

GEOENVIRONMENTAL SITE INVESTIGATION REPORT

Site

Middle House Nursery,
Straight Lane,
Brookland,
Romney Marsh
Kent, TN29 9QU

Client

Sussex Surveying Limited

Report Reference

PH2GT-2023-000003

Prepared by

STM Environmental Consultants Ltd

Date

19/01/2024



**CONSULTING GEO-ENVIRONMENTAL
ENGINEERS AND SCIENTISTS**

Phase 1 Contaminated Land Desk Studies, Geo-Environmental Site Investigations, Environmental Due Diligence, Flood Risk Assessments, Surface Water Management Strategies (SuDS), Ecology, Noise and Air Quality Assessments, Environmental Management Systems, GIS & Data Management Systems

TABLE OF CONTENTS

TABLE OF CONTENTS	2
1 DOCUMENT CONTROL	5
2 DISCLAIMERS	6
3 EXECUTIVE SUMMARY	7
4 INTRODUCTION	10
4.1 Development Proposals	10
4.2 Report Objectives	10
5 SUMMARY OF DESK STUDY FINDINGS	10
5.1 Site Location and Description	10
5.2 Current Site and Surrounding Land Uses	10
5.3 Published Geology and Hydrogeology	10
5.4 Site History	12
5.5 Previous Site Investigations	12
5.5.1 Pepperland Nursery, Straight Lane, Brookland, Romney Marsh TN29 9QU	12
5.6 Qualitative Risk Assessment	13
5.6.1 Potential Sources	13
5.6.2 Potential Receptors	13
5.6.3 Conceptual Site Risk Model	14
6 ENVIRONMENTAL SITE INVESTIGATION	14
6.1 Strategy and Scope of the Site Investigation and Risk Assessment	14
6.1.1 Soil Sampling Strategy	14
6.1.2 On-site Screening of Volatile Organic Compounds	14
6.1.3 Sample Collection and Transport	15
6.1.4 Laboratory Analysis	15
6.1.5 Groundwater, Ground Gas and Vapour Monitoring	15
6.2 Site Investigation Findings	15
6.2.1 Ground Conditions	15
6.2.2 Groundwater	15
6.2.3 Visual and Olfactory Signs of Contamination	16
6.3 Laboratory Sample Analysis Results	16
6.4 Risk Assessment	16
6.4.1 Generic Quantitative Risk Assessment (Human Health)	16
6.4.2 Generic Assessment Criteria for Soils	16

6.4.3	Soil Organic Matter Content	16
6.4.4	Contaminants Exceeding Generic Assessment Criteria.....	16
6.4.5	Statistical Analysis.....	16
6.5	Asbestos	16
6.6	Pesticides	16
6.6.1	Re-Assessment of Potential Pollutant Linkages	16
6.7	Potential Risks to On-Site Human Health	19
6.8	Potential Risks to Off-Site Human Health.....	19
6.9	Potential Risks to Groundwater Receptors	19
6.10	Potential Risks to Surface Water Receptors	19
6.11	Potential Risks to Ecological Receptors	19
6.12	Potential Risks to Property Receptors	19
6.13	Environmental Conclusions and Recommendations	20
6.13.1	Remedial Works.....	21
6.13.2	Watching Brief and Discovery Strategy.....	21
6.13.3	Health and Safety.....	21
6.13.4	Waste Disposal	21
6.13.5	Services.....	22
7	GEOTECHNICAL SITE INVESTIGATION.....	22
7.1	Service and Utility Plans	22
7.2	Scope of Geotechnical Works.....	22
7.2.1	Standard Penetration Tests	23
7.2.2	Dynamic Probing Tests	23
7.3	Geotechnical Sampling and Laboratory Testing.....	23
7.4	Findings of Geotechnical Site Investigation	24
7.4.1	Ground Conditions	24
7.4.2	Groundwater	24
7.4.3	Trees	24
7.4.4	Results of Standard Penetration Tests.....	24
7.4.5	Results of Dynamic Probing	25
7.4.6	Laboratory Test Results	26
7.4.7	Plasticity Index Analysis	26
7.4.8	Particle Size Distribution Analysis.....	27
7.4.9	pH and Sulphate Analyses	27
7.5	Geotechnical Conclusions and Recommendations.....	27
7.5.1	Ground Model	27
7.5.2	Allowable Bearing Capacity of the Soils	27
7.6	Influence of Trees on Required Foundation Depth	28

7.7	Foundation Assessment	29
7.7.1	Conventional Shallow Foundations.....	29
7.7.2	Pile Foundations	29
7.8	Excavations	30
7.9	Groundwater Control.....	30
7.10	Chemical Attack on Buried Concrete	30
8	INFORMATION GAPS AND UNCERTAINTIES	31
9	APPENDICES	32
9.1	Appendix 1 – Proposed Development Plans	32
9.2	Appendix 2 - Borehole Location Plan	33
9.3	Appendix 3 - Borehole Logs.....	34
9.4	Appendix 4 - Photographs	35
9.5	Appendix 5 – Laboratory Certification.....	41
9.6	Appendix 6 – Adopted Generic Assessment Criteria.....	42
9.6.1	Generic Assessment Criteria for Soils.....	42
9.7	Appendix 7 – Statistical Analysis	44
9.8	Appendix 8 - Assessment Methodology	45
9.9	Appendix 9 – Results of Standard Penetration Testing	47
	Appendix 10 - Borehole logs from nearby investigations.....	48
9.9.1	Previous Borehole Log 1	48
9.9.2	Previous Borehole Log 2	49
9.10	Appendix 11 - Foundation Depth Calculator Results.....	50
10	ABBREVIATIONS.....	51
11	REFERENCES	52

LIST OF TABLES

Table 1:	Summary of potential contamination sources, period of operation and distance from site....	13
Table 2:	Results of Qualitative Risk Assessment.....	18
Table 3:	Summary of revised conceptual site risk model	20
Table 4:	Summary of boreholes	23
Table 5:	Statistical Summary of N Values.....	24
Table 6:	Dynamic Probe Results with estimated N values	25
Table 7:	Summary of Classification Test Results.....	26
Table 8:	Summary of PSD Results.....	27
Table 9:	Summary of pH and Sulphate Test Results	27
Table 10:	Simplified Ground Model	27
Table 11:	Inferred Allowable Bearing Capacities	28
Table 12:	Contamination Risk Matrix.....	45
Table 13:	Assessment description for risk scores.....	45
Table 14:	Risk Classification System.....	46

1 DOCUMENT CONTROL

	GEOENVIRONMENTAL SITE INVESTIGATION REPORT	
Site Address:	Middle House Nursery, Straight Lane, Brookland, Romney Marsh Kent, TN29 9QU	
Site Coordinates:	599336, 126042	
Prepared for:	Sussex Surveying Limited	
Report Reference:	PH2GT-2023-000003	
Version No:	1.0	
Date:	19/01/2024	
Phase 2 Report Author:	Rebecca Andrew (MSci) Environmental Consultant	
Geotechnical Report Authors:	Zoe Price (MSci) Graduate GeoEnvironmental Consultant Parminder Bhatia (MSc) Senior GeoEnvironmental Consultant	
Authorised by:	Simon Makoni (MSc) Director	

2 DISCLAIMERS

This report and any information or advice which it contains, is provided by STM Environmental Consultants Ltd (STM) and can only be used and relied upon by Sussex Surveying Limited (Client). Any party other than the Client using or placing reliance upon any information contained in this report, do so at their own risk.

STM has exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant when undertaking works of this nature. However, STM gives no warranty, representation or assurance as to the accuracy or completeness of any information, assessments or evaluations presented within this report.

This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

It should be noted that this report has been produced for environmental purposes only. It should not in any way be construed to be or used to replace a geotechnical survey, structural survey, asbestos survey, buried services survey, unexploded ordnance survey or invasive plant survey.

3 EXECUTIVE SUMMARY

SECTION	SUMMARY
Site Location and Description	The site is located at Middle House Nursery, Straight Lane, Brookland, Romney Marsh Kent, TN29 9QU and is centred at national grid reference 599336, 126042. The site has an area of approximately 0.3ha.
Proposed Development	The development proposal is for the erection of 4-8no. residential dwellings. It is understood that there are proposals to include private gardens in the development.
Summary of Phase 1 Desk Study	A Phase 1 Desk Study was carried out by STM in September 2023 which indicated that the site has been subject to past potentially contaminative land uses (PCLUs) including Nurseries and Tanks while off site PCLUs include Nurseries (adjacent E & W), B1 Light Industrial Building (adjacent E), Tanks (5m E, 5m W & 15m E), and an Infilled Pond (200m W). A conceptual risk site model was constructed and a qualitative risk assessment carried out. This identified potentially significant potential pollutant linkages with respect to human health and property receptors. The Desk Study recommended that an intrusive site investigation be carried out with the objective of determining the presence and extent of any soil contamination at the site.
Summary of Site Investigation	Site investigation works were carried out on the 25th July 2023. A total of 6no. sampling locations (BH01 – BH06) were excavated at the site for the purpose of undertaking Environmental and Geotechnical soil sampling and in-situ testing. 4no. boreholes (BH01, BH02, BH04 and BH06) were advanced to a maximum depth of 2mbgl using a hand auger. Boreholes BH03 and BH04 were advanced to depths to 3mbgl using a dynamic windowless sampling rig. Core sampling and in-situ Standard Penetration Tests (SPT) being were carried out at 1m intervals. Drilling was prematurely ceased at these depths due to encountering difficult ground conditions (i.e. running sands) preventing any further drilling. Dynamic probing was therefore undertaken adjacent to BH03 and BH04 to a depth of 8mbgl in order to supplement the information obtained from windowless sampling. A total of 9no. soil samples were collected and submitted to a UKAS/MCERTS accredited laboratory for analysis of Heavy Metals, TPH, BTEX, PAHs, Pesticides and Asbestos. An additional, 5no. disturbed soil samples were collected for Geotechnical testing and were submitted to a UKAS/MCERTS accredited laboratory for pH, Sulphate water soluble, Plasticity Index and Particle Size Distribution analysis..

SECTION	SUMMARY
Geology Encountered	Made Ground consisting of SILT mixed with polystyrene material was encountered to a maximum depth of 0.7mbgl. The Made Ground was underlain by a band of silty CLAY ranging between 0.3 – 1.05m boreholes within BH01, BH03 and BH04 only, in turn underlain by SAND to 3mbgl, the maximum depth of the boreholes. Based on the results of the Dynamic Probing, the SAND was inferred to continue to depths beyond 8mbgl.
Environmental Findings, Updated Contamination Assessment, Conclusions and Recommendations	A Generic Quantitative Risk Assessment was carried out where the results of the soil sample analysis were compared to Generic Assessment Criteria (GAC) for a residential housing with plant uptake land use scenario. None of the contaminants analysed were present in concentrations that exceeded the GAC in any of the borehole locations. The Conceptual Risk Model for the site was reassessed incorporating the results of the site investigation. None of the Potential Pollutant Linkages (PPLs) were considered to have the potential to be significant. Therefore, no remedial action is considered to be required. It is recommended that a “watching brief” is kept at all times during the development. Should any unexpected contamination be encountered then the discovery strategy outlined in this document should be followed.
Geotechnical Findings, Conclusions and Recommendations	The single in-situ SPT test carried out within the CLAY gave an N value of 3 at 1mbgl indicating that its consistency can be described as soft. The in-situ SPT testing carried out within the SAND strata gave N Values that ranged from a minimum of 3 at 1mbgl to a maximum of 6 at 3mbgl suggesting that its consistency can be described as ranging from very loose to loose. A single Clay sample tested was found to have Modified Plasticity Index of 13% indicating that the Clay has Low plasticity and Low volume change potential. The results of the Sulphate tests ranged from <10 to 14 mg/l SO₄ indicating that the tested soils fall into Class DS-1 of the Building Research Establishments (BRE) classification system Special Digest Part 1:2005 “Concrete in aggressive ground”. Numerous trees were observed that were within the potential zone of influence of the development. Root activity was not recorded within any of the boreholes. Groundwater strikes were encountered within 2no. of the boreholes (BH03 and BH06) at a depth of 2mbgl. Due to borehole collapses, resting levels were not recorded. Based on a 1m wide footing, a maximum safe allowable bearing capacity less than 30kPa was inferred for loose SANDS (Tidal Flat Deposits) encountered

SECTION	SUMMARY
	between 1 to 3mbgl across the site. This inferred bearing capacity is considered unlikely to be sufficient to support the load of the proposed development without unacceptable settlement occurring. Conventional shallow foundations are therefore deemed unlikely to be suitable for the proposed development. Pile foundations are recommended for the proposed development. Depending on the anticipated loads, the piles should be extended such that they are firmly embedded within suitably competent soils, which based on the findings of the ground investigation, are unlikely to be present at depths of 8mbgl or less. It is recommended that pile load testing is undertaken prior to undertaking the main works to allow for the assessment of the performance of the piles and for adjustments to be made. Piles should be capped with an appropriate ground beam system. There should be adequate connections between the beam and the pile to ensure that the loads are transmitted effectively or that the beams are adequately restrained to the pile to resist uplift. Shallow excavations for foundations and services are likely to require nominal side support in the short term. Deeper excavations (i.e. > 1.50mbgl) may require temporary support or shoring up in order to comply with current statutory safety regulations and to maintain the stability of the excavation sides. The results of the Water Soluble Sulphate tests indicate that conditions in which the deterioration of buried concrete due to sulphate or acid attack are unlikely to exist at the site. The final design of buried concrete should therefore be in accordance with Class DS-1 of the Building Research Establishments (BRE) classification system Special Digest Part 1:2005 "Concrete in aggressive ground" and ACEC Site Class AC-1.

4 INTRODUCTION

STM Environmental Consultants Limited were commissioned by Messrs Simon, John & Luke Roger c/o Sussex Surveying Limited (Client) to undertake a preliminary risk assessment at Middle House Nursery, Straight Lane, Brookland, Romney Marsh Kent, TN29 9QU (the site).

4.1 Development Proposals

The development proposal is for the erection of 4-8no. residential dwellings. It is understood that there are proposals to include private gardens in the development.

The proposed development plans are available in Appendix 1.

4.2 Report Objectives

The main objectives of the works were to:

- Provide information for a generic quantitative risk assessment (GQRA) to be undertaken;
- Refine the Conceptual Site Risk Model using the findings of the GQRA;
- Inform the need for and scope of any remedial works that may be required;
- Provide an interpretive report on current ground conditions to assist with the design of foundations for structures associated with a planned redevelopment at the Site.

A summary of the findings of the site investigation and risk assessment are detailed within this report.

This report should be read in conjunction with the Desk Study Report (Ref: PH1-2023-000083) produced for the site by STM Environmental Consultants in September 2023 which is summarised below.

5 SUMMARY OF DESK STUDY FINDINGS

5.1 Site Location and Description

The site is located at Middle House Nursery, Straight Lane, Brookland, Romney Marsh Kent, TN29 9QU at grid reference is 599336, 126042. The site has an area of approximately 0.3ha.

The site lies within the jurisdiction of Folkestone & Hythe District Council in terms of the planning process.

5.2 Current Site and Surrounding Land Uses

The site currently comprises a former Horticultural Nursery, with a number of portacabins located in the north of the site. The main current uses in the immediate surrounding area include Agricultural and Nursery buildings, with a small number of residential dwellings.

5.3 Published Geology and Hydrogeology

According to mapping information provided by the BGS the site is located on the superficial deposits consist of Tidal Flat deposits (Sand) underlain by bedrock geology pertaining to the Hastings beds (Subgroup - Sandstone, Siltstone and Mudstone).

Borehole logs from nearby previous site investigations provided by the BGS are presented in [Appendix 10](#).

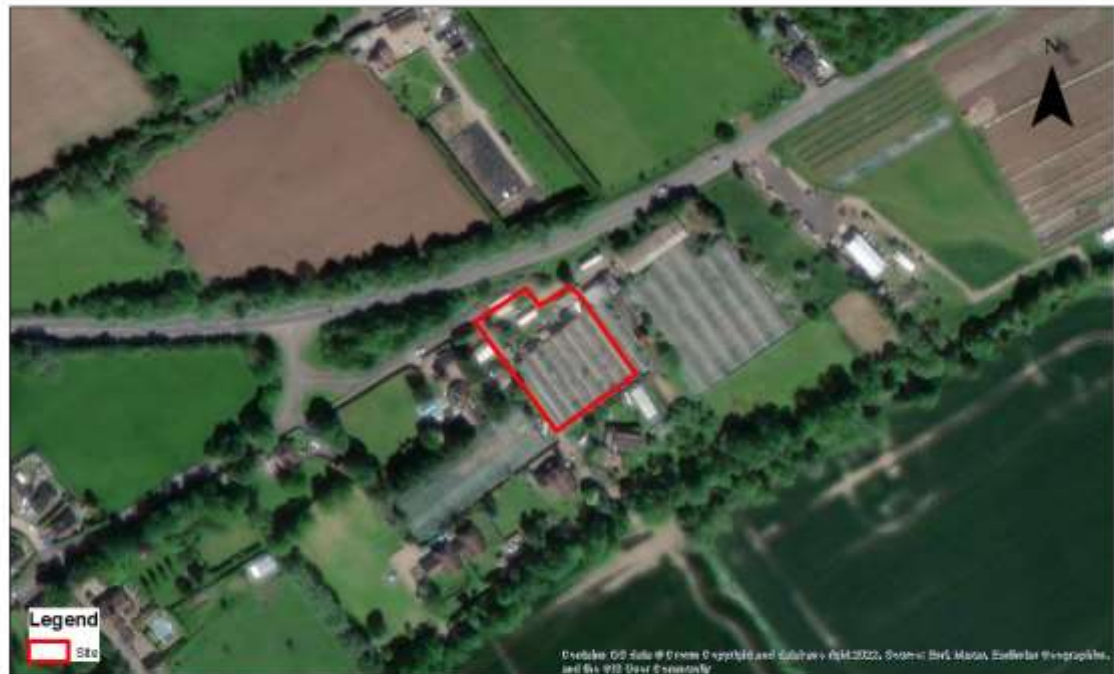


Figure 1: Site Location and Aerial Maps

According to the BGS, groundwater is likely to be encountered at depths of less than 3mbgl for at least part of the year.

The nearby boreholes logs referred to above encountered groundwater at depths of 1.2mbgl.

5.4 Site History

Examination of Ordnance Survey historic maps revealed that the site comprised open undeveloped land until c.1976, when a Nursery building was constructed in the south of the site, and 1no. small unspecified building was constructed in the north of the site. By c.2003 2no. Tanks were present north of the Nursery building, as well as 1no. unspecified building. The surrounding area has been predominantly Agricultural.

5.5 Previous Site Investigations

A search of relevant information on Folkestone & Hythe District Council's planning portal identified the following records of previous contaminated land site investigations which were undertaken at or in the vicinity of the site.

5.5.1 Pepperland Nursery, Straight Lane, Brookland, Romney Marsh TN29 9QU

A number of contaminated land reports have previously been undertaken by STM to support the redevelopment of the site. The reports summarised below were submitted in association with the planning applications Y18/0169/SH, Y18/0554/FH and 20/0294/FH/CON.

A Phase 1 Desk Study Report (ref. PH1-2018-001008) was produced for the site in February 2018. The analysis of Ordnance Survey historical maps indicated that the site has been subject to past potentially contaminative uses including Pepperland Nurseries.

A conceptual risk site model was constructed and a qualitative risk assessment carried out. This identified potentially significant potential pollutant linkages with respect to human health and property receptors. The Desk Study recommended that an intrusive site investigation be carried out with the objective of determining the presence and extent of any soil contamination at the site.

A Phase 2 Environmental Site Investigation Report (ref. PH2-2018-001006) was produced for the site in March 2018. Site investigation works were carried out on the 21st of February 2018. 8no. soil samples were taken from 4no. boreholes (BH01 – BH04) at depths ranging from 0.5 – 1.6 m. The samples were submitted to an UKAS/MCERTS accredited laboratory for analysis of heavy metals, TPH, BTEX and PAHs and Asbestos.

Analysis of the samples indicated that mean contaminant levels across the site were below the adopted Generic Assessment Criteria (GAC) for 'Residential with Plant Uptake' land use scenario. No exceedances were identified. Therefore, the report recommended that no remedial action was required. However, a Watching Brief was recommended to be kept at all times during the development.

An Addendum to Phase 2 Environmental Site Investigation Report (ref. PH2-2018-001006) was produced for the site in June 2018. Further intrusive ground investigation works were undertaken in order to assess the potential for Pesticide contamination, based on a request by the Council.

Additional site investigation works were carried out on the 5th of June 2018. 4no. topsoil samples were taken from 4no. borehole locations (BH01 – BH04) at depths ranging from 0.3 – 0.4 m. The samples were submitted to an UKAS/MCERTS accredited laboratory for analysis of Pesticides (Organochlorine and Organophosphorus) Heavy Metals, TPH, BTEX and PAHs and Asbestos.

No exceedances were identified with respect to the residential with plant uptake land use scenario. Therefore, remedial action was not considered to be required.

The submitted reports were considered to be satisfactory by the Council, and the relevant Contaminated Land Conditions were discharged for the aforementioned planning applications.

5.6 Qualitative Risk Assessment

A qualitative risk assessment was undertaken in order to assess the magnitude of the potential risks identified in the Phase 1 Report.

5.6.1 Potential Sources

Any Potentially Contaminative Land Uses (PCLs) within a 50m radius of the site as well as any PCLs with high pollution migration potential within 250m of the site were considered to be of concern and were included within the assessment.

A summary is provided in the table below.

Table 1: Summary of potential contamination sources, period of operation and distance from site.

Site Name/ Description	Industrial Profile	Approx. Year Use Established	Approx. Year Use Ended	Direction	Approx. Distance from Site (m)
Nurseries	Plant Nursery	c.1976	Current (2023)	Onsite E W	0 Adjacent Adjacent
Tanks	Tanks	c.2003	Unknown	Onsite	0
		c.1993	Unknown	E	5
		c.1976	Unknown	W	5
		c.1976	c.1993	E	15
B1 Light Industrial Building	-	Unknown	Current (2023)	E	Adjacent
Infilled Pond	Unknown Filled Ground (Pond, Marsh, River, Stream, Dock, etc)	c.1976	Current (2023)	W	200

5.6.2 Potential Receptors

Potential human health receptors were considered to include future site users, construction workers and neighbours. Property receptors were considered to include onsite buildings and services.

Data from the BGS indicates that the site is underlain by superficial deposits consisting of Tidal Flat Deposits (Sand) which are classified as a Secondary A Aquifer. The bedrock consists of Hastings Beds (Subgroup – Sandstone, Siltstone and Mudstone) and is classified as a Secondary A Aquifer. The site does not lie within a Source Protection Zone and there are recorded water abstractions on and within 500m of the site.

The nearest surface water feature is an unnamed watercourse which is located approximately 26m NW of the site.

No designated ecological receptors were identified onsite or within 250m of the site.

5.6.3 Conceptual Site Risk Model

A preliminary conceptual site risk model (CSM) was constructed in order to assess potential pollutant linkages.

Potentially significant potential pollutant linkages (PPSLs) were identified with respect to:

-  Human health receptors (PPL1a)
-  Property (PPL6a)

The desk study recommended that an intrusive site investigation be carried out to determine the presence and extent of any soil contamination at the site.

6 ENVIRONMENTAL SITE INVESTIGATION

The site investigation works were carried out on the 25th July 2023 and were undertaken in accordance with the following guidance:

-  Land contamination risk management (LCRM) guidance - DEFRA;
-  BS 10175 - Code of practice for the Investigation of potentially contaminated sites British Standard Institution;
-  BS5930:2015 Code of Practice for Ground Investigation
-  BS 8485: 2015 - Code of practice for the Characterisation and remediation from Ground Gas in Affected Developments. British Standard Institution;
-  BS8576:2013, Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs).
-  C665, 2007 - Assessing Risks posed by Hazardous Ground Gases to Buildings CIRIA.

6.1 Strategy and Scope of the Site Investigation and Risk Assessment

6.1.1 Soil Sampling Strategy

The strategy for selecting the locations of the exploratory positions was based on the conceptual source, pathway and receptor model and potentially contaminating activities identified by the Conceptual Site Model.

A total of 6no. sampling locations (BH01 – BH06) were excavated to a maximum depth of 3mbgl for Contamination and Geotechnical assessment purposes. A semi-targeted sampling strategy was used to select the locations of the exploratory positions, with boreholes being generally equally spaced out across the site, with efforts being made to ensure that samples were collected from the most sensitive areas (i.e. gardens) of the proposed development.

As the investigation was primarily focused on assessing the quality of near surface soils, environmental soil samples were collected at relatively shallow depths between 0.2 – 1.0mbgl.

A map showing the locations of boreholes and the borehole logs are available in [Appendix 2](#) and [Appendix 3](#) respectively.

6.1.2 On-site Screening of Volatile Organic Compounds

Soil from each borehole was screened on site for volatile organic compounds (VOCs) using a hand held Minirae photo-ionisation detector (PID) which has a detection limit of 0.1 parts per billion (ppb). The PID was calibrated in the field prior to use using a gas of known concentration (isobutylene gas – 100ppm).

Soil vapour readings were taken using the headspace method, which involved placing the soil sample into a sealed plastic bag and then taking a reading by placing the PID filter into the bag.

6.1.3 Sample Collection and Transport

All samples were put into sample containers (jars and tubs) that were tightly sealed with minimal headspace. The sample containers were put into a cooler box immediately on collection and kept cool until analysis was undertaken at the laboratory.

6.1.4 Laboratory Analysis

A total of 9no. soil samples were submitted to a UKAS\MCERTs accredited laboratory for analysis of the following:

- Heavy Metals – Arsenic, Boron, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Zinc;
- Petroleum Hydrocarbons (TPHCWG);
- Total Phenols - Total Phenols (monohydric);
- Monoaromatics – Benzene, Toluene, Ethylbenzene, p & m-xylene, o-xylene, MTBE (Methyl Tertiary Butyl Ether);
- Speciated PAHs – Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, Benzo(ghi)perylene;
- Total PAHs - Speciated Total EPA-16 PAHs;
- Asbestos Screening and Quantification;
- Inorganics - pH – Automated, Total Cyanide, Water Soluble Sulphate, Sulphide, Total Organic Carbon (TOC);
- Pesticides;
- SVOCs.

6.1.5 Groundwater, Ground Gas and Vapour Monitoring

Groundwater, ground gas or vapour monitoring was not carried out as part of the site investigation as no potential pollutant linkages in this respect were identified by the Desk Study. Additionally, observations (i.e. visual assessments of contamination and PID readings) and the findings of the site investigation did not indicate the need for ground gas or groundwater monitoring.

6.2 Site Investigation Findings

6.2.1 Ground Conditions

Boreholes were advanced to maximum depths up to 3mbgl. Made Ground consisting of SILT with polystyrene material, and SILT was encountered to a maximum depth of 0.7mbgl. The Made Ground was underlain by a band of silty CLAY ranging between 0.3 – 1.05m boreholes within BH01, BH03 and BH04 only, in turn underlain by SAND to 3mbgl, the maximum depth of the boreholes.

The borehole logs are shown in [Appendix 3](#) and photographs from some of the soils extracted from the boreholes are presented in [Appendix 4](#).

6.2.2 Groundwater

Groundwater was encountered during the site investigation, with water strikes encountered at 2mbgl in BH03 and BH06.

6.2.3 Visual and Olfactory Signs of Contamination

Visual indications of contamination of the Made Ground were observed (i.e. occasional polystyrene material) in BH01. No significant odours or PID readings were recorded during the investigation. The PID readings can be seen in the borehole logs shown in [Appendix 3](#).

6.3 Laboratory Sample Analysis Results

A total of 9no. soil samples were submitted for analysis. The full results of the laboratory sample analysis can be seen in [Appendix 5](#).

6.4 Risk Assessment

6.4.1 Generic Quantitative Risk Assessment (Human Health)

A Generic Quantitative Risk Assessment (GQRA) was conducted using the soil analytical results in order to further evaluate the significance of the potential pollutant linkages identified in the Preliminary Risk Assessment in the Desk Study.

6.4.2 Generic Assessment Criteria for Soils

The GAC used for the screening of the soils and their sources are outlined in the table in [Appendix 6](#). The GAC used are a combination of the DEFRA's Category 4 Screening Levels and the CIEH\LQM GAC for residential with homegrown produce land use scenario.

6.4.3 Soil Organic Matter Content

Sample results indicated that soils on the site have an average Total Organic Carbon (TOC) content of 0.75%, which based on a conversion factor of 1.72, indicates a Soil Organic Matter (SOM) of around 1.29%. Therefore, a soil organic matter content of 1% was assumed.

6.4.4 Contaminants Exceeding Generic Assessment Criteria

No exceedances were identified when the soil results were compared to LQM Suitable for Use Levels for the residential with homegrown produce land use.

6.4.5 Statistical Analysis

The results of statistical analysis are presented in [Appendix 7](#). None of the samples had means that exceeded their relevant GAC.

6.5 Asbestos

Asbestos was not detected in any of the samples analysed.

6.6 Pesticides

Pesticides were not detected above the limit of detection in any of the samples analysed.

6.6.1 Re-Assessment of Potential Pollutant Linkages

The Potential Pollutant Linkages (PPLs) identified as being plausible in the Desk Study are concerned with the following risks:

-  Risk of direct contact (ingestion and absorption) with and inhalation of contaminants to on-site human health receptors (PPL1a)
-  Risk of injury/death of on-site human health receptors as a result of explosion due to accumulation of ground gas from on and off-site sources in confined spaces within on-site dwellings. (PPL1b)
-  Risk of direct contact with (ingestion and absorption) and inhalation of contaminants to off-site human health receptors as a result of on-site contaminants migrating off-site (PPL2a)

-  Risk of injury/death to off-site human health receptors as a result of explosion due to migration of on-site ground gas and subsequent accumulation in confined spaces in off-site buildings. (PPL2b)
-  Risk of derogation of groundwater quality resulting from the migration of on-site contaminants into the underlying aquifer (PPL3)
-  Risk of derogation of surface water quality resulting from the migration and entry of on-site contaminants into the surface water receptor (PPL4)
-  Risk of derogation of ecological quality resulting from the migration and entry of on-site contaminants to the ecological receptor during development and after completion (PPL5);
-  Risk of damage to buildings and services from on-site contaminants (PPL6a)
-  Risk of damage to property as a result of explosion due to accumulation of ground gas from on and off-site sources in confined spaces within buildings (PPL6b).

The Desk Study concluded that PPL1a and PPL6a had the potential to be significant. All of the PPLs were re-assessed considering the soil analytical results obtained from site investigation. The table below presents the results of the re-assessment.

A detailed explanation of the risk assessment methodology is available in [Appendix 8](#).

Table 2: Results of Qualitative Risk Assessment.

CRITERIA	POTENTIAL POLLUTANT LINKAGES										
	PPL1a	PPL1b	PPL1c	PPL1d	PPL2a	PPL2b	PPL3	PPL4	PPL5	PPL6a	PPL6b
SEVERITY	Major (4)	Major (4)	Major (4)	Major (4)	Major (4)	Major (4)	Moderate (3)	Moderate (3)	Moderate (3)	Moderate (3)	Moderate (3)
LIKELIHOOD	Improbable (1)	Improbable (1)	Improbable (1)	Improbable (1)	Improbable (1)	Improbable (1)	Improbable (1)	Improbable (1)	Improbable (1)	Improbable (1)	Improbable (1)
RISK	Low (4)	Low (4)	Low (4)	Low (4)	Low (4)	Low (4)	Very Low (3)	Very Low (3)	Very Low (3)	Very Low (3)	Very Low (3)
POTENTIALLY SIGNIFICANT?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

6.7 Potential Risks to On-Site Human Health

PPL1a and PPL1c are concerned with the risk of direct contact (ingestion and dermal absorption) with and inhalation of on and off-site contaminants by on site human health receptors. PPL1a and PPL1c are considered unlikely to have the potential to be significant as no contaminants exceeding the relevant GAC for residential with homegrown produce land use scenario were identified.

PPL1b and PPL1d are concerned with the risk of injury/death of on-site human health receptors as a result of explosion due to the potential accumulation of ground gases and vapours from on and off-site sources. PPL1b and PPL1d are considered unlikely to have the potential to be significant as no potential sources of explosive ground gases (i.e. Landfills) were identified on or in the vicinity of the site.

6.8 Potential Risks to Off-Site Human Health

PPL2a is concerned with the risk of direct contact and inhalation of contaminants originating from the site by off-site human health receptors. PPL2a is considered unlikely to have the potential to be significant as no contaminants exceeding the relevant GAC were identified.

PPL2b is concerned with the risk of injury/death of on-site human health receptors as a result of explosion due to accumulation of ground gases from on-site sources. PPL2b is considered unlikely to be significant for the same reasons as PPL1b.

6.9 Potential Risks to Groundwater Receptors

PPL3 is concerned with the risk of deterioration of groundwater quality resulting from the migration of on-site contaminants into the underlying aquifer. PPL3 is considered unlikely to have the potential to be significant. Although the underlying aquifer is classified as Secondary A, no contaminants exceeding the relevant GAC were identified. Furthermore, no Source Protection Zones were identified at the site.

6.10 Potential Risks to Surface Water Receptors

PPL4 is concerned with the risk of negative impacts on surface water quality resulting from the migration and entry of on-site contaminants into surface water receptors. Although the nearest water course is the unnamed watercourse located 26m from the site, no contaminants exceeding the relevant GAC were identified.

6.11 Potential Risks to Ecological Receptors

PPL5 is concerned with the risk of negative ecological impacts resulting from potential on-site contaminants. PPL5 is considered unlikely to have the potential to be significant given that no designated ecological receptors were identified onsite or within 250m of the site.

6.12 Potential Risks to Property Receptors

PPL6a is concerned with the risk of damage to on site buildings and services from on and off-site contaminants. If contaminated, the soil may contain aggressive chemicals (i.e. Sulphates, VOCs) that can attack building materials and services. PPL6a is considered unlikely to have the potential to be significant as no contaminants exceeding the relevant GAC were identified.

PPL6b is concerned with the risk of damage to property as a result of explosion due to migration of on and off-site ground gases and vapours and their subsequent accumulation in confined spaces in on-site buildings. PPL6b is considered unlikely to be significant for the same reasons as PPL1b.

6.13 Environmental Conclusions and Recommendations

In response to the findings of the Desk Study carried out for the site by STM Environmental Consultants, an environmental site investigation was carried out on the 25th July 2023. The objective of the investigation was to determine the presence and extent of potential contamination at the site in order to further inform the risk assessment process.

Site investigation works were carried out on the 25th July 2023. A total of 6no. sampling locations (BH01 – BH06) were excavated to a maximum depth of 3mbgl using a hand auger and dynamic windowless sampler rig. A total of 9no. soil samples were collected and submitted to a UKAS/MCERTS accredited laboratory for analysis of Heavy Metals, TPH, BTEX, PAHs, SVOCs, Pesticides and Asbestos.

A Generic Quantitative Risk Assessment was carried out where the results of the soil sample analysis were compared to Generic Assessment Criteria (GAC) for a residential with homegrown produce land use scenario.

No exceedances were identified when the soil results were compared to LQM Suitable for Use Levels for the proposed residential with homegrown produce land use. Pesticides and Asbestos were not detected in any of the samples screened.

The Conceptual Risk Model for the site was reassessed incorporating the results of the site investigation. None of the PPLs were considered to have the potential to be significant.

The revised conceptual site risk model is summarised in Table 3 below.

Table 3: Summary of revised conceptual site risk model

Potential Receptor	Potential Pathway	Potential Hazard	PSPPL?	Risk
On-Site Human Health	Ingestion/Absorption Inhalation	Adverse health Injury/Death	No	Low
	Build-up of Methane/ VOCs in confined spaces	Explosion/ Fire Injury/Death	No	Low
Off-Site Human Health	Ingestion/Absorption Inhalation	Adverse health Injury/Death	No	Low
	Build-up of Methane/ VOCs in confined spaces	Explosion/ Fire Injury/Death	No	Low
Groundwater	Percolation/Leaching	Adverse groundwater quality	No	Very Low
Surface Water	Lateral Migration Groundwater baseflow	Adverse Surface water quality	No	Very Low
Ecology	Ingestion/Absorption	Adverse health Injury/Death	No	Very Low
Property	Physical Contact/Absorption	Damage to building and services	No	Very Low
	Build-up of Methane/ VOCs in confined spaces	Explosion/ Fire Damage to building	No	Very Low

6.13.1 Remedial Works

Given that none of the PPLs were considered to have the potential to be significant, no remedial action is considered to be required.

6.13.2 Watching Brief and Discovery Strategy

It is recommended that a “watching brief” is kept at all times during the development. Should any unexpected contamination be encountered then the discovery strategy outlined below should be followed.

-  Works should be halted if any suspicious ground conditions are identified by groundworkers;
-  The Contractor should assess the need for any immediate health and safety or environmental management control measures. If control measures are considered to be required, they should be implemented;
-  The Contractor should notify the Client’s Environmental Consultant and the Local Planning Authority;
-  The Environmental Consultant should attend the site to record the extent of ‘contamination’ and if necessary to collect samples.
-  If remedial action is considered necessary then the proposed works should be agreed with the Local Planning Authority prior to implementation;
-  Once remediation is complete, the Environmental Consultant should collate evidence of work carried out for inclusion in a Remediation Verification Report which should be submitted to the Local Planning Authority.

6.13.3 Health and Safety

Although no contaminants were identified during the site investigation, measures will be necessary to protect the health and safety of site workers during the site works. The following measures are suggested to provide a minimum level of protection.

-  Provision of appropriate Personal Protective Equipment (PPE) including protective clothing, footwear, gloves and dust masks to all groundworkers on-site. These should not be removed from site, and advice should be given on when and how they are to be used.
-  Great care should be taken to minimise the amount of dust and mud generated on-site.
-  Good practices relating to personal hygiene (i.e. washing and changing procedures) should be adhered to on-site, i.e. food and drink should only be consumed within designated areas on the site and smoking should be prohibited in all working areas.
-  Availability of site welfare;
-  Daily safety briefings

All site works should be carried out in accordance with Health and Safety Executive regulations and guidelines and the Contractor’s Construction Health and Safety Plan. Particular should be made to the Health and Safety Executive (HSE) document “Protection of Workers and the General Public during the Development of Contaminated Land”.

6.13.4 Waste Disposal

Groundworks at the site are likely to give rise to waste soils. These may require classification before removal from site to an appropriately licensed facility for treatment or final disposal. The Environment Agency’s Hazardous Waste Technical Guidance document (WM3) outlines the methodology for classifying wastes.

The contractor will need to keep a full documentary record of the waste disposal works in line with Duty of Care requirements. The record will include waste transfer notes and details of the receiving site.

Copies of all relevant documents should be provided to the Client's Environmental Consultant for inclusion in the remediation verification report.

6.13.5 Services

The Statutory Water Undertaker for the area should be contacted in relation to new services that are to be installed as part of the proposed development in order to determine their specification for the type of pipework/conduits that should be used on this site.

It is recommended that all services, and in particular potable water, should be supplied using materials that are resistant to attack and degradation to chemical attack. Reference should be made to the document '*Selection of Water Supply Pipes to be used in Brownfield Sites*', issued in January 2011 by the UK Water Industry Research.

7 GEOTECHNICAL SITE INVESTIGATION

The ground investigation works were generally in accordance with the following standards where relevant:

-  BS5930:2015 Code of Practice for Ground Investigation.
-  BS EN 1997-2 Ground investigation and testing
-  BS EN ISO 14688 Geotechnical investigation and testing – Identification and classification of soil
-  BS EN ISO 14689 Geotechnical investigation and testing – Identification and classification of rock
-  BS EN ISO 22476 Geotechnical investigation and testing - Field testing

7.1 Service and Utility Plans

The Client did not supply service and utility plans prior to undertaking the works.

All exploratory locations were cleared for buried services using a calibrated CAT scan device and hand pits were excavated to a depth of 1.2mbgl at each exploratory hole location prior to commencing drilling.

7.2 Scope of Geotechnical Works

A total of 2no. boreholes (BH03 and BH06) were excavated at the site for the purpose of undertaking geotechnical soil sampling and in-situ testing. The boreholes were advanced to 3mbgl using a dynamic windowless sampling rig. Drilling was ceased at these depths due to encountering difficult ground conditions (i.e. running sands) preventing any further drilling.

Dynamic probing was undertaken in adjacent to BH03 and BH06 to a depth of 8mbgl in the borehole in order to supplement the information obtained from windowless sampling.

In addition, a further 4no. boreholes (BH01, BH02, BH04 and BH06) were advanced to a maximum depth of 2mbgl using a hand auger as part of a Phase 2 Contamination Investigation for the site.

A summary of the boreholes undertaken is provided in the table below.

Table 4: Summary of boreholes

Borehole ID	Easting*	Northing*	Level at surface (mAOD)	Level at Base (mAOD)	Depth (m)	Comments
BH01	599365	126032	2.70	1.20	1.5	Environmental purposes only
BH02	599360	126050	2.73	0.73	2.0	
BH04	599334	126037	2.84	1.34	1.5	
BH05	599335	126021	2.82	1.32	1.5	
BH03	599348	126052	2.72	-0.28	3.0	Geo-environmental purposes
BH06	599342	126002	2.90	-0.10	3.0	Terminated due to encountering difficult ground conditions Dynamic Probing undertaken

*Note: coordinates and levels are approximate based on OS mapping and LiDAR data

A map showing the locations of the boreholes is available in [Appendix 2](#).

7.2.1 Standard Penetration Tests

In-situ Standard Penetration Tests (SPT) were undertaken at the base of the initial hand dug hole and at 1.00m intervals as the boreholes were advanced.

The tests were carried out in accordance with BS EN ISO 22476-3 and consisted of driving a 50 mm split spoon sampler into the soil with a 64 kg weight having a free fall of 760 mm. The blows required to drive the split –barrel sample a distance of 305 mm, after an initial penetration of 152 mm, is referred to as the SPT –N value. They were undertaken at the base of the initial hand dug hole and at 1.00m intervals as the boreholes were advanced.

7.2.2 Dynamic Probing Tests

Dynamic Probing Test as per BS1377: Part 9: 1990 involves the driving of a metal cone into the ground through a series of 1-metre length steel rods. These rods are driven from the surface by the hammer system on the rig which drops 63.5 kg weight onto the rods through a fall of 760mm. The number of blows that is required to drive the cone down each 100mm increment is then recorded until a required depth is reached or a refusal is achieved. The data obtained was used to estimate the depths of at the interface between the strata.

7.3 Geotechnical Sampling and Laboratory Testing

5no. disturbed samples were recovered for geotechnical analysis from a range of depths within each borehole.

The samples were put into sample containers which were typically tubs, jars or polyethylene bags and tightly sealed. The samples were then transported to the laboratory for analysis.

A programme of geotechnical laboratory testing agreed with the Client and was carried out by i2 Analytical an MCERTS/UKAS accredited laboratory. The requested testing consisted of the following:

-  pH (3no.)
-  Sulphate Water Soluble (3no.)
-  Plasticity Index (1no.)
-  Particle Size Distribution (1no.)

7.4 Findings of Geotechnical Site Investigation

7.4.1 Ground Conditions

7.4.1.1 Geology

Made Ground consisting of SILT with polystyrene material, and SILT was encountered to a maximum depth of 0.7mbgl. The Made Ground was underlain by a band of silty CLAY ranging between 0.3 – 1.05m boreholes within BH01, BH03 and BH04 only, in turn underlain by SAND to 3mbgl, the maximum depth of the boreholes.

The borehole logs from the site investigation are available in [Appendix 3](#). Photographs of the soils extracted from the boreholes are presented in [Appendix 4](#).

7.4.2 Groundwater

Groundwater strikes were encountered within 2no. of the boreholes (BH03 and BH06) at a depth of 2mbgl. Due to borehole collapses, resting levels were not recorded.

The installation of a monitoring well and subsequent groundwater level monitoring was not undertaken as part of the works.

It should be noted that due to seasonal variations, accurate groundwater levels can only be determined through long term measurements in monitoring wells.

7.4.3 Trees

The undertaking of an arboriculture/tree survey was not part of the scope of works. Therefore, the opinions provided in this section in relation to tree heights and species are provided for information only and should not be relied upon. It is recommended that a tree identification survey is undertaken by a suitably qualified Arboriculturist.

Numerous trees were observed that were within the potential zone of influence of the development. The trees, whose species could not be identified, were estimated to be located approximately 5-15m from the proposed developments and had heights ranging up to approximately 10m.

7.4.3.1 Root Activity

Root activity was not recorded within any of the boreholes.

7.4.4 Results of Standard Penetration Tests

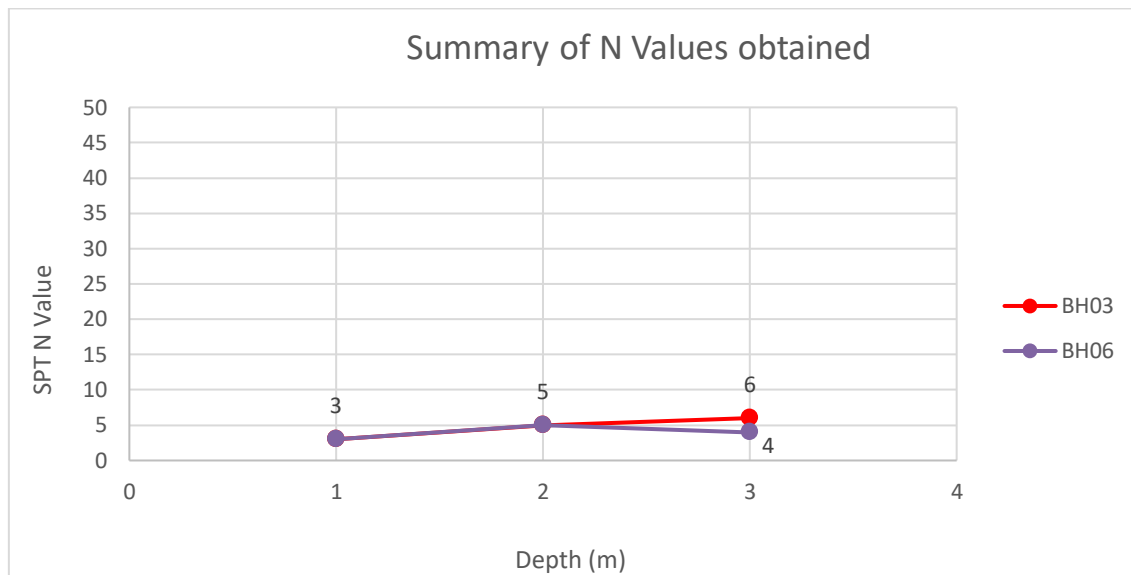
The results of the in-situ Standard Penetration Tests (SPT) are presented on the borehole logs in [Appendix 3](#) and in tabular form in [Appendix 6](#).

A statistical summary of the results is presented in Table 5 below.

Table 5: Statistical Summary of N Values

Depth (mbgl)	No. of Values	Average N Value	Minimum N Value	Maximum N Value
1	3	3	3	3
2	3	5	5	5
3	3	5	4	6

Figure 2: Graph Summary of N Values



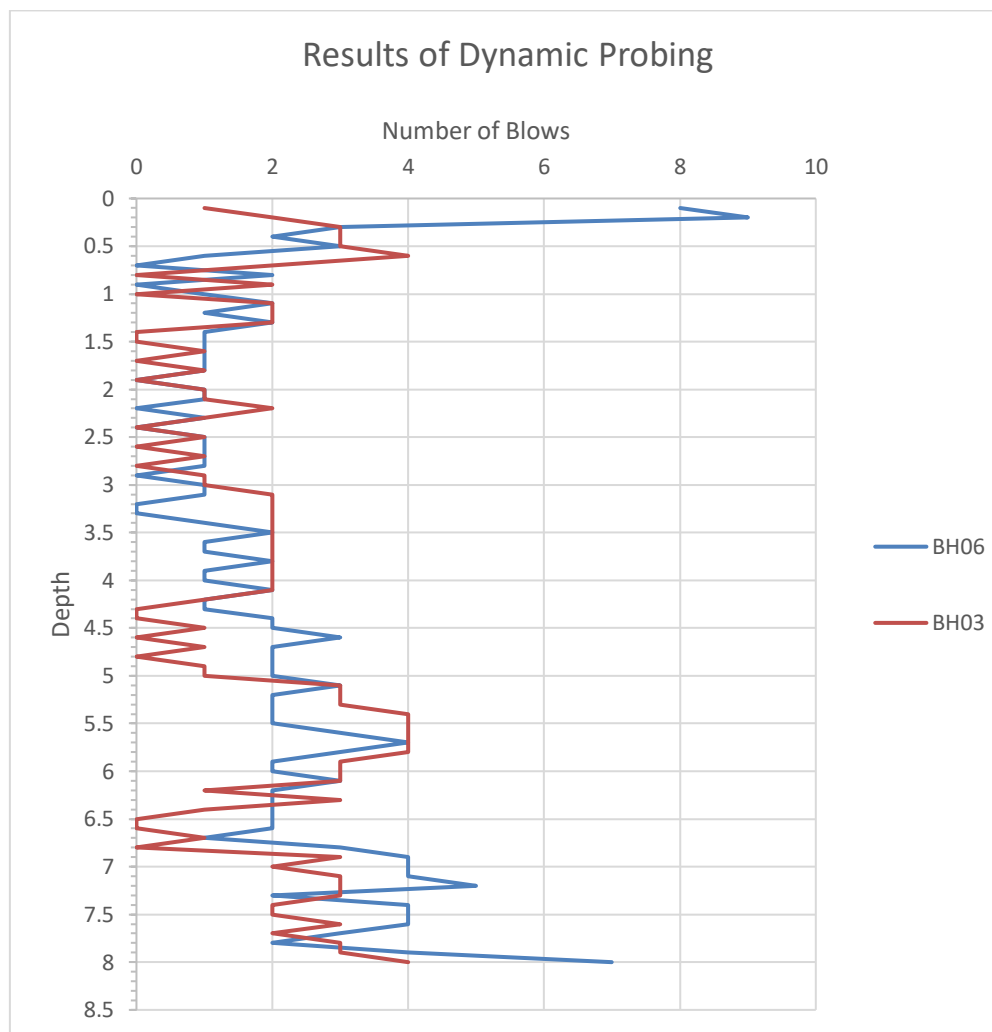
7.4.5 Results of Dynamic Probing

Dynamic probing was undertaken at boreholes BH03 and BH06 to a depth of 8mbgl. Equivalent SPT 'N' values (NDP), were derived from the DP results in order to determine general strength properties of the ground. The last 3no. consecutive DP results from each metre were summed to give a lower estimate of the equivalent N value (NDPL). The NDPL was then multiplied by a factor of 1.5 to give an upper range equivalent N value (NDPU) in order to account for the reduction in friction experienced when undertaking dynamic probing, when compared to when undertaking standard SPTs. The results are summarised in Table 2 below.

Table 6: Dynamic Probe Results with estimated N values

DEPTH (M)	DYNAMIC PROBING READINGS (100MM INCREMENTS)										ESTIMATED N VALUE RANGE (NDP)
BH03	100	100	100	100	100	100	100	100	100	100	
1	1	2	3	3	3	4	2	0	2	0	2-3
2	2	2	2	0	0	1	0	1	0	1	2-3
3	1	2	1	0	1	0	1	0	1	1	2-3
4	2	2	2	2	2	2	2	2	2	2	6-9
5	2	1	0	0	1	0	1	0	1	1	2-3
6	3	3	3	4	4	4	4	4	3	3	10-15
7	3	1	3	1	0	0	1	0	3	2	5-8
8	3	3	3	2	2	3	2	3	3	4	10-15
BH06	100	100	100	100	100	100	100	100	100	100	
1	8	9	3	2	3	1	0	2	0	1	3-5
2	2	1	2	1	1	1	1	1	0	1	2-3
3	1	0	1	0	1	1	1	1	0	1	2-3
4	1	0	0	1	2	1	1	2	1	1	4-6
5	2	1	1	2	2	3	2	2	2	2	6-9
6	3	2	2	2	2	3	4	3	2	2	7-11
7	3	2	2	2	2	2	1	3	4	4	11-17
8	4	5	2	4	4	4	3	2	4	7	13-20

Figure 3: Graph showing Results of Dynamic Probing



7.4.6 Laboratory Test Results

Copies of all laboratory test certificates are available in [Appendix 5](#).

7.4.7 Plasticity Index Analysis

Atterberg Limit tests were carried out on 1no. sample retrieved from borehole BH03 at a depth of 1.2mbgl. The results of the index testing are summarised in Table 7 below.

Table 7: Summary of Classification Test Results

Borehole ID	Depth (mbgl)	Sample Description	Plasticity Index (PI) (%)	Modified Plasticity Index (MPI) (%)	Classification	Volume Change Potential
BH03	1.2	Silty CLAY	15	13	CL	Low

The sample tested produced results of “CL” (Clay of low plasticity).

The sample was found to have a Modified Plasticity Index value of 13% indicating that the volume change potential of the Clay is Low.

7.4.8 Particle Size Distribution Analysis

Particle size distribution analysis was carried out on 1no. soil sample. The results are available in [Appendix 4](#) and are summarised in Table 8 below.

Table 8: Summary of PSD Results

Borehole ID	Depth (m)	% Very Coarse	% Gravel	% Sand	% Fines	Lab Sample Description
BH06	1-1.5	0	0	92	8	Silty SAND

7.4.9 pH and Sulphate Analyses

pH and Water-Soluble Sulphate content analyses were carried out on 3no. soil samples. The results are available in [Appendix 4](#) and are summarised in Table 9 below.

Table 9: Summary of pH and Sulphate Test Results

Borehole ID	BH03	BH06	BH06
Sample Depth (m)	2	1	3
Sulphate Results (mg/l)	14	<10	11
pH	8.6	8.7	8.9

The pH values were variable and ranged from 8.6 to 8.9, indicating that alkaline soil conditions exist at the site.

The results of the Sulphate tests ranged from <10 to 14 mg/l SO₄.

7.5 Geotechnical Conclusions and Recommendations

7.5.1 Ground Model

Based on the results of ground investigation to date the simplified ground model for preliminary design is given in Table 10 below.

Table 10: Simplified Ground Model

Stratum	Maximum Observed Extent (mbgl)		Inferred Geological Member	
	From	To		
Made Ground/ SILT	0.0	0.7	n/a	-
Silty CLAY (BH01, BH03, BH04 only)	0.7	1.65	Tidal Flat Deposits	-
SAND	0.5	3.0		-
SAND	3	8.0>	?	Inferred from dynamic probing

7.5.2 Allowable Bearing Capacity of the Soils

The investigation encountered ground conditions that were generally consistent with the published geological records of the area.

The single in-situ SPT test carried out within the CLAY gave an N Value of 3 at 1mbgl indicating that its consistency can be described as soft.

The in-situ SPT testing carried out within the SAND strata gave N Values that ranged from a minimum of 3 at 1mbgl to a maximum of 6 at 3mbgl suggesting that its consistency can be described as ranging from very loose to loose.

The presence of a high groundwater table in sandy or gravel soils is an important consideration with regard to foundation construction as any future rise of water table may cause additional settlement, which can jeopardize the integrity of the structure. In these situations, it is important to keep foundations as high as possible because the bearing capacity of the ground can be as little as half when water is present. In this case groundwater was encountered at a minimum depth of 2mbgl. Therefore the calculated bearing capacities were reduced to take into account the high groundwater table.

The inferred allowable bearing capacities by depth are summarised in Table 11 below. It should be noted that for prudence, the values are based on the minimum measured N values obtained from testing.

Table 11: Inferred Allowable Bearing Capacities

Depth (mbgl)	Strata Description	Minimum N Value	Minimum Estimated N value derived from Dynamic Probing	Average Estimated N value derived from Dynamic Probing	Presumptive Bearing Capacity (kPa) ^(a)	Allowable Bearing Capacity (kPa)
1	Soft CLAY/ Very Loose SAND	3	2-3	2.5-4		<30 ^(b&c)
2	Loose SAND	5	2-3	2-3	<75	<30 ^(c)
3		4	2-3	2-3		
4			4-6	5-7.5		
5	*Loose SAND	n/a	2-3	4-6	<200	<75 ^(c)
6			7-11	8.5-13		
7			5-8	8-12.5		
8			10-15	11.5-17.5		

*Inferred from Dynamic Probing

a. For preliminary design purposes, BS 8004:2015 Code of practice for foundations gives typical values of allowable bearing capacity which should result in an adequate factor of safety against shear failure without accounting for the settlement criteria. Acceptable settlement is often taken to lie within the range of 10-25mm, but is structure dependent. Anticipated settlement can be calculated using elastic methods and will vary according to foundation shape and soil stiffness.

b. Stroud and Butler's (1975) graph which shows $C_u = 4.5N$ for $PI > 30\%$, and increasing to $C_u = 8N$ for low plasticity clays ($PI = 15\%$). Allowable Bearing Capacity is assumed to be equal to $2 * C_u$.

c. Meyerhof (1956) and Terzaghi & Peck (1996).

7.6 Influence of Trees on Required Foundation Depth

The NHBC recommends that except where founded on rock, any strip foundations should have a minimum depth of 450mm, measured from finished ground level, to their underside to avoid the action of frost. The depth of the foundation will however need to be varied depending on whether the building is likely to be in the zone of influence of trees and the volume change potential of the bearing strata.

The underlying soils at the site have been shown to be predominantly granular and non-shrinkable. However, in this case areas of the site contain both Clay soils and are in the zone of influence of trees meaning that special precautions may need to be taken to protect against subsidence and/or heave.

The [NHBC foundation depth calculator](#) was used to determine the minimum foundation required for the development. The nearest trees are noted to be situated approximately 5m from the proposed development. The trees were unknown which are considered to have a high water demand. The Clay was found to have a maximum Modified Plasticity Index of 13% indicating a low volume change potential. The slope of the site was considered to be less than 1 in 7. The results of the calculation, which are available in [Appendix 8](#), indicate that a minimum required foundation depth of 1.1m.

7.7 Foundation Assessment

The information presented in this section is concerned with the potential applicability of a variety of foundation types for the proposed development. It largely based on technical guidance issued by the NHBC (to which the user is referred for further clarification). Materials and workmanship should meet the requirements set out in this guidance.

The advice of a specialist Structural Engineer (and a specialist piling contractor if relevant) should be sought before proceeding with any foundation design. Structural calculations should be provided by the appointed Structural Engineer, confirming that the foundation design is suitable for bearing onto the ground, and that the ground bearing capacity safely supports the structure without unacceptable settlement before commencing any development.

It is proposed to construct 4-6no. residential dwellings. The precise details of the anticipated foundation design were not available at the time of writing. Consequently, the observations presented below are relatively generic.

7.7.1 Conventional Shallow Foundations

Conventional shallow foundations (i.e. strip, trench fill, pad foundations formed at 2.5mbgl or less) are typically used where the loads imposed by a structure are low relative to the bearing capacity of the surface soils. The surface soil should have sufficient bearing capacity, and underlying weaker strata should not result in undue settlement.

Conventional strip foundations may be constructed practically and economically to a maximum depth of 2.5m. Trench fill foundations are likely to be most economic at depths below 1.5m but can be economic to depths up to 2.5m. Any foundation greater than 2.5mbgl would need to be designed by a suitably qualified Structural Engineer taking account of the likely movement of the soil on the foundations and substructure.

As discussed in section 7.6, due to the need to protect against shrinkage and/or heave, the minimum required foundation depth required for the proposed development is 1.1m.

With regard to the bearing capacity of the soils, based on a 1m wide footing, a maximum safe allowable bearing capacity of less than 30kPa was inferred for loose SANDS (Tidal Flat Deposits) encountered between 1-3mbgl across the site. This is considered unlikely to be sufficient to support the loads of the proposed dwellings without unacceptable settlement occurring. Therefore, conventional shallow foundations are deemed unlikely to be suitable for the proposed development.

7.7.2 Pile Foundations

Pile foundations are recommended for the proposed development. Dependant on the anticipated loads, the piles should be extended such that they are firmly embedded within suitable competent soils. Based on the findings of the investigation, such competent soils (i.e. bedrock geology pertaining to the Hasting beds), are unlikely to be encountered at depths of 8mbgl or less.

It is recommended that pile load testing is undertaken prior to undertaking the main works to allow for the assessment of the performance of the piles and for adjustments to be made.

Piles should be capped with an appropriate ground beam system. There should be adequate connections between the beam and the pile to ensure that the loads are transmitted effectively or that the beams are adequately restrained to the pile to resist uplift.

In this case given the high groundwater table and the cohesive soils, driven piles are considered unlikely to be suitable for the site as they would result in an increase in pore water pressure and decrease in the bearing capacity of the soil.

As it is beyond the scope of works to provide a full and detailed pile design, the advice of a specialist structural engineer and piling contractor should be sought in this respect.

7.8 Excavations

Shallow excavations (<1.5mbgl) for foundations and services are likely to require nominal side support in the short term. Temporary trench support, or battering of excavation sides, is likely to be required for all excavations that are to be left open for any length of time or where man entry is required. Normal safety precautions should be taken if excavations are to be entered.

Deeper excavations (i.e. > 1.50mbgl) or excavation below the groundwater table are likely to become unstable and may require temporary support (i.e. props) or shoring up in order to comply with current statutory safety regulations and to maintain the stability of the excavation sides. A sheet piled or contiguous piled wall could be used provide stability in this instance.

In line with BS:6031 (2009), a risk assessment of the stability of any open excavation should be undertaken by a competent person and appropriate measures adopted to ensure safe working practise in and around open excavations. Further guidance on responsibilities and requirements for working near, and in, excavations can be obtained from the Construction Design and Management Regulations (2015).

7.9 Groundwater Control

Recorded groundwater levels are generally shallow. As any inflows into excavations could promote instability, it is recommended that temporary works measures include an allowance for groundwater control.

Any dewatering shall avoid lowering the groundwater table outside the works outside acceptable limits.

Any water pumped from excavations is likely to need to be passed via settlement tanks before being discharged to the sewer, which may require discharge consents.

7.10 Chemical Attack on Buried Concrete

The soil samples tested were found to have water soluble sulphate contents ranging from <10mg/l to 14mg/l associated with alkaline pH values. The characteristic value (i.e. average of the highest two values) was calculated to be 12 mg/l indicating that the tested soils fall into Class DS-1 of the Building Research Establishments classification system Special Digest Part 1:2005 "Concrete in aggressive ground" (BRESO).

In these conditions, it is considered that deterioration of buried concrete due to sulphate or acid attack is not likely to occur. The final design of buried concrete according to Tables C1 and C2 of BRESO

should be in accordance with Class DS-1 conditions and Aggressive Chemical Environment for Concrete ACEC Site Class AC-1.

8 INFORMATION GAPS AND UNCERTAINTIES

Assumptions have been made regarding the nature and scale of the activities that took place on the site and the types of potential contaminants that may have resulted. There are therefore a number of uncertainties associated with the investigation which include, but are not limited to, the following:

-  This report is based on data obtained from the chosen sampling locations only. Although efforts have been made to ensure adequate coverage of the site when designing the investigation, it is nonetheless possible that (as with any site investigation) there may be locations which were not sampled where localised pockets of contamination exist.
-  The site investigation and risk assessment were designed to investigate only the most likely contaminants associated with the former industrial use. The presence of additional unknown contaminants cannot be discounted.

These uncertainties will need to be reviewed along with the Conceptual Site Risk Model should further information come to light in the future.

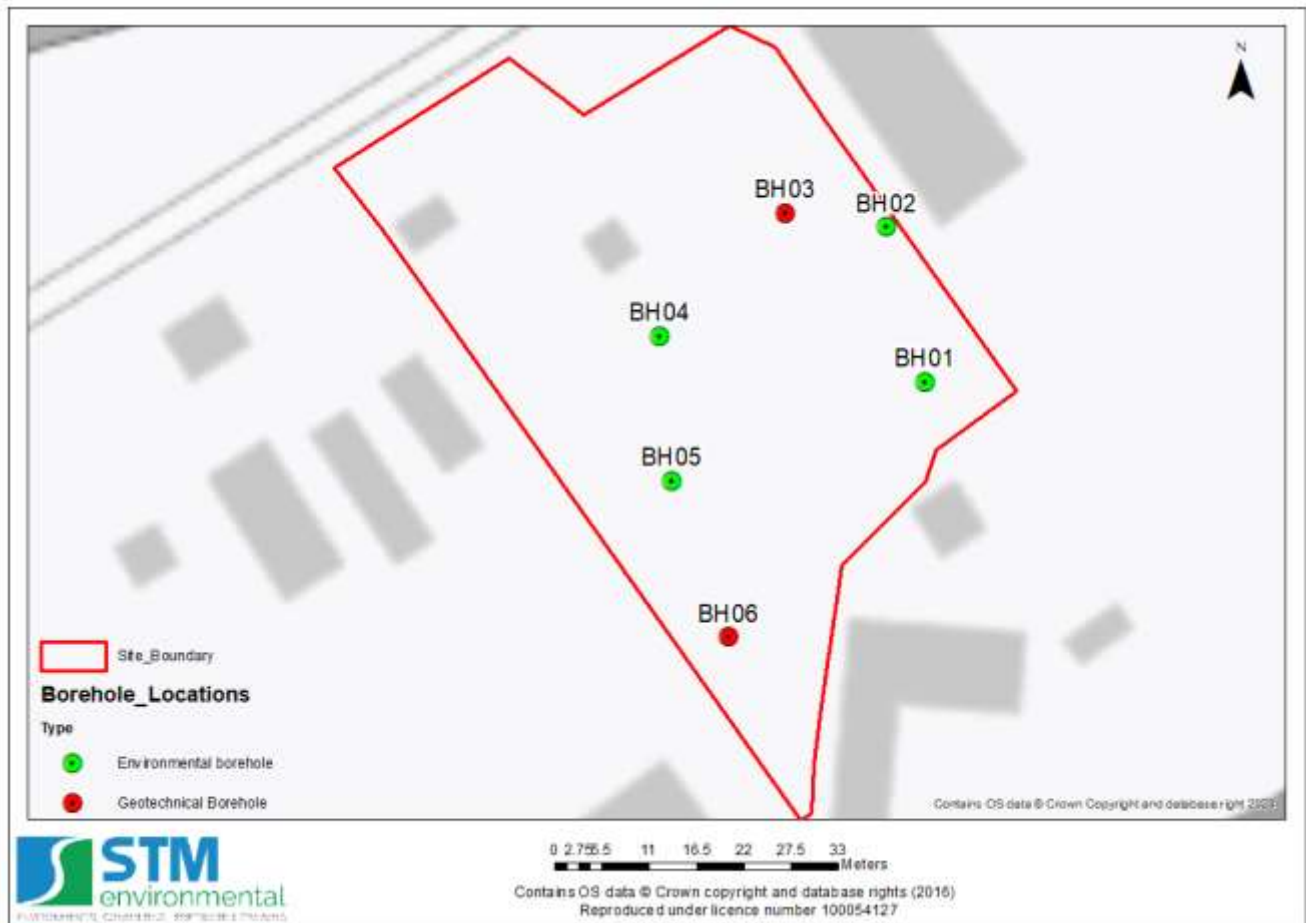
9 APPENDICES

9.1 Appendix 1 – Proposed Development Plans



Notes	CDM 2015	Rev	Date	Description	KENT DESIGN STUDIO KDS web - www.kentdesignstudio.co.uk tel - 01580 230413 Scale As Noted @ A1 Date Sept '22 EXISTING	Project Title Works at: Middlehouse Nursery, Straight lane, Brookland, Romney Marsh, Kent, TN29 9QU	Description Site Location and Existing Site Plan
Do Not Scale (unless for the purposes of planning). Report all discrepancies, errors and omissions. Verify all dimensions on site before commencing any work on site or preparing shop drawings. All materials, components and workmanship are to comply with the relevant British Standards, Codes of Practice, and appropriate manufacturers recommendations that from time to time shall apply. For all specialist work, see relevant drawings. This drawing is copyright of Kent Design Studio Ltd	Under the CDM regulations 2015, the client will need to employ a principal designer and principal contractor to assist in the health and safety process and co-ordinate health and safety matters. Further advice with regards to the clients duties and the duties of the principal designer & principal contractor can be found on the Internet (such as CONIAC Industry Guidance & HSE website), or alternatively you should take advice from a suitably qualified company. This drawing, together with an asbestos survey or any other surveys and record drawings / information that the client has on the building or site such as service locations should be passed on to the contractor. Our brief does not extend to principal designer role, so the principal contractor will be responsible for developing health and safety file during construction and handing it over to the client as an as built health and safety file.						Drawing Number 3979_100A Drawn By - KGJ

9.2 Appendix 2 - Borehole Location Plan



9.3 Appendix 3 - Borehole Logs

					Borehole Log			Borehole No. BH01 Sheet 1 of 1	
Project Name: Middle House Nursery					Project No. PH2GT-2023-000003		Co-ords: 599365.00 - 126032.00		Hole Type HA
Location: Straight Lane, Brookland, Kent, TN29 9QU					Level: 2.70		Scale 1:50		
Client: Roger and Sons					Dates: 25/07/2023 - 25/07/2023		Logged By M. Forshaw/ Z. Price		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES		0.25	2.45		Made Ground - Dark brown SILT with occasional polystyrene material	1 2 3 4 5 6 7 8 9 10
					0.50	2.20		Dark brown SILT	
								Dark and light brown very silty CLAY	
									
									
									
									
									
									
									
		1.00	D		1.25	1.45		Brownish red very silty SAND	
					1.50	1.20	End of borehole at 1.50 m		
Remarks Borehole advanced to a maximum depth of 1.5mbgl. No groundwater encountered. Elevation levels and borehole location grid references are approximated based on LiDAR data.									

					Borehole Log			Borehole No. BH02 Sheet 1 of 1		
Project Name: Middle House Nursery					Project No. PH2GT-2023-000003		Co-ords: 599360.00 - 126050.00		Hole Type HA	
Location: Straight Lane, Brookland, Kent, TN29 9QU					Level: 2.73		Scale 1:50			
Client: Roger and Sons					Dates: 25/07/2023 - 25/07/2023		Logged By M. Forshaw/ Z. Price			
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.20	ES		0.20	2.53	XXXXX	Dark brown SILT	1 2 3 4 5 6 7 8 9 10	
		0.40			0.40	2.33	XXXXX	Brownish yellow very silty SAND		
		1.00	ES							Light brownish grey SAND
					2.00	0.73		End of borehole at 2.00 m		
Remarks Borehole advanced to a maximum depth of 2mbgl. No groundwater encountered. Elevation levels and borehole location grid references are approximated based on LiDAR data.										



				Borehole Log				Borehole No. BH06 Sheet 1 of 1	
Project Name: Middle House Nursery				Project No. PH2GT-2023-000003		Co-ords: 599342.00 - 126002.00		Hole Type WLS	
Location: Straight Lane, Brookland, Kent, TN29 9QU				Level: 2.90		Scale 1:50			
Client: Roger and Sons				Dates: 25/07/2023 - 25/07/2023		Logged By M. Forshaw/ Z. Price			
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES		0.40	2.50	XXXXXX	Turf over, dark brown SILT	
					0.70	2.20	XXXXXX	Light brown very sandy SILT	
		1.00	B	N=3 (3,1/1,1,0,1)					1
		1.00							
		2.00		N=5 (1,2/1,2,1,1)					2
		3.00	D	N=4 (2,1/1,0,2,1)	3.00	-0.10			3
		3.00							
									End of borehole at 3.00 m
								5	
								6	
								7	
								8	
								9	
								10	
Remarks Borehole advanced to a maximum depth of 3mbgl. Water strike encountered at 2mbgl. Dynamic probing undertaken to 8mbgl. Elevation levels and borehole location grid references are approximated based on LiDAR data.									

9.4 Appendix 4 - Photographs



Image of the Windowless Sampler Rig in operation



Image of the 1st to 1.5th metre (left to right) of sample retrieved from BH01



Image of the 1st to 2nd metre (left to right) of sample retrieved from BH02



Image of the SAND sample retrieved from BH02



Image of the 1st to 3rd metre (left to right) of sample retrieved from BH03



Image of the Silty CLAY sample retrieved from BH03



Image of the 1st to 1.5th metre (left to right) of sample retrieved from BH04



Image of the SAND sample retrieved from BH04



Image of the 1st to 1.5th metre (left to right) of sample retrieved from BH05



Image of the 1st to 3rd metre (left to right) of sample retrieved from BH06



Image of the SAND sample retrieved from BH06

9.5 Appendix 5 – Laboratory Certification

Certificate of Analysis

Client: STM ENVIRONMENTAL

Project: 23073321

Quote: BEC230228809 V2.1

Project Ref: Middle House

Site: Middle House

Contact: Parminder Bhatia

Address: Unit 6, Crane Mews
32 Gould Road
Twickenham
London
TW2 6RS

E-Mail: Parminder@stmenvironmental.co.uk

Phone: 07760469516

No. Samples Received: 9

Date Received: 28/07/2023

Analysis Date: 11/08/2023

Date Issued: 11/08/2023

Report Type: Final Version 01

This report supersedes any versions previously issued by the laboratory



epor e y epor ng cer
Aniko Gondolne-Mantler
01283 554434



Client: STM ENVIRONMENTAL
Project Name: Middle House-Middle House
Project No: 23073321
Date Issued: 11/08/2023

Samples Analysed

<u>Text ID</u>	<u>Sample Reference</u>	<u>Sampling Date</u>	<u>Sample Type</u>	<u>Sample Description</u>
23073321-001	BH01/1-0-ES-0.30-0.50	25/07/2023 10:00:00	SOLID	Soil Sample
23073321-002	BH01/2-0-ES-0.30-0.50	25/07/2023 10:00:00	SOLID	Soil Sample
23073321-003	BH02/1-0-ES-0.40-0.40	25/07/2023 10:00:00	SOLID	Soil Sample
23073321-004	BH02/2-0-ES-1.00-1.00	25/07/2023 10:00:00	SOLID	Soil Sample
23073321-005	BH03/1-0-ES-0.40-0.40	25/07/2023 10:00:00	SOLID	Soil Sample
23073321-006	BH04/1-0-ES-0.30-0.30	25/07/2023 10:00:00	SOLID	Soil Sample
23073321-007	BH05/1-0-ES-0.20-0.40	25/07/2023 10:00:00	SOLID	Soil Sample
23073321-008	BH05/3-0-ES-0.20-0.40	25/07/2023 10:00:00	SOLID	Soil Sample
23073321-009	BH06/1-0-ES-0.30-0.30	25/07/2023 10:00:00	SOLID	Soil Sample

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006	007
					Customer ID	BH01/1-0-ES-0.30-0.50	BH01/2-0-ES-0.30-0.50	BH02/1-0-ES-0.40-0.40	BH02/2-0-ES-1.00-1.00	BH03/1-0-ES-0.40-0.40	BH04/1-0-ES-0.30-0.30	BH05/1-0-ES-0.20-0.40
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023
>C6-C8 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg [^]	UM		<0.223		<0.252			<0.238	
>C7-C8 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.01	mg/kg [^]	UM		<0.011		<0.013			<0.012	
>C8-C10 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg [^]	UM		<0.223		<0.252			<0.238	
>C8-C10 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.04	mg/kg [^]	UM		<0.045		<0.051			<0.048	
C5-C6 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg [^]	UM		<0.223		<0.252			<0.238	
C5-C7 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.01	mg/kg [^]	UM		<0.011		<0.013			<0.012	
Total GRO C5-C10 HS_1D_Total	GROHSA/BTEXHSA	0.2	mg/kg [^]	UM		<0.223		<0.252			<0.238	
pH (2.5:1 extraction)	PHSOIL	1	pH units	UM		6.1		7.9	8.6		6.0	6.3
Phenol Index	SFAPI	0.5	mg/kg [^]	U		<0.6		<0.6	<0.5		<0.6	<0.6
Sulphide as S	SFAPI	0.5	mg/kg [^]	N		<0.6		<0.6	<0.5		<0.6	<0.6
Total Cyanide	SFAPI	0.5	mg/kg [^]	UM		<0.6		<0.6	<0.5		<0.6	<0.6
Total Organic Carbon	WSLM59	0.02	% m/m [^]	U		1.01		0.54	0.40		1.27	0.80
Arsenic as As	ICPMSS	0.3	mg/kg [^]	UM		18.5		11.8	15.3		15.6	9.5
Cadmium as Cd	ICPMSS	0.2	mg/kg [^]	UM		0.2		<0.2	<0.2		<0.2	<0.2
Copper as Cu	ICPMSS	1.6	mg/kg [^]	UM		11.5		4.5	10.7		8.0	3.0
Lead as Pb	ICPMSS	0.7	mg/kg [^]	UM		22.5		7.1	24.1		13.5	4.8
Mercury as Hg	ICPMSS	0.5	mg/kg [^]	UM		<0.5		<0.5	<0.5		<0.5	<0.5
Nickel as Ni	ICPMSS	2	mg/kg [^]	UM		10.5		7.2	9.2		11.8	6.0
Selenium as Se	ICPMSS	0.5	mg/kg [^]	UM		<0.5		<0.5	<0.5		<0.5	<0.5

Client: STM ENVIRONMENTAL
Project Name: Middle House-Middle House
Project No: 23073321
Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	
					Customer ID	
					Sample Type	
					Sampling Date	
>C6-C8 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM	008 BH05/3-0-ES-0.20-0 .40	009 BH06/1-0-ES-0.30-0 .30
>C7-C8 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.01	mg/kg^	UM	SOLID	SOLID
>C8-C10 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM	25/07/2023	25/07/2023
>C8-C10 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.04	mg/kg^	UM		
C5-C6 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM		<0.266
C5-C7 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.01	mg/kg^	UM		<0.013
Total GRO C5-C10 HS_1D_Total	GROHSA/BTEXHSA	0.2	mg/kg^	UM		<0.266
pH (2.5:1 extraction)	PHSOIL	1	pH units	UM		7.2
Phenol Index	SFAPI	0.5	mg/kg^	U		<0.7
Sulphide as S	SFAPI	0.5	mg/kg^	N		<0.7
Total Cyanide	SFAPI	0.5	mg/kg^	UM		<0.7
Total Organic Carbon	WSLM59	0.02	% m/m^	U		0.47
Arsenic as As	ICPMSS	0.3	mg/kg^	UM		13.3
Cadmium as Cd	ICPMSS	0.2	mg/kg^	UM		<0.2
Copper as Cu	ICPMSS	1.6	mg/kg^	UM		10.1
Lead as Pb	ICPMSS	0.7	mg/kg^	UM		14.8
Mercury as Hg	ICPMSS	0.5	mg/kg^	UM		<0.5
Nickel as Ni	ICPMSS	2	mg/kg^	UM		10.1
Selenium as Se	ICPMSS	0.5	mg/kg^	UM		<0.5



Client: STM ENVIRONMENTAL
Project Name: Middle House-Middle House
Project No: 23073321
Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006	007
					Customer ID	BH01/1-0-ES-0.30-0.50	BH01/2-0-ES-0.30-0.50	BH02/1-0-ES-0.40-0.40	BH02/2-0-ES-1.00-1.00	BH03/1-0-ES-0.40-0.40	BH04/1-0-ES-0.30-0.30	BH05/1-0-ES-0.20-0.40
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023
Total Chromium as Cr	ICPMSS	1.2	mg/kg^	UM		19.7		13.2	17.7		19.3	11.4
Zinc as Zn	ICPMSS	16	mg/kg^	UM		68.1		28.0	61.5		43.5	20.9
Boron as B	ICPBOR	0.5	mg/kg^	UM		3.3		2.5	1.8		3.3	2.5
Acid Soluble Sulphate as SO4	ICPACIDS	20	mg/kg^	UM		469		305	289		464	535
Benzene HS_1D_AR	BTEXHSA	10	µg/kg^	UM		<11		<13			<12	
Ethylbenzene HS_1D_AR	BTEXHSA	10	µg/kg^	UM		<11		<13			<12	
m/p-Xylene HS_1D_AR	BTEXHSA	20	µg/kg^	UM		<22		<25			<24	
o-Xylene HS_1D_AR	BTEXHSA	10	µg/kg^	UM		<11		<13			<12	
Toluene HS_1D_AR	BTEXHSA	10	µg/kg^	UM		<11		<13			<12	
1,2,3,4-Tetrachlorobenzene	PESTSW-OCP	1	µg/kg^	N			<1.28			<1.24		
1,2,3-Trichlorobenzene	PESTSW-OCP	1	µg/kg^	N			<1.28			<1.24		
1,3,5-Trichlorobenzene	PESTSW-OCP	1	µg/kg^	N			<1.28			<1.24		
2,6-Dichlorobenzonitrile	PESTSW-OCP	1	µg/kg^	N			<1.28			<1.24		
Aldrin	PESTSW-OCP	2	µg/kg^	N			<2.55			<2.48		
Alpha-HCH	PESTSW-OCP	2	µg/kg^	N			<2.55			<2.48		
Beta-HCH	PESTSW-OCP	2	µg/kg^	N			<2.55			<2.48		
Chlorthalonil	PESTSW-OCP	2	µg/kg^	N			<2.55			<2.48		
cis-Chlordane	PESTSW-OCP	2	µg/kg^	N			<2.55			<2.48		
cis-Permethrin	PESTSW-OCP	3	µg/kg^	N			<3.83			<3.72		

Client: STM ENVIRONMENTAL
Project Name: Middle House-Middle House
Project No: 23073321
Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	008	009
					Customer ID	BH05/3-0-ES-0.20-0.40	BH06/1-0-ES-0.30-0.30
					Sample Type	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023
Total Chromium as Cr	ICPMSS	1.2	mg/kg^	UM			17.1
Zinc as Zn	ICPMSS	16	mg/kg^	UM			47.7
Boron as B	ICPBOR	0.5	mg/kg^	UM			2.8
Acid Soluble Sulphate as SO4	ICPACIDS	20	mg/kg^	UM			277
Benzene HS_1D_AR	BTEXHSA	10	µg/kg^	UM			<13
Ethylbenzene HS_1D_AR	BTEXHSA	10	µg/kg^	UM			<13
m/p-Xylene HS_1D_AR	BTEXHSA	20	µg/kg^	UM			<27
o-Xylene HS_1D_AR	BTEXHSA	10	µg/kg^	UM			<13
Toluene HS_1D_AR	BTEXHSA	10	µg/kg^	UM			<13
1,2,3,4-Tetrachlorobenzene	PESTSW-OCP	1	µg/kg^	N		<1.28	
1,2,3-Trichlorobenzene	PESTSW-OCP	1	µg/kg^	N		<1.28	
1,3,5-Trichlorobenzene	PESTSW-OCP	1	µg/kg^	N		<1.28	
2,6-Dichlorobenzonitrile	PESTSW-OCP	1	µg/kg^	N		<1.28	
Aldrin	PESTSW-OCP	2	µg/kg^	N		<2.56	
Alpha-HCH	PESTSW-OCP	2	µg/kg^	N		<2.56	
Beta-HCH	PESTSW-OCP	2	µg/kg^	N		<2.56	
Chlorthalonil	PESTSW-OCP	2	µg/kg^	N		<2.56	
cis-Chlordane	PESTSW-OCP	2	µg/kg^	N		<2.56	
cis-Permethrin	PESTSW-OCP	3	µg/kg^	N		<3.84	

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006	007
					Customer ID	BH01/1-0-ES-0.30-0.50	BH01/2-0-ES-0.30-0.50	BH02/1-0-ES-0.40-0.40	BH02/2-0-ES-1.00-1.00	BH03/1-0-ES-0.40-0.40	BH04/1-0-ES-0.30-0.30	BH05/1-0-ES-0.20-0.40
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023
Delta-HCH	PESTSW-OCP	2	µg/kg [^]	N			<2.55			<2.48		
Dieldrin	PESTSW-OCP	5	µg/kg [^]	N			<6.38			<6.20		
Endosulfan I	PESTSW-OCP	1	µg/kg [^]	N			<1.28			<1.24		
Endosulfan II	PESTSW-OCP	10	µg/kg [^]	N			<12.8			<12.4		
Endosulfan sulfate	PESTSW-OCP	5	µg/kg [^]	N			<6.38			<6.20		
Endrin	PESTSW-OCP	3	µg/kg [^]	N			<3.83			<3.72		
Endrin ketone	PESTSW-OCP	30	µg/kg [^]	N			<38.3			<37.2		
Gamma-HCH	PESTSW-OCP	1	µg/kg [^]	N			<1.28			<1.24		
Heptachlor	PESTSW-OCP	3	µg/kg [^]	N			<3.83			<3.72		
Heptachlor epoxide	PESTSW-OCP	2	µg/kg [^]	N			<2.55			<2.48		
Hexachlorobenzene	PESTSW-OCP	2	µg/kg [^]	N			<2.55			<2.48		
Isodrin	PESTSW-OCP	2	µg/kg [^]	N			<2.55			<2.48		
Methoxychlor	PESTSW-OCP	5	µg/kg [^]	N			<6.38			<6.20		
o,p'-DDD	PESTSW-OCP	5	µg/kg [^]	N			<6.38			<6.20		
o,p'-DDE	PESTSW-OCP	2	µg/kg [^]	N			<2.55			<2.48		
o,p'-DDT	PESTSW-OCP	3	µg/kg [^]	N			<3.83			<3.72		
p,p'-DDD	PESTSW-OCP	5	µg/kg [^]	N			<6.38			<6.20		
p,p'-DDE	PESTSW-OCP	5	µg/kg [^]	N			<6.38			<6.20		
p,p'-DDT	PESTSW-OCP	5	µg/kg [^]	N			<6.38			<6.20		

Client: STM ENVIRONMENTAL
 Project Name: Middle House-Middle House
 Project No: 23073321
 Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	
					008	009
					Customer ID	BH05/3-0-ES-0.20-0.40
					Sample Type	SOLID
					Sampling Date	25/07/2023
Analysis	Method Code	MDL	Units	Accred.	Sample ID	
					Customer ID	
Delta-HCH	PESTSW-OCP	2	µg/kg^	N	<2.56	
Dieldrin	PESTSW-OCP	5	µg/kg^	N	<6.39	
Endosulfan I	PESTSW-OCP	1	µg/kg^	N	<1.28	
Endosulfan II	PESTSW-OCP	10	µg/kg^	N	<12.8	
Endosulfan sulfate	PESTSW-OCP	5	µg/kg^	N	<6.39	
Endrin	PESTSW-OCP	3	µg/kg^	N	<3.84	
Endrin ketone	PESTSW-OCP	30	µg/kg^	N	<38.4	
Gamma-HCH	PESTSW-OCP	1	µg/kg^	N	<1.28	
Heptachlor	PESTSW-OCP	3	µg/kg^	N	<3.84	
Heptachlor epoxide	PESTSW-OCP	2	µg/kg^	N	<2.56	
Hexachlorobenzene	PESTSW-OCP	2	µg/kg^	N	<2.56	
Isodrin	PESTSW-OCP	2	µg/kg^	N	<2.56	
Methoxychlor	PESTSW-OCP	5	µg/kg^	N	<6.39	
o,p'-DDD	PESTSW-OCP	5	µg/kg^	N	<6.39	
o,p'-DDE	PESTSW-OCP	2	µg/kg^	N	<2.56	
o,p'-DDT	PESTSW-OCP	3	µg/kg^	N	<3.84	
p,p'-DDD	PESTSW-OCP	5	µg/kg^	N	<6.39	
p,p'-DDE	PESTSW-OCP	5	µg/kg^	N	<6.39	
p,p'-DDT	PESTSW-OCP	5	µg/kg^	N	<6.39	

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006	007
					Customer ID	BH01/1-0-ES-0.30-0.50	BH01/2-0-ES-0.30-0.50	BH02/1-0-ES-0.40-0.40	BH02/2-0-ES-1.00-1.00	BH03/1-0-ES-0.40-0.40	BH04/1-0-ES-0.30-0.30	BH05/1-0-ES-0.20-0.40
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023
Pendimethalin	PESTSW-OCP	10	µg/kg [^]	N			<12.8			<12.4		
Pentachlorobenzene	PESTSW-OCP	1	µg/kg [^]	N			<1.28			<1.24		
Propyzamide	PESTSW-OCP	2	µg/kg [^]	N			<2.55			<2.48		
Tecnazene	PESTSW-OCP	3	µg/kg [^]	N			<3.83			<3.72		
trans-Chlordane	PESTSW-OCP	2	µg/kg [^]	N			<2.55			<2.48		
trans-Permethrin	PESTSW-OCP	3	µg/kg [^]	N			<3.83			<3.72		
Triadimefon	PESTSW-OCP	2	µg/kg [^]	N			<2.55			<2.48		
Triallate	PESTSW-OCP	2	µg/kg [^]	N			<2.55			<2.48		
Trifluralin	PESTSW-OCP	10	µg/kg [^]	N			<12.8			<12.4		
Azinphos-ethyl	PESTSW-OPP	5	µg/kg [^]	N			<6.38			<6.20		
Azinphos-methyl	PESTSW-OPP	5	µg/kg [^]	N			<6.38			<6.20		
Carbofenthion	PESTSW-OPP	3	µg/kg [^]	N			<3.83			<3.72		
Chlorpyrifos	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Chlorpyrifos-methyl	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Clorfenvinfos	PESTSW-OPP	3	µg/kg [^]	N			<3.83			<3.72		
Diazinon	PESTSW-OPP	1	µg/kg [^]	N			<1.28			<1.24		
Dichlorvos	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Dimethoate	PESTSW-OPP	3	µg/kg [^]	N			<3.83			<3.72		
Ethion	PESTSW-OPP	3	µg/kg [^]	N			<3.83			<3.72		

Client: STM ENVIRONMENTAL
 Project Name: Middle House-Middle House
 Project No: 23073321
 Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	
					008	009
					Customer ID	
					Sample Type	
					Sampling Date	
					25/07/2023	25/07/2023
Pendimethalin	PESTSW-OCP	10	µg/kg^	N	BH05/3-0-ES-0.20-0.40	BH06/1-0-ES-0.30-0.30
Pentachlorobenzene	PESTSW-OCP	1	µg/kg^	N	SOLID	SOLID
Propyzamide	PESTSW-OCP	2	µg/kg^	N	25/07/2023	25/07/2023
Tecnazene	PESTSW-OCP	3	µg/kg^	N		
trans-Chlordane	PESTSW-OCP	2	µg/kg^	N		
trans-Permethrin	PESTSW-OCP	3	µg/kg^	N		
Triadimefon	PESTSW-OCP	2	µg/kg^	N		
Triallate	PESTSW-OCP	2	µg/kg^	N		
Trifluralin	PESTSW-OCP	10	µg/kg^	N		
Azinphos-ethyl	PESTSW-OPP	5	µg/kg^	N		
Azinphos-methyl	PESTSW-OPP	5	µg/kg^	N		
Carbofenthion	PESTSW-OPP	3	µg/kg^	N		
Chlorpyrifos	PESTSW-OPP	2	µg/kg^	N		
Chlorpyrifos-methyl	PESTSW-OPP	2	µg/kg^	N		
Clorfenvinfos	PESTSW-OPP	3	µg/kg^	N		
Diazinon	PESTSW-OPP	1	µg/kg^	N		
Dichlorvos	PESTSW-OPP	2	µg/kg^	N		
Dimethoate	PESTSW-OPP	3	µg/kg^	N		
Ethion	PESTSW-OPP	3	µg/kg^	N		

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006	007
					Customer ID	BH01/1-0-ES-0.30-0.50	BH01/2-0-ES-0.30-0.50	BH02/1-0-ES-0.40-0.40	BH02/2-0-ES-1.00-1.00	BH03/1-0-ES-0.40-0.40	BH04/1-0-ES-0.30-0.30	BH05/1-0-ES-0.20-0.40
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023
Etrimpfos	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Fenitrothion	PESTSW-OPP	5	µg/kg [^]	N			<6.38			<6.20		
Fenthion	PESTSW-OPP	10	µg/kg [^]	N			<12.8			<12.4		
Malathion	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Methacrifos	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Mevinphos	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Parathion	PESTSW-OPP	5	µg/kg [^]	N			<6.38			<6.20		
Parathion-methyl	PESTSW-OPP	10	µg/kg [^]	N			<12.8			<12.4		
Phosalone	PESTSW-OPP	5	µg/kg [^]	N			<6.38			<6.20		
Phosphamidon	PESTSW-OPP	5	µg/kg [^]	N			<6.38			<6.20		
Pirimiphos-ethyl	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Pirimiphos-methyl	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Propetamphos	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Triazophos	PESTSW-OPP	3	µg/kg [^]	N			<3.83			<3.72		
Ametryn	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Atrazine	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Prometryn	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Propazine	PESTSW-OPP	2	µg/kg [^]	N			<2.55			<2.48		
Simazine	PESTSW-OPP	3	µg/kg [^]	N			<3.83			<3.72		

Client: STM ENVIRONMENTAL
Project Name: Middle House-Middle House
Project No: 23073321
Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	
					Customer ID	
					Sample Type	
					Sampling Date	
Etrimphos	PESTSW-OPP	2	µg/kg^	N	008 BH05/3-0-ES-0.20-0.40	009 BH06/1-0-ES-0.30-0.30
Fenitrothion	PESTSW-OPP	5	µg/kg^	N	SOLID	SOLID
Fenthion	PESTSW-OPP	10	µg/kg^	N	25/07/2023	25/07/2023
Malathion	PESTSW-OPP	2	µg/kg^	N		
Methacrifos	PESTSW-OPP	2	µg/kg^	N		
Mevinphos	PESTSW-OPP	2	µg/kg^	N		
Parathion	PESTSW-OPP	5	µg/kg^	N		
Parathion-methyl	PESTSW-OPP	10	µg/kg^	N		
Phosalone	PESTSW-OPP	5	µg/kg^	N		
Phosphamidon	PESTSW-OPP	5	µg/kg^	N		
Pirimiphos-ethyl	PESTSW-OPP	2	µg/kg^	N		
Pirimiphos-methyl	PESTSW-OPP	2	µg/kg^	N		
Propetamphos	PESTSW-OPP	2	µg/kg^	N		
Triazophos	PESTSW-OPP	3	µg/kg^	N		
Ametryn	PESTSW-OPP	2	µg/kg^	N		
Atrazine	PESTSW-OPP	2	µg/kg^	N		
Prometryn	PESTSW-OPP	2	µg/kg^	N		
Propazine	PESTSW-OPP	2	µg/kg^	N		
Simazine	PESTSW-OPP	3	µg/kg^	N		



Client: STM ENVIRONMENTAL
 Project Name: Middle House-Middle House
 Project No: 23073321
 Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006	007
					Customer ID	BH01/1-0-ES-0.30-0.50	BH01/2-0-ES-0.30-0.50	BH02/1-0-ES-0.40-0.40	BH02/2-0-ES-1.00-1.00	BH03/1-0-ES-0.40-0.40	BH04/1-0-ES-0.30-0.30	BH05/1-0-ES-0.20-0.40
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023
Terbutryn	PESTSW-OPP	2	µg/kg^	N			<2.55			<2.48		
Terbutylazine	PESTSW-OPP	10	µg/kg^	N			<12.8			<12.4		
Trietazine	PESTSW-OPP	3	µg/kg^	N			<3.83			<3.72		
2,3,6-TBA	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
2,4,5-T	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
2,4-D	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
2,4-DB	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
2,4-Dinitrophenol	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
Benazolin	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
Bentazone	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
Bromoxynil	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
Clopyralid	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
Dicamba	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
Dichloroprop	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
DNOC	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
Fenoprop	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
Fluroxypyr	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
Ioxynil	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
MCPA	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		

Client: STM ENVIRONMENTAL
 Project Name: Middle House-Middle House
 Project No: 23073321
 Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	008	009
					Customer ID	BH05/3-0-ES-0.20-0.40	BH06/1-0-ES-0.30-0.30
					Sample Type	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023
Terbutryn	PESTSW-OPP	2	µg/kg^	N		<2.56	
Terbutylazine	PESTSW-OPP	10	µg/kg^	N		<12.8	
Trietazine	PESTSW-OPP	3	µg/kg^	N		<3.84	
2,3,6-TBA	AHBLCMS	0.1	mg/kg^	N		<0.10	
2,4,5-T	AHBLCMS	0.1	mg/kg^	N		<0.10	
2,4-D	AHBLCMS	0.1	mg/kg^	N		<0.10	
2,4-DB	AHBLCMS	0.1	mg/kg^	N		<0.10	
2,4-Dinitrophenol	AHBLCMS	0.1	mg/kg^	N		<0.10	
Benazolin	AHBLCMS	0.1	mg/kg^	N		<0.10	
Bentazone	AHBLCMS	0.1	mg/kg^	N		<0.10	
Bromoxynil	AHBLCMS	0.1	mg/kg^	N		<0.10	
Clopyralid	AHBLCMS	0.1	mg/kg^	N		<0.10	
Dicamba	AHBLCMS	0.1	mg/kg^	N		<0.10	
Dichloroprop	AHBLCMS	0.1	mg/kg^	N		<0.10	
DNOC	AHBLCMS	0.1	mg/kg^	N		<0.10	
Fenoprop	AHBLCMS	0.1	mg/kg^	N		<0.10	
Fluroxypyr	AHBLCMS	0.1	mg/kg^	N		<0.10	
Ioxynil	AHBLCMS	0.1	mg/kg^	N		<0.10	
MCPA	AHBLCMS	0.1	mg/kg^	N		<0.10	



Client: STM ENVIRONMENTAL
 Project Name: Middle House-Middle House
 Project No: 23073321
 Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006	007
					Customer ID	BH01/1-0-ES-0.30-0.50	BH01/2-0-ES-0.30-0.50	BH02/1-0-ES-0.40-0.40	BH02/2-0-ES-1.00-1.00	BH03/1-0-ES-0.40-0.40	BH04/1-0-ES-0.30-0.30	BH05/1-0-ES-0.20-0.40
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023
MCPB	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
Mecoprop	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
Pentachlorophenol	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
Triclopyr	AHBLCMS	0.1	mg/kg^	N			<0.10			<0.10		
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM		<0.09		<0.10	<0.09		<0.10	<0.10
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U		<0.09		<0.10	<0.09		<0.10	<0.10
Anthracene	PAHMSUS	0.08	mg/kg^	U		<0.09		<0.10	<0.09		<0.10	<0.10
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM		<0.09		<0.10	<0.09		<0.10	<0.10
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM		<0.09		<0.10	<0.09		<0.10	<0.10
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM		<0.09		<0.10	<0.09		<0.10	<0.10
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM		<0.09		<0.10	<0.09		<0.10	<0.10
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM		<0.09		<0.10	<0.09		<0.10	<0.10
Chrysene	PAHMSUS	0.08	mg/kg^	UM		<0.09		<0.10	<0.09		<0.10	<0.10
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM		<0.09		<0.10	<0.09		<0.10	<0.10
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM		<0.09		<0.10	<0.09		<0.10	<0.10
Fluorene	PAHMSUS	0.08	mg/kg^	UM		<0.09		<0.10	<0.09		<0.10	<0.10
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM		<0.09		<0.10	<0.09		<0.10	<0.10
Naphthalene	PAHMSUS	0.08	mg/kg^	UM		<0.09		<0.10	<0.09		<0.10	<0.10
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM		<0.09		<0.10	<0.09		<0.10	<0.10

Client: STM ENVIRONMENTAL
 Project Name: Middle House-Middle House
 Project No: 23073321
 Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	
					008	009
					Customer ID	BH05/3-0-ES-0.20-0.40
					Sample Type	SOLID
					Sampling Date	25/07/2023
MCPB	AHBLCMS	0.1	mg/kg^	N		<0.10
Mecoprop	AHBLCMS	0.1	mg/kg^	N		<0.10
Pentachlorophenol	AHBLCMS	0.1	mg/kg^	N		<0.10
Triclopyr	AHBLCMS	0.1	mg/kg^	N		<0.10
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM		<0.11
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U		<0.11
Anthracene	PAHMSUS	0.08	mg/kg^	U		<0.11
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM		<0.11
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM		<0.11
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM		<0.11
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM		<0.11
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM		<0.11
Chrysene	PAHMSUS	0.08	mg/kg^	UM		<0.11
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM		<0.11
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM		<0.11
Fluorene	PAHMSUS	0.08	mg/kg^	UM		<0.11
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM		<0.11
Naphthalene	PAHMSUS	0.08	mg/kg^	UM		<0.11
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM		<0.11

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006	007
					Customer ID	BH01/1-0-ES-0.30-0.50	BH01/2-0-ES-0.30-0.50	BH02/1-0-ES-0.40-0.40	BH02/2-0-ES-1.00-1.00	BH03/1-0-ES-0.40-0.40	BH04/1-0-ES-0.30-0.30	BH05/1-0-ES-0.20-0.40
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023
Pyrene	PAHMSUS	0.08	mg/kg [^]	UM		<0.09		<0.10	<0.09		<0.10	<0.10
Total PAH 16	PAHMSUS	1.28	mg/kg [^]	U		<1.43		<1.61	<1.38		<1.52	<1.53
1,2,4-Trichlorobenzene	SVOC SW	0.1	mg/kg [^]	N		<0.1		<0.1		<0.1	<0.1	<0.1
1,2-Dichlorobenzene	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
1,3-Dichlorobenzene	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
1,4-Dichlorobenzene	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
1-Methylnaphthalene	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
2,4,5-Trichlorophenol	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
2,4,6-Trichlorophenol	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
2,4-Dichlorophenol	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
2,4-Dimethylphenol	SVOC SW	0.1	mg/kg [^]	U		<0.1* _B		<0.1* _B		<0.1* _B	<0.1* _B	<0.1* _B
2,4-Dinitrophenol	SVOC SW	0.5	mg/kg [^]	N		<0.6		<0.6		<0.6	<0.6	<0.6
2,4-Dinitrotoluene	SVOC SW	0.2	mg/kg [^]	U		<0.2		<0.3		<0.2	<0.2	<0.2
2,6-Dinitrotoluene	SVOC SW	0.5	mg/kg [^]	U		<0.6		<0.6		<0.6	<0.6	<0.6
2-Chloronaphthalene	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
2-Chlorophenol	SVOC SW	0.1	mg/kg [^]	U		<0.1* _B		<0.1* _B		<0.1* _B	<0.1* _B	<0.1* _B
2-Methylnaphthalene	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
2-Methylphenol	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
2-Nitroaniline	SVOC SW	0.5	mg/kg [^]	N		<0.6		<0.6		<0.6	<0.6	<0.6

Client: STM ENVIRONMENTAL
 Project Name: Middle House-Middle House
 Project No: 23073321
 Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	
					008	009
					Customer ID	
					Sample Type	
					Sampling Date	
					008	009
Pyrene	PAHMSUS	0.08	mg/kg^	UM	BH05/3-0-ES-0.20-0.40	BH06/1-0-ES-0.30-0.30
Total PAH 16	PAHMSUS	1.28	mg/kg^	U	SOLID	SOLID
1,2,4-Trichlorobenzene	SVOC	0.1	mg/kg^	N	25/07/2023	25/07/2023
1,2-Dichlorobenzene	SVOC	0.1	mg/kg^	U		
1,3-Dichlorobenzene	SVOC	0.1	mg/kg^	U		
1,4-Dichlorobenzene	SVOC	0.1	mg/kg^	U		
1-Methylnaphthalene	SVOC	0.1	mg/kg^	U		
2,4,5-Trichlorophenol	SVOC	0.1	mg/kg^	U		
2,4,6-Trichlorophenol	SVOC	0.1	mg/kg^	U		
2,4-Dichlorophenol	SVOC	0.1	mg/kg^	U		
2,4-Dimethylphenol	SVOC	0.1	mg/kg^	U		<0.1* B
2,4-Dinitrophenol	SVOC	0.5	mg/kg^	N		<0.7
2,4-Dinitrotoluene	SVOC	0.2	mg/kg^	U		<0.3
2,6-Dinitrotoluene	SVOC	0.5	mg/kg^	U		<0.7
2-Chloronaphthalene	SVOC	0.1	mg/kg^	U		<0.1
2-Chlorophenol	SVOC	0.1	mg/kg^	U		<0.1* B
2-Methylnaphthalene	SVOC	0.1	mg/kg^	U		<0.1
2-Methylphenol	SVOC	0.1	mg/kg^	U		<0.1
2-Nitroaniline	SVOC	0.5	mg/kg^	N		<0.7

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006	007
					Customer ID	BH01/1-0-ES-0.30-0.50	BH01/2-0-ES-0.30-0.50	BH02/1-0-ES-0.40-0.40	BH02/2-0-ES-1.00-1.00	BH03/1-0-ES-0.40-0.40	BH04/1-0-ES-0.30-0.30	BH05/1-0-ES-0.20-0.40
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023
2-Nitrophenol	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
3- & 4-Methylphenol	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
3-Nitroaniline	SVOC SW	0.5	mg/kg [^]	N		<0.6		<0.6		<0.6	<0.6	<0.6
4,6-Dinitro-2-methylphenol	SVOC SW	0.2	mg/kg [^]	N		<0.2		<0.3		<0.2	<0.2	<0.2
4-Bromophenyl-phenylether	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
4-Chloro-3-methylphenol	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
4-Chloroaniline	SVOC SW	0.5	mg/kg [^]	N		<0.6		<0.6		<0.6	<0.6	<0.6
4-Chlorophenol	SVOC SW	0.5	mg/kg [^]	U		<0.6		<0.6		<0.6	<0.6	<0.6
4-Chlorophenyl-phenylether	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
4-Nitroaniline	SVOC SW	0.6	mg/kg [^]	N		<0.7		<0.8		<0.7	<0.7	<0.7
4-Nitrophenol	SVOC SW	0.5	mg/kg [^]	N		<0.6		<0.6		<0.6	<0.6	<0.6
Acenaphthene	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
Acenaphthylene	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
Anthracene	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
Azobenzene	SVOC SW	0.3	mg/kg [^]	N		<0.3		<0.4		<0.4	<0.4	<0.4
Benzo[a]anthracene	SVOC SW	0.2	mg/kg [^]	U		<0.2		<0.3		<0.2	<0.2	<0.2
Benzo[a]pyrene	SVOC SW	0.2	mg/kg [^]	U		<0.2		<0.3		<0.2	<0.2	<0.2
Benzo[b]fluoranthene	SVOC SW	0.2	mg/kg [^]	U		<0.2		<0.3		<0.2	<0.2	<0.2
Benzo[g,h,i]perylene	SVOC SW	0.5	mg/kg [^]	U		<0.6		<0.6		<0.6	<0.6	<0.6

Client: STM ENVIRONMENTAL
Project Name: Middle House-Middle House
Project No: 23073321
Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	
					008	009
					Customer ID	BH05/3-0-ES-0.20-0.40
					Sample Type	BH06/1-0-ES-0.30-0.30
					Sampling Date	SOLID
					25/07/2023	SOLID
						25/07/2023
2-Nitrophenol	SVOC SW	0.1	mg/kg^	U		<0.1
3- & 4-Methylphenol	SVOC SW	0.1	mg/kg^	U		<0.1
3-Nitroaniline	SVOC SW	0.5	mg/kg^	N		<0.7
4,6-Dinitro-2-methylphenol	SVOC SW	0.2	mg/kg^	N		<0.3
4-Bromophenyl-phenylether	SVOC SW	0.1	mg/kg^	U		<0.1
4-Chloro-3-methylphenol	SVOC SW	0.1	mg/kg^	U		<0.1
4-Chloroaniline	SVOC SW	0.5	mg/kg^	N		<0.7
4-Chlorophenol	SVOC SW	0.5	mg/kg^	U		<0.7
4-Chlorophenyl-phenylether	SVOC SW	0.1	mg/kg^	U		<0.1
4-Nitroaniline	SVOC SW	0.6	mg/kg^	N		<0.8
4-Nitrophenol	SVOC SW	0.5	mg/kg^	N		<0.7
Acenaphthene	SVOC SW	0.1	mg/kg^	U		<0.1
Acenaphthylene	SVOC SW	0.1	mg/kg^	U		<0.1
Anthracene	SVOC SW	0.1	mg/kg^	U		<0.1
Azobenzene	SVOC SW	0.3	mg/kg^	N		<0.4
Benzo[a]anthracene	SVOC SW	0.2	mg/kg^	U		<0.3
Benzo[a]pyrene	SVOC SW	0.2	mg/kg^	U		<0.3
Benzo[b]fluoranthene	SVOC SW	0.2	mg/kg^	U		<0.3
Benzo[g,h,i]perylene	SVOC SW	0.5	mg/kg^	U		<0.7

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006	007
					Customer ID	BH01/1-0-ES-0.30-0.50	BH01/2-0-ES-0.30-0.50	BH02/1-0-ES-0.40-0.40	BH02/2-0-ES-1.00-1.00	BH03/1-0-ES-0.40-0.40	BH04/1-0-ES-0.30-0.30	BH05/1-0-ES-0.20-0.40
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023
Benzo[k]fluoranthene	SVOC SW	0.2	mg/kg [^]	U		<0.2		<0.3		<0.2	<0.2	<0.2
Benzoic Acid	SVOC SW	0.5	mg/kg [^]	N		<0.6		<0.6		<0.6	<0.6	<0.6
Benzyl alcohol	SVOC SW	0.5	mg/kg [^]	U		<0.6* _B		<0.6* _B		<0.6* _B	<0.6* _B	<0.6* _B
Biphenyl	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
bis(2-Chloroethoxy)methane	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
bis(2-Chloroethyl)ether	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
bis(2-Chloroisopropyl)ether	SVOC SW	0.5	mg/kg [^]	U		<0.6		<0.6		<0.6	<0.6	<0.6
bis(2-Ethylhexyl)phthalate	SVOC SW	0.2	mg/kg [^]	U		<0.2		<0.3		<0.2	<0.2	<0.2
Butylbenzylphthalate	SVOC SW	0.2	mg/kg [^]	U		<0.2		<0.3		<0.2	<0.2	<0.2
Carbazole	SVOC SW	0.3	mg/kg [^]	N		<0.3		<0.4		<0.4	<0.4	<0.4
Chrysene	SVOC SW	0.2	mg/kg [^]	U		<0.2		<0.3		<0.2	<0.2	<0.2
Coronene	SVOC SW	0.3	mg/kg [^]	N		<0.3		<0.4		<0.4	<0.4	<0.4
Dibenzo[a,h]anthracene	SVOC SW	0.5	mg/kg [^]	U		<0.6		<0.6		<0.6	<0.6	<0.6
Dibenzofuran	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
Diethylphthalate	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
Dimethylphthalate	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
Di-n-butylphthalate	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
Di-n-octylphthalate	SVOC SW	0.2	mg/kg [^]	U		<0.2		<0.3		<0.2	<0.2	<0.2
Diphenyl ether	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1

Client: STM ENVIRONMENTAL
 Project Name: Middle House-Middle House
 Project No: 23073321
 Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	
					008	009
					Customer ID	BH05/3-0-ES-0.20-0.40
					Sample Type	SOLID
					Sampling Date	25/07/2023
Analysis	Method Code	MDL	Units	Accred.	Sample ID	
					Customer ID	
Benzo[k]fluoranthene	SVOC SW	0.2	mg/kg^	U		<0.3
Benzoic Acid	SVOC SW	0.5	mg/kg^	N		<0.7
Benzyl alcohol	SVOC SW	0.5	mg/kg^	U		<0.7* B
Biphenyl	SVOC SW	0.1	mg/kg^	U		<0.1
bis(2-Chloroethoxy)methane	SVOC SW	0.1	mg/kg^	U		<0.1
bis(2-Chloroethyl)ether	SVOC SW	0.1	mg/kg^	U		<0.1
bis(2-Chloroisopropyl)ether	SVOC SW	0.5	mg/kg^	U		<0.7
bis(2-Ethylhexyl)phthalate	SVOC SW	0.2	mg/kg^	U		<0.3
Butylbenzylphthalate	SVOC SW	0.2	mg/kg^	U		<0.3
Carbazole	SVOC SW	0.3	mg/kg^	N		<0.4
Chrysene	SVOC SW	0.2	mg/kg^	U		<0.3
Coronene	SVOC SW	0.3	mg/kg^	N		<0.4
Dibenzo[a,h]anthracene	SVOC SW	0.5	mg/kg^	U		<0.7
Dibenzofuran	SVOC SW	0.1	mg/kg^	U		<0.1
Diethylphthalate	SVOC SW	0.1	mg/kg^	U		<0.1
Dimethylphthalate	SVOC SW	0.1	mg/kg^	U		<0.1
Di-n-butylphthalate	SVOC SW	0.1	mg/kg^	U		<0.1
Di-n-octylphthalate	SVOC SW	0.2	mg/kg^	U		<0.3
Diphenyl ether	SVOC SW	0.1	mg/kg^	U		<0.1

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006	007
					Customer ID	BH01/1-0-ES-0.30-0.50	BH01/2-0-ES-0.30-0.50	BH02/1-0-ES-0.40-0.40	BH02/2-0-ES-1.00-1.00	BH03/1-0-ES-0.40-0.40	BH04/1-0-ES-0.30-0.30	BH05/1-0-ES-0.20-0.40
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023
Fluoranthene	SVOC SW	0.2	mg/kg [^]	U		<0.2		<0.3		<0.2	<0.2	<0.2
Fluorene	SVOC SW	0.2	mg/kg [^]	U		<0.2		<0.3		<0.2	<0.2	<0.2
Hexachlorobenzene	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
Hexachlorobutadiene	SVOC SW	0.1	mg/kg [^]	N		<0.1		<0.1		<0.1	<0.1	<0.1
Hexachlorocyclopentadiene	SVOC SW	0.1	mg/kg [^]	N		<0.1		<0.1		<0.1	<0.1	<0.1
Hexachloroethane	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
Indeno[1,2,3-cd]pyrene	SVOC SW	0.5	mg/kg [^]	U		<0.6		<0.6		<0.6	<0.6	<0.6
Isophorone	SVOC SW	0.1	mg/kg [^]	N		<0.1		<0.1		<0.1	<0.1	<0.1
Naphthalene	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
Nitrobenzene	SVOC SW	0.5	mg/kg [^]	U		<0.6		<0.6		<0.6	<0.6	<0.6
N-Nitroso-di-n-propylamine	SVOC SW	0.9	mg/kg [^]	N		<1.0		<1.1		<1.1	<1.1	<1.1
N-Nitrosodiphenylamine	SVOC SW	0.1	mg/kg [^]	N		<0.1		<0.1		<0.1	<0.1	<0.1
Pentachlorophenol	SVOC SW	0.5	mg/kg [^]	N		<0.6		<0.6		<0.6	<0.6	<0.6
Phenanthrene	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
Phenol	SVOC SW	0.1	mg/kg [^]	U		<0.1		<0.1		<0.1	<0.1	<0.1
Pyrene	SVOC SW	0.2	mg/kg [^]	U		<0.2		<0.3		<0.2	<0.2	<0.2
>C10-C40 EH_1D_Total	TPHFIDUS	10	mg/kg [^]	U					<10.8			88.1
>C10-C12 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg [^]	U		<4.46		<5.03			<4.76	
>C12-C16 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg [^]	U		<4.46		5.54			5.88	

Client: STM ENVIRONMENTAL
Project Name: Middle House-Middle House
Project No: 23073321
Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	
					Customer ID	
					Sample Type	
					Sampling Date	
Fluoranthene	SVOC SW	0.2	mg/kg^	U	008 BH05/3-0-ES-0.20-0.40	009 BH06/1-0-ES-0.30-0.30
Fluorene	SVOC SW	0.2	mg/kg^	U	SOLID	SOLID
Hexachlorobenzene	SVOC SW	0.1	mg/kg^	U	25/07/2023	25/07/2023
Hexachlorobutadiene	SVOC SW	0.1	mg/kg^	N		
Hexachlorocyclopentadiene	SVOC SW	0.1	mg/kg^	N		
Hexachloroethane	SVOC SW	0.1	mg/kg^	U		
Indeno[1,2,3-cd]pyrene	SVOC SW	0.5	mg/kg^	U		
Isophorone	SVOC SW	0.1	mg/kg^	N		
Naphthalene	SVOC SW	0.1	mg/kg^	U		
Nitrobenzene	SVOC SW	0.5	mg/kg^	U		
N-Nitroso-di-n-propylamine	SVOC SW	0.9	mg/kg^	N		
N-Nitrosodiphenylamine	SVOC SW	0.1	mg/kg^	N		
Pentachlorophenol	SVOC SW	0.5	mg/kg^	N		
Phenanthrene	SVOC SW	0.1	mg/kg^	U		
Phenol	SVOC SW	0.1	mg/kg^	U		
Pyrene	SVOC SW	0.2	mg/kg^	U		
>C10-C40 EH_1D_Total	TPHFIDUS	10	mg/kg^	U		
>C10-C12 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg^	U		<5.31
>C12-C16 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg^	U		5.91



Client: STM ENVIRONMENTAL
 Project Name: Middle House-Middle House
 Project No: 23073321
 Date Issued: 11/08/2023



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006	007
					Customer ID	BH01/1-0-ES-0.30-0.50	BH01/2-0-ES-0.30-0.50	BH02/1-0-ES-0.40-0.40	BH02/2-0-ES-1.00-1.00	BH03/1-0-ES-0.40-0.40	BH04/1-0-ES-0.30-0.30	BH05/1-0-ES-0.20-0.40
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023	25/07/2023
>C16-C21 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg^	U		<4.46		5.62			6.19	
>C21-C35 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	10	mg/kg^	U		<11.1		<12.6			12.2	
>C35-C44 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	6	mg/kg^	N		<6.69		<7.55			<7.13	
Total TPH >C8-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg^	U		<22.3		25.7			33.5	
>C10-C12 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg^	U		<4.46		6.25			5.30	
>C12-C16 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg^	U		<4.46		14.1			12.6	
>C16-C21 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg^	U		<4.46		14.4			12.8	
>C21-C35 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	10	mg/kg^	U		<11.1		21.9			27.0	
>C35-C44 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	6	mg/kg^	N		<6.69		21.0			38.0	
Total TPH >C8-C40 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	20	mg/kg^	U		<22.3		71.7			83.8	
Total Moisture at 35°C	CLANDPREP	0.1	%	N		10.3	21.6	20.5	7.0	19.4	15.9	16.6
Description of Solid Material	CLANDPREP		-	N		SILT	CLAY	SILT	SILT	SILT	SILT	CLAY
Asbestos Identification	SUB020		-	N		NAIIS		NAIIS	NAIIS		NAIIS	NAIIS

Client: STM ENVIRONMENTAL
Project Name: Middle House-Middle House
Project No: 23073321
Date Issued: 11/08/2023



Analysis Results

					Sample ID	008	009
					Customer ID	BH05/3-0-ES-0.20-0.40	BH06/1-0-ES-0.30-0.30
					Sample Type	SOLID	SOLID
					Sampling Date	25/07/2023	25/07/2023
Analysis	Method Code	MDL	Units	Accred.			
>C16-C21 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg^	U	6.70		
>C21-C35 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	10	mg/kg^	U	<13.3		
>C35-C44 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	6	mg/kg^	N	<7.97		
Total TPH >C8-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg^	U	29.9		
>C10-C12 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg^	U	<5.31		
>C12-C16 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg^	U	7.69		
>C16-C21 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg^	U	7.15		
>C21-C35 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	10	mg/kg^	U	13.7		
>C35-C44 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	6	mg/kg^	N	<7.97		
Total TPH >C8-C40 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	20	mg/kg^	U	35.0		
Total Moisture at 35°C	CLANDPREP	0.1	%	N	21.8	24.7	
Description of Solid Material	CLANDPREP		-	N	SILT	SILT	
Asbestos Identification	SUB020		-	N		NAIIS	

CERTIFICATE OF ANALYSIS

ANALYSIS REQUESTED BY: SOCOTEC UK Ltd
Environmental Chemistry
PO Box 100
Burton upon Trent
Staffordshire
DE15 0XD

CONTRACT NO: S34954-2

DATE OF ISSUE: 09.08.23

DATE SAMPLES RECEIVED: 02.08.23

DATE ANALYSIS COMPLETED: 09.08.23

DESCRIPTION: Six soil/loose aggregate samples each weighing approximately 0.2-0.4kg.

ANALYSIS REQUESTED: Qualitative and quantitative analysis of soil/loose aggregate samples for mass determination of asbestos.

METHODS:

Qualitative - The samples were analysed qualitatively for asbestos by polarised light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative - The analysis was carried out using our documented in-house method based on HSE Contract Research Report No. 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies *et al*, 1996) and HSG 248. Our method includes initial examination of the entire sample, detailed analysis of a representative sub-sample and quantification by hand picking/weighing and/or fibre counting/sizing as appropriate.

RESULTS:

Initial Screening

No asbestos was detected in any of the soil samples by stereo-binocular and polarised light microscopy.

A summary of the results is given in Table 1.





CONTRACT NO: S34954-2
DATE OF ISSUE: 09.08.23

RESULTS: (cont.)

Table 1: Qualitative Results

SOCOTEC Job I.D: 23073321

IOM sample number	SOCOTEC Sample ID	Client Sample ID	ACM type detected	PLM result
S34954-2	23073321-001	BH01/1-0-ES-0.30-0.50	-	No Asbestos Detected
S34954-3	23073321-003	BH02/1-0-ES-0.40-0.40	-	No Asbestos Detected
S34954-4	23073321-004	BH02/2-0-ES-1.00-1.00	-	No Asbestos Detected
S34954-5	23073321-006	BH04/1-0-ES-0.30-0.30	-	No Asbestos Detected
S34954-6	23073321-007	BH05/1-0-ES-0.20-0.40	-	No Asbestos Detected
S34954-7	23073321-009	BH06/1-0-ES-0.30-0.30	-	No Asbestos Detected

Our detection limit for this method is 0.001%.

COMMENTS:

IOM Consulting cannot accept responsibility for samples that have been incorrectly collected or despatched by external clients.

Any opinions and interpretations expressed herein are out with the scope of our UKAS accreditation.

AUTHORISED BY:



D Third
Laboratory Analyst



Client: STM ENVIRONMENTAL
 Project Name: Middle House-Middle House
 Project No: 23073321
 Date Issued: 11/08/2023

Deviating Sample Report

All samples received in an appropriate condition with no deviancies noted with the samples.

Analysis Method

<u>Method Code</u>	<u>Method Description</u>	<u>Analysis Method</u>
AHBLCMS	Acid Herbicides (Suite 1) by LC/MS/MS	Air Dried & Ground
BTEXHSA	BTEX by GCFID	As Received
CLANDPREP	Basic Solid Description	As Received
CLANDPREP	DW35 - CLand Prep and Dry Weight Correction to 35°C	As Received
GROHSA/BTEXHSA	GRO CWG UK (C5-C10) Ali/Aro Split	As Received
ICPACIDS	Sulphate as SO ₄ (Acid Soluble)	Air Dried & Ground
ICPBOR	Boron (Water Soluble) by ICPOES	Air Dried & Ground
ICPMSS	Arsenic in Solids by ICPMS	Air Dried & Ground
ICPMSS	Cadmium in Solids by ICPMS	Air Dried & Ground
ICPMSS	Chromium in Solids by ICPMS	Air Dried & Ground
ICPMSS	Copper in Solids by ICPMS	Air Dried & Ground
ICPMSS	Lead in Solids by ICPMS	Air Dried & Ground
ICPMSS	Mercury in Solids by ICPMS	Air Dried & Ground
ICPMSS	Nickel in Solids by ICPMS	Air Dried & Ground
ICPMSS	Selenium in Solids by ICPMS	Air Dried & Ground
ICPMSS	Zinc in Solids by ICPMS	Air Dried & Ground
PAHMSUS	16 PAHs by GCMS	As Received
PESTSW-OCP	OCP: Organochlorine Pesticides by GCMS	As Received
PESTSW-OPP	OPP: Organophosphorus Pesticides by GCMS	As Received
PESTSW-OPP	Triazine Herbicides Suite by GCMS	As Received
PHSOIL	pH (2.5:1)	As Received
SFAPI	Cyanide (Total) by SFA	As Received
SFAPI	Phenol Index (Total) by SFA	As Received
SFAPI	Sulphide by SFA	As Received
SUB002	Asbestos Stage 1 (with Stage 2 Trigger)	
SUB020	Asbestos Stage 1 (with Stage 2 Trigger)	
SVOCSW	SVOCs (Target List) by GCMS	As Received
TPHFIDUS	TPH (>C10-C40) Total	As Received
TPHFIDUS (Aliphatic)	TPH (CWG UK) Aliphatic Split with Carbon Banding	As Received
TPHFIDUS (Aromatic)	TPH (CWG UK) Aromatic Split with Carbon Banding	As Received
WSLM59	TOC: Total Organic Carbon	Air Dried & Ground



Client: STM ENVIRONMENTAL
Project Name: Middle House-Middle House
Project No: 23073321
Date Issued: 11/08/2023

Result Report Notes

Letters alongside results signify that the result has associated report notes.
The report notes are as follows:

<u>Letter</u>	<u>Note</u>
A	Due to the matrix of the sample the laboratory has had to deviate from our standard protocols to be able to process the sample and provide a result. Where applicable the accreditation has been removed and this should be taken into consideration when utilising the data.
B	The QC associated with this result has not wholly met the QMS requirements, the accreditation has therefore been removed. However, the Laboratory has confidence in the performance of the method as a whole and that the integrity of the data has not been significantly compromised.
C	Due to matrix interference, the internal standard and/or surrogate has not met the QMS requirements. This should be taken into consideration when utilising the data.
D	A non-standard volume or mass has been used for this test which has resulted in a raised detection limit.
E	Due to the parameter value being beyond our calibration range (and following the maximum size of dilution allowed, where applicable), the result cannot be quantified and as such the result will appear as a greater than symbol (>) with the accreditation removed. This data should be used for indicative purposes only.
F	Based on the sample history, appearance and smell a dilution was applied prior to testing . Unfortunately, the result is either above (>) or below (<) our calibration range. Results above our calibration range have accreditation removed. The data should be used for indicative purposes only.
G	The day 5 oxygen reading was below the capability of the instrument to detect, and therefore the calculated BOD has been reported unaccredited for guidance purposes only.

HWOL Acronym Key

<u>Acronym</u>	<u>Description</u>
HS	Headspace Analysis
EH	Extractable Hydrocarbons - i.e everything extracted by the solvent(s)
CU	Clean up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
+	Operator to indicate cumulative e.g. EH_CU+HS_1D_Total



Client: STM ENVIRONMENTAL
Project Name: Middle House-Middle House
Project No: 23073321
Date Issued: 11/08/2023

Additional Information

This report refers to samples as received. SOCOTEC UK Ltd takes no responsibility for accuracy or competence of sampling by others.

Results within this report relate only to the samples tested.

The accreditation codes are as follows:

- U = UKAS accredited analysis
- M = MCERT accredited analysis
- N = Unaccredited analysis

Any units marked with ^ signify results are reported on a dry weight basis of 35 ° c.

All Air Dried and Ground Samples (ADG) are oven dried at less than 35° c.

This report shall not be reproduced except in full, without written approval of the laboratory.

Opinions and interpretations given are outside the scope of our UKAS accreditation.

Any samples marked with * are not covered by our scope of UKAS accreditation. If applicable, further report notes have been added.

Any solid samples where the Major Constituents are not one of the following (Sand, Silt, Clay, Made Ground) are not one of our accredited matrix types.

Any samples marked with ‡ have had MCERTS accreditation removed for this result

Any samples marked with a tick in the deviant table is deviant for the specific reason.

Any samples reported as IS, NA, ND mean the following:

- IS = Insufficient Sample to complete analysis
- NA = Sample is not amenable for the required analysis
- ND = Results cannot be determined

Items listed with a 'SUB' method code prefix have been carried out by an external subcontracted laboratory.

Our deviating sample report does not include deviancy information for Subcontracted analysis. Please see the report from the subcontracted lab for information regarding any deviancies for this analysis.

Summaries of analysis methods are available upon request.

End of Certificate of Analysis

9.6 Appendix 6 – Adopted Generic Assessment Criteria

9.6.1 Generic Assessment Criteria for Soils

Contaminant	Concentration (mg/kg)	GAC Literature Source
Arsenic	37	Category 4 Screening Levels - Residential (with Home-grown Produce) LQM SULs - RWHP (1% SOM)
Cadmium	11	LQM SULs - RWHP
Chromium	910	LQM SULs - RWHP
Chromium - Hexavalent	6	LQM SULs - RWHP
Copper	2400	LQM SULs - RWHP
Lead	200	LQM SULs - RWHP
Mercury	40	LQM SULs - RWHP
Nickel	180	LQM SULs - RWHP
Selenium	250	LQM SULs - RWHP
Zinc	3700	LQM SULs - RWHP
Toluene	130	LQM SULs - RWHP (1% SOM)
Benzene	0.087	LQM SULs - RWHP (1% SOM)
Ethylbenzene	47	LQM SULs - RWHP (1% SOM)
m,p xylenes	56	LQM SULs - RWHP (1% SOM)
Acenaphthylene	170	LQM SULs - RWHP (1% SOM)
Acenaphthene	210	LQM SULs - RWHP (1% SOM)
Fluorene	170	LQM SULs - RWHP (1% SOM)
Phenanthrene	95	LQM SULs - RWHP (1% SOM)
Anthracene	2400	LQM SULs - RWHP (1% SOM)
Fluoranthene	280	LQM SULs - RWHP (1% SOM)
Pyrene	620	LQM SULs - RWHP (1% SOM)
Benzo(a)anthracene	7.2	LQM SULs - RWHP (1% SOM)
Chrysene	15	LQM SULs - RWHP (1% SOM)
Benzo (b) fluoranthene	2.6	LQM SULs - RWHP (1% SOM)
Benzo(k)fluoranthene	77	LQM SULs - RWHP (1% SOM)
Benzo(a)pyrene	2.2	LQM SULs - RWHP (1% SOM)
Dibenz-a-h-anthracene	0.24	LQM SULs - RWHP (1% SOM)
Indeno(1,2,3-cd) pyrene	27	LQM SULs - RWHP (1% SOM)
Benzo (g,h,i) perylene	320	LQM SULs - RWHP (1% SOM)
Aliphatics >C5-6	42	LQM SULs - RWHP (1% SOM)
Aliphatics >C6-8	100	LQM SULs - RWHP (1% SOM)
Aliphatics >C8-10	27	LQM SULs - RWHP (1% SOM)
Aliphatics >C10-12	130	LQM SULs - RWHP (1% SOM)
Aliphatics >C12-16	1100	LQM SULs - RWHP (1% SOM)
Aliphatics >C16-C35	65000	LQM SULs - RWHP (1% SOM)
Aliphatics >C21-35	1100	LQM SULs - RWHP (1% SOM)
Aliphatics >C35-44	65000	LQM SULs - RWHP (1% SOM)

Contaminant	Concentration (mg/kg)	GAC Literature Source
Aromatics >C5-7	70	LQM SULs - RWHP (1% SOM)
Aromatics >C8-10	34	LQM SULs - RWHP (1% SOM)
Aromatics >C10-12	74	LQM SULs - RWHP (1% SOM)
Aromatics >C12-16	140	LQM SULs - RWHP (1% SOM)
Aromatics >C16-21	260	LQM SULs - RWHP (1% SOM)
Aromatics >C21-35	1100	LQM SULs - RWHP (1% SOM)
Aromatics >C35-44	1100	LQM SULs - RWHP (1% SOM)
Naphthalene	2.3	LQM SULs - RWHP (1% SOM)
Phenol	120	LQM SULs - RWHP (1% SOM)

LQM S4ULs – RWHP: LQM Suitable for Use Levels - Residential (With Home-grown Produce - 1% Soil Organic Matter)

LQM S4ULs - RWHP (1% SSOM): LQM Suitable for Use Levels - Residential (With Home-grown Produce - 1% Organic Matter)

The LQM values quoted are copyright Land Quality Management Limited reproduced with permission; publication number S4UL3637. All rights reserved.

9.7 Appendix 7 – Statistical Analysis

Parameter	GAC	GAC Source	No. Samples	Mean	Maximum	Outliers Excluded	Max. Value Location	Mean Exceedence	Std Deviation	Non-Detects	W-Shapiro-Wilk	W-Critical	Distribution	T Statistic	Upper 95th percentile (L95)	Mean Value Test Result	Max. Value Test Result	One Sample T Test - T0	One Sample T Test - Tn	One Sample T Test Result	One Sample T Test - Evidence Level (%)	Kruskal-Wallis	UCL95 - Chebychev	KD - Chebychev	Chebychev Test Result	Chebychev - Evidence Level (%)	Samples Exceeding GAC
Aliphatics <C6-6	100	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	0	0	0	N/A	No	0	4	0	0	N/A	2.353	0	N/A	N/A	N/A	N/A	N/A	51	4.36	0	0	Reject H0 (ND <-kurt)	0	None
Aliphatics <C8-10	27	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	0	0	0	N/A	No	0	4	0	0	N/A	2.353	0	N/A	N/A	N/A	N/A	N/A	51	4.36	0	0	Reject H0 (ND <-kurt)	0	None
Aromatics <C8-10	34	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	0	0	0	N/A	No	0	4	0	0	N/A	2.353	0	N/A	N/A	N/A	N/A	N/A	51	4.36	0	0	Reject H0 (ND <-kurt)	0	None
Aliphatics <C5-6	42	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	0	0	0	N/A	No	0	4	0	0	N/A	2.353	0	N/A	N/A	N/A	N/A	N/A	51	4.36	0	0	Reject H0 (ND <-kurt)	0	None
Aromatics <C5-7	70	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	0	0	0	N/A	No	0	4	0	0	N/A	2.353	0	N/A	N/A	N/A	N/A	N/A	51	4.36	0	0	Reject H0 (ND <-kurt)	0	None
Asenic	37	Category 4 Screening Levels - Residential (with homegrown produce)	6	14	18.5	0	BH01/1	No	3.16	0	0.9871	0.788	Normal	2.015	16.6034	PA85ED	Max. Value NOT Outlier	-17.801	-1.943	Reject H0 10 < tp-1, 0.95)	99.5	4.36	19.633237	-17.801489	Reject H0 (ND <-kurt)	99	None
Cadmium	11	LQM Suitable for Use Levels - Residential (With Plant Uptake)	6	0.03	0.2	0	BH01/1	No	0.08	5	0.4961	0.788	Non-Normal	2.015	0.1005	PA85ED	Max. Value is Outlier	-329	-1.943	Reject H0 10 < tp-1, 0.95)	99.5	4.36	0.17866667	-329	Reject H0 (ND <-kurt)	99	None
Copper	2400	LQM Suitable for Use Levels - Residential (With Plant Uptake)	6	7.97	11.5	0	BH01/1	No	3.5	0	0.8931	0.788	Normal	2.015	10.8445	PA85ED	Max. Value NOT Outlier	-1674.85	-1.943	Reject H0 10 < tp-1, 0.95)	99.5	4.36	14.193631	-1674.8495	Reject H0 (ND <-kurt)	99	None
Lead	200	LQM Suitable for Use Levels - Residential (With Plant Uptake)	6	14.47	24.1	0	BH02/2	No	7.82	0	0.9278	0.788	Normal	2.015	20.963	PA85ED	Max. Value NOT Outlier	-58.084	-1.943	Reject H0 10 < tp-1, 0.95)	99.5	4.36	28.3935134	-58.083883	Reject H0 (ND <-kurt)	99	None
Mercury	40	LQM Suitable for Use Levels - Residential (With Plant Uptake)	6	0	0	0	N/A	No	0	6	0.9278	0.788	N/A	2.015	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-58.083883	Reject H0 (ND <-kurt)	99	None
Nickel	130	LQM Suitable for Use Levels - Residential (With Plant Uptake)	6	9.13	11.8	0	BH04/1	No	2.17	0	0.9555	0.788	Normal	2.015	10.9157	PA85ED	Max. Value NOT Outlier	-136.641	-1.943	Reject H0 10 < tp-1, 0.95)	99.5	4.36	12.990101	-136.64061	Reject H0 (ND <-kurt)	99	None
Selenium	250	LQM Suitable for Use Levels - Residential (With Plant Uptake)	6	0	0	0	N/A	No	0	6	0.9555	0.788	N/A	2.015	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-136.64061	Reject H0 (ND <-kurt)	99	None
Chromium	910	LQM Suitable for Use Levels - Residential (With Plant Uptake)	6	16.4	19.7	0	BH01/1	No	3.37	0	0.8897	0.788	Normal	2.015	19.1707	PA85ED	Max. Value NOT Outlier	-649.884	-1.943	Reject H0 10 < tp-1, 0.95)	99.5	4.36	22.3950661	-649.88375	Reject H0 (ND <-kurt)	99	None
Zinc	3700	LQM Suitable for Use Levels - Residential (With Plant Uptake)	6	44.95	68.1	0	BH01/1	No	18.36	0	0.9558	0.788	Normal	2.015	60.0522	PA85ED	Max. Value NOT Outlier	-487.673	-1.943	Reject H0 10 < tp-1, 0.95)	99.5	4.36	77.6276595	-487.67319	Reject H0 (ND <-kurt)	99	None
Benzene	0.087	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	0	0	0	N/A	No	0	4	0.8439	0.788	N/A	2.353	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Ethylbenzene	47	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	0	0	0	N/A	No	0	4	0.8439	0.788	N/A	2.353	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
m, p-xylenes	56	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	0	0	0	N/A	No	0	4	0.8439	0.788	N/A	2.353	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Toluene	130	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	0	0	0	N/A	No	0	4	0.8439	0.788	N/A	2.353	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Acenaphthene	210	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Acenaphthylene	170	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Anthracene	2400	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Benz(a)anthracene	7.2	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Benzo(a)pyrene	2.2	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Benzo(b)fluoranthene	2.6	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Benzo(g,h,i)perylene	320	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Benzo(k)fluoranthene	77	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Chrysene	15	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Dibenz(a,h)anthracene	0.24	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Fluoranthene	280	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Fluorene	170	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Indeno(1,2,3-cd)pyrene	27	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Naphthalene	2.3	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Phenanthrene	95	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Pyrene	620	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	12	0	0	0	N/A	No	0	12	0.8439	0.788	N/A	1.796	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Phenol	120	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	6	0	0	0	N/A	No	0	6	0.8439	0.788	N/A	2.015	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Aliphatics <C10-12	130	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	0	0	0	N/A	No	0	4	0.8439	0.788	N/A	2.353	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-487.67319	Reject H0 (ND <-kurt)	99	None
Aliphatics <C12-16	1100	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	4.33	5.91	0	BH06/1	No	2.89	1	0.6751	0.748	Non-Normal	2.353	7.7364	PA85ED	Max. Value NOT Outlier	-757.408	-2.132	Reject H0 10 < tp-1, 0.95)	99.5	4.36	10.636631	-757.4079	Reject H0 (ND <-kurt)	99	None
Aliphatics <C21-35	1100	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	3.05	12.2	0	BH04/1	No	6.1	3	0.6293	0.748	Non-Normal	2.353	10.2267	PA85ED	Max. Value is Outlier	-359.656	-2.132	Reject H0 10 < tp-1, 0.95)	99.5	4.36	16.348	-359.65574	Reject H0 (ND <-kurt)	99	None
Aliphatics <C35-44	65000	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	0	0	0	N/A	No	0	4	0.6293	0.748	N/A	2.353	0	N/A	N/A	N/A	N/A	N/A	99.5	4.36	0	-359.65574	Reject H0 (ND <-kurt)	99	None
Aromatics <C10-12	74	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	2.89	6.25	0	BH02/1	No	3.36	2	0.7951	0.748	Normal	2.353	6.8366	PA85ED	Max. Value NOT Outlier	-42.371	-2.132	Reject H0 10 < tp-1, 0.95)	99.5	4.36	10.2050895	-42.370755	Reject H0 (ND <-kurt)	99	None
Aromatics <C12-16	140	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	8.6	14.1	0	BH02/1	No	6.35	1	0.9129	0.748	Normal	2.353	16.0705	PA85ED	Max. Value NOT Outlier	-41.375	-2.132	Reject H0 10 < tp-1, 0.95)	99.5	4.36	22.4453376	-41.374547	Reject H0 (ND <-kurt)	99	None
Aromatics <C16-21	260	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	8.59	14.4	0	BH02/1	No	6.52	1	0.9031	0.748	Normal	2.353	16.2526	PA85ED	Max. Value NOT Outlier	-77.178	-2.132	Reject H0 10 < tp-1, 0.95)	99.5	4.36	22.7905458	-77.177707	Reject H0 (ND <-kurt)	99	None
Aromatics <C21-35	1100	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	15.65	27	0	BH04/1	No	11.78	1	0.8531	0.748	Normal	2.353	29.5142	PA85ED	Max. Value NOT Outlier	-184.033	-2.132	Reject H0 10 < tp-1, 0.95)	99.5	4.36	41.3397993	-184.03281	Reject H0 (ND <-kurt)	99	None
Aromatics <C35-44	1100	LQM Suitable for Use Levels - Residential (With Plant Uptake - 1% Organic Matter)	4	14.75	38	0	BH04/1	No	18.39	2	0.8654	0.748	Normal	2.353	36.3877	PA85ED	Max. Value NOT Outlier	-118.016	-2.132	Reject H0 10 < tp-1, 0.95)	99.5	4.36	54.8436317	-118.016	Reject H0 (ND <-kurt)	99	None

9.8 Appendix 8 - Assessment Methodology

- Severity considers the potential impact of the linkage on the receptors if the linkage was active. Categories range from slight/superficial to fatal.
- Likelihood considers the chances of the linkage occurring and is classified into categories from improbable to frequent.

By assigning scores with each of the above categories, the risk assessment can be undertaken using the formula:

$$\text{RISK} = \text{LIKELIHOOD} \times \text{SEVERITY}$$

The matrix given in Table 7 provides a means of calculating the overall risk; while Table 13 provides the qualitative assessment based on the risk score.

Table 12: Contamination Risk Matrix

		Potential Severity				
		Fatal 5	Major 4	Moderate 3	Minor 2	Slight 1
Probable Likelihood	Frequent 5	Very High	High	Moderate	Low - Moderate	Low
	Probable 4	High	High	Moderate	Low - Moderate	Low
	Possible 3	Moderate	Moderate	Low - Moderate	Low - Moderate	Very Low
	Remote 2	Low - Moderate	Low - Moderate	Low - Moderate	Low	Very Low
	Improbable 1	Low	Low	Very Low	Very Low	Very Low

Table 13: Assessment description for risk scores

Risk Score	Risk Assessment
1-3	Very Low
3-5	Low
6-10	Low to Moderate
11-15	Moderate
16-20	High
21-25	Very High

Table 14: Risk Classification System

Risk Term	Description
Very Low to Low	The presence of an identified hazard does not give rise to the potential to cause significant harm to a designated receptor. In the event of such harm being realized, it is not likely to be Severe.
Low to Moderate	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realized, would at worst normally be mild.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
High	Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remedial action. Investigation is required and remedial works may be necessary in the short term and are likely over the longer term.
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, or, there is an evidence that severe harm to a designated receptor is currently happening. Urgent investigation and remediation are likely to be required.

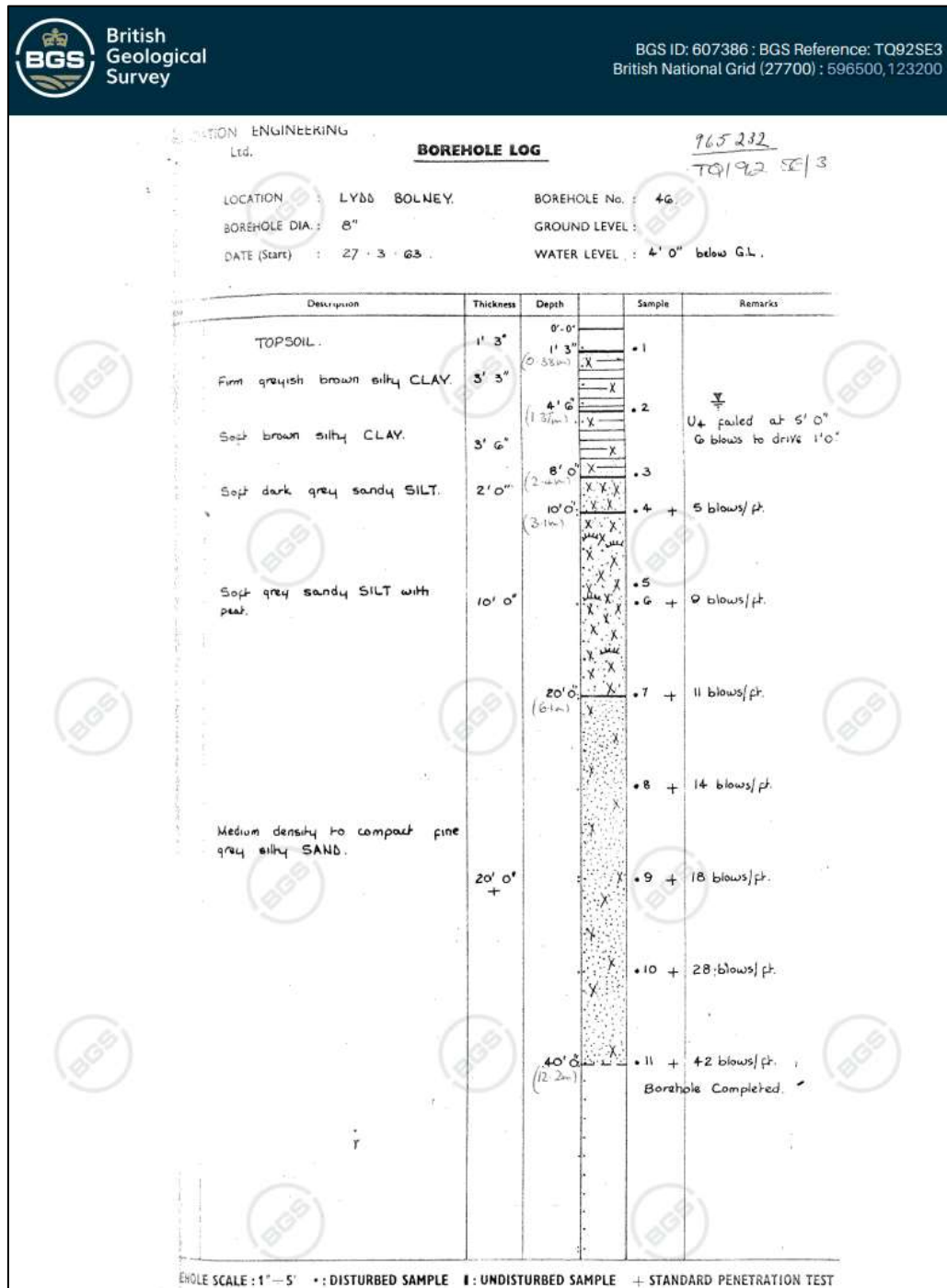
9.9 Appendix 9 – Results of Standard Penetration Testing

Location ID	Depth Top (mbgl)	Blows Seating 1	Blows Seating 2	Blows Mains 1	Blows Mains 2	Blows Mains 3	Blows Mains 4	N Value
BH03	1	2	1	0	1	1	1	3
	2	1	1	2	1	1	1	5
	3	1	2	1	1	2	2	6
BH06	1	3	1	1	1	0	1	3
	2	1	2	1	2	1	1	5
	3	2	1	1	0	2	1	4

Appendix 10 - Borehole logs from nearby investigations

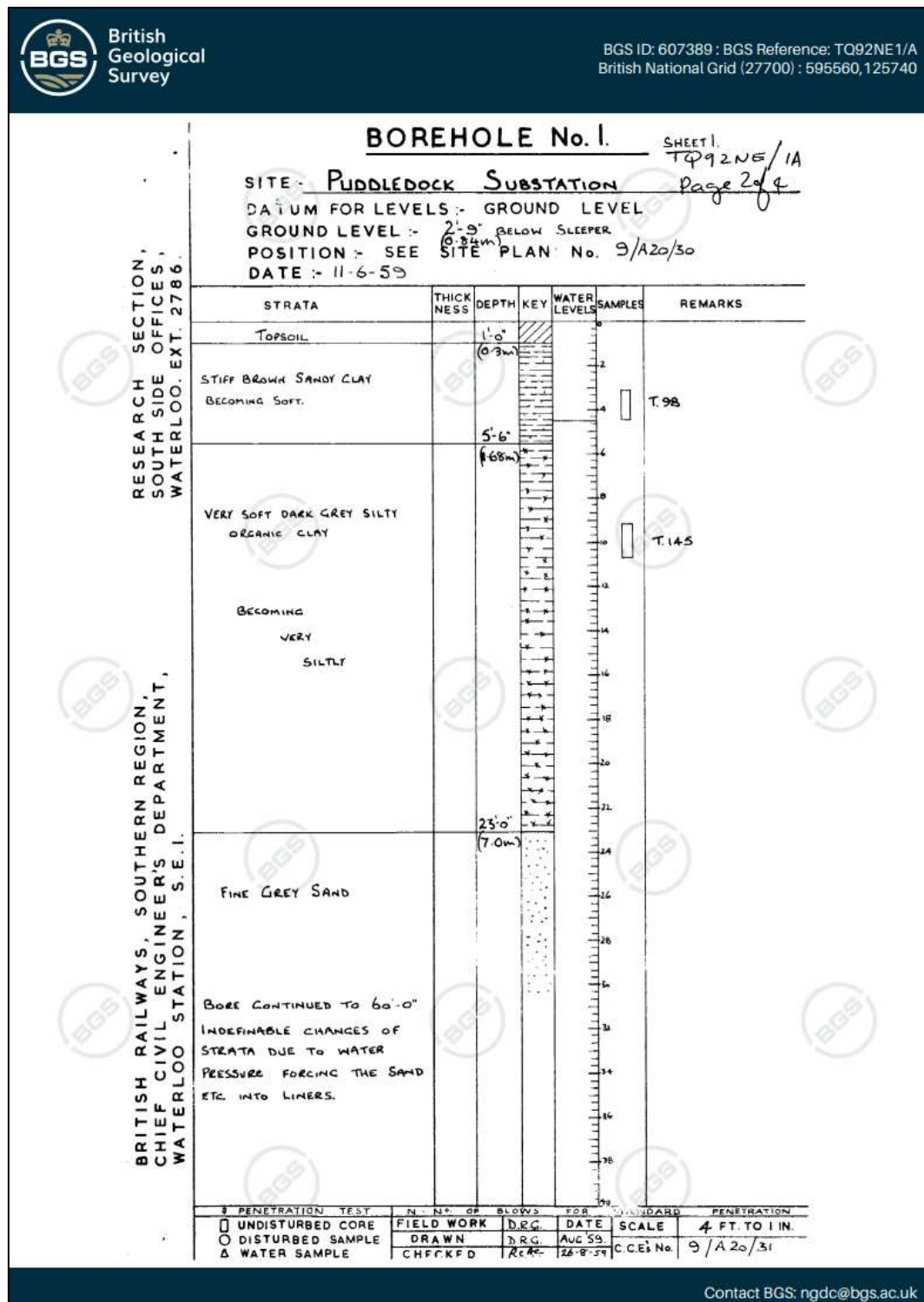
9.9.1 Previous Borehole Log 1

Previous borehole log recorded approximately 3.5km Southwest of the Site at grid reference: 596500, 123200. Peat encountered between 3 to 6m, underlain by SAND.



9.9.2 Previous Borehole Log 2

Previous borehole log recorded approximately 3.6km West of the Site at grid reference: 595560 125740. Organic Clay encountered between 1.68 to 7m, underlain by SAND.



9.10 Appendix 11 - Foundation Depth Calculator Results

Parameter	Input Value
Is sloping ground (>1:7) present on-site or Adjacent?	No
Volume Change Potential	Low
Ground Level Alterations	Unaltered
Climate Zone Depth Reduction	0.00

Tree Details							
Tree Name	Species	Tree Group	Water Demand	Status	Mature Height	Actual Height	Distance to foundation
T1	Unknown	Broad Leafed	High*	Remaining*	5*	5*	5*
T2	Unknown	Broad Leafed	High*	Remaining*	15*	10*	15*

*Assumed values

Calculated Foundation Depth = 1.1m

10 ABBREVIATIONS

Abbreviation	Description
BTEX	Benzene, Tolulene, Ethylene and Xylene
c.	Circa
CLRA	Contaminated Land Risk Assessment
CSM	Conceptual Site Risk Model
EA	Environment Agency
GAC	Generic Assessment Criteria
IPC	Integrated Pollution Control
LAPC	Local Authority Pollution Control
NPPF	National Planning Policy Framework
OS	Ordnance Survey
PAHs	Polycyclic aromatic hydrocarbons
Part IIA	Part IIA of the Environmental Protection. Act 1990
PID	Photoionization Detector
PCB	Polychlorinated Biphenyl
PCL	Potentially Contaminative Land Use
PPL	Potential Pollutant Linkage
PSPPL	Potentially Significant Potential Pollutant Linkage
SI	Site Investigation
SOM	Soil Organic Matter
SPOSH	Significant Possibility of Significant Harm
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TPHCWG	Total Petroleum Hydrocarbon Criteria Working Group
UXO	Unexploded Ordnance
mbgl	metres below ground level
OS	Ordnance Survey
NPPF	National Planning Policy Framework
PI	Plasticity Index
MPI	Modified Plasticity Index
VCP	Volume Change Potential

11 REFERENCES

1. CLAIRE\ Chartered Institute of Environmental Health (May 2008) - Guidance on comparing soil contamination data with a critical concentration
2. Department of Environment (1994), CLR 3, Documentary Research on Industrial Sites, 3. Contaminated Land Research Report
3. Environment Agency (2005) - Model Procedures for the Management of Land Contamination
4. British Standards Institution (2011) - BS 10175 2011 Investigation of Contaminated Sites – Code of Practice
5. Department of Environment (2002) - Priority Contaminants Report, CLR8
6. Department of Environment: Contaminated Land Research Report No. 6, (1995) – Prioritisation and Categorisation Procedure for Sites which may be contaminated
7. Department of Environment, Food and Rural Affairs, Environment Agency (2002) - The Contaminated Land Exposure Assessment Model (CLEA): Technical Basis and Algorithms
8. National House-Building Council, Environment Agency, Chartered Institute of Environmental Health (2008) - Guidance for the Safe Development of Housing on Land Affected by Contamination - R&D Publication 66: 2008.
9. [NHBC Standards 2018](#)
10. BS 8004: (1986): Code of practice for foundations
11. Craig, R. F. (1986), Soil Mechanics, 4th ed., ISBN 0-412-38430-2
12. Terzaghi, K. (1943): Theoretical soil mechanics, John Wiley and sons, New York