comprising either;

- Soft dark blue-grey slightly gravelly sandy clay, with decayed rootlets. The gravel was subangular to subrounded fine to coarse chalk, flint and occasional fragments of brick and cement, or;
- Orange-yellow gravelly medium to coarse sand, with gravel of subangular to subrounded fine to coarse flint.

5.3.2. Superficial Deposits (Unspecified)

Superficial Deposits (Unspecified) were encountered beneath the surface materials or Made Ground in 7no. locations (TP01-TP02, WS01-WS02, WS05-WS07) to a maximum depth of 2.50m bgl (WS01).

The Superficial Deposits were typically encountered as a very soft to soft green-grey/grey brown slightly sandy silty clay, with occasional decayed wood and gravel of fine to medium flint and chalk.

A loose green mottled-yellow slightly clayey, fine to medium sand was also recorded as unspecified Superficial Deposits in WS01 between 0.90m bgl and 1.30m bgl. A medium dense green mottled yellowish orange silty fine to medium sand with flint gravel was also recorded as Superficial Deposits in WS01 between 2.00m and 2.50m bgl.

SPTs were undertaken throughout the depth of the Superficial Deposits (unspecified) in WLS boreholes. The results of these tests ranged from N=4 (WS02 at 1.00m bgl) to N=23 (WS01 at 2.00m bgl). Full results are provided on the WLS logs and summarised on the 'N' Value –vs- Depth Plot presented in Appendix B.

Hand shear vane tests were also undertaken throughout the depth of the Superficial Deposits (unspecified). The results of these tests generally ranged from 13kN/m^2 (TP01 at 0.75m bgl) to 38kN/m^2 (WS07 at 0.50m), although a value of 122kN/m^2 was recorded at 1.30m bgl in WS01. Full results are provided on the exploratory hole logs and summarised on the 'undrained shear strength –vs- depth plots presented in Appendix B.

Atterberg limit tests were undertaken on 2no. samples of the Superficial Deposits (unspecified) recovered from Ws01 at 1.50m bgl and WS02 at 1.50m bgl with an additional water content determination undertaken on a sample recovered from WS02 at 1.00m bgl. Full results of these tests are provided in Appendix D and can be summarised as follows:

- Water Content: 27.0% (WS01 at 1.50m bgl) – 40% (WS02 at 1.00m bgl);
- Liquid Limit: 41% (WS02 at 1.50m bgl) – 42% (WS01 at 1.50m bgl);
- Plastic Limit: 18% (WS01 at 1.50m bgl) - 19% (WS02 at 1.50m bgl);
- Plasticity Index: 22% (Ws01 at 1.50m bgl) – 24% (WS01 at 1.50m bgl).

Modified plasticity indices of between 20% (Ws02 at 1.50m bgl) and 22% (WS01 at 1.50m bgl) have been calculated on the basis of the following relationship:

- Modified plasticity index = (% samples passing 0.425mm sieve x plasticity index) / 100

The results of the Atterberg limit test indicated the Superficial Deposits (unspecified) to be of intermediate plasticity and of low to medium volume change potential.

5.3.3. Lowestoft Formation

Soils interpreted to represent the Lowestoft Formation were encountered beneath the surfacing materials, Made Ground or Unspecified Superficial Deposits in 11no. of the 12no. exploratory holes, being absent in WS04. The base of the Lowestoft Formation remained unproven in this investigation, which extended to a maximum depth of 5.0m bgl (WS10).

The Lowestoft Formation was typically encountered as firm becoming-stiff light brown becoming blue grey silty gravelly clay, with occasional decayed root material and iron staining and gravel of subangular to subrounded chalk and flint.

Sand partings were noted throughout the Lowestoft Formation, notably in WS08 between 2.55m and 3.0m bgl, and in WS01 from 0.9m to 1.3m bgl and 2.0m to 2.5m bgl. Frequent organic material comprising roots, rootlets and peat was noted in WS02 between 0.5m and 0.65m bgl.

SPTs were undertaken throughout the depth of the Lowestoft Formation in WLS boreholes. The results of these tests ranged from N=10 (WS03 at 2.00m bgl) to N=41 (WS10 at 5.00m bgl). Full results are provided on the WLS logs and summarised on the 'N' Value –vs- Depth Plot presented in Appendix B.

Hand shear vane tests were also undertaken throughout the depth of the Superficial Deposits (unspecified). The results of these tests ranged from 42kN/m^2 (WS10 at 0.50m bgl) to >130kN/m^2 (WS10 at 3.50m). Full results are provided on the exploratory hole logs and summarised on the 'undrained shear strength –vs- depth plots presented in Appendix B.

Water content determinations were undertaken on 27no. samples of the Lowestoft Formation, with Atterberg limit tests were undertaken on 7no. samples. Full results of these tests are provided in Appendix D and can be summarised as follows:

- Water Content: 13.9% (WS09 at 1.00m bgl) – 21.3% (WS03 at 3.60m bgl)
- Liquid Limit: 31% (WS09 at 1.00m bgl) – 48% (WS10 at 1.00m bgl)
- Plastic Limit: 13% (WS09 at 1.00m bgl) – 19% (WS05 at 1.70m bgl)
- Plasticity Index: 18% (WS09 at 1.00m bgl) – 30% (WS10 at 1.00m bgl).

Modified plasticity indices of between 17.1% (WS09 at 1.00m bgl & 2.00m bgl) and 26.1% (WS10 at 1.00m bgl) were calculated on the basis of the following relationship:

- Modified plasticity index = (% samples passing 0.425mm sieve x plasticity index) / 100

The results of the Atterberg limit tests indicated the Lowestoft Formation to be of intermediate plasticity and of medium volume change potential.

5.3.4. Groundwater

Groundwater was encountered in a number of the exploratory holes during formation. Table 1 provides a summary of the groundwater data and includes strike depth and observed rises in groundwater during borehole formation.

Table 1: Summary of Groundwater Levels.

Exploratory Hole	Groundwater Strike Depth (m bgl)	SWL on completion (m bgl)	Stratum of Groundwater Strike	SWL on 01.06.22 (m bgl)
TP01	NE*	N/A	N/A	N/A
TP02	NE*	N/A	N/A	N/A
WS01	0.90	1.70	Superficial Deposits	0.38
	2.00	1.70	Lowestoft Formation	
WS02	NE*	N/A	N/A	No Installation
WS03	3.00	3.85	Lowestoft Formation	0.65
WS04	1.30	0.60	Made Ground	0.70
WS05	NE*	N/A	N/A	No Installation
WS06	NE*	N/A	N/A	0.53
WS07	2.45	3.65	Lowestoft Formation	No Installation
WS08	1.35	2.45	Made Ground	0.63
WS09	NE*	N/A	N/A	1.20
WS10	NE*	N/A	N/A	No Installation
**NE – Not encountered*				

6. Geo-Environmental Assessment

The purpose of this section is to provide an assessment of the contamination status of the site.

The analysis was undertaken by Envirolab Ltd., a UKAS and MCerts accredited laboratory.

6.1. Soil Analysis

A broad suite of analyses was scheduled, including metals, hydrocarbons, inorganic compounds and volatile organic compounds.

10no. samples of soil have been analysed for a broad suite of contaminants as follows:

Arsenic	pH
Cadmium	Total Cyanide
Chromium	Water Soluble Sulphate
Copper	Total Phenols
Nickel	BTEX Compounds
Lead	Total Sulphur
Mercury	Speciated Polyaromatic Hydrocarbons (PAH)
Selenium	Organic Matter Content
Zinc	Total Petroleum Hydrocarbons (TPH)

A further 5no. samples were analysed for the above listed metals and PAH compounds.

Asbestos screening was undertaken by the analytical laboratory on 9no. samples of soil.

Analysis for the presence of a range of Volatile Organic Compounds (VOC) was undertaken on 5no. soil samples.

6.1.1. Reference Criteria

Screening values have been adopted for the site to reflect site-specific parameters, such as, intended end use and the Soil Organic Matter (SOM). Screening values have been developed on the basis of current guidance as given in The Land Quality Management / Chartered Institute of Environmental Health document, 'The LQM / CIEH S4ULS for human health assessment', (2015) publication no. S4UL3379.

It is understood that the site is to be developed for residential purposes. Therefore, screening values specific to residential with home-grown plant uptake have been adopted for the site.

A SOM of 1% has been adopted for organic chemicals for the purposes of the initial assessment on the basis of laboratory analysis. A SOM of 6% has been adopted for inorganic chemicals as detailed in 'The LQM / CIEH S4ULS for human health assessment', (2015).

In the absence of published S4UL for lead, the DEFRA Category 4 Screening Level (C4SL) for lead has been adopted.

Full details of the reference criteria used to derive the screening values, including the adopted values, are provided in Appendix C and summarised below.

The adopted screening values are also summarised in the following section.

6.1.2. Discussion of Analytical Results – Soils

Results of the chemical analyses undertaken on soils are presented in Appendix C and summarised in Table 2.

Table 2: Results of Chemical Analyses - Soils

Contaminant	No of Samples Tested	Screening Value (mg/kg)	Range of Concentrations (mg/kg)	No of samples exceeding screening value
Arsenic	15	37	2 - 73	**1**
Cadmium	15	11	<0.5 - 7.3	0
Chromium	15	910	10 - 51	0
Copper	15	2,400	6 - 125	0
Nickel	15	180	10 - 124	0
Lead	15	200	12 - 1,730	**4**
Selenium	15	250	<1 - 2	0
Mercury	15	40	<0.17 - 1.83	0
Zinc	15	3,700	16 - 702	0
Benzo(a)pyrene	15	2.2	<0.04 - 0.79	0
Dibenz(a,h)anthracene	15	0.24	<0.04 - 0.09	0
Naphthalene	15	2.3	<0.03 - 0.05	0
Total Phenols	10	280	<0.2	0
TPH Aromatic C_5-C_7	10	70	<0.01	0
TPH Aromatic C_7-C_8	10	130	<0.01	0
TPH Aromatic C_8-C_{10}	10	34	<1	0
TPH Aromatic C_{10}-C_{12}	10	74	<1 - 1	0
TPH Aromatic C_{12}-C_{16}	10	140	<1 - 6	0
TPH Aromatic C_{16}-C_{21}	10	260	<1 - 28	0

Contaminant	No of Samples Tested	Screening Value (mg/kg)	Range of Concentrations (mg/kg)	No of samples exceeding screening value
TPH Aromatic C_{21}-C_{35}	10	1,100	<1 - 100	0
TPH Aliphatic C_5-C_6	10	42	<0.01	0
TPH Aliphatic C_6-C_8	10	100	<0.01	0
TPH Aliphatic C_8-C_{10}	10	27	<1	0
TPH Aliphatic C_{10}-C_{12}	10	130	<1	0
TPH Aliphatic C_{12}-C_{16}	10	1,100	<1	0
TPH Aliphatic C_{16}-C_{35}	10	65,000	<1 - 35	0
Benzene	10	0.087	<0.01	0
Toluene	10	130	<0.01	0
Ethylbenzene	10	47	<0.01	0
M & P xylene	10	56	<0.01	0
O xylene	10	60	<0.01	0
Vinyl Chloride	5	0.00064	<0.001	0
1,2 – Dichloroethane	5	0.0071	<0.001	0
Trichloroethene	5	0.016	<0.001	0
1,1,1 – Trichloroethane	5	8.8	<0.001	0
Tetrachloroethene	5	0.18	<0.001	0
Chlorobenzene	5	0.46	<0.001	0
Hexachlorobutadiene	5	0.29	<0.001	0

Asbestos was not detected in the 9no. samples which underwent asbestos screening.

From the above it is evident that 2no. contaminants recorded concentrations in excess of their tier one screening values for the protection of human health. These are summarised in Table 3.

Table 3: Summary of Encountered Soil Contamination

Contaminant	Exploratory Hole (s)	Depth (m bgl)	Stratum	Screening Value (mg/kg)	Concentration (mg/kg)
Arsenic	WS04	1.00	Made Ground	37	73
Lead	WS02	0.40	Made Ground	200	341
	WS03	0.40	Made Ground	200	592
	WS04	0.25	Made Ground	200	1730
	WS04	1.00	Made Ground	200	1640

6.2. Risk Assessment

As detailed in the preceding sections, elevated concentrations of 2no. contaminants were encountered within the Made Ground in WS02, WS03 and WS04, located within the footprint of the on-site structure.

6.2.1. Soil Contamination and End Users

Considering initially end users of the site, exposure to contaminants would be primarily through direct contact, ingestion or inhalation of contaminated soils where soil is exposed such as in gardens or other soft landscaping areas.

There is considered to be a significantly reduced risk beneath buildings or in paved areas as in such areas there is no pathway by which the pollutant linkage may be completed.

On the basis of the results to date, remediation is likely to be required for soft landscaping areas in the vicinity of the recorded contaminant impacts. Elevated contaminant concentrations were recorded in WS02-WS04, which correspond to proposed Plots 1, 2 and 4, as seen in Figure 3 in Appendix A. Site wide remediation is not considered to be necessary.

Remediation of Plots 1, 2 and 4 may be achieved by the capping of contaminated soils with a layer of certified imported soils, which are chemically and physically suitable for their end use. This may be achieved by excavation, raising levels of a combination of both.

At the concentrations recorded to date, a clean cover system of 600mm in thickness would be required in accordance with guidance given in BRE 465 'Cover Systems for Land Regeneration', 2004 and subject to the approval of the Local Authority.

A detailed remediation method statement (RMS) should be produced, indicating where remediation is required, and how the remediation is to be achieved. The RMS should also include information on how implemented remedial measures are to be validated.

6.2.2. Soil Contamination and Controlled Waters

The concentrations of Arsenic and Lead recorded in the Made Ground beneath the site may be considered to pose a theoretical risk to the underlying controlled waters associated with the Lowestoft Formation, a Secondary (Undifferentiated) Aquifer.

Localised groundwater has been recorded within the Lowestoft Formation beneath the site, however, given the predominantly cohesive nature of this stratum, it is believed to be localised, discrete perched pockets rather than a continuous water body in hydraulic continuity with the wider groundwater environment. On this basis the sensitivity of the underlying controlled waters is considered to be low.

In addition to the above, the recorded contaminant impacts are discrete in nature, and the low permeability cohesive nature of the prevailing soils will restrict the leaching and migration of contamination. Furthermore, both Arsenic and Lead generally have low solubility at normal geochemical soil conditions, therefore further restricting the potential for leaching or migration.

On the basis of the above, it is considered that the risk posed by soil contamination to controlled waters is low and further investigation or remediation in respect to this risk is not considered to be required.

6.2.3. Soil Contamination and Construction Workers, Maintenance Workers and the Public

Risks to site workers and site neighbours during redevelopment arise primarily through dermal contact, ingestion and inhalation of contaminants. It is considered that the degree of contamination observed poses a low risk to site workers and the general public.

In order to reduce the risk to site workers during redevelopment, appropriate safety measures should be adopted on site.

Workers should avoid contact with the soils by the use of protective boots, overalls and gloves, and should wash before eating, drinking and using the toilet.

To prevent the inhalation of contaminants by site workers and the wind-blown transfer of contaminants off site, the generation of dust should be avoided; this can be achieved by spraying the materials with water if necessary. Measures should be taken to ensure that contaminated materials are not accidentally transferred off site, for example on vehicle tyres.

In the absence of gas monitoring data, excavations should be checked for elevated gas concentrations and depleted oxygen levels prior to entry by site workers.

Reference should be made to CIRIA Report No.132 'A Guide for Safe Working on Contaminated Sites' (1996), and Health and Safety Guidance Document,

Protection of Workers and the General Public during the Development of Contaminated Land' (1991).

6.2.4. Soil Contamination and Flora

Concentrations of the phytotoxic contaminants, zinc, copper and nickel have been compared to the threshold values presented in Table 1 of British Standard BS3882: 'Specification for Topsoil and Requirements for Use' (2007), in order that this risk to flora may be assessed. It should be appreciated that this specification is only applicable to topsoil materials which are being placed. Topsoil which is to remain in-situ is not required to comply with the specifications of BS3882.

The screening values for phytotoxic contaminants are pH dependent and the following values have been adopted on the basis of a pH greater than 7.

- Threshold Value for Zinc – 300 mg/kg
- Threshold Value for Copper – 200 mg/kg
- Threshold Value for Nickel – 110 mg/kg

A single sample of soil recovered from the Made Ground in WS04 at 1.0m bgl presented elevated concentrations of Zinc and Nickel when compared to the above screening values and thus this material is not considered appropriate for re-use as topsoil.

6.2.5. Soil Contamination and Structures and Services

On the basis of the results of chemical analyses on soils undertaken to date, the concentrations of contaminants are not considered to pose a risk to structures and services within the proposed development scheme.

6.2.6. Conceptual Model

On the basis of the findings detailed in Section 6.1 together with the above discussion, we have produced a conceptual model which is presented as Table 4.

Table 4: Conceptual Model

Contaminant	Source(s)	Pathway(s)	Receptor(s)	Comment
Arsenic, Lead	Made Ground	Ingestion, Inhalation, Direct Contact	Residential End Users	Remediation of soft landscaping will be required in parts of the site. Refer to Section 6.2.1.
			Site Workers, General Public	Reference should be made to Section 6.2.3.
Ground Gases	Made Ground	Inhalation, Accumulation, Explosion	Residential End Users, General Public	A gas monitoring programme should be undertaken to assess this risk.
			Site Workers	Refer to Section 6.2.3.

6.2.7. Summary

On the basis of the above it is considered that the site may be developed for its intended residential end use, subject to the following:

- Remediation of soft landscaping in areas of the site impacted by contamination, thereby bringing the site to a condition suitable for its end use;
- Completion of a gas monitoring programme and associated risk assessment, including the adoption of gas mitigation measures as required.

6.3. Waste

Reference should be made to the EU Waste Framework Directive, Revised Directive 2008/98/EC and 'The definition of Waste: Development Industry Code of Practice (CoP) Version 2' published by CL:AIRE (2011) to establish whether soils generated from on-site works are classified as waste.

Waste will likely be generated from excavation works. There may be limited opportunities for re-use of materials on site, subject to compliance with the CoP. There is, however, likely to be some waste to be disposed of off-site.

The groundworks contractor should classify the waste in accordance with the document entitled, 'Guidance on the classification and assessment of waste (1st Edition 2015), Technical Guidance WM3', to determine whether the soils to be disposed of off-site are considered to be hazardous or not.

Waste removed from the site, for disposal, must be classified according to the analytical methods and criteria recommended by the Landfill (England and Wales) (Amendment) Regulations 2004 and 2005. The regulations set new acceptance criteria for wastes to be disposed of at landfill sites with effect from 16th July 2005.

Results of solid soil analysis are included in Appendix C and should be forwarded to the received/haulier to assist in the off-site disposal of waste soils.

Full and detailed records should be kept of all waste soils removed from site for future reference purposes.

6.4. General

As with any sampling exercise, the sampling process is representative and it is possible that areas of contamination may be found during the redevelopment of the site. Excavations on site should be supervised and any areas of suspected contamination should be assessed by a competent professional and subject to further analysis is necessary.

It should be noted that all remediation proposals are subject to the approval of the Local Authority. It would be prudent to involve the regulatory bodies early in the development of the proposed scheme and before construction commences in order that all requirements are met.

7. Geotechnical Assessment

We understand that the proposed development will include predominantly low-rise buildings with associated roads and parking areas. Exact details of building loads were not available at the time of writing this report, however, we anticipated that loadings for typical one to two storey residential dwellings will be applicable.

The recommendations provided within this section are based upon the above information and our understanding of the proposed scheme as detailed in Section 4, together with the proposed development plans included in Appendix A.

7.1. Structural Foundations

7.1.1. Shallow Foundations

Conventional mass concrete foundations bearing onto the Lowestoft Formation are considered appropriate for adoption across the site.

Net safe bearing pressures have been determined for the site on, based on conventional strip footings. The net safe bearing pressures is the permissible increase in vertical stress at the level of the underside of the foundation, above existing overburden pressure which may be calculated on the basis of a soil bulk density of 20kN/m^3.

Groundwater was encountered in a number of exploratory holes during formation and subsequent monitoring. For the purposes of estimating net safe bearing pressures, we have taken a conservative approach to the depth to groundwater beneath the site and assumed that the water table is at 0.50m bgl.

It should be noted that the Lowestoft Formation is a shrinkable material and therefore, where influenced by trees, hedgerows or other vegetation, foundations will need to be designed in accordance with NHBC Standards Chapter 4.2 'Building near Trees' (2016). The Lowestoft Formation should be considered to have a medium volume change potential.

Table 5 provides a summary of the calculated net safe bearing pressures at a range of depths bgl. The assumed undrained shear strength of the soil has been inferred from the 'undrained shear strength –vs- depth' plot presented in Appendix B together with the soil descriptions provided by the site engineer. Undrained shear strengths have also been derived from SPT 'N' Values using the correlations provided in Stroud and Butler's paper (1975). Elastic theory has been used to derive the stress distribution beneath the foundations.

Table 5: Net Safe Bearing Pressures

Foundation	Depth, bgl (m)	Bearing Stratum	Nett Safe Bearing Pressure (kN/m^2)
0.6m wide strip footing	1.50	Lowestoft Formation	150
	2.00		150

At the above net safe bearing pressures, total drained settlements have been calculated to be within tolerable limits.

The total drained settlements have been calculated using modulus of elasticity values, Ev'. In over consolidated cohesive soils the Ev' values are based on the relationship; Ev' = 130 x C_u, after Stroud and Butler (1975).

Settlement in cohesive soils typically comprises a small amount of immediate settlement as loads are applied and a larger proportion of consolidation settlement which will occur over a longer period of time.

All surface materials, made ground and unspecified Superficial Deposits should be penetrated and foundations extended at least 150mm into undisturbed natural soils. The formation should be inspected by a competent engineer prior to concreting. If very soft or loose pockets are encountered, these should be excavated until a firm to stiff or medium dense to dense deposit suitable for bearing is encountered.

It should be noted that the Lowestoft Formation is a shrinkable material and therefore, where influenced by trees, hedgerows or other vegetation, foundations will need to be designed in accordance with NHBC Standards Chapter 4.2 'Building near Trees' (2016). The Lowestoft Formation should be considered to have a medium-volume change potential.

An initial assessment of desiccation within the Lowestoft Formation has been undertaken on the basis of the below established relationship:

- On-set of desiccation = Water Content < 0.4 x Liquid Limit

On the basis of the above, the Lowestoft Formation materials do not appear to be desiccated.

On the basis of the proposed layout, it is envisaged that foundations will exceed a depth of 1.5m due to the influence of trees, anti-heave precautions should be adopted. Foundations should be excavated beyond the depth of any significant roots encountered in the excavations. Reference should be made to NHBC standards when considering any new areas of planting.

Shallow groundwater may be encountered and therefore, groundwater control measures may be required to control groundwater ingress.

7.2. Ground Floor Construction

Fully suspended ground floor slabs are recommended for adoption on site and should incorporate a sub floor void appropriate to medium-volume change potential soils.

7.3. Groundworks

The stability of made ground or disturbed ground must not be relied upon in unsupported excavations.

Safe working conditions must be provided at all times where operatives are required to work in excavations.

Heavy plant and stockpiles of materials should not be permitted close to the edges of open excavations.

Based on observations made during fieldwork, groundwater ingress could be encountered in excavations for structures or services and the requirement for groundwater control measures should be considered.

Further reference should be made to CIRIA Report No. 97, 'Trenching Practice' (1997).

Where operatives are required to work in excavations, the excavations should be monitored for the presence of toxic, anoxic or explosive conditions prior to being entered. Monitoring should also be undertaken throughout the duration of the works in excavations to ensure safe working conditions are maintained.

7.4. Concrete Grade

Sulphate content and pH value determinations were carried out by both the geotechnical and analytical laboratories on a total of 15no. soil samples. Total sulphur determinations were undertaken on a total of 10no. samples.

The results of the testing can be summarised as follows:

- Water soluble sulphate – <10mg/l SO_4 – 150mg/l SO_4
- pH – 7.5 – 11.47
- Total Sulphur – 0.01% - 0.3%

The above results have been compared to current guidance provided within BRE Special Digest 1, third edition 'Concrete in Aggressive Ground' (2005). Given the observed extent of made ground at the site, the methodology provided within Section C5.1.3 has been used to determine the required concrete grade.

The following representative values have been adopted for the shallow soils at the site:

- Water Soluble Sulphate – 100mg/l SO_4;
- pH Value – 7.53;
- Total Potential Sulphate – 0.57%.

In accordance with BRE SD1 (2005) and on the basis of the above results and an assumption of mobile groundwater, the following classifications are recommended for shallow buried concrete at the site.

- Design Sulphate Class – DS-2;
- Aggressive Chemical Environment for Concrete (ACEC) – AC-2.

7.4.1. Pavement Design

The investigation identified the likely subgrade for pavement design to comprise either Made Ground or the Superficial Deposits (unspecified).

Given the variable nature of the Made Ground, a conservative design CBR value of 1% should be adopted for preliminary design purposes in areas where made ground is present at subgrade level.

Reference has also been made to the 'Design Guidance for Road Pavement Foundations', Interim Advice Note 73106, Revision 1 (2009), when considering the CBR value appropriate for use where the Superficial Deposits (unspecified) materials exists at subgrade level.

Interim advice note 73106, Revision 1 (2009) provides recommendations for design CBR values on the basis of soil plasticity. The recorded plasticity index of the Superficial Deposits (unspecified) ranged from 22% to 25%. This corresponds to a CBR value of 4%, for thin road pavements. Thin pavement construction is defined as a depth to subgrade of 300mm. Consideration should be given to the soft, compressible nature of the Superficial Deposits together with the recorded organic matter content of these soils.

On the basis of the above summarised data, the following CBR values are recommended for preliminary design of road pavements:

- Made Ground – 1%

- Superficial Deposits (unspecified)– 1%

In-situ CBR tests should be carried out prior to road pavement construction to confirm the CBR values. In-situ tests should be undertaken once final levels for road construction have been determined.

Once formation level for the new road pavements has been achieved, proof rolling should be carried out using a heavy roller and any soft areas that are revealed should be excavated and a greater depth of subbase provided.

Exposed subgrades are likely to deteriorate rapidly on exposure to wet weather and should be shaped to shed water. Subbase should be placed as soon as possible to minimise the exposure of subgrade to adverse weather conditions.

Subgrade stabilisation, possibly using a geogrid product or similar may be advantageous and should be considered at the design stage. It is recommended that specialist geotextile suppliers are consulted regarding possible mitigation measures.

8. Further Works

The following sections provide a summary of the further works which are recommended. It should be appreciated that the works detailed below are not a comprehensive list and additional works may be required depending on the findings of future investigation.

8.1. Geo-Environmental

The following further works are considered likely to be required from a geo-environmental perspective:

- Completion of the on-going gas monitoring programme to assess the gassing regime beneath the site and determine the requirement for gas mitigation measures;
- Preparation of a Remediation Method Statement (RMS) detailing the required remedial measures and how they are to be implemented;
- Validation works and preparation of a verification report.

It is possible that a contaminated land condition will be placed on the site during planning and this will also need to be considered with respect to further works. Liaison with the regulatory authorities is likely to be necessary in order to discharge contaminated land conditions.

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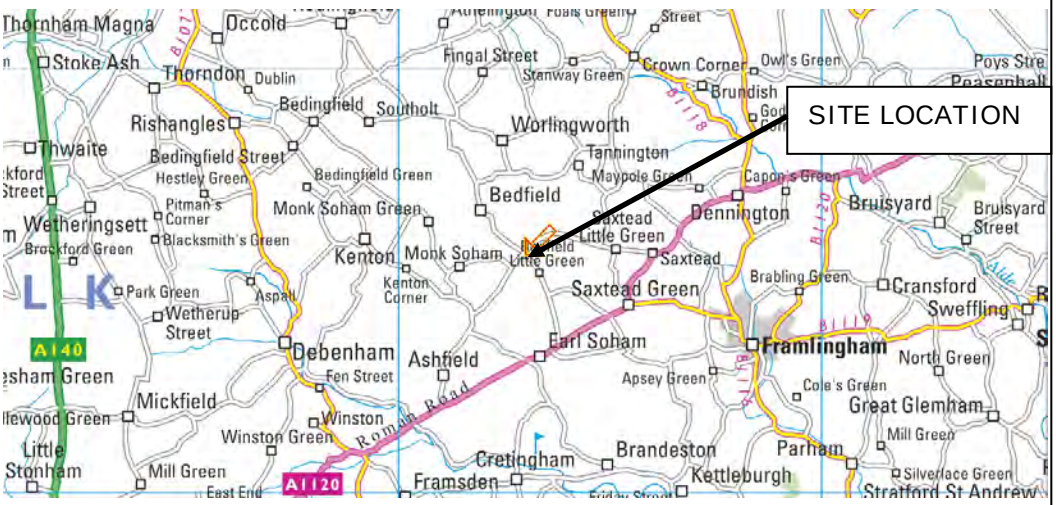
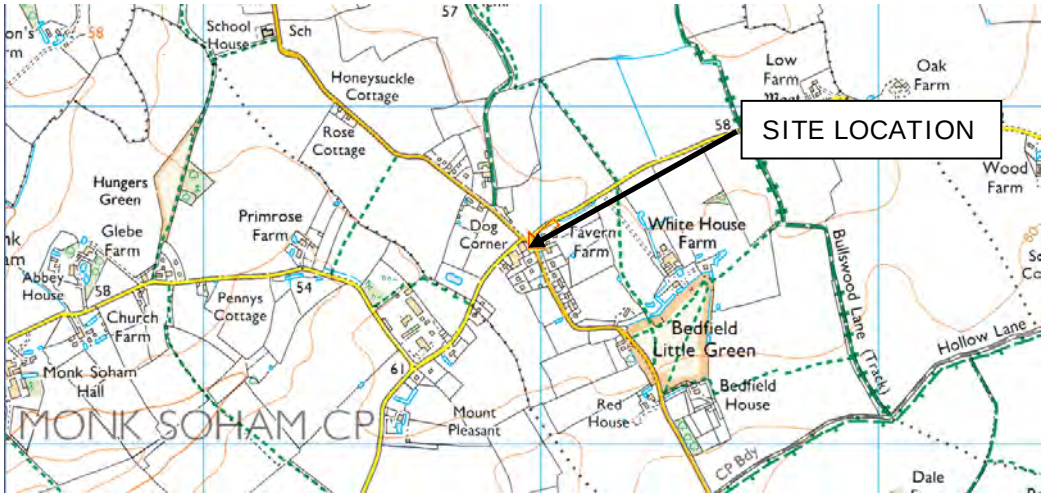
Appendix A

Figures & Drawings





RichardJackson Engineering Consultants
consulting civil & structural engineers
847 The Crescent, Colchester, CO4 9YQ
Tel: 01206 228 800

Home Farm, Bedfield, IP13 7EE

FIGURE 1

SITE LOCATION PLAN

SCALE: N.T.S.

JOB NO: 61647

DO NOT SCALE

KEY

INFILTRATION TEST LOCATIONS (TP01-TP02)

WINDOWLESS SAMPLER LOCATIONS (WS01-WS10)

REV	DATE	DESCRIPTION	DRAWN	CHKD

REVISIONS

This drawing is to be read in conjunction with all other Engineer's drawings and all other project information. Any discrepancy between the Engineer's drawings and other project information is to be reported to the Engineer immediately.

Project

HOME FARM, BEDFIELD
SUFFOLK, IP13 7EE

Title

EXPLORATION HOLE LOCATION PLAN

Client

CHAPTER BUILD GROUP LTD

Scale	Drawn	Date
1:250 @ A3	MB	04/04/22
Job Manager	Checked	Approved
KO	GB	GB

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847 The Crescent, Colchester, Essex CO4 9YQ Tel: 01206 228800
Unit 06C130, 6th Floor, 1 St. Katherine's Way, London, E1W 1UN Tel: 020 7448 9910
5 Quern House, Mill Court, Great Shelford, Cambs CB22 5LD Tel: 01223 314794
4 The Old Church, St. Matthews Road, Norwich, Norfolk NR1 1SP Tel: 01603 230240
The Wheelhouse, Bonds Mill, Stonehouse, Gloucestershire GL10 3RF Tel: 01172 020070
Email Address: mail@rj.uk.com Website: http://www.rj.uk.com

Drawing No. 61647-G-FIG02

Revision

Drawing Status

☒ INFORMATION ☐ APPROVAL ☐ COSTING
☐ TENDER ☐ CONSTRUCTION ☐ AS CONSTRUCTED

A3

DO NOT SCALE

KEY

WINDOWLESS SAMPLER LOCATION (WS01 - WS10)

TRIAL PIT LOCATION (TP01 - TP02)

REV.	DATE	DESCRIPTION	DRAWN	CHKD

REVISIONS

This drawing is to be read in conjunction with all other Engineer's drawings and all other project information. Any discrepancy between the Engineer's drawings and other project information is to be reported to the Engineer immediately.

Project
HOME, FARM, BEDFIELD
SUFFOLK, IP13 7EE

Title
EXPLORATORY HOLE LOCATION PLAN

Client
CHAPTER BUILD GROUP LTD

Scale	Drawn	Date
1:250 @ A1	MB	13/05/22
Job Manager	Checked	Approved
KO	CW	CW

RichardJackson Engineering Consultants
847 The Crescent, Colchester, Essex CO4 9YQ Tel: 01206 228800
Unit 06C130, 6th Floor, 1 St. Katherine's Way, London, E1W 1UN Tel: 020 7448 9910
5 Queen House, Mill Court, Great Shelford, Cambs CB22 5LD Tel: 01223 314794
4 The Old Church, St. Matthews Road, Norwich, Norfolk NR1 1SP Tel: 01603 230240
The Wheelhouse, Bonds Mill, Stonehouse, Gloucestershire GL10 3RF Tel: 01172 020070
Email Address: mail@rj.uk.com Website: http://www.rj.uk.com

Drawing No. 61643-G-FIG03

Revision

Drawing Status
☒ INFORMATION ☐ APPROVAL ☐ COSTING
☐ TENDER ☐ CONSTRUCTION ☐ AS CONSTRUCTED

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Appendix B

Exploratory hole logs & Data Plots

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Trial Pit No. **TP01** Sheet 1 of 1

Project Name: Home Farm	**Project No.** 61647	**Co-ords:**	Date **28/03/2022**
		Orientation:	**Dimensions (m)**
Location: Earl Soham Road, Bedfield, IP13 7EE		**Level (m, aOD):**	1.50 × 0.30 — Scale **1:20**
Client: Chapter Build Group Ltd		**Depth (m):** 2.04	Logged **TS**

Ground water	Samples & In Situ Testing: Depth	Type	Results	Level (m)	Depth (m)	Legend	Stratum Description
					0.12		CONCRETE
					0.25		Brown sandy GRAVEL of subangular to subrounded fine to coarse flint, brick, concrete, wood, metal and concrete fragments. With an organic odour. MADE GROUND
	0.50	D1					Very soft greenish grey silty CLAY with decayed wood fragments. SUPERFICIAL DEPOSITS
	0.75	IVN	13				
					1.10		Stiff light grey mottled light brown gravelly CLAY. Gravel of subrounded fine to coarse chalk. LOWESTOFT FORMATION
	1.40	D2					
	2.00	D3					
					2.04		End of Pit at 2.040m

Groundwater: Groundwater not encountered.

Stability: Gravel-filled for soakage testing.

Remarks: Infiltration test undertaken between 0.90and 2.04m.

Key

D	Disturbed	**IVN**	Hand Vane
B	Bulk	**PID**	PID Reading
ES	Environmental	**PP**	Pocket Penetrometer
	Groundwater strike		Standing water level

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Trial Pit No. **TP02** Sheet 1 of 1

Project Name: Home Farm	**Project No.** 61647	**Co-ords:**	Date **28/03/2022**
		Orientation:	**Dimensions (m)**
Location: Earl Soham Road, Bedfield, IP13 7EE		**Level (m, aOD):**	1.50 × 0.30 — Scale **1:20**
Client: Chapter Build Group Ltd		**Depth (m):** 2.05	Logged **TS**

Ground water	Samples & In Situ Testing: Depth	Type	Results	Level (m)	Depth (m)	Legend	Stratum Description
					0.20		Grass over a dark brown CLAY. TOPSOIL
	0.50	D1					Soft brown mottled light grey silty CLAY. SUPERFICIAL DEPOSITS
	0.60	D2			0.55		
	0.70	IVN	71		0.70		Soft light grey mottled light brown sandy CLAY. SUPERFICIAL DEPOSITS
	1.00	D3					Firm to stiff light brown mottled light grey gravelly CLAY. Gravel is subrounded fine to coarse chalk and occasional flint. LOWESTOFT FORMATION
							...becoming greyish brown from 1.00m
							...becoming stiff from 1.40m
							...pocket of orangish brown clayey medium sand at 1.60m
	2.00	D4			2.05		End of Pit at 2.050m

Groundwater: Groundwater not encountered.

Stability: Gravel-filled for soakage testing.

Remarks: Infiltration test undertaken between 0.91m and 2.05m.

Key

D	Disturbed	**IVN**	Hand Vane
B	Bulk	**PID**	PID Reading
ES	Environmental	**PP**	Pocket Penetrometer
▽	Groundwater strike	▼	Standing water level

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Borehole No. **WS01**

Sheet 1 of 1

Project Name:	Home Farm	**Dates** 31/03/2022	**Project no.** 61647
Location:	Earl Soham Road, Bedfield, IP13 7EE	**Co-ordinates:**	
Client:	Chapter Build Group Ltd	**Ground Level (m):**	

Hole Type **WLS**

Scale **1:30**

Logged By **GB**

Well	Water Depth	Water Level	Casing	SWL	Samples & In-situ Tests Depth	Type	Results	Level (m)	Depth (m)	Legend	Stratum Description	Scale
									0.21		CONCRETE	
					0.30	ES1					Very soft to soft green grey slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to medium chalk and occasional flint, tile and brick.	
					0.50	IVN	35					
					0.50	D1						
	0.90				0.90	ES2			0.90		MADE GROUND	
					1.00	S	N=7				*...no tile or brick fragments from 0.40m*	1
					1.00	D2	(1,1/1,2,2,2)				Loose green mottled yellowish orange slightly clayey fine to medium SAND. Saturated.	
					1.30	IVN	122		1.30		SUPERFICIAL DEPOSITS	
					1.50	D3					Stiff dark blue grey mottled yellowish orange slightly gravelly CLAY with occasional small sandy partings, iron staining and decayed root material. Gravel is angular to subangular fine to coarse chalk and occasional flint.	
	1.70										SUPERFICIAL DEPOSITS	
	2.00				2.00	S	N=23		2.00		*...becoming soft at 1.50m*	2
					2.00	D4	(3,3/4,5,7,7)				Medium dense green mottled yellowish orange gravelly silty fine to medium SAND. Gravel is angular fine to coarse flint.	
					2.30	D5			2.50		SUPERFICIAL DEPOSITS	
					2.75	IVN	117				*...hole collapsing from 2.00m*	
									3.00		Stiff blue grey mottled yellowish orange slightly gravelly CLAY with occasional small sandy pockets, and iron staining. Gravel is angular to subangular fine to coarse chalk and flint.	3
											LOWESTOFT FORMATION	
											End of Borehole at 3.000m	4
												5

Groundwater: Groundwater struck at 0.90m and 2.00m.

Remarks: Standing water level at 1.70m.

Groundwater Key		Sample Type Key			Test Type Key	
▽	Groundwater Strike	**D**	Disturbed	**IVN**	Hand vane	
		B	Bulk	**S/C**	SPT / CPT	
▼	Standing water level	**U**	Undisturbed	**PP**	Pocket penetrometer	
		ES	Environmental	**PID**	PID Reading	

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Borehole No. **WS02**

Sheet 1 of 1

Project Name: Home Farm	**Dates** 31/03/2022	**Project no.** 61647	Hole Type **WLS**
Location: Earl Soham Road, Bedfield, IP13 7EE	**Co-ordinates:**		Scale **1:30**
Client: Chapter Build Group Ltd	**Ground Level (m):**		Logged By **GB**

Well	Water Depth	Water Level	Casing	SWL	Sample Depth	Sample Type	Sample Results	Level (m)	Depth (m)	Legend	Stratum Description	Scale
									0.20		CONCRETE	
					0.40	ES1			0.40		Orange gravelly medium to coarse SAND. Gravel is subangular to subrounded fine to coarse flint.	
									0.50		MADE GROUND	
					0.70	IVN	29		0.65		Soft dark blue grey gravelly CLAY. Gravel is subangular to subrounded fine to coarse chalk with occasional brick.	
			1.00		1.00	S	N=4				MADE GROUND	1
					1.00	D1	(1,1/1,1,1,1)				Soft dark brown/ black slightly gravelly sandy CLAY with frequent roots, rootlets, and peat. Gravel is subangular to subrounded fine to medium flint.	
					1.40	IVN	27				SUPERFICIAL DEPOSITS	
					1.50	D2			1.80		Very soft to soft green grey mottled brown silty organic CLAY with occasional gravel of subangular to subrounded fine to medium flint and chalk. Occasional recently active roots and shell debris.	
			1.00		2.00	S	N=19				SUPERFICIAL DEPOSITS	2
					2.00	IVN	(3,2/3,5,5,6)				Stiff grey slightly gravelly slightly silty CLAY with occasional sandy pockets, iron staining and decayed roots. Gravel is subangular to subrounded fine to medium chalk and occasional flint and ironstone.	
					2.00	D3	103				LOWESTOFT FORMATION	
					2.50	IVN	100				*...becoming light grey from 2.70m*	
			1.00		3.00	S	N=21					3
					3.00	IVN	(4,3/4,5,6,6)					
					3.20	D4	115					
					3.50	IVN	121		4.00		End of Borehole at 4.000m	4
												5

Groundwater: No groundwater encountered.

Remarks:

Groundwater Key		Sample Type Key			Test Type Key	
▽	Groundwater Strike	**D**	Disturbed		**IVN**	Hand vane
		B	Bulk		**S/C**	SPT / CPT
▼	Standing water level	**U**	Undisturbed		**PP**	Pocket penetrometer
		ES	Environmental		**PID**	PID Reading

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Borehole No. **WS03**

Sheet 1 of 1

Project Name:	Home Farm	**Dates** 31/03/2022	**Project no.** 61647
Location:	Earl Soham Road, Bedfield, IP13 7EE	**Co-ordinates:**	
Client:	Chapter Build Group Ltd	**Ground Level (m):**	

Hole Type **WLS** | Scale **1:30** | Logged By **GB**

Well	Water Depth	Water Level	Casing	SWL	Sample Depth	Sample Type	Results	Level (m)	Depth (m)	Legend	Stratum Description	Scale
									0.15		CONCRETE	
									0.30		Yellow medium to coarse SAND. MADE GROUND	
					0.40	ES1					Very soft to soft dark brownish greenish black slightly gravelly slightly sandy CLAY with root material. Gravel is angular to subangular fine to medium flint and occasional brick. MADE GROUND	
					0.50	IVN	20					
					0.60	D1						
					0.90	IVN	35					
			1.00		1.00	S	N=5					1
					1.00	ES2	(1,0/1,1,2,1)					
					1.20	D2	63		1.20		*...fragment of scrap metal at 0.90m*	
					1.30	IVN					Firm dark blue grey occasionally mottled greyish brown slightly gravelly CLAY with occasional silty sandy partings, iron staining and decayed root material. Gravel is subangular to subrounded fine to medium chalk and occasional ironstone and flint. LOWESTOFT FORMATION	
					1.50	ES3						
					1.80	IVN	88					
					1.80	D3						
			1.00		2.00	S	N=10 (1,1/2,2,2,4)					2
					2.50	D4					*..becoming stiff mottled orange brown with rare frequent sandy silty partings between 1.70m and 2.20m*	
											...locally soft between 2.00m and 2.20m	
					2.90	D5					*...becoming orange brown with frequent silty sandy partings from 2.80m*	
	3.00		1.00		3.00	S	N=17 (24,2/3,4,5,5)					3
					3.60	IVN	64					
					3.60	D6						
	3.85				3.90	IVN	92					
			1.00		4.00	S	N=24 (4,3/4,5,7,8)					4
									4.80		End of Borehole at 4.800m	
												5

Groundwater: Groundwater struck at 3.00m.

Remarks: Standing water level at 3.85m.

Groundwater Key		Sample Type Key			Test Type Key	
▽	Groundwater Strike	**D**	Disturbed		**IVN**	Hand vane
		B	Bulk		**S/C**	SPT / CPT
▼	Standing water level	**U**	Undisturbed		**PP**	Pocket penetrometer
		ES	Environmental		**PID**	PID Reading

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847 The Crescent, Colchester, Essex, CO4 9YQ

Borehole No. **WS04**

Sheet 1 of 1

Project Name:	Home Farm	**Dates** 30/03/2022	**Project no.** 61647
Location:	Earl Soham Road, Bedfield, IP13 7EE	**Co-ordinates:**	
Client:	Chapter Build Group Ltd	**Ground Level (m):**	

Hole Type **WLS**

Scale **1:30**

Logged By **GB**

Well	Water Depth	Water Level	Samples & In-situ Tests: Casing	SWL	Depth	Type	Results	Level (m)	Depth (m)	Legend	Stratum Description	Scale
					0.25	ES1			0.15		CONCRETE	
	0.60		1.00		1.00 1.00	S ES2	N=1 (1,1/1,0,0,0)				Very soft dark brownish black slightly gravelly sandy CLAY. Gravel is angular to subangular fine to coarse brick, flint, chalk and cement, with cobble sized brick fragments. MADE GROUND	1
	1.30								1.30		NO RECOVERY	
			1.00		2.00	S	50 (13,12/50 for 75mm)		2.00		End of Borehole at 2.000m	2
												3
												4
												5

Groundwater: Groundwater struck at 1.30m.

Remarks: Borehole terminated at 2.00m due to obstruction preventing further progress. Standing water level at 0.60m.

Groundwater Key		Sample Type Key		Test Type Key	
▽	Groundwater Strike	D	Disturbed	IVN	Hand vane
		B	Bulk	S/C	SPT / CPT
▼	Standing water level	U	Undisturbed	PP	Pocket penetrometer
		ES	Environmental	PID	PID Reading

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Borehole No. **WS05**

Sheet 1 of 1

Project Name:	Home Farm	**Dates** 31/03/2022	**Project no.** 61647
Location:	Earl Soham Road, Bedfield, IP13 7EE	**Co-ordinates:**	
Client:	Chapter Build Group Ltd	**Ground Level (m):**	

Hole Type **WLS** | Scale **1:30** | Logged By **GB**

Well	Water Depth	Water Level	Casing	SWL	Depth	Type	Results	Level (m)	Depth (m)	Legend	Stratum Description	Scale
					0.10	ES1			0.10		CONCRETE	
									0.25		Soft light brown mottled greenish grey and reddish brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to medium flint, chalk and occasional brick. MADE GROUND	
					0.60	IVN	26					
					0.60	D1						
					0.80	ES2			0.90			
			1.00		1.00	S	N=14				Soft green grey slightly gravelly slightly sandy CLAY with root material. Gravel is subangular to subrounded fine to medium chalk and occasional flint. SUPERFICIAL DEPOSITS	1
					1.00	D2	(2,1/2,4,3,5)					
					1.20	IVN	98					
					1.70	D3						
					1.80	IVN	120				Stiff blue grey mottled orange brown slightly gravelly CLAY with occasional silty sandy partings, iron staining and decayed root material. Gravel is subangular to subrounded fine to coarse chalk, and occasional flint and ironstone. LOWESTOFT FORMATION	
			1.00		2.00	S	N=23 (3,3/5,5,7,6)					2
					2.40	IVN	87					
					2.40	D4						
					2.90	IVN	123					
			1.00		3.00	S	N=31					3
					3.10	D5	(5,5/6,7,8,10)				*...frequent silty fine sand partings between 3.10m and 3.40m*	
					3.70	D6						
			1.00		4.00	S	N=33 (6,6/7,7,9,10)		4.00		End of Borehole at 4.000m	4
												5

Groundwater: Groundwater not encountered.

Remarks:

Groundwater Key		Sample Type Key			Test Type Key	
▽	Groundwater Strike	**D**	Disturbed		**IVN**	Hand vane
		B	Bulk		**S/C**	SPT / CPT
▼	Standing water level	**U**	Undisturbed		**PP**	Pocket penetrometer
		ES	Environmental		**PID**	PID Reading

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847 The Crescent, Colchester, Essex, CO4 9YQ

Borehole No. **WS06**

Sheet 1 of 1

Project Name:	Home Farm	**Dates** 30/03/2022	**Project no.** 61647
Location:	Earl Soham Road, Bedfield, IP13 7EE	**Co-ordinates:**	
Client:	Chapter Build Group Ltd	**Ground Level (m):**	

Hole Type **WLS** | Scale **1:30** | Logged By **GB**

Well	Water Depth	Water Level	Casing	SWL	Depth	Type	Results	Level (m)	Depth (m)	Legend	Stratum Description	Scale
									0.25		CONCRETE	
					0.40	ES1					Very soft light brown mottled reddish brown and grey very sandy CLAY with sandy partings and iron staining. Gravel is angular to subangular fine to medium flint and chalk. (Saturated).	
					0.60	D1			0.80		SUPERFICIAL DEPOSITS	
					0.90	IVN	50				*...becoming grey mottled yellowish orange from 0.55m*	1
			1.00		0.90	ES2	N=15				Firm blue grey mottled yellowish orange slightly gravelly CLAY with small silty sandy partings, iron staining and decayed root material. Gravel is angular to subangular fine to medium chalk and occasional flint.	
					1.00	S	(2,2/3,3,4,5)				LOWESTOFT FORMATION	
					1.40	D2					*...becoming stiff at 1.50m*	
					1.50	IVN	84					2
					1.90	IVN	127					
			1.00		1.90	D3	N=24				*...parting of light brown silty fine sand at 2.40m*	
					2.00	S	(4,3/5,6,7,6)					
					2.40	D4						
					2.50	IVN	122					
					2.90	IVN	97				*...becoming blue grey from 3.00m*	3
			1.00		2.90	D5	N=34					
					3.00	S	(4,4/5,6,12,11)					
					3.50	IVN	106				*...becoming light grey and silty between 3.50m and 3.60m*	
					3.50	D6						
					3.90	IVN	97					4
			1.00		4.00	S	N=37					
					4.00	D7	(6,5/7,9,10,11)		4.15		End of Borehole at 4.150m	
												5

Groundwater: Saturated 0.25m - 0.80m.

Remarks:

Groundwater Key		Sample Type Key		Test Type Key	
▽	Groundwater Strike	**D**	Disturbed	**IVN**	Hand vane
		B	Bulk	**S/C**	SPT / CPT
▼	Standing water level	**U**	Undisturbed	**PP**	Pocket penetrometer
		ES	Environmental	**PID**	PID Reading

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847 The Crescent, Colchester, Essex, CO4 9YQ

Borehole No. **WS07**

Sheet 1 of 1

Project Name:	Home Farm	**Dates** 31/03/2022	**Project no.** 61647
Location:	Earl Soham Road, Bedfield, IP13 7EE	**Co-ordinates:**	
Client:	Chapter Build Group Ltd	**Ground Level (m):**	

Hole Type **WLS** | Scale **1:30** | Logged By **GB**

Well	Water Depth	Water Level	Casing	SWL	Sample Depth	Sample Type	Results	Level (m)	Depth (m)	Legend	Stratum Description	Scale
									0.14		CONCRETE	
									0.35		Orange slightly clayey medium SAND. (subbase).	
					0.50	IVN	38		0.45		MADE GROUND	
					0.50	ES1			0.55		Grey slightly clayey very gravelly medium to coarse SAND. Gravel is subangular to subrounded fine to medium flint and concrete.	
					0.60	D1					MADE GROUND	
					0.90	ES2						
			1.00		1.00	S	N=14					1
					1.00	IVN	(2,1/2,3,4,5)					
					1.00	D2	93				Soft grey slightly gravelly slightly sandy CLAY. Gravel is angular to subangular fine to coarse flint and chalk.	
					1.50	IVN	106				SUPERFICIAL DEPOSITS	
					1.60	D3						
					1.90	IVN	74				Firm to stiff grey mottled orange slightly gravelly CLAY with occasional small silty sandy partings, iron staining and decayed roots. Gravel is subangular to subrounded fine to coarse chalk and flint.	
			1.00		2.00	S	N=24					2
					2.00	IVN	(3,2/5,5,6,8)					
					2.20	D4	98				LOWESTOFT FORMATION	
	2.45										*...becoming stiff at 1.50m*	
											...saturated sandy pockets at 1.90m	
											...becoming dark brown grey from 2.90m	
			1.00		3.00	S	N=21					3
					3.00	IVN	(3,3/4,5,6,6)					
					3.00	D5	62					
	3.65				3.60	D6						
			1.00		4.00	S	N=24 (5,4/5,6,6,7)		4.00		End of Borehole at 4.000m	4
												5

Groundwater: Groundwater struck at 2.45m

Remarks: Standing water level at 3.65m.

Groundwater Key		Sample Type Key			Test Type Key	
▽	Groundwater Strike	**D**	Disturbed		**IVN**	Hand vane
		B	Bulk		**S/C**	SPT / CPT
▼	Standing water level	**U**	Undisturbed		**PP**	Pocket penetrometer
		ES	Environmental		**PID**	PID Reading

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847 The Crescent, Colchester, Essex, CO4 9YQ

Borehole No. **WS08**

Sheet 1 of 1

Project Name:	Home Farm	**Dates** 30/03/2022	**Project no.** 61647
Location:	Earl Soham Road, Bedfield, IP13 7EE	**Co-ordinates:**	
Client:	Chapter Build Group Ltd	**Ground Level (m):**	

Hole Type **WLS** | Scale **1:30** | Logged By **GB**

Well	Water Depth	Water Level	Casing	SWL	Samples & In-situ Tests Depth	Type	Results	Level (m)	Depth (m)	Legend	Stratum Description	Scale
									0.03		Orange medium SAND.	
									0.15		MADE GROUND	
											CONCRETE	
					0.60	IVN	25				Soft dark brown mottled green brown and reddish brown slightly gravelly slightly sandy CLAY with decayed root material. Gravel is angular to subangular fine to medium flint.	
					0.60	ES1						
					0.70	D1			0.80			
					1.00	S	N=11 (1,1/1,3,3,4)				MADE GROUND	1
					1.20	IVN	29				*...becoming sandy with no reddish-brown mottling from 0.45m*	
	1.35				1.20	ES2					Soft orange mottled grey slightly gravelly sandy CLAY with frequent sandy partings and decayed root material. Sand is fine to medium. Gravel is angular to subrounded fine to medium chalk, flint and metal.	
					1.30	D2						
									1.70		MADE GROUND	
					1.80	IVN	103				*...saturated between 1.60m and 1.70m*	
					1.80	D3						
					2.00	S	N=16 (2,2/3,3,4,6)		2.00			2
					2.00	ES3					Stiff dark blue grey slightly gravelly CLAY with occasional small sandy pockets and iron staining. Gravel is subangular to subrounded fine to coarse chalk and occasional flint.	
					2.20	D5					LOWESTOFT FORMATION	
	2.45				2.50	IVN	88		2.55			
					2.80	D4					Firm to stiff dark blue grey slightly gravelly CLAY with occasional small sandy pockets and iron staining. Gravel is subangular to subrounded fine to coarse chalk and occasional flint.	
					3.00	S	N=25 (3,3/5,6,6,8)		3.00		LOWESTOFT FORMATION	3
											...saturated between 2.35m and 2.55m	
											Medium-dense orange red SAND. LOWESTOFT FORMATION	4
											End of Borehole at 3.000m	5

Groundwater: Groundwater struck at 1.35m.

Remarks: Standing water level at 2.45m.

Groundwater Key		Sample Type Key			Test Type Key		
▽	Groundwater Strike	**D**	Disturbed		**IVN**	Hand vane	
		B	Bulk		**S/C**	SPT / CPT	
▼	Standing water level	**U**	Undisturbed		**PP**	Pocket penetrometer	
		ES	Environmental		**PID**	PID Reading	

RichardJackson Engineering Consultants

847 The Crescent, Colchester, Essex, CO4 9YQ

Borehole No. **WS09**

Sheet 1 of 1

Project Name:	Home Farm	**Dates** 30/03/2022	**Project no.** 61647
Location:	Earl Soham Road, Bedfield, IP13 7EE	**Co-ordinates:**	
Client:	Chapter Build Group Ltd	**Ground Level (m):**	

Hole Type **WLS** | Scale **1:30** | Logged By **GB**

Well	Water Depth	Water Level	Casing	SWL	Depth	Type	Results	Level (m)	Depth (m)	Legend	Stratum Description	Scale
					0.30	ES1			0.40		Dark brown slightly gravelly sandy CLAY with roots and rootlets. Gravel is angular to subangular fine to medium flint and occasional chalk. TOPSOIL	
					0.50	IVN	67				*...becoming light brown mottled orange from 0.20m*	
					0.50	D1						
					0.80	ES2						
					0.90	IVN	73				Firm grey and orange mottled slightly gravelly CLAY with occasional small silty sandy pockets, iron staining and decayed root material. Gravel is angular to subrounded fine to coarse chalk, flint and ironstone with occasional chalk cobbles. LOWESTOFT FORMATION	1
					1.00	S	N=20					
					1.00	D2	(3,2/4,5,5,6)					
					1.50	IVN	124					
					1.90	IVN	101				*...becoming stiff at 1.00m*	
					2.00	S	N=24					2
					2.00	D3	(4,3/4,6,7,7)					
					2.50	IVN	98					
									2.70		Stiff dark brown slightly gravelly CLAY with occasional silty sandy partings and decayed root material. Gravel is subangular to subrounded fine to coarse chalk and occasional flint with occasional chalk cobbles. LOWESTOFT FORMATION	3
					2.90	IVN	85					
					3.00	S	N=29					
					3.00	D4	(5,4/5,6,8,10)					
					3.50	IVN	54				*...light brown mottled grey fine sand parting between 3.30m and 3.50m*	
					3.50	D5						
					4.00	S	N=26					4
					4.10	D6	(4,4/5,6,7,8)				*...becoming dark blue grey at 4.10m*	
									4.30		NO RECOVERY	
					5.00	S	N=30 (5,4/5,8,8,9)		5.00		End of Borehole at 5.000m	5

Groundwater: No groundwater encountered.

Remarks:

Groundwater Key		Sample Type Key		Test Type Key	
▽	Groundwater Strike	**D**	Disturbed	**IVN**	Hand vane
		B	Bulk	**S/C**	SPT / CPT
▼	Standing water level	**U**	Undisturbed	**PP**	Pocket penetrometer
		ES	Environmental	**PID**	PID Reading

RichardJackson Engineering Consultants	847 The Crescent, Colchester, Essex, CO4 9YQ	Borehole No. **WS10** Sheet 1 of 1

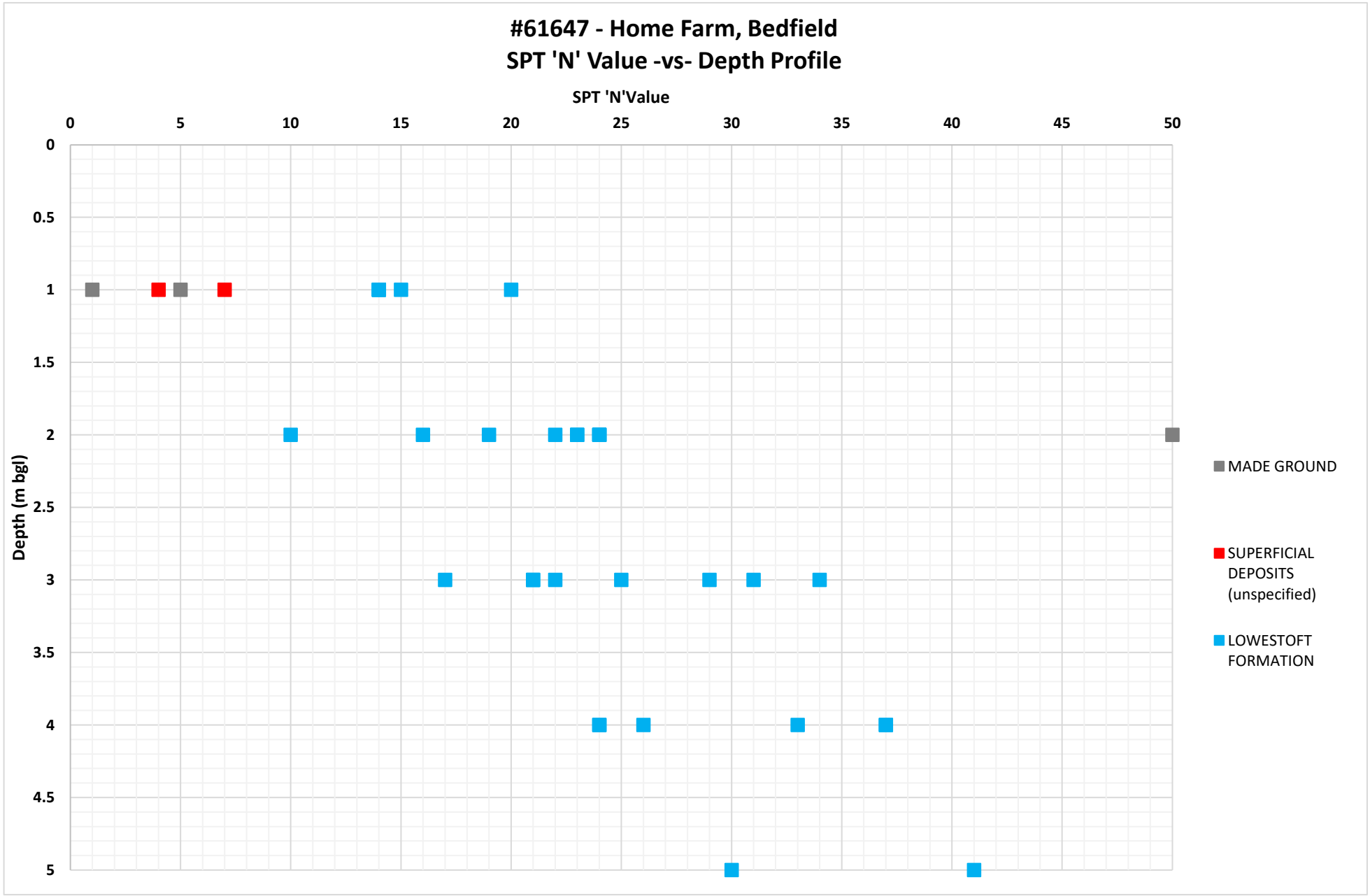
Project Name: Home Farm	**Dates** 30/03/2022	**Project no.** 61647	Hole Type **WLS**
Location: Earl Soham Road, Bedfield, IP13 7EE	**Co-ordinates:**		Scale **1:30**
Client: Chapter Build Group Ltd	**Ground Level (m):**		Logged By **GB**

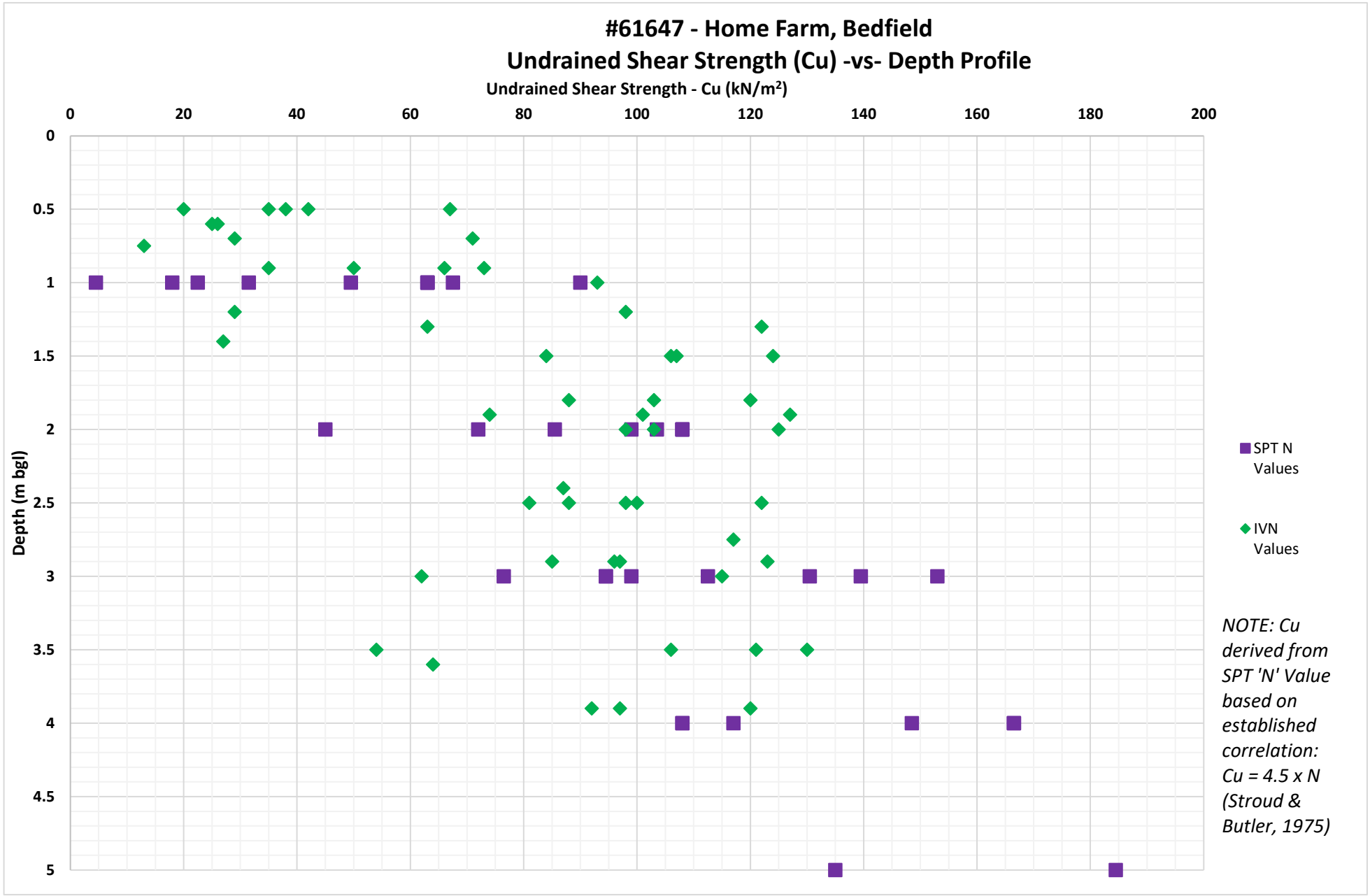
Well	Water Depth	Water Level	Samples & In-situ Tests: Casing	SWL	Depth	Type	Results	Level (m)	Depth (m)	Legend	Stratum Description	Scale
					0.10	ES1			0.20		Grass over a dark brown slightly gravelly very sandy CLAY with rootlets. Gravel is angular to subangular fine to medium flint and occasional chalk and brick. MADE GROUND	
					0.50	IVN	42					
					0.50	D1			0.70			
					0.60	ES2					Soft to firm light brown mottled greyish orange slightly gravelly sandy CLAY. Gravel is angular to subangular fine to medium flint and chalk. LOWESTOFT FORMATION	
					0.90	IVN	66					
			1.00		1.00	S	N=14					1
					1.00	D2	(2,1/2,3,4,5)					
					1.50	IVN	107				Firm dark grey slightly gravelly CLAY with occasional small silty sandy partings, iron staining and occasional recently active and decayed roots. Gravel is angular to subangular fine to medium chalk and flint and occasional ironstone. LOWESTOFT FORMATION	
			1.00		2.00	S	N=22					2
					2.00	IVN	(3,2/4,5,6,7) 125					
											...becoming stiff at 1.50m	
					2.50	IVN	81					
											...becoming dark blue grey from 2.70m	
					2.90	IVN	96					
			1.00		3.00	S	N=22				*...no roots from 3.00m*	3
					3.00	D3	(4,3/4,6,6,6)					
					3.50	IVN	130+					
					3.70	D4						
					3.90	IVN	120					
			1.00		4.00	S	N=37					4
					4.00	D5	(5,5/7,8,10,12)					
					4.50	D6						
			1.00		5.00	S	N=41 (6,6/8,9,11,13)		5.00		End of Borehole at 5.000m	5

Groundwater: Groundwater not encountered.

Remarks:

Groundwater Key		Sample Type Key		Test Type Key	
▽	Groundwater Strike	**D**	Disturbed	**IVN**	Hand vane
		B	Bulk	**S/C**	SPT / CPT
▼	Standing water level	**U**	Undisturbed	**PP**	Pocket penetrometer
		ES	Environmental	**PID**	PID Reading


#61647 - Home Farm, Bedfield
SPT 'N' Value -vs- Depth Profile
SPT 'N'Value
0
5
10
15
20
25
30
35
40
45
50
Depth (m bgl)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
MADE GROUND
SUPERFICIAL DEPOSITS (unspecified)
LOWESTOFT FORMATION


#61647 - Home Farm, Bedfield
Undrained Shear Strength (Cu) -vs- Depth Profile
Undrained Shear Strength - Cu (kN/m²)
0
20
40
60
80
100
120
140
160
180
200
Depth (m bgl)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
SPT N Values
IVN Values
NOTE: Cu derived from SPT 'N' Value based on established correlation: Cu = 4.5 x N (Stroud & Butler, 1975)

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Appendix C

Results of Chemical Analyses

61647 – Home Farm, Bedfield, Suffolk, IP13 7EE

Geo-environmental Assessment
Reference Criteria

Soils

In 2014 Land Quality Management Ltd (LQM) and the Chartered Institute of Environmental Health (CIEH) published 'Suitable 4 Use Levels' (S4ULs) for human health risk assessment. The S4ULs have been derived in accordance with UK legislation, national and Environment Agency policy using a modified version of the Contaminated Land Exposure Assessment (CLEA) software. The S4ULs are based on minimal or tolerable risk as described in SR2 (Environment Agency, 2009a).

The S4ULs are intended to replace the 2nd edition of the LQM/CIEH Generic Assessment Criteria (GAC).

The S4ULs have also been used to replace the Environment Agency Soil Guideline Values (SGVs), which were defined in 2009 alongside updates to the CLEA methodology and software.

The parameters detailed in the LQM/CIEH S4ULs publication have been adapted using the CLEA software to reflect site specific conditions, including the Soil Organic Matter (SOM), where these are significantly different from the values used to derive the SGV.

It is understood the site is to be developed for residential purposes, therefore S4ULs for residential with home-grown plant have been adopted for this site.

A SOM of 1% has been adopted for organic chemicals for the purposes of the initial assessment on the basis of laboratory analysis. A SOM of 6% has been adopted for inorganic chemical as detailed in 'The LQM / CIEH S4ULS for human health assessment', (2015).

The three most hazardous PAH's, benzo(a)pyrene, dibenz(a,h)anthracene and naphthalene have been considered on this occasion.

In the absence an S4UL for lead the Category 4 Screening Level (C4SL) for lead has been adopted. In March 2014 DEFRA published C4SLs for six contaminants including lead. The C4SLs are based on a unique toxicological benchmark, 'Low Level of Toxicological Concern' rather than the 'minimal or tolerable level of risk' which forms the basis for the S4ULs.

A summary of the tier one screening values for human health is given in the Table, below.

Contaminant	Origin of Screening Value	Screening Value (mg/kg)
Arsenic	S4UL[1]	37
Cadmium	S4UL[1]	11
Chromium	S4UL[1]	910
Copper	S4UL[1]	2,400
Nickel	S4UL[1]	180
Lead	C4SL[2]	200
Selenium	S4UL[1]	250
Mercury	S4UL[1]	40
Zinc	S4UL[1]	3,700
Benzo(a)pyrene	S4UL[3]	2.2
Dibenz(a,h)anthracene	S4UL[3]	0.24
Naphthalene	S4UL[3]	2.3
Total Phenols	S4UL[3]	280
TPH Aromatic C_5-C_7	S4UL[3]	70
TPH Aromatic C_7-C_8	S4UL[3]	130
TPH Aromatic C_8-C_{10}	S4UL[3]	34
TPH Aromatic C_{10}-C_{12}	S4UL[3]	74
TPH Aromatic C_{12}-C_{16}	S4UL[3]	140
TPH Aromatic C_{16}-C_{21}	S4UL[3]	260
TPH Aromatic C_{21}-C_{35}	S4UL[3]	1,100
TPH Aliphatic C_5-C_6	S4UL[3]	42
TPH Aliphatic C_6-C_8	S4UL[3]	100
TPH Aliphatic C_8-C_{10}	S4UL[3]	27
TPH Aliphatic C_{10}-C_{12}	S4UL[3]	130
TPH Aliphatic C_{12}-C_{16}	S4UL[3]	1,100
TPH Aliphatic C_{16}-C_{35}	S4UL[3]	65,000
Benzene	S4UL[3]	0.087
Toluene	S4UL[3]	130
Ethylbenzene	S4UL[3]	47

Contaminant	Origin of Screening Value	Screening Value (mg/kg)
M & P Xylene	S4UL[3]	56
O Xylene	S4UL[3]	60
Vinyl Chloride	S4UL[3]	0.00064
1,2 – Dichloroethane	S4UL[3]	0.0071
Trichloroethene	S4UL[3]	0.016
1,1,1 – Trichloroethane	S4UL[3]	8.8
Tetrachloroethene	S4UL[3]	0.18
Chlorobenze	S4UL[3]	0.46
Hexachlorobutadine	S4UL[3]	0.29

[1] Value derived for site specific conditions use using CLEA software, S4UL parameters, at an SOM of 6% for residential with home-grown plant.
[2] Category 4 Screening Level adopted based on DEFRA (2014)
[3] Value derived for site specific conditions use using CLEA software, S4UL parameters, at an SOM of 1% for residential with home-grown plant.
*Although soils up to this value may not be harmful to human health, it should be noted that soils would be saturated at this value and remediation may still be necessary. Results will therefore be reviewed on a case by case basis.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

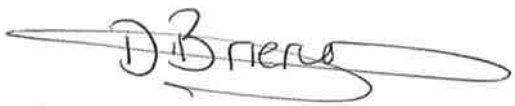
FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 22/03386
Issue Number: 1 **Date:** 14 April, 2022

Client: Richard Jackson Ltd
847 The Crescent
Colchester Business Park
Colchester
CO4 9YQ

Project Manager: Basil Fagg
Project Name: Bedfield
Project Ref: 61647
Order No: 61647
Date Samples Received: 04/04/22
Date Instructions Received: 07/04/22
Date Analysis Completed: 14/04/22

Approved by:



Danielle Brierley
Deputy Client Services Supervisor

Envirolab Job Number: 22/03386

Client Project Name: Bedfield

Client Project Ref: 61647

Lab Sample ID	22/03386/1	22/03386/3	22/03386/4	22/03386/6	22/03386/8	22/03386/9	22/03386/10	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	1	2	1			
Client Sample ID	WS10	WS08	WS08	WS09	WS04	WS04	WS01			
Depth to Top	0.10	0.60	1.20	0.30	0.25	1.00	0.30			
Depth To Bottom										
Date Sampled	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	31-Mar-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AB	3A	5AB	5A	6AB	6AB	6A			
% Stones >10mm$_A$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	% w/w	0.1	A-T-044
pH$_D^{M\#}$	-	7.87	-	-	8.25	8.33	8.45	pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	-	<0.01	-	-	0.03	0.07	<0.01	g/l	0.01	A-T-026s
Sulphur BRE (total)$_D$	-	0.02	-	-	0.08	0.30	0.06	% w/w	0.01	A-T-024s
Cyanide (total)$_A^{M\#}$	-	<1	-	-	<1	<1	<1	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	-	<0.2	-	-	<0.2	<0.2	<0.2	mg/kg	0.2	A-T-050s
Organic matter$_D^{M\#}$	-	0.9	-	-	6.3	5.3	3.6	% w/w	0.1	A-T-032 OM
Arsenic$_D^{M\#}$	5	6	6	4	14	73	7	mg/kg	1	A-T-024s
Cadmium$_D^{M\#}$	1.0	1.3	0.9	1.0	2.0	7.3	1.4	mg/kg	0.5	A-T-024s
Copper$_D^{M\#}$	18	14	14	15	61	125	23	mg/kg	1	A-T-024s
Chromium$_D^{M\#}$	24	28	24	23	30	51	26	mg/kg	1	A-T-024s
Lead$_D^{M\#}$	74	43	12	25	1730	1640	110	mg/kg	1	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17	<0.17	0.20	1.10	mg/kg	0.17	A-T-024s
Nickel$_D^{M\#}$	18	21	22	19	30	124	22	mg/kg	1	A-T-024s
Selenium$_D^{M\#}$	<1	<1	<1	<1	<1	<1	2	mg/kg	1	A-T-024s
Zinc$_D^{M\#}$	82	64	40	62	245	702	68	mg/kg	5	A-T-024s

Envirolab Job Number: 22/03386

Client Project Name: Bedfield

Client Project Ref: 61647

Lab Sample ID	22/03386/1	22/03386/3	22/03386/4	22/03386/6	22/03386/8	22/03386/9	22/03386/10	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	1	2	1			
Client Sample ID	WS10	WS08	WS08	WS09	WS04	WS04	WS01			
Depth to Top	0.10	0.60	1.20	0.30	0.25	1.00	0.30			
Depth To Bottom										
Date Sampled	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	31-Mar-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AB	3A	5AB	5A	6AB	6AB	6A			
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_D^{\#}$	-	NAD	-	-	NAD	NAD	NAD			A-T-045
Asbestos Matrix (visual)$_D$	-	-	-	-	-	-	-			A-T-045
Asbestos Matrix (microscope)$_D$	-	-	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	-	N/A	-	-	N/A	N/A	N/A			A-T-045

Envirolab Job Number: 22/03386

Client Project Name: Bedfield

Client Project Ref: 61647

Lab Sample ID	22/03386/1	22/03386/3	22/03386/4	22/03386/6	22/03386/8	22/03386/9	22/03386/10	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	1	2	1			
Client Sample ID	WS10	WS08	WS08	WS09	WS04	WS04	WS01			
Depth to Top	0.10	0.60	1.20	0.30	0.25	1.00	0.30			
Depth To Bottom										
Date Sampled	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	31-Mar-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AB	3A	5AB	5A	6AB	6AB	6A			
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	<0.02	<0.02	0.04	0.03	<0.02	mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.05	<0.04	<0.04	<0.04	0.22	0.16	0.11	mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.07	<0.04	<0.04	<0.04	0.26	0.16	0.12	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.08	<0.05	<0.05	<0.05	0.28	0.19	0.15	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	<0.05	<0.05	0.12	<0.05	0.07	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07	0.11	<0.07	<0.07	mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06	<0.06	<0.06	0.27	0.19	0.14	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	0.13	<0.08	<0.08	<0.08	0.51	0.42	0.25	mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.01	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	0.15	0.09	0.07	mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	0.05	<0.03	<0.03	<0.03	0.20	0.24	0.12	mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	0.12	<0.07	<0.07	<0.07	0.45	0.36	0.22	mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	0.50	<0.08	<0.08	<0.08	2.63	1.87	1.26	mg/kg	0.01	A-T-019s

Envirolab Job Number: 22/03386

Client Project Name: Bedfield

Client Project Ref: 61647

Lab Sample ID	22/03386/1	22/03386/3	22/03386/4	22/03386/6	22/03386/8	22/03386/9	22/03386/10	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	1	2	1			
Client Sample ID	WS10	WS08	WS08	WS09	WS04	WS04	WS01			
Depth to Top	0.10	0.60	1.20	0.30	0.25	1.00	0.30			
Depth To Bottom										
Date Sampled	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	31-Mar-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AB	3A	5AB	5A	6AB	6AB	6A			
VOC										
Dichlorodifluoromethane$_A$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Chloromethane$_A$	-	-	-	-	<10	<10	<10	µg/kg	10	A-T-006s
Vinyl Chloride (Chloroethene)$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Bromomethane$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Chloroethane$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Trichlorofluoromethane$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,1-Dichloroethene$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Carbon Disulphide$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Dichloromethane$_A$	-	-	-	-	<5	<5	<5	µg/kg	5	A-T-006s
trans 1,2-Dichloroethene$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,1-Dichloroethane$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
cis 1,2-Dichloroethene$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
2,2-Dichloropropane$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Bromochloromethane$_A^\#$	-	-	-	-	<5	<5	<5	µg/kg	5	A-T-006s
Chloroform$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,1,1-Trichloroethane$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,1-Dichloropropene$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Carbon Tetrachloride$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,2-Dichloroethane$_A^\#$	-	-	-	-	<2	<2	<2	µg/kg	2	A-T-006s
Benzene$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Trichloroethene$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,2-Dichloropropane$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Dibromomethane$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Bromodichloromethane$_A^\#$	-	-	-	-	<10	<10	<10	µg/kg	10	A-T-006s
cis 1,3-Dichloropropene$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Toluene$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
trans 1,3-Dichloropropene$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,1,2-Trichloroethane$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,3-Dichloropropane$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Tetrachloroethene$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Dibromochloromethane$_A^\#$	-	-	-	-	<3	<3	<3	µg/kg	3	A-T-006s
1,2-Dibromoethane$_A^\#$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s

Envirolab Job Number: 22/03386 **Client Project Name: Bedfield**

Client Project Ref: 61647

Lab Sample ID	22/03386/1	22/03386/3	22/03386/4	22/03386/6	22/03386/8	22/03386/9	22/03386/10	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	1	2	1			
Client Sample ID	WS10	WS08	WS08	WS09	WS04	WS04	WS01			
Depth to Top	0.10	0.60	1.20	0.30	0.25	1.00	0.30			
Depth To Bottom										
Date Sampled	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	31-Mar-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AB	3A	5AB	5A	6AB	6AB	6A			
Chlorobenzene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,1,1,2-Tetrachloroethane$_{A}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Ethylbenzene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
m & p Xylene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
o-Xylene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Styrene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Bromoform$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Isopropylbenzene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,1,2,2-Tetrachloroethane$_{A}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,2,3-Trichloropropane$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
Bromobenzene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
n-Propylbenzene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
2-Chlorotoluene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,3,5-Trimethylbenzene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
4-Chlorotoluene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
tert-Butylbenzene$_{A}^{\#}$	-	-	-	-	<2	<2	<2	µg/kg	2	A-T-006s
1,2,4-Trimethylbenzene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
sec-Butylbenzene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
4-Isopropyltoluene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,3-Dichlorobenzene$_{A}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,4-Dichlorobenzene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
n-Butylbenzene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,2-Dichlorobenzene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,2-Dibromo-3-chloropropane (DCBP)$_{A}$	-	-	-	-	<2	<2	<2	µg/kg	2	A-T-006s
1,2,4-Trichlorobenzene$_{A}$	-	-	-	-	<3	<3	<3	µg/kg	3	A-T-006s
Hexachlorobutadiene$_{A}^{\#}$	-	-	-	-	<1	<1	<1	µg/kg	1	A-T-006s
1,2,3-Trichlorobenzene$_{A}$	-	-	-	-	<3	<3	<3	µg/kg	3	A-T-006s

Envirolab Job Number: 22/03386

Client Project Name: Bedfield

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Lab Sample ID	22/03386/1	22/03386/3	22/03386/4	22/03386/6	22/03386/8	22/03386/9	22/03386/10	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	1	2	1			
Client Sample ID	WS10	WS08	WS08	WS09	WS04	WS04	WS01			
Depth to Top	0.10	0.60	1.20	0.30	0.25	1.00	0.30			
Depth To Bottom										
Date Sampled	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	30-Mar-22	31-Mar-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6AB	3A	5AB	5A	6AB	6AB	6A			
TPH UKCWG with Clean Up *C1										
Ali >C5-C6$_A^{\#}$	-	<0.01	-	-	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	-	<0.01	-	-	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	-	<1	-	-	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	-	<1	-	-	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	-	<1	-	-	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	-	<1	-	-	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C21-C35$_A^{M\#}$	-	<1	-	-	6	3	6	mg/kg	1	A-T-055s
Ali >C35-C44$_A$	-	<1	-	-	4	<1	<1	mg/kg	1	A-T-055s
Total Aliphatics$_A$	-	<1	-	-	10	3	6	mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	-	<0.01	-	-	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	-	<0.01	-	-	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	-	<1	-	-	<1	<1	<1	mg/kg	1	A-T-055s
Aro >C10-C12$_A$	-	<1	-	-	<1	<1	<1	mg/kg	1	A-T-055s
Aro >C12-C16$_A$	-	<1	-	-	6	<1	1	mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	-	<1	-	-	17	4	6	mg/kg	1	A-T-055s
Aro >C21-C35$_A$	-	<1	-	-	37	12	9	mg/kg	1	A-T-055s
Aro >C35-C44$_A$	-	<1	-	-	2	<1	<1	mg/kg	1	A-T-055s
Total Aromatics$_A$	-	<1	-	-	62	16	16	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44)$_A$	-	<1	-	-	72	19	22	mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	-	<0.01	-	-	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	-	<0.01	-	-	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	-	<0.01	-	-	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	-	<0.01	-	-	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	-	<0.01	-	-	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	-	<0.01	-	-	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 22/03386

Client Project Name: Bedfield

Client Project Ref: 61647

Lab Sample ID	22/03386/11	22/03386/12	22/03386/13	22/03386/15	22/03386/16	22/03386/17	22/03386/19	Units	Limit of Detection	Method ref
Client Sample No	2	1	2	1	2	1	1			
Client Sample ID	WS01	WS03	WS03	WS05	WS05	WS06	WS02			
Depth to Top	0.90	0.40	1.00	0.10	0.80	0.40	0.40			
Depth To Bottom										
Date Sampled	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid			
Sample Matrix Code	4A	6A	3A	6A	3A	6A	7			
% Stones >10mm$_A$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	% w/w	0.1	A-T-044
pH$_D^{M\#}$	8.92	8.23	-	8.27	-	11.47	8.52	pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	<0.01	<0.01	-	<0.01	-	0.06	<0.01	g/l	0.01	A-T-026s
Sulphur BRE (total)$_D$	0.01	0.07	-	0.04	-	0.06	0.05	% w/w	0.01	A-T-024s
Cyanide (total)$_A^{M\#}$	<1	<1	-	<1	-	<1	<1	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	-	<0.2	-	<0.2	<0.2	mg/kg	0.2	A-T-050s
Organic matter$_D^{M\#}$	<0.1	4.8	-	2.7	-	0.9	5.5	% w/w	0.1	A-T-032 OM
Arsenic$_D^{M\#}$	3	7	7	4	2	5	5	mg/kg	1	A-T-024s
Cadmium$_D^{M\#}$	<0.5	1.3	1.4	1.1	1.1	1.2	1.3	mg/kg	0.5	A-T-024s
Copper$_D^{M\#}$	6	22	19	20	17	18	16	mg/kg	1	A-T-024s
Chromium$_D^{M\#}$	10	27	34	28	29	32	17	mg/kg	1	A-T-024s
Lead$_D^{M\#}$	15	592	19	85	15	110	341	mg/kg	1	A-T-024s
Mercury$_D$	<0.17	0.91	1.72	<0.17	<0.17	0.54	1.83	mg/kg	0.17	A-T-024s
Nickel$_D^{M\#}$	10	21	46	20	23	24	13	mg/kg	1	A-T-024s
Selenium$_D^{M\#}$	<1	<1	1	<1	<1	<1	<1	mg/kg	1	A-T-024s
Zinc$_D^{M\#}$	16	73	50	70	84	106	203	mg/kg	5	A-T-024s

Envirolab Job Number: 22/03386

Client Project Name: Bedfield

Client Project Ref: 61647

Lab Sample ID	22/03386/11	22/03386/12	22/03386/13	22/03386/15	22/03386/16	22/03386/17	22/03386/19	Units	Limit of Detection	Method ref
Client Sample No	2	1	2	1	2	1	1			
Client Sample ID	WS01	WS03	WS03	WS05	WS05	WS06	WS02			
Depth to Top	0.90	0.40	1.00	0.10	0.80	0.40	0.40			
Depth To Bottom										
Date Sampled	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid			
Sample Matrix Code	4A	6A	3A	6A	3A	6A	7			
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{D}^{\#}$	-	NAD	-	NAD	-	NAD	NAD			A-T-045
Asbestos Matrix (visual)$_{D}$	-	-	-	-	-	-	-			A-T-045
Asbestos Matrix (microscope)$_{D}$	-	-	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_{D}$	-	N/A	-	N/A	-	N/A	N/A			A-T-045

Envirolab Job Number: 22/03386

Client Project Name: Bedfield

Client Project Ref: 61647

Lab Sample ID	22/03386/11	22/03386/12	22/03386/13	22/03386/15	22/03386/16	22/03386/17	22/03386/19	Units	Limit of Detection	Method ref
Client Sample No	2	1	2	1	2	1	1			
Client Sample ID	WS01	WS03	WS03	WS05	WS05	WS06	WS02			
Depth to Top	0.90	0.40	1.00	0.10	0.80	0.40	0.40			
Depth To Bottom										
Date Sampled	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid			
Sample Matrix Code	4A	6A	3A	6A	3A	6A	7			
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	<0.01	0.04	0.85	<0.01	0.05	mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	0.05	<0.01	<0.01	0.05	mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	<0.02	0.14	0.38	<0.02	0.14	mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	0.08	<0.04	0.44	0.09	0.11	0.71	mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	0.08	<0.04	0.42	0.07	0.13	0.79	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	0.09	<0.05	0.48	0.09	0.14	0.90	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	<0.05	0.22	<0.05	0.07	0.43	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	0.18	<0.07	<0.07	0.35	mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	<0.06	0.09	<0.06	0.51	0.10	0.13	0.83	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	0.05	<0.04	<0.04	0.09	mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	0.22	<0.08	1.13	0.42	0.22	1.87	mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	0.06	1.04	<0.01	0.12	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	<0.03	<0.03	0.23	0.04	0.07	0.48	mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	0.08	<0.03	0.70	0.15	0.06	0.85	mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	<0.07	0.17	<0.07	0.94	0.30	0.20	1.56	mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08	0.81	<0.08	5.59	3.53	1.13	9.27	mg/kg	0.01	A-T-019s

Lab Sample ID	22/03386/11	22/03386/12	22/03386/13	22/03386/15	22/03386/16	22/03386/17	22/03386/19	Units	Limit of Detection	Method ref
Client Sample No	2	1	2	1	2	1	1			
Client Sample ID	WS01	WS03	WS03	WS05	WS05	WS06	WS02			
Depth to Top	0.90	0.40	1.00	0.10	0.80	0.40	0.40			
Depth To Bottom										
Date Sampled	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid			
Sample Matrix Code	4A	6A	3A	6A	3A	6A	7			
VOC										
Dichlorodifluoromethane$_{A}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Chloromethane$_{A}$	-	<10	-	-	-	-	<10	µg/kg	10	A-T-006s
Vinyl Chloride (Chloroethene)$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromomethane$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Chloroethane$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Trichlorofluoromethane$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1-Dichloroethene$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Carbon Disulphide$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Dichloromethane$_{A}$	-	<5	-	-	-	-	<5	µg/kg	5	A-T-006s
trans 1,2-Dichloroethene$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1-Dichloroethane$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
cis 1,2-Dichloroethene$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
2,2-Dichloropropane$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromochloromethane$_{A}^{\#}$	-	<5	-	-	-	-	<5	µg/kg	5	A-T-006s
Chloroform$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,1-Trichloroethane$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1-Dichloropropene$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Carbon Tetrachloride$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dichloroethane$_{A}^{\#}$	-	<2	-	-	-	-	<2	µg/kg	2	A-T-006s
Benzene$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Trichloroethene$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dichloropropane$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Dibromomethane$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromodichloromethane$_{A}^{\#}$	-	<10	-	-	-	-	<10	µg/kg	10	A-T-006s
cis 1,3-Dichloropropene$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Toluene$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
trans 1,3-Dichloropropene$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,2-Trichloroethane$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,3-Dichloropropane$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Tetrachloroethene$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Dibromochloromethane$_{A}^{\#}$	-	<3	-	-	-	-	<3	µg/kg	3	A-T-006s
1,2-Dibromoethane$_{A}^{\#}$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s

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Lab Sample ID	22/03386/11	22/03386/12	22/03386/13	22/03386/15	22/03386/16	22/03386/17	22/03386/19	Units	Limit of Detection	Method ref
Client Sample No	2	1	2	1	2	1	1			
Client Sample ID	WS01	WS03	WS03	WS05	WS05	WS06	WS02			
Depth to Top	0.90	0.40	1.00	0.10	0.80	0.40	0.40			
Depth To Bottom										
Date Sampled	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid			
Sample Matrix Code	4A	6A	3A	6A	3A	6A	7			
Chlorobenzene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,1,2-Tetrachloroethane$_A$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Ethylbenzene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
m & p Xylene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
o-Xylene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Styrene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromoform$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Isopropylbenzene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,1,2,2-Tetrachloroethane$_A$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2,3-Trichloropropane$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
Bromobenzene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
n-Propylbenzene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
2-Chlorotoluene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,3,5-Trimethylbenzene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
4-Chlorotoluene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
tert-Butylbenzene$_A^\#$	-	<2	-	-	-	-	<2	µg/kg	2	A-T-006s
1,2,4-Trimethylbenzene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
sec-Butylbenzene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
4-Isopropyltoluene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,3-Dichlorobenzene$_A$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,4-Dichlorobenzene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
n-Butylbenzene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dichlorobenzene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2-Dibromo-3-chloropropane (DCBP)$_A$	-	<2	-	-	-	-	<2	µg/kg	2	A-T-006s
1,2,4-Trichlorobenzene$_A$	-	<3	-	-	-	-	<3	µg/kg	3	A-T-006s
Hexachlorobutadiene$_A^\#$	-	<1	-	-	-	-	<1	µg/kg	1	A-T-006s
1,2,3-Trichlorobenzene$_A$	-	<3	-	-	-	-	<3	µg/kg	3	A-T-006s

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Client Project Name: Bedfield

Client Project Ref: 61647

Lab Sample ID	22/03386/11	22/03386/12	22/03386/13	22/03386/15	22/03386/16	22/03386/17	22/03386/19	Units	Limit of Detection	Method ref
Client Sample No	2	1	2	1	2	1	1			
Client Sample ID	WS01	WS03	WS03	WS05	WS05	WS06	WS02			
Depth to Top	0.90	0.40	1.00	0.10	0.80	0.40	0.40			
Depth To Bottom										
Date Sampled	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22	31-Mar-22			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid			
Sample Matrix Code	4A	6A	3A	6A	3A	6A	7			
TPH UKCWG with Clean Up *C1										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	<1	<1	-	<1	-	<1	<1	mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1	-	<1	-	<1	<1	mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	<1	-	<1	-	<1	<1	mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	<1	-	<1	-	<1	<1	mg/kg	1	A-T-055s
Ali >C21-C35$_A^{M\#}$	<1	3	-	35	-	8	14	mg/kg	1	A-T-055s
Ali >C35-C44$_A$	<1	<1	-	11	-	2	4	mg/kg	1	A-T-055s
Total Aliphatics$_A$	<1	3	-	46	-	11	18	mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	<1	<1	-	<1	-	<1	<1	mg/kg	1	A-T-055s
Aro >C10-C12$_A$	<1	<1	-	1	-	<1	<1	mg/kg	1	A-T-055s
Aro >C12-C16$_A$	<1	<1	-	5	-	<1	1	mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	<1	<1	-	28	-	<1	8	mg/kg	1	A-T-055s
Aro >C21-C35$_A$	<1	4	-	100	-	4	30	mg/kg	1	A-T-055s
Aro >C35-C44$_A$	<1	<1	-	7	-	<1	3	mg/kg	1	A-T-055s
Total Aromatics$_A$	<1	4	-	142	-	4	42	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44)$_A$	<1	7	-	187	-	14	60	mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	mg/kg	0.01	A-T-022s

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Lab Sample ID	22/03386/21							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS07									
Depth to Top	0.50									
Depth To Bottom										
Date Sampled	31-Mar-22									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
% Stones >10mm$_A$	<0.1							% w/w	0.1	A-T-044
pH$_D$$^{M\#}$	8.15							pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	<0.01							g/l	0.01	A-T-026s
Sulphur BRE (total)$_D$	0.01							% w/w	0.01	A-T-024s
Cyanide (total)$_A$$^{M\#}$	<1							mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2							mg/kg	0.2	A-T-050s
Organic matter$_D$$^{M\#}$	0.9							% w/w	0.1	A-T-032 OM
Arsenic$_D$$^{M\#}$	4							mg/kg	1	A-T-024s
Cadmium$_D$$^{M\#}$	1.1							mg/kg	0.5	A-T-024s
Copper$_D$$^{M\#}$	12							mg/kg	1	A-T-024s
Chromium$_D$$^{M\#}$	20							mg/kg	1	A-T-024s
Lead$_D$$^{M\#}$	20							mg/kg	1	A-T-024s
Mercury$_D$	<0.17							mg/kg	0.17	A-T-024s
Nickel$_D$$^{M\#}$	15							mg/kg	1	A-T-024s
Selenium$_D$$^{M\#}$	<1							mg/kg	1	A-T-024s
Zinc$_D$$^{M\#}$	56							mg/kg	5	A-T-024s

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Lab Sample ID	22/03386/21							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS07									
Depth to Top	0.50									
Depth To Bottom										
Date Sampled	31-Mar-22									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{D}^{\#}$	NAD									A-T-045
Asbestos Matrix (visual)$_{D}$	-									A-T-045
Asbestos Matrix (microscope)$_{D}$	-									A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_{D}$	N/A									A-T-045

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Client Project Name: Bedfield

Client Project Ref: 61647

Lab Sample ID	22/03386/21							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS07									
Depth to Top	0.50									
Depth To Bottom										
Date Sampled	31-Mar-22									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01							mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01							mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	<0.02							mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04							mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07							mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	<0.06							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04							mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08							mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	<0.01							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03							mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03							mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03							mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	<0.07							mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08							mg/kg	0.01	A-T-019s

Envirolab Job Number: 22/03386

Client Project Name: Bedfield

Client Project Ref: 61647

Lab Sample ID	22/03386/21							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS07									
Depth to Top	0.50									
Depth To Bottom										
Date Sampled	31-Mar-22									
Sample Type	Soil - ES									
Sample Matrix Code	6A									
TPH UKCWG with Clean Up *C1										
Ali >C5-C6$_A^{\#}$	<0.01							mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01							mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	<1							mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1							mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1							mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1							mg/kg	1	A-T-055s
Ali >C21-C35$_A^{M\#}$	1							mg/kg	1	A-T-055s
Ali >C35-C44$_A$	<1							mg/kg	1	A-T-055s
Total Aliphatics$_A$	1							mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01							mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01							mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	<1							mg/kg	1	A-T-055s
Aro >C10-C12$_A$	<1							mg/kg	1	A-T-055s
Aro >C12-C16$_A$	<1							mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	<1							mg/kg	1	A-T-055s
Aro >C21-C35$_A$	<1							mg/kg	1	A-T-055s
Aro >C35-C44$_A$	<1							mg/kg	1	A-T-055s
Total Aromatics$_A$	<1							mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44)$_A$	1							mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01							mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01							mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01							mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01							mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01							mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01							mg/kg	0.01	A-T-022s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.
Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve
EPH CWG results have humics mathematically subtracted through instrument calculation
TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

v2

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Richard Jackson Ltd, 847 The Crescent, Colchester Business Park, Colchester , CO4 9YQ

Project: Bedfield

Clients Project No: 61647

Project No: 22/03386

Date Received: 07/04/2022 (am)

Cool Box Temperatures (°C): 9.8 - 10.1

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	22/03386/1	22/03386/3	22/03386/4	22/03386/6	22/03386/8	22/03386/9	22/03386/10	22/03386/11	22/03386/12	22/03386/13	22/03386/15	22/03386/16
Client Sample No	1	1	2	1	1	2	1	2	1	2	1	2
Client Sample ID/Depth	WS10 0.10m	WS08 0.60m	WS08 1.20m	WS09 0.30m	WS04 0.25m	WS04 1.00m	WS01 0.30m	WS01 0.90m	WS03 0.40m	WS03 1.00m	WS05 0.10m	WS05 0.80m
Date Sampled	30/03/22	30/03/22	30/03/22	30/03/22	30/03/22	30/03/22	31/03/22	31/03/22	31/03/22	31/03/22	31/03/22	31/03/22
A-T-006s					12/04/2022	12/04/2022	12/04/2022		12/04/2022			
A-T-019s	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022
A-T-022s		13/04/2022			13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022		13/04/2022	
A-T-024s	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022
A-T-026s		13/04/2022			13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022		13/04/2022	
A-T-031s		13/04/2022			13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022		13/04/2022	
A-T-032 OM		13/04/2022			13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022		13/04/2022	
A-T-042sTCN		12/04/2022			12/04/2022	12/04/2022	12/04/2022	12/04/2022	12/04/2022		12/04/2022	
A-T-044	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022
A-T-045		08/04/2022			08/04/2022	08/04/2022	08/04/2022		08/04/2022		08/04/2022	
A-T-050s		11/04/2022			11/04/2022	11/04/2022	11/04/2022	11/04/2022	11/04/2022		11/04/2022	
A-T-055s		13/04/2022			13/04/2022	13/04/2022	13/04/2022	13/04/2022	13/04/2022		13/04/2022	

Lab Sample ID	22/03386/17	22/03386/19	22/03386/21
Client Sample No	1	1	1
Client Sample ID/Depth	WS06 0.40m	WS02 0.40m	WS07 0.50m
Date Sampled	31/03/22	31/03/22	31/03/22
A-T-006s		12/04/2022	
A-T-019s	14/04/2022	14/04/2022	14/04/2022
A-T-022s	13/04/2022	13/04/2022	13/04/2022
A-T-024s	14/04/2022	14/04/2022	14/04/2022
A-T-026s	13/04/2022	13/04/2022	13/04/2022
A-T-031s	13/04/2022	13/04/2022	13/04/2022
A-T-032 OM	13/04/2022	13/04/2022	13/04/2022
A-T-042sTCN	12/04/2022	12/04/2022	12/04/2022
A-T-044	13/04/2022	13/04/2022	13/04/2022
A-T-045	08/04/2022	08/04/2022	08/04/2022
A-T-050s	11/04/2022	11/04/2022	11/04/2022
A-T-055s	13/04/2022	13/04/2022	13/04/2022

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

RichardJackson Engineering Consultants

Appendix D

Geotechnical Testing Results

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 27/06/2022

0998

Contract	**Home Farm, Bedfield**
Serial No.	**40963_1**

Client:

Richard Jackson Limited

847 The Crescent
Colchester
Essex
CO4 9YQ

Soil Property Testing Ltd

15, 16, 18 Halcyon Court, St Margaret's Way,
Stukeley Meadows, Huntingdon,
Cambridgeshire, PE29 6DG

Tel: 01480 455579
Email: enquiries@soilpropertytesting.com
Website: www.soilpropertytesting.com

Samples Submitted By:

Richard Jackson Limited

Samples Labelled:

Home Farm, Bedfield

Approved Signatories:

☑ **J.C. Garner B.Eng (Hons) FGS**
Technical Director & Quality Manager

☐ **W. Johnstone**
Materials Lab Manager

Date Received: 16/06/2022

Samples Tested Between: 16/06/2022 **and** 27/06/2022

Remarks:

For the attention of Kay O'Reilly
Your Reference No: 61647

Notes:

1. All remaining samples or remnants from this contract will be disposed of after 21 days from today, unless we are notified to the contrary.
2. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
3. Tests marked "NOT UKAS ACCREDITED" in this test report are not included in the UKAS Accreditation Schedule for this testing laboratory.
4. This test report may not be reproduced other than in full except with the prior written approval of the issuing laboratory.
5. The results within this report only relate to the items tested or sampled.

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 27/06/2022

0998

Contract	**Home Farm, Bedfield**		
Serial No.	**40963_1**	**Target Date**	30/06/2022
Scheduled By	Richard Jackson Limited		

Schedule Remarks

Bore Hole No.	Type	Sample Ref.	Top Depth	Sulphate Content/pH Value	Water Content (BSEN)	Liquid/Plastic Limits	Wet Sieve Preparation																Sample Remarks
TP01	D	2	1.40	1																			
TP02	D	3	1.00	1																			
WS01	D	3	1.50		1	1	1																
WS01	D	4	2.00	1																			
WS02	D	1	1.00		1																		
WS02	D	2	1.50		1	1	1																
WS02	D	3	2.00		1																		
WS02	D	4	3.20		1																		
WS03	D	2	1.20		1																		
WS03	D	3	1.80		1	1	1																
WS03	D	4	2.50	1																			
WS03	D	5	2.90		1																		
WS03	D	6	3.60		1																		
WS05	D	2	1.00		1																		
WS05	D	3	1.70		1	1	1																
WS05	D	4	2.40		1																		
WS05	D	6	3.90		1																		
WS06	D	2	1.40		1	1	1																
WS06	D	3	1.90		1																		
WS06	D	4	2.40	1																			
WS06	D	5	2.90		1																		
WS06	D	7	4.00		1																		
WS07	D	2	1.00		1																		
WS07	D	3	1.60		1	1	1																
WS07	D	4	2.20	1																			
WS07	D	5	3.00		1																		
WS09	D	2	1.00		1	1	1																
WS09	D	3	2.00		1	1	1																
WS09	D	4	3.00		1																		
WS09	D	5	3.50		1																		
WS09	D	6	4.10		1																		
WS10	D	2	1.00		1	1	1																
WS10	D	4	3.00		1																		

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 27/06/2022

0998

Contract	**Home Farm, Bedfield**		
Serial No.	**40963_1**	**Target Date**	30/06/2022
Scheduled By	Richard Jackson Limited		
Schedule Remarks			

Bore Hole No.	Type	Sample Ref.	Top Depth	Sulphate Content/pH Value	Water Content (BSEN)	Liquid/Plastic Limits	Wet Sieve Preparation														Sample Remarks
WS10	D	5	4.00		1																
WS10	D	6	4.50		1																
Totals				**6**	**29**	**9**	**9**														**End of Schedule**

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 27/06/2022

0998

Contract	**Home Farm, Bedfield**
Serial No.	**40963_1**

SUMMARY OF WATER CONTENT

Borehole /Pit No.	Depth (m)	Type	Ref.	Water Content (%)	Description	Remarks
WS01	1.50	D	3	**27.0**	Soft olive brown slightly gravelly slightly sandy silty CLAY with occasional bluish grey mottling, rare dark grey organic pockets and recently active roots. Gravel is fine and medium angular to subrounded chalk and chert	
WS02	1.00	D	1	**40.0**	Soft very dark grey organic silty CLAY locally oxidised to brown with occasional recently active roots and rare shell debris	
WS02	1.50	D	2	**29.6**	Very soft light olive brown slightly gravelly slightly sandy silty CLAY locally slightly organic with occasional bluish grey mottling and recently active roots. Gravel is fine and medium angular to subrounded chert	
WS02	2.00	D	3	**15.9**	Stiff mottled grey and light olive brown slightly gravelly slightly sandy silty CLAY with rare decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	
WS02	3.20	D	4	**18.7**	Stiff mottled grey and light olive brown slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium angular to subrounded chalk and chert	
WS03	1.20	D	2	**19.9**	Stiff dark greyish brown slightly gravelly slightly sandy silty CLAY with occasional orange mottling. Gravel is fine and medium angular to subrounded chalk and chert	
WS03	1.80	D	3	**20.9**	Stiff light olive brown slightly gravelly slightly sandy silty CLAY with occasional bluish grey mottling and rare decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	
WS03	2.90	D	5	**18.8**	Soft yellowish brown slightly gravelly sandy silty CLAY. Gravel is fine to coarse angular to subrounded chalk and chert	
WS03	3.60	D	6	**21.3**	Stiff dark greyish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse angular to subrounded chalk and chert	
WS05	1.00	D	2	**19.9**	Stiff yellowish brown slightly gravelly slightly sandy silty CLAY with occasional grey mottling. Gravel is fine to coarse angular to subrounded chalk and chert	
WS05	1.70	D	3	**19.3**	Stiff light olive brown slightly gravelly slightly sandy silty CLAY with rare decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	
WS05	2.40	D	4	**20.7**	Stiff mottled grey, orange and dark brown slightly gravelly slightly sandy silty CLAY with rare decayed roots. Gravel is fine to coarse angular to subrounded chalk and chert	
WS05	3.90	D	6	**17.1**	Stiff very dark grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse angular to subrounded chalk and chert	
WS06	1.40	D	2	**19.0**	Stiff olive slightly gravelly slightly sandy silty CLAY with rare recently active and decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	

Method Of Preparation: BS EN ISO: 17892-1: 2014
Method of Test: BS EN ISO: 17892-1: 2014
Type of Sample Key: U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
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 105-110C

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 27/06/2022

0998

Contract	**Home Farm, Bedfield**
Serial No.	**40963_1**

SUMMARY OF WATER CONTENT

Borehole /Pit No.	Depth (m)	Type	Ref.	Water Content (%)	Description	Remarks
WS06	1.90	D	3	**18.6**	Very stiff yellowish brown slightly gravelly slightly sandy silty CLAY with grey mottling. Gravel is fine to coarse angular to subrounded chalk and chert	
WS06	2.90	D	5	**19.5**	Stiff mottled grey and dark greyish brown slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse angular to subrounded chalk and chert	
WS06	4.00	D	7	**18.2**	Stiff mottled brown and dark grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse angular to subrounded chalk and chert	
WS07	1.00	D	2	**16.4**	Stiff mottled grey and olive yellow slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium angular to subrounded chalk and chert	
WS07	1.60	D	3	**15.3**	Stiff mottled light bluish grey and olive yellow slightly gravelly slightly sandy silty CLAY with occasional decayed root network. Gravel is fine and medium angular to subrounded chalk and chert	
WS07	3.00	D	5	**22.0**	Soft mottled brown and grey slightly gravelly slightly sandy silty CLAY. Gravel is fine and medium angular to subrounded chalk and chert	
WS09	1.00	D	2	**13.9**	Stiff mottled light bluish grey and olive yellow slightly gravelly slightly sandy silty CLAY with occasional decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	
WS09	2.00	D	3	**17.2**	Stiff mottled grey and olive yellow slightly gravelly slightly sandy silty CLAY with occasional decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	
WS09	3.00	D	4	**20.6**	Stiff mottled bluish grey and olive slightly gravelly slightly sandy silty CLAY with rare decayed roots. Gravel is fine to coarse angular to subrounded chalk and chert	
WS09	3.50	D	5	**19.6**	Stiff mottled bluish grey and olive slightly gravelly slightly sandy silty CLAY with rare decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	
WS09	4.10	D	6	**19.0**	Stiff mottled olive and grey slightly gravelly slightly sandy silty CLAY with rare decayed roots. Gravel is fine to coarse angular to subrounded chalk and chert	
WS10	1.00	D	2	**20.6**	Stiff mottled grey and olive slightly gravelly slightly sandy silty CLAY with occasional recently active and decayed roots. Gravel is fine to coarse angular to subrounded chalk and chert	
WS10	3.00	D	4	**18.1**	Stiff mottled olive and dark grey slightly gravelly slightly sandy silty CLAY with occasional orange staining. Gravel is fine to coarse angular to subrounded chalk and chert	
WS10	4.00	D	5	**16.5**	Stiff dark olive grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse angular to subrounded chalk and chert	

Method Of Preparation: BS EN ISO: 17892-1: 2014
Method of Test: BS EN ISO: 17892-1: 2014
Type of Sample Key: U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
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 105-110C

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 27/06/2022

0998

Contract	**Home Farm, Bedfield**
Serial No.	**40963_1**

SUMMARY OF WATER CONTENT

Borehole /Pit No.	Depth (m)	Type	Ref.	Water Content (%)	Description	Remarks
WS10	4.50	D	6	**16.6**	Stiff dark olive grey slightly gravelly slightly sandy silty CLAY. Gravel is fine to coarse angular to subrounded chalk and chert	

Method Of Preparation: BS EN ISO: 17892-1: 2014
Method of Test: BS EN ISO: 17892-1: 2014
Type of Sample Key: U = Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
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 105-110C

TEST REPORT

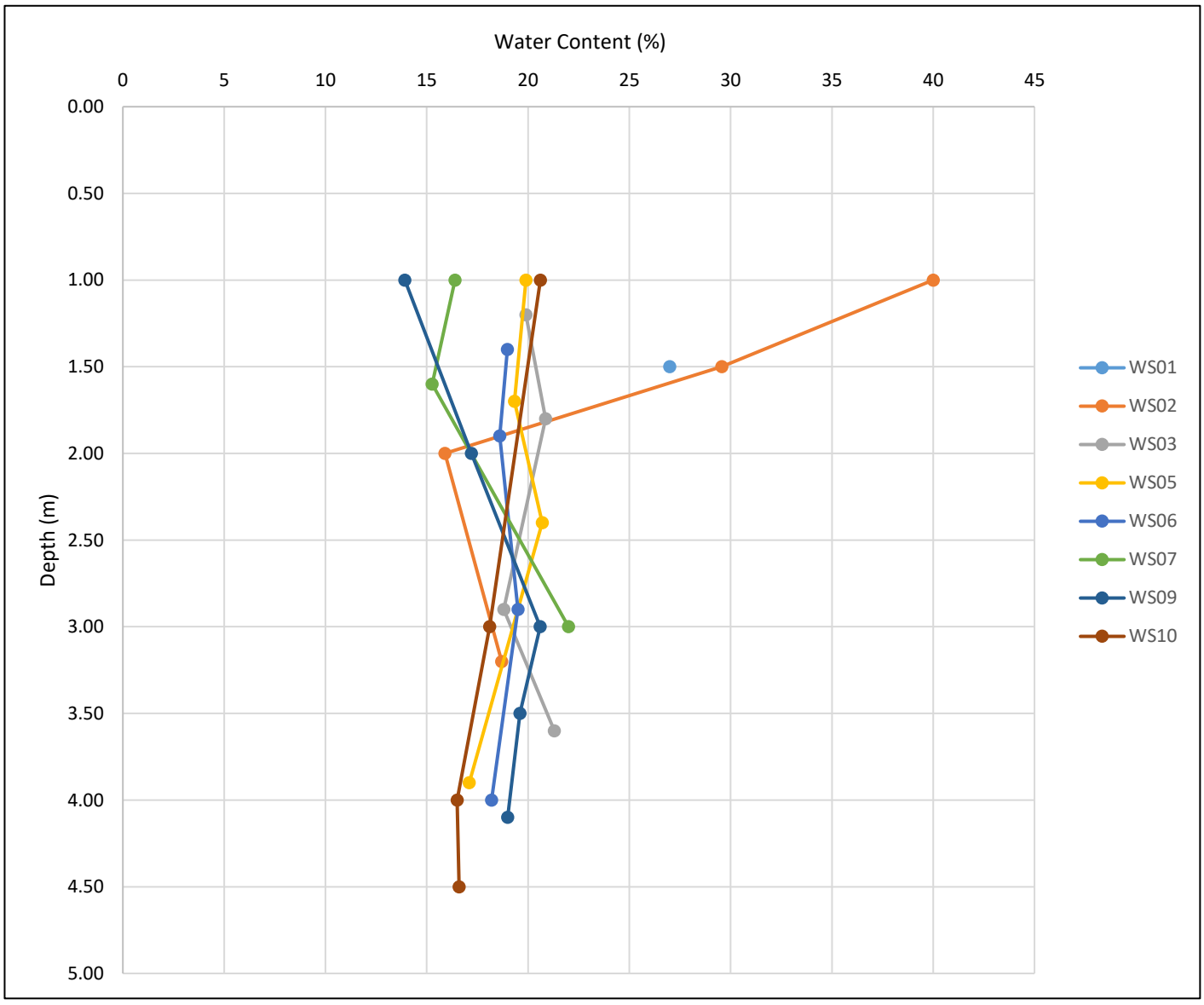
ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 27/06/2022

0998

Contract	**Home Farm, Bedfield**
Serial No.	**40963_1**

WATER CONTENT VS DEPTH BELOW GROUND LEVEL



Method of Preparation:	BSEN ISO 17892-1: 2014
Method of Test:	BSEN ISO 17892-1: 2014
Type of Sample Key:	U - Undisturbed, B = Bulk, D = Disturbed, J = Jar, W = Water, SPT = Split Spoon Sample, C = Core Cutter
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°C

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

Borehole /Pit No.	Depth (m)	Type	Ref.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasti-city Index (%)	Liquid-ity Index	Sample Preparation				Description	Class
									Method	Ret'd 0.425mm (%)	Corr'd W/C <0.425mm	Curing Time (hrs)		
WS01	1.50	D	3	**27.0**	42	18	24	0.37	Wet Sieved	10 (M)	30.0*	25	Soft olive brown slightly gravelly slightly sandy silty CLAY with occasional bluish grey mottling, rare dark grey organic pockets and recently active roots. Gravel is fine and medium angular to subrounded chalk and chert	CI
WS02	1.50	D	2	**29.6**	41	19	22	0.48	Wet Sieved	9 (M)	32.5*	24	Very soft light olive brown slightly gravelly slightly sandy silty CLAY locally slightly organic with occasional bluish grey mottling and recently active roots. Gravel is fine and medium angular to subrounded chert	CI
WS03	1.80	D	3	**20.9**	42	16	26	0.19	Wet Sieved	10 (M)	23.2*	24	Stiff light olive brown slightly gravelly slightly sandy silty CLAY with occasional bluish grey mottling and rare decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	CI
WS05	1.70	D	3	**19.3**	47	19	28	0.01	Wet Sieved	13 (M)	22.2*	24	Stiff light olive brown slightly gravelly slightly sandy silty CLAY with rare decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	CI
WS06	1.40	D	2	**19.0**	40	17	23	0.09	Wet Sieved	6 (M)	20.2*	24	Stiff olive slightly gravelly slightly sandy silty CLAY with rare recently active and decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	CI
WS07	1.60	D	3	**15.3**	38	15	23	0.01	Wet Sieved	7 (M)	16.4*	24	Stiff mottled light bluish grey and olive yellow slightly gravelly slightly sandy silty CLAY with occasional decayed root network. Gravel is fine and medium angular to subrounded chalk and chert	CI
WS09	1.00	D	2	**13.9**	31	13	18	0.05	Wet Sieved	5 (M)	14.7*	24	Stiff mottled light bluish grey and olive yellow slightly gravelly slightly sandy silty CLAY with occasional decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	CL
WS09	2.00	D	3	**17.2**	35	16	19	0.06	Wet Sieved	10 (M)	19.1*	24	Stiff mottled grey and olive yellow slightly gravelly slightly sandy silty CLAY with occasional decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	CL/CI

Method Of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:4.2
Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:3.2, 4.3, 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: *Corrected water content assume material greater than 0.425mm is non-porous. See BS1377: Part 2: 1990 Clause 3 Note 1.

Table Notation: Ret'd 0.425mm: (A) = Assumed, (M) = Measured

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

Borehole /Pit No.	Depth (m)	Type	Ref.	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasti-city Index (%)	Liquid-ity Index	Sample Preparation				Description	Class
									Method	Ret'd 0.425mm (%)	Corr'd W/C <0.425mm	Curing Time (hrs)		
WS10	1.00	D	2	**20.6**	48	18	30	0.09	Wet Sieved	13 (M)	23.7*	26	Stiff mottled grey and olive slightly gravelly slightly sandy silty CLAY with occasional recently active and decayed roots. Gravel is fine to coarse angular to subrounded chalk and chert	CI

Method Of Preparation: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:4.2
Method of Test: BS EN ISO: 17892-1: 2014 & BS 1377: Part 2:1990:3.2, 4.3, 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: *Corrected water content assume material greater than 0.425mm is non-porous. See BS1377: Part 2: 1990 Clause 3 Note 1.

Table Notation: Ret'd 0.425mm: (A) = Assumed, (M) = Measured

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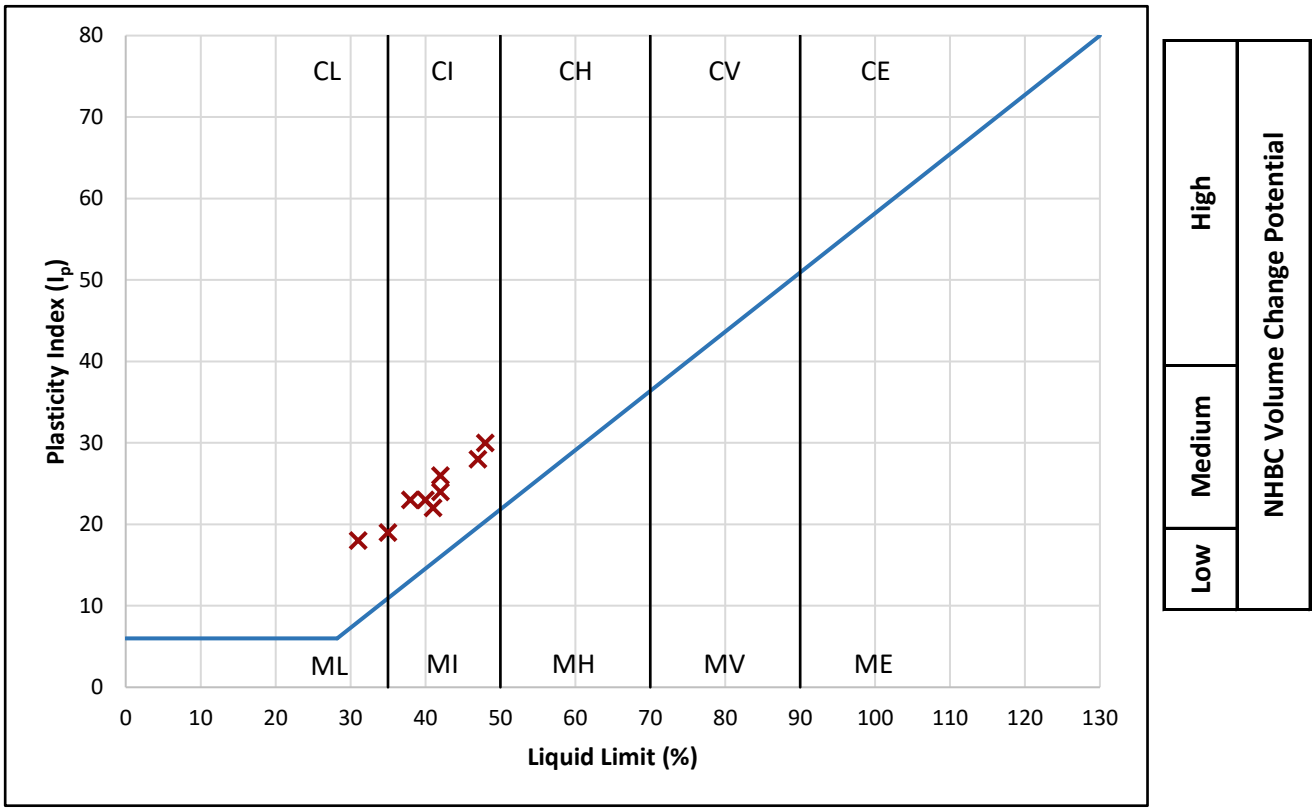
PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT USING CASAGRANDE CLASSIFICATION CHART

Plasticity				
Low	Medium	High	Very High	Extremely High



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS 1377: Part 2: 1990: 4.2
Method of Test:	BS1377: Part 2: 3.2, 4.3, 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:	Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index

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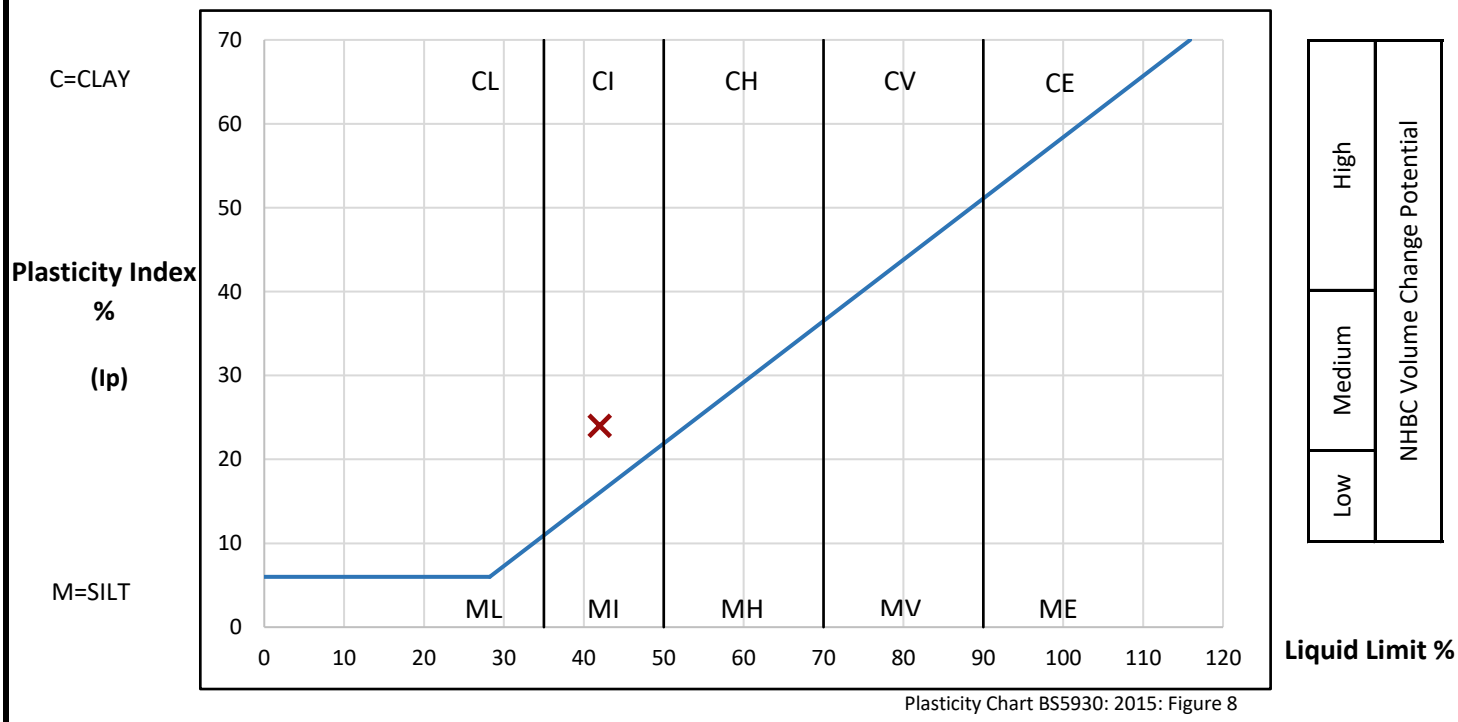
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS01	1.50	D	3	27.0	Soft olive brown slightly gravelly slightly sandy silty CLAY with occasional bluish grey mottling, rare dark grey organic pockets and recently active roots. Gravel is fine and medium angular to subrounded chalk and chert	

PREPARATION			Liquid Limit	42 %
Method of preparation	Wet sieved over 0.425mm sieve		Plastic Limit	18 %
Sample retained 0.425mm sieve	(Measured)	10 %	Plasticity Index	24 %
Corrected water content for material passing 0.425mm		30.0 %	Liquidity Index	0.37
Sample retained 2mm sieve	(Measured)	5 %	NHBC Modified (I'p)	22 %
Curing time	25 hrs	Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.3, 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:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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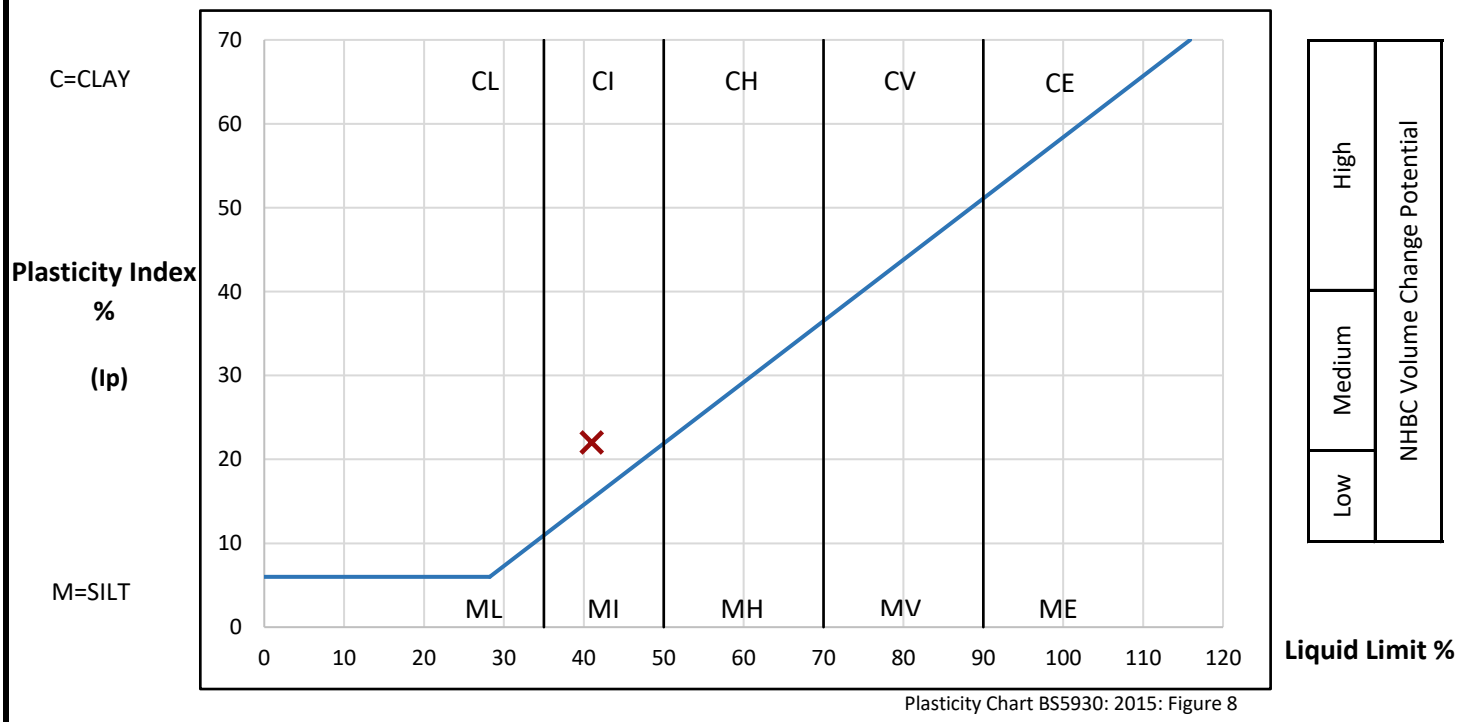
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS02	1.50	D	2	29.6	Very soft light olive brown slightly gravelly slightly sandy silty CLAY locally slightly organic with occasional bluish grey mottling and recently active roots. Gravel is fine and medium angular to subrounded chert	

PREPARATION				Liquid Limit	41 %
Method of preparation		Wet sieved over 0.425mm sieve		Plastic Limit	19 %
Sample retained 0.425mm sieve	(Measured)	9 %		Plasticity Index	22 %
Corrected water content for material passing 0.425mm		32.5 %		Liquidity Index	0.48
Sample retained 2mm sieve	(Measured)	5 %		NHBC Modified (I'p)	20 %
Curing time	24 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.3, 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:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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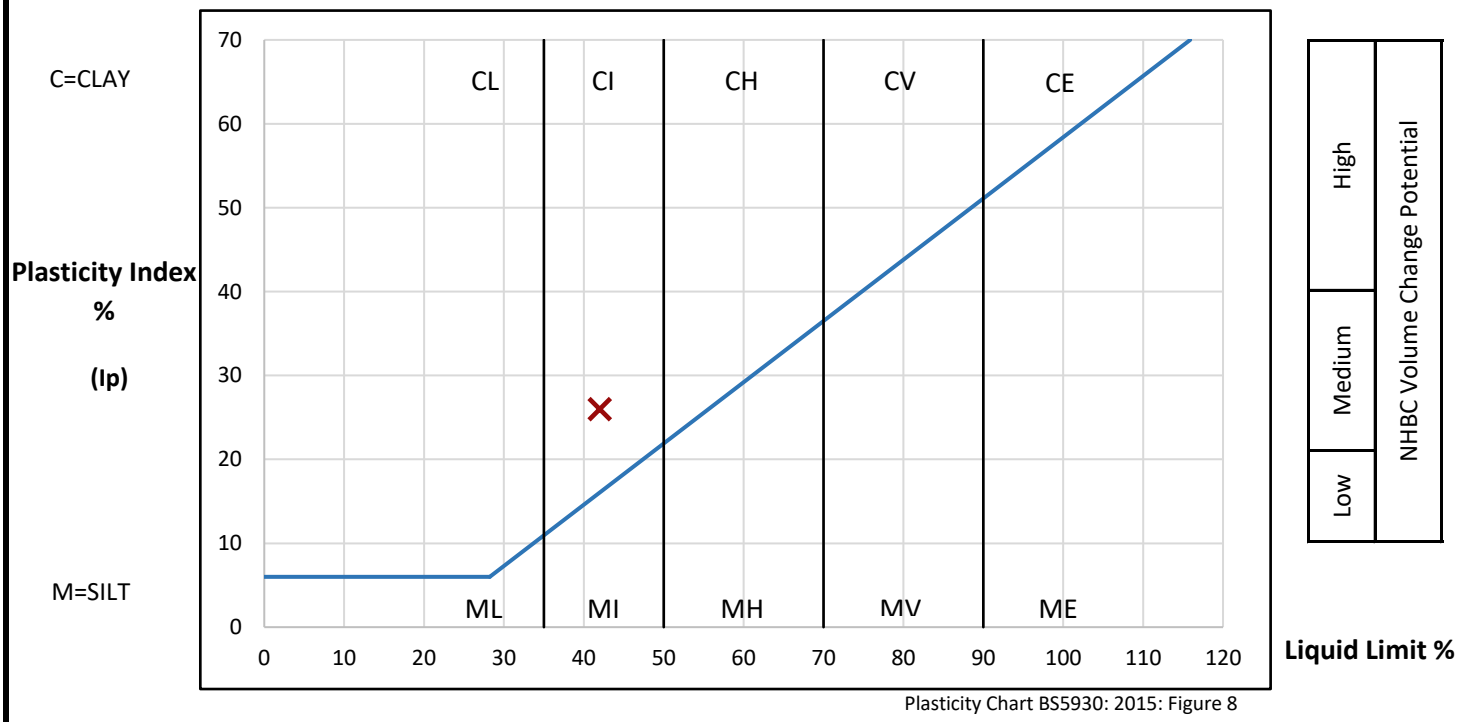
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS03	1.80	D	3	20.9	Stiff light olive brown slightly gravelly slightly sandy silty CLAY with occasional bluish grey mottling and rare decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	

PREPARATION					
Method of preparation	Wet sieved over 0.425mm sieve			Liquid Limit	42 %
Sample retained 0.425mm sieve	(Measured)	10 %		Plastic Limit	16 %
Corrected water content for material passing 0.425mm		23.2 %		Plasticity Index	26 %
Sample retained 2mm sieve	(Measured)	8 %		Liquidity Index	0.19
Curing time	24 hrs		Clay Content Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.3, 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:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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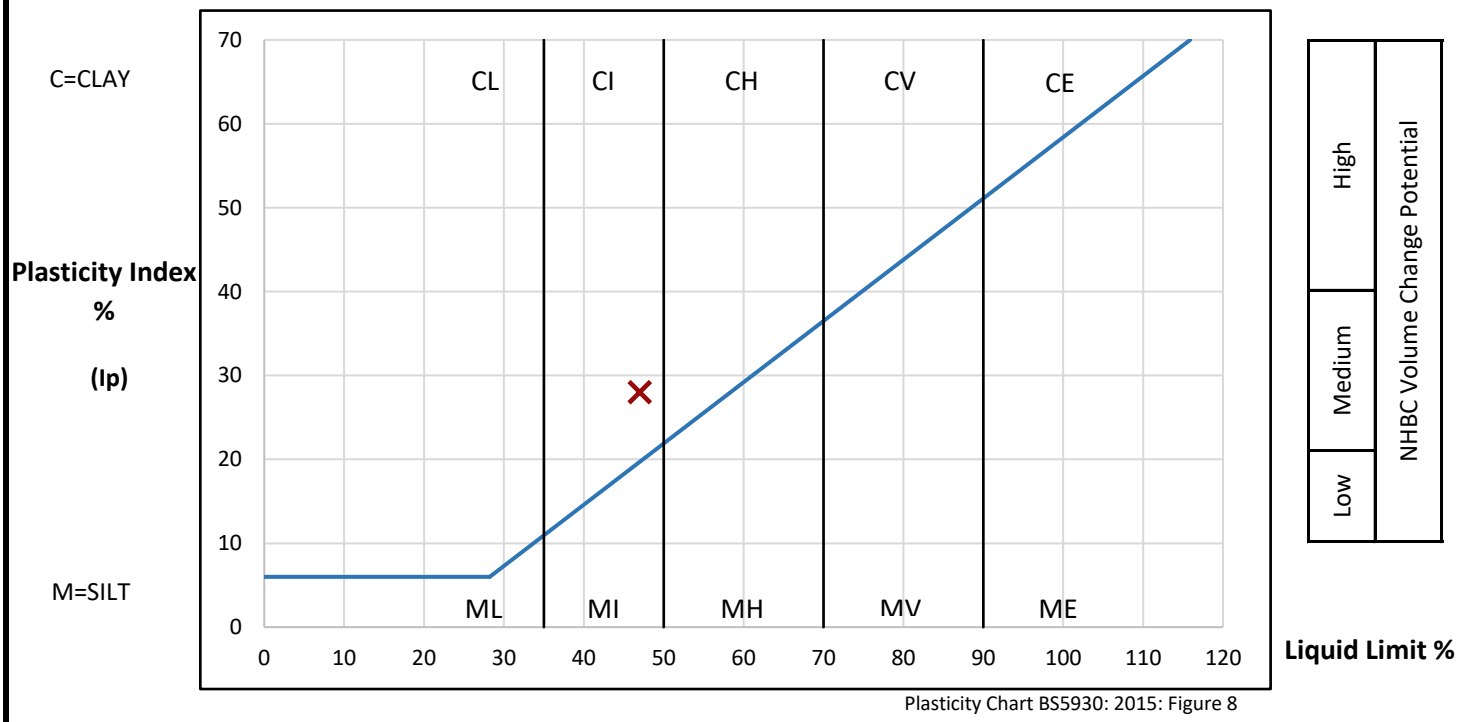
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS05	1.70	D	3	19.3	Stiff light olive brown slightly gravelly slightly sandy silty CLAY with rare decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	

PREPARATION			Liquid Limit	47 %
Method of preparation	Wet sieved over 0.425mm sieve		Plastic Limit	19 %
Sample retained 0.425mm sieve	(Measured)	13 %	Plasticity Index	28 %
Corrected water content for material passing 0.425mm		22.2 %	Liquidity Index	0.01
Sample retained 2mm sieve	(Measured)	11 %	NHBC Modified (I'p)	24 %
Curing time	24 hrs	Clay Content: Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.3, 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:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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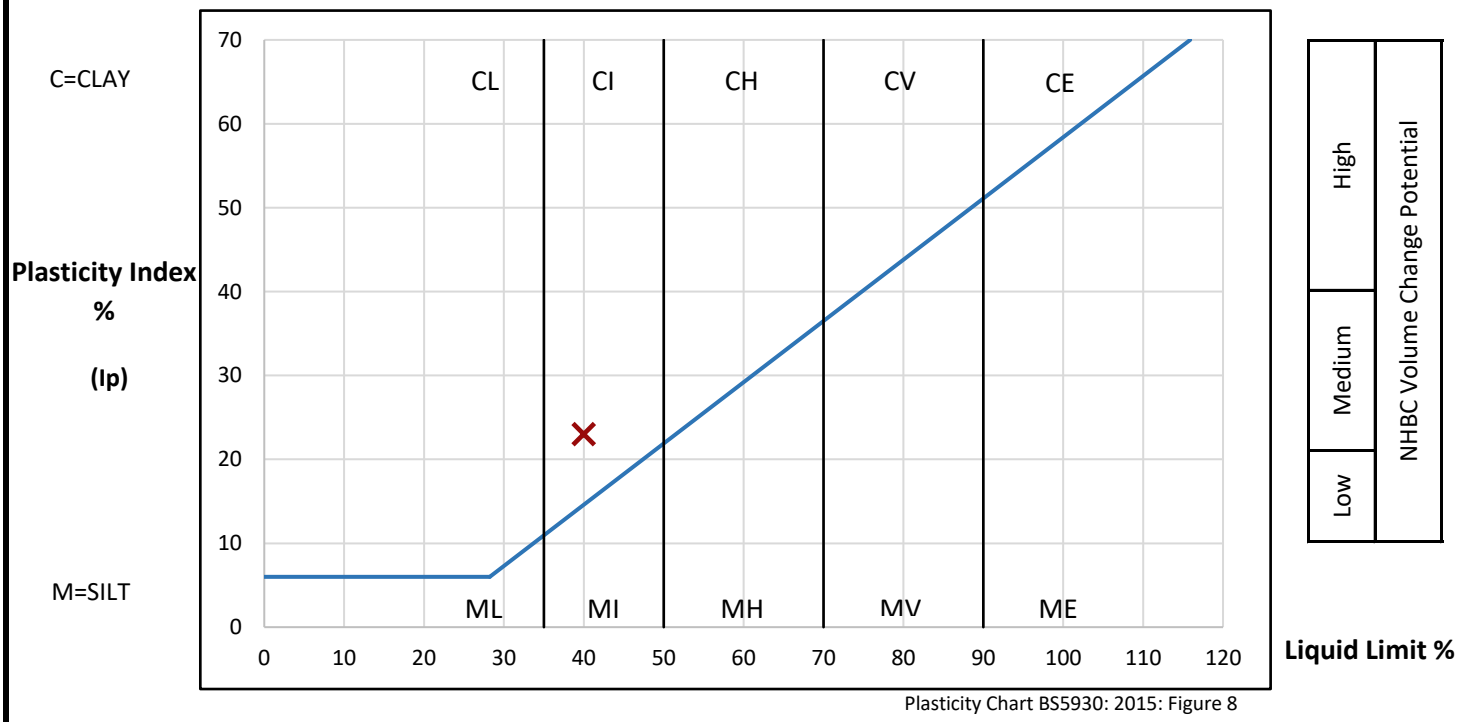
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS06	1.40	D	2	19.0	Stiff olive slightly gravelly slightly sandy silty CLAY with rare recently active and decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	

PREPARATION			Liquid Limit	40 %
Method of preparation	Wet sieved over 0.425mm sieve		Plastic Limit	17 %
Sample retained 0.425mm sieve	(Measured)	6 %	Plasticity Index	23 %
Corrected water content for material passing 0.425mm		20.2 %	Liquidity Index	0.09
Sample retained 2mm sieve	(Measured)	2 %	NHBC Modified (I'p)	22 %
Curing time	24 hrs	Clay Content: Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.3, 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:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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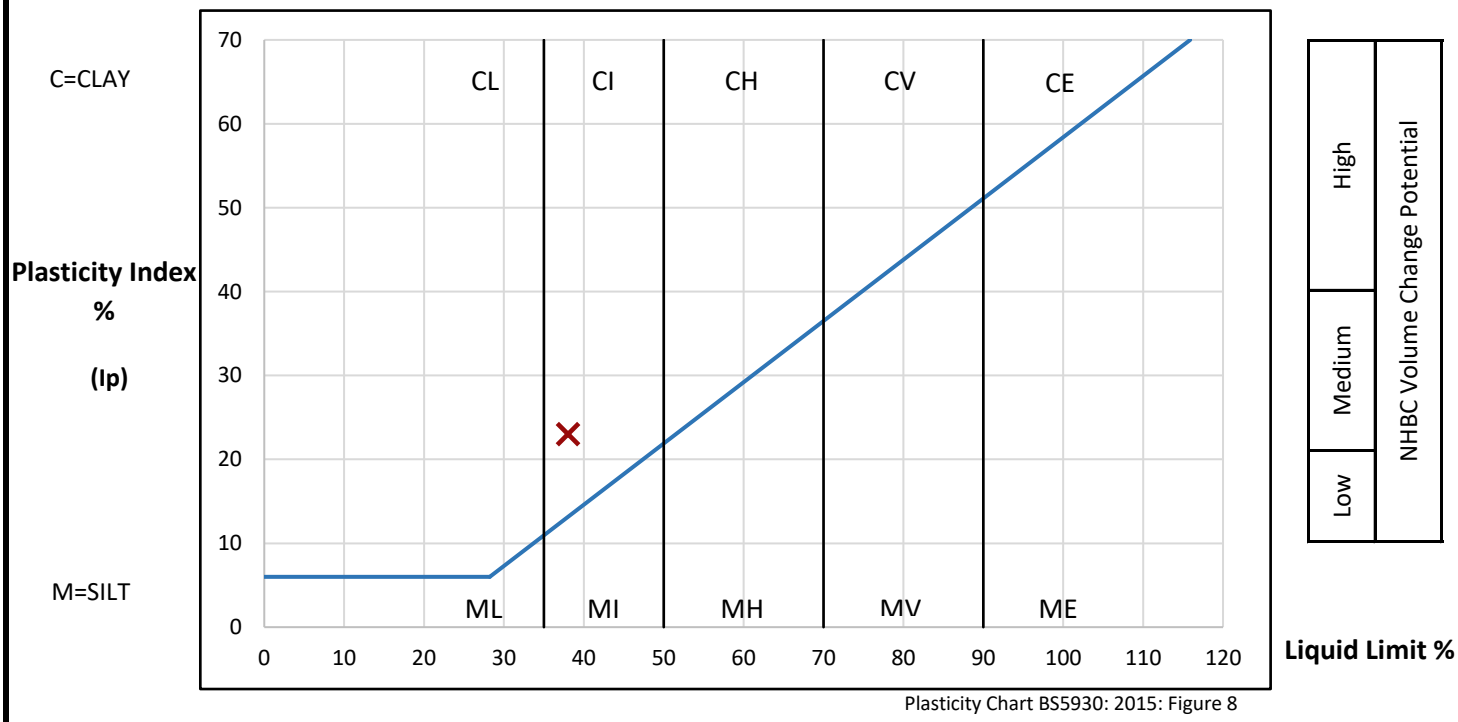
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS07	1.60	D	3	15.3	Stiff mottled light bluish grey and olive yellow slightly gravelly slightly sandy silty CLAY with occasional decayed root network. Gravel is fine and medium angular to subrounded chalk and chert	

PREPARATION					
Method of preparation	Wet sieved over 0.425mm sieve			Liquid Limit	38 %
Sample retained 0.425mm sieve	(Measured)	7 %		Plastic Limit	15 %
Corrected water content for material passing 0.425mm		16.4 %		Plasticity Index	23 %
Sample retained 2mm sieve	(Measured)	5 %		Liquidity Index	0.01
Curing time	24 hrs	Clay Content	Not analysed	NHBC Modified (I'p)	21 %
				Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.3, 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:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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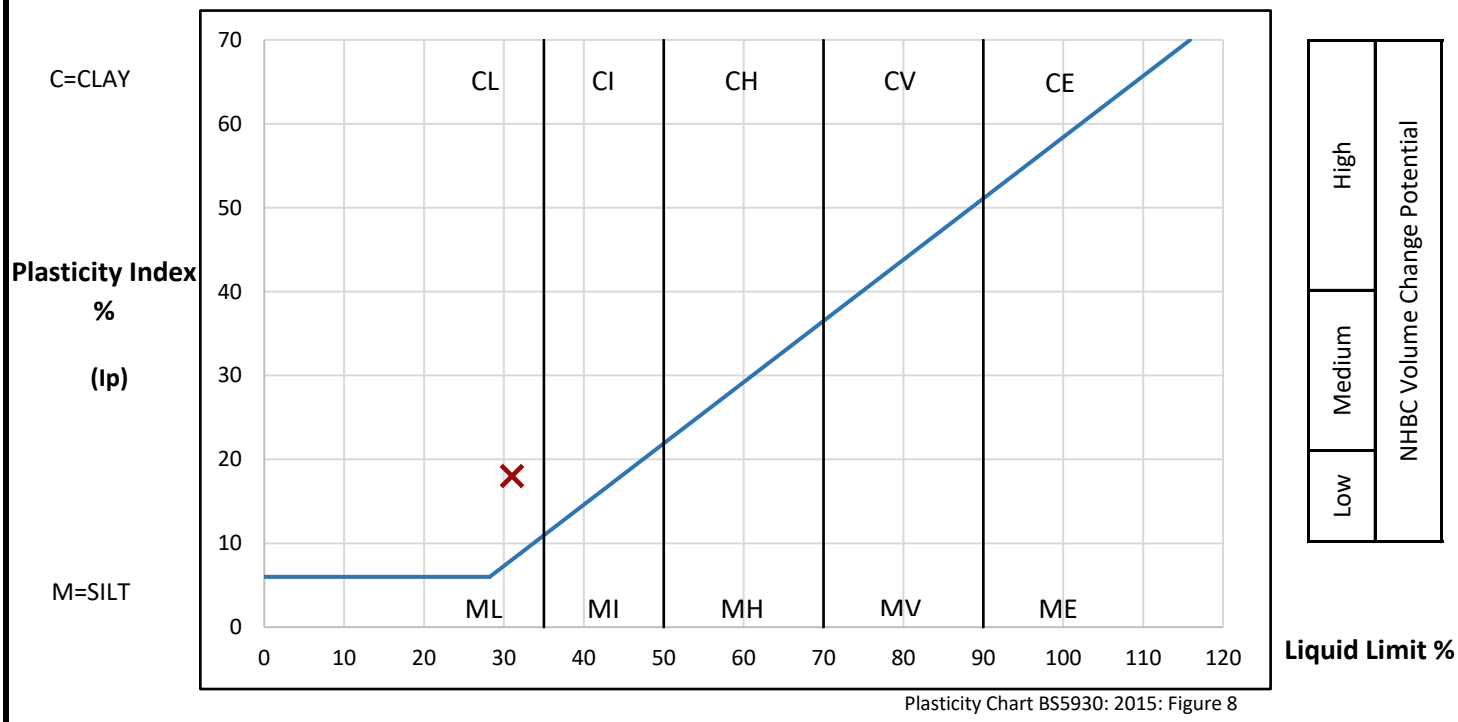
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS09	1.00	D	2	13.9	Stiff mottled light bluish grey and olive yellow slightly gravelly slightly sandy silty CLAY with occasional decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	

PREPARATION				Liquid Limit	31 %
Method of preparation		Wet sieved over 0.425mm sieve		Plastic Limit	13 %
Sample retained 0.425mm sieve	(Measured)	5 %		Plasticity Index	18 %
Corrected water content for material passing 0.425mm		14.7 %		Liquidity Index	0.05
Sample retained 2mm sieve	(Measured)	3 %		NHBC Modified (I'p)	17 %
Curing time	24 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.3, 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:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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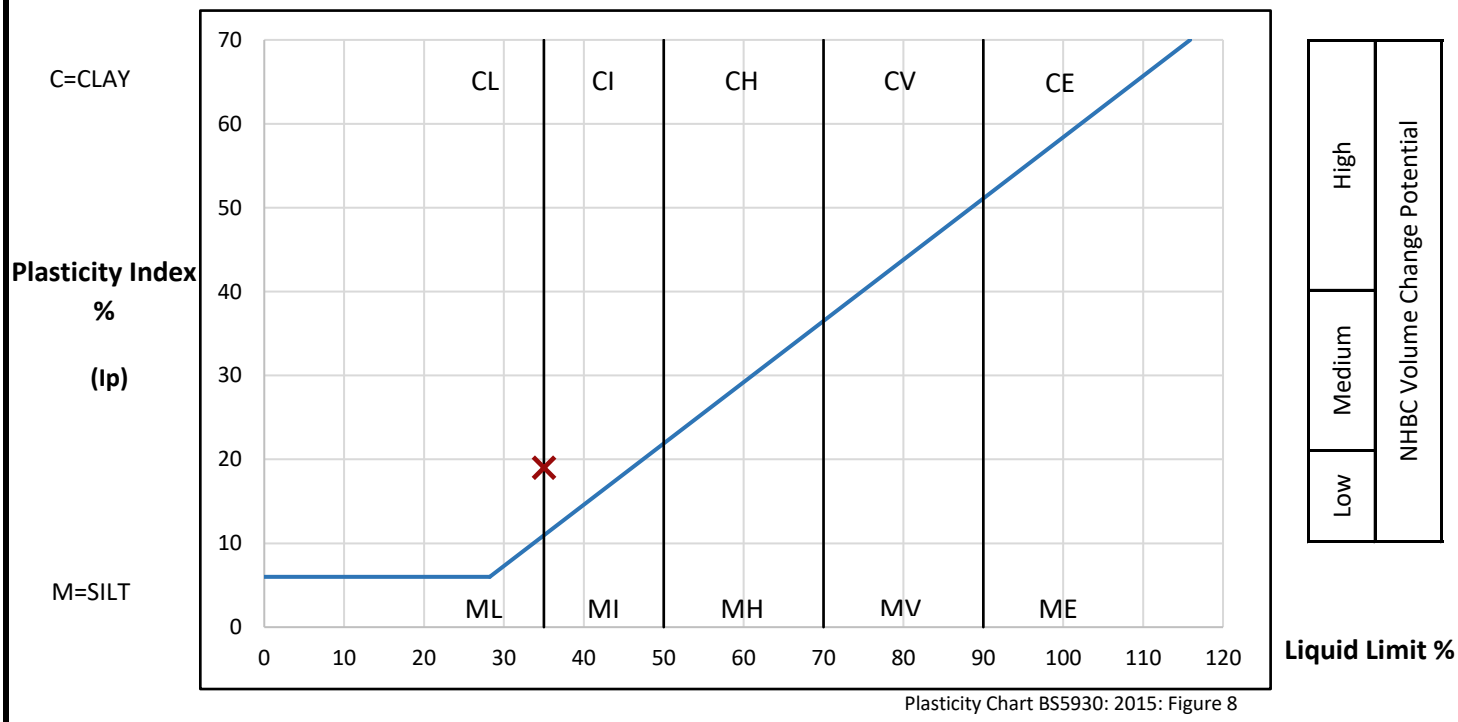
Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS09	2.00	D	3	17.2	Stiff mottled grey and olive yellow slightly gravelly slightly sandy silty CLAY with occasional decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	

PREPARATION				Liquid Limit	35 %
Method of preparation	Wet sieved over 0.425mm sieve			Plastic Limit	16 %
Sample retained 0.425mm sieve	(Measured)	10 %		Plasticity Index	19 %
Corrected water content for material passing 0.425mm		19.1 %		Liquidity Index	0.06
Sample retained 2mm sieve	(Measured)	7 %		NHBC Modified (I'p)	17 %
Curing time	24 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

Method of Preparation:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 4.2
Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.3, 5.3, 5.4
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Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

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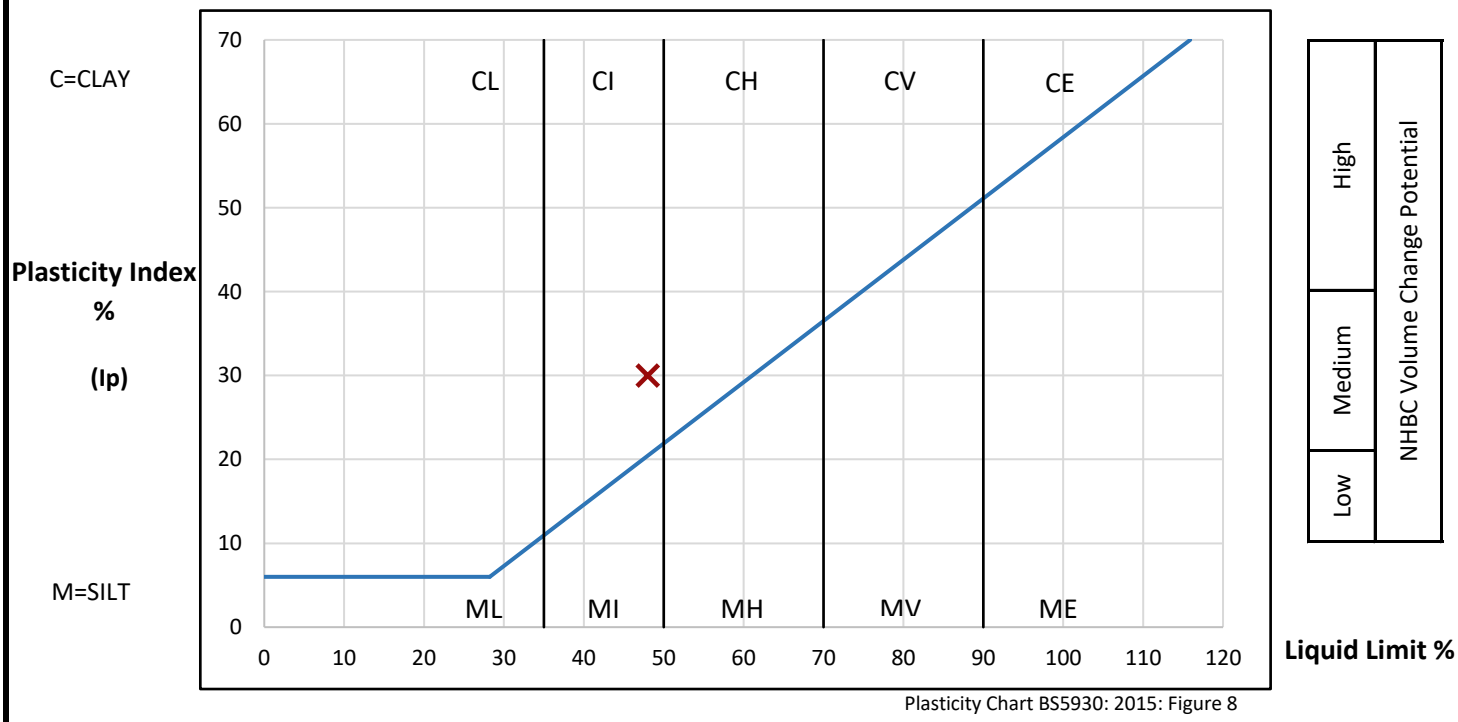
DETERMINATION OF WATER CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY INDEX AND LIQUIDITY INDEX

Borehole / Pit No.	Depth m	Sample Type	Sample Reference	Water Content (W) %	Description	Remarks
WS10	1.00	D	2	20.6	Stiff mottled grey and olive slightly gravelly slightly sandy silty CLAY with occasional recently active and decayed roots. Gravel is fine to coarse angular to subrounded chalk and chert	

PREPARATION				Liquid Limit	48 %
Method of preparation	Wet sieved over 0.425mm sieve			Plastic Limit	18 %
Sample retained 0.425mm sieve	(Measured)	13 %		Plasticity Index	30 %
Corrected water content for material passing 0.425mm		23.7 %		Liquidity Index	0.09
Sample retained 2mm sieve	(Measured)	11 %		NHBC Modified (I'p)	26 %
Curing time	26 hrs	Clay Content	Not analysed	Derived Activity	Not analysed



Plasticity Chart BS5930: 2015: Figure 8

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Method of Test:	BS EN ISO: 17892-1: 2014 & BS 1377: Part 2: 1990: 3.2, 4.3, 5.3, 5.4
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Comments:	Corrected water content assume material greater than 0.425mm non-porous. See BS1377: Part2: 1990 Clause 3 Note 1 Volume Change Potential: NHBC Standards Chapter 4.2 Unmodified Plasticity Index Note: Modified Plasticity Index I'p = Ip x (% less than 425microns/100)

TEST REPORT

ISSUED BY SOIL PROPERTY TESTING LTD

DATE ISSUED: 27/06/2022

Contract:	**Home Farm, Bedfield**
Serial No:	**40963_1**

DETERMINATION OF THE SULPHATE CONTENT AND pH OF SOIL AND GROUNDWATER

Borehole / Pit No.	Depth (m)	Sample		Conc. of Soluble SO3		Calc'd Conc. Of SO4 (g/L)	pH Value	% Sample Passing 2mm Sieve	Description	Remarks
		Type	Ref.	Water Soluble 2:1 (g/L)	Ground Water (g/L)					
TP01	1.40	D	2	<0.01		<0.01	7.7	95	Stiff mottled bluish grey and olive slightly gravelly slightly sandy silty CLAY with occasional decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	
TP02	1.00	D	3	0.02		0.02	7.5	97	Stiff mottled bluish grey and olive slightly gravelly slightly sandy silty CLAY with occasional recently active and decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	
WS01	2.00	D	4	0.07		0.08	7.8	92	Brownish yellow gravelly silty fine and medium SAND. Gravel is fine to coarse angular chert	
WS03	2.50	D	4	0.13		0.15	7.5	99	Stiff olive slightly gravelly slightly sandy silty CLAY with occasional dark bluish grey mottling. Gravel is fine and medium subangular to subrounded chalk and chert	
WS06	2.40	D	4	0.07		0.09	7.6	98	Stiff yellowish brown slightly gravelly slightly sandy silty CLAY with occasional bluish grey mottling and rare decayed roots. Gravel is fine and medium angular to subrounded chalk and chert	
WS07	2.20	D	4	0.08		0.09	7.6	95	Soft mottled bluish grey and olive slightly gravelly slightly sandy silty CLAY with rare decayed roots. Gravel is fine to coarse angular to subrounded chalk and chert	

Method of Preparation:	BS1377: Part 1: 2016: 8.5, BS1377: Part 3: 1990: 5.3 Soil/Water Extract, 5.4 Groundwater
Method of Test:	BS1377: 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 105-110C.

RichardJackson Engineering Consultants

Appendix E

Limitations of use

Limitations of Use

This report is based on the results of the exploratory boreholes, the laboratory testing carried out on samples recovered from those boreholes and on details of the scheme provided by the Client.

This report has been prepared for the benefit of Chapter Build Group Ltd, and its contents should not be relied upon by others without the written authority of Richard Jackson Ltd. If any unauthorised third party makes use of this report, they do so at their own risk and Richard Jackson Ltd owes them no duty of care or skill.

All information provided by others is taken as being in good faith as being accurate, but Richard Jackson Ltd cannot, and does not, accept any liability for the detailed accuracy, errors or omissions in such information.

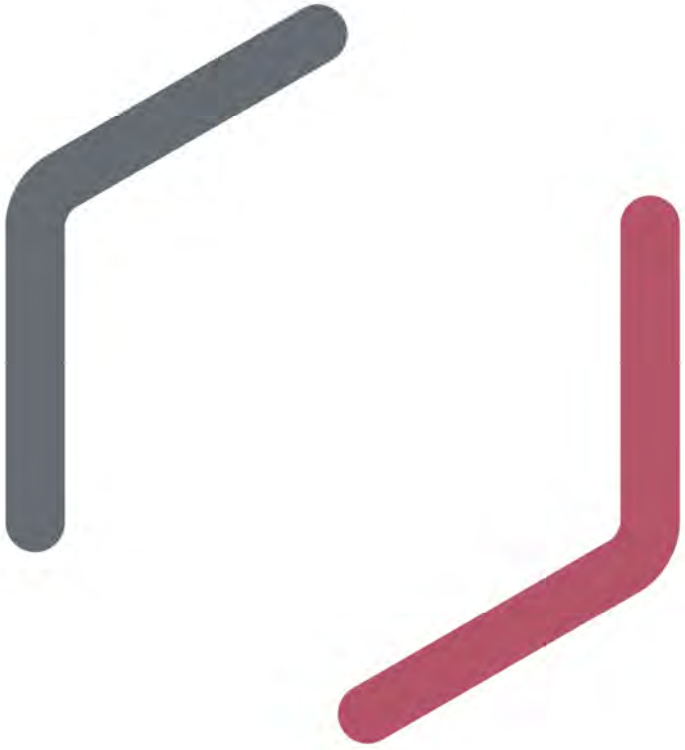
Subsoils are by their nature hidden from view and no investigation can be exhaustive to the extent that all soil conditions are revealed. Conditions may well be present beneath the site which was not evident from the investigations carried out.

Geological data, with the exception of geological maps held by Richard Jackson Ltd, Ordnance Survey maps and aerial photographs have not been inspected, nor has any other data relating to site conditions past or present, or any information regarding underground services, other than as indicated.

Groundwater levels can be subject to considerable seasonal variations, and the conditions encountered in the exploratory holes may not reflect long-term conditions.

There can be no guarantee that the samples analysed represent the highest concentrations of contamination present beneath the site. The chemical analysis results have been assessed to standards appropriate at the time of investigation.

Unless a greater period of retention of samples is agreed, it is our normal practice to discard all samples one month after submission of our final report.



Colchester 01206 228800

London 020 7448 9910

Norwich 01603 230240

Cambridge 01223 314794

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