



Proposed redevelopment
Eaton Court
104-112 Oxford Road
Reading

Ground Investigation Report

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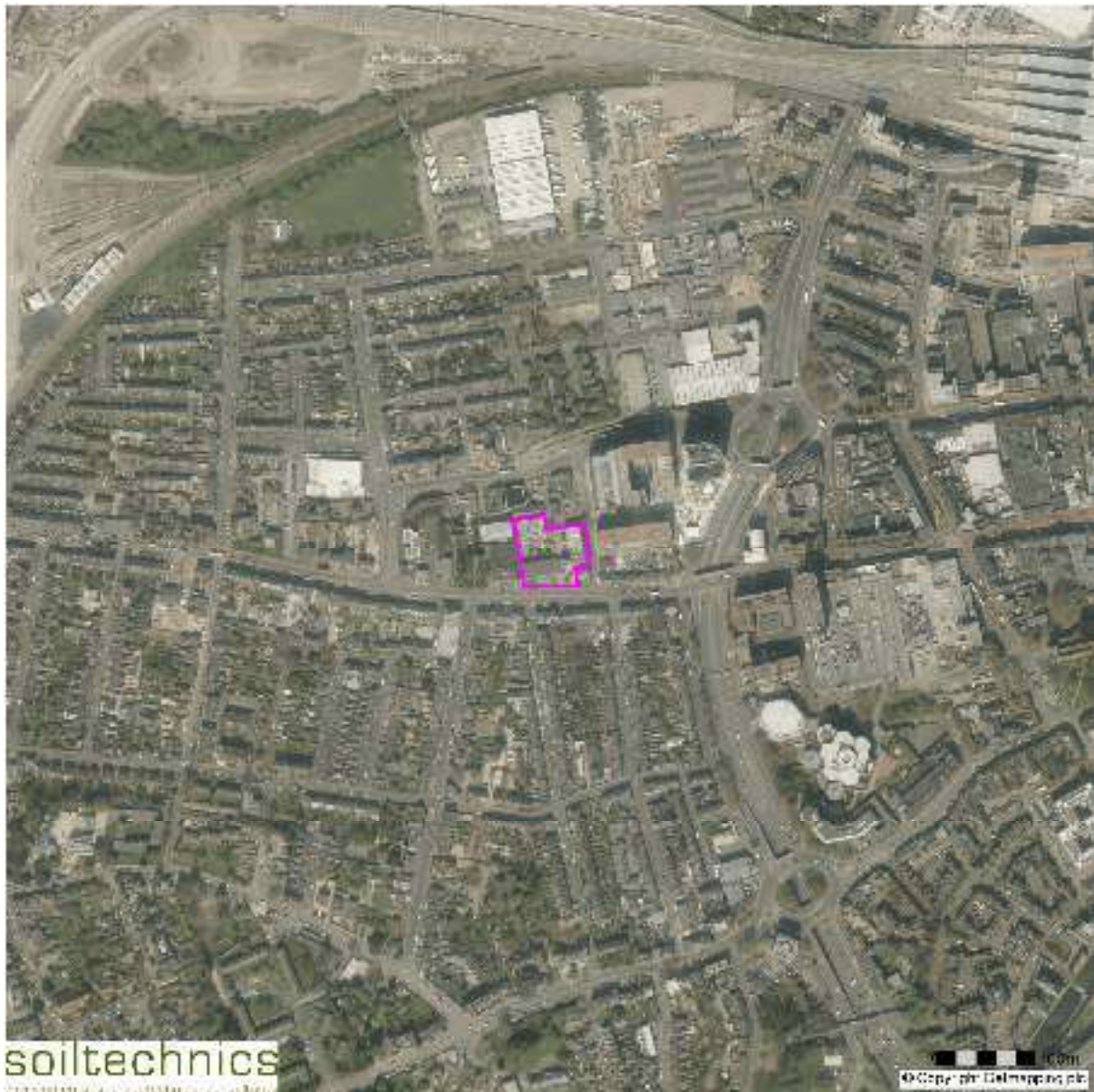
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GROUND INVESTIGATION REPORT

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Aerial photograph of site



Approximate site boundary is the area outlined in **magenta**.

Bookmarking

As a PDF version this document is bookmarked. If you click on the bookmark icon  on a PDF viewer then the main contents listing is shown and by clicking on the bookmark you can navigate through the report.

Report status and format

Report section	Principal coverage	Report status	
		Revision	Comments
1	Executive summary	02	Revised February 2026
2	Introduction	02	Revised February 2026
3	Desk study information and site observations	02	Revised February 2026
4	Fieldwork	01	Revised September 2021
5	Laboratory testing	01	Revised September 2021
6	Ground conditions encountered	01	Revised September 2021
7	Geotechnical Appraisal	01	Revised September 2021
8	Chemical contamination	02	Revised February 2026
9	Gaseous contamination	00	First issue, August 2021
10	Effects of ground conditions on building materials	00	First issue, August 2021
11	Waste characterisation	00	First issue, August 2021
12	Further investigations	01	Revised September 2021

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1 Executive summary

General

We recommend the following executive summary is not read in isolation to the main report which follows.

Site description, history and development proposals

The site is roughly square in shape and at time of initial reporting was occupied by a two to three storey building in an L-shaped plan arrangement located in the south and east of the site. The north-west quadrant is occupied by a multi-level car park. The remaining site area is a mixture of block paved car parking areas, landscaped areas and access pathways.

At time of the report revision enabling works had commenced including the stripping out of the existing office buildings and partial demolition.

In summary, in the late 1800s, the south-west of the site was occupied by residential housing while the remainder of the site was undeveloped (public and private gardens). There was little significant change until the late 1950s, when a warehouse was recorded in the eastern part of the site. Further warehouses are recorded in the 1970s. The current building is recorded from 1990.

The planning proposals comprise the partial demolition of the existing buildings and change of use and redevelopment of existing office buildings into 40 x1 bedroom and 12 x2 bedroom dwelling units. Including a 2-storey roof extension to accommodate 15 further dwelling units. Along with car parking, cycle parking and associated landscaping, amenity space, plant and refuse areas, and access arrangements.

Ground conditions encountered

Ground conditions comprised Made Ground/Topsoil over Taplow Gravel Member and subsequently the Seaford and Newhaven Chalk Formations. Made Ground was limited and did not extend beyond 0.65m. The Taplow Gravel generally comprised dense to very dense creamish brown or orangish brown clayey sand, sand and gravel or sandy gravel and extended to 3.15-3.75m.

Chalk Formation comprised structureless chalk composed of creamish white, sandy, gravelly clay (Grade Dm) over silty, sandy, clayey gravel (grade Dc). Silts and gravels were interlayered within BH2 below 10m. Based on the SPT results, it is likely the chalk is structured at around 9-12m and will be of a higher Grade.

Groundwater was encountered at 8.2m depth in BH1 and 8.0m in BH2.

No evidence of significant contamination was encountered. The granular Taplow Gravel Member deposits were relatively unstable and as such, many of the boreholes were terminated due to collapse of borehole sides.

Foundation solution

Due to the size, linking of the proposed buildings, and the moderate to high possibility of dissolution features being present on site, it is likely that a piled foundation design will be adopted. It should also be noted that a raft solution is considered potentially feasible, however, consideration would have to be given to differential settlement across the likely unevenly loaded raft.

Chemical and gaseous contamination

None of the concentrations of commonly occurring chemical contaminants exceeded the guideline values for identified human receptors. In addition, no asbestos was encountered in the soils on site. As such, it is considered unlikely that the near surface Made Ground will pose a risk to residential end users or construction operatives. The risk to vegetation and water receptors is also considered to be very low.

No elevated gaseous contamination was identified during the return monitoring visits and as such, the risk of landfill type gases affecting the proposed development is considered to be very low.

Based on above, no remedial action is considered necessary to make the site safe and suitable for use.

Landfill classification

Two types of Made Ground were encountered on site. A reddish brown, gravelly, clayey sand with gravel of igneous rock and occasional asphalt and a brown gravelly, clayey sand with gravels of brick, igneous rock and flint (identified in WS03 only). Both were classified as being suitable for disposal as inert waste. Natural soils can also be disposed of as inert waste.

10 Effects of ground conditions on building materials

10.1	General
10.2	Concrete – sulphate attack
10.3	Concrete – chloride attack
10.4	Concrete – acid attack
10.5	Concrete – magnesium attack
10.6	Concrete – ammonium attack
10.7	Plastic pipes

10.1 General

10.1.1 Building materials are often subjected to aggressive environments which cause them to undergo chemical or physical changes. These changes may result in loss of strength or other properties that may put at risk their structural integrity or ability to perform to design requirements. Aggressive conditions include:

- Severe climates
- Coastal conditions
- Polluted atmospheres
- Aggressive ground conditions

10.1.2 This report section only considers aggressive ground conditions in relation to buried concrete and water pipes. Ground conditions may affect other materials but have not been considered here.

10.2 Concrete - Sulphate attack

10.2.1 Hazard

10.2.1.1 Sulphate attack on concrete is characterised by expansion, leading to loss of strength, cracking, spalling and eventual disintegration. There are three principal forms of sulphate attack, as follows:

- Formation of gypsum through reaction of calcium hydroxide and sulphate ions.
- Ettringite formation through reaction of tricalcium aluminate and sulphite ions.
- Thaumasite formation as a result of reactions between calcium silicate hydrates, carbonate ions (from aggregates) and sulphate ions.

10.2.2 Assessment

10.2.2.1 The hazard of sulphide attack is addressed by reference to procedures described in Building Research Establishment (BRE) Special Digest 1: 2005 '*Concrete in Aggressive Ground*' to establish a design sulphate class (DS) and the '*Aggressive Chemical Environment for Concrete*' (ACEC). These procedures have been followed during our investigation and are described in the following paragraphs.

10.2.3 Desk Study Information

10.2.3.1 The first step in the procedure is to consider specific elements of the desk study. These are tabulated below.

Summary of desk study information			
Element	Interrogation	Outcome	SD1: 2005 reference
Geology	Likelihood of soils containing pyrites	Unlikely	Box C6
Past industrial uses	Brownfield site?	Yes	C2.1.2

Table 10.2.3.1

10.2.3.2 A brownfield site is defined in SD1: 2005 as a site, or part of a site which has been subject to industrial development, storage of chemicals (including for agricultural use) or deposition of waste, and which may contain aggressive chemicals in residual surface materials, or in ground penetrated by leachates. Where the history of the site is not known, it should be treated as brownfield until there is evidence to classify it as natural.

10.2.3.3 Based on the above it is necessary to follow the procedures described in figure C6 (*'locations on brownfield sites except where soils may contain pyrite'*).

10.2.4 Laboratory testing

10.2.4.1 The following table summarises ground conditions and laboratory testing.

Item	Soil type	Outcome
Soil		
Number of samples	Made Ground	2
	Taplow Gravel	3
	Chalk	2
Characteristic w/s sulphate	Made Ground	37mg/l
	Taplow Gravel	24mg/l
	Chalk	10mg/l
Characteristic pH	Made Ground	8.5
	Taplow Gravel	7.9
	Chalk	8.2
Characteristic total acid soluble sulphate	Made Ground	0.09%
	Taplow Gravel	0.04%
	Chalk	0.05%

Table 10.2.4.1

10.2.5 Disturbed ground

10.2.5.1 As potentially pyritic ground has not been identified at the site, disturbed ground is not considered in the following assessment.

10.2.6 Assessment of design sulphate class (DC) and aggressive chemical environment for concrete (ACEC)

10.2.6.1 Based on the design sulphate class, characteristic value of pH and assessment of groundwater mobility, and with reference to table C2 of SDI: 2005, the ACEC class for each soil type is presented in Table 10.2.6.

Summary of concrete classification				
Soil type	Disturbed ground?	Consider TPS?	DS class	ACEC class
Made Ground	N	N	DS-1	AC-1
Taplow Gravel	N	N	DS-1	AC-1
Chalk	N	N	DS-1	AC-1
Table 10.2.6.1				

10.3 Concrete - Chloride attack

10.3.1 Hazards

10.3.1.1 There are a number of ways in which chlorides can react with hydrated cement compounds in concrete. These are as follows:

- Chlorides react with calcium hydroxide in the cement binder to form soluble calcium chloride. This reaction increases the permeability of the concrete reducing its durability.
- Calcium and magnesium chlorides can react with calcium aluminate hydrates to form chloroaluminates which result in low to medium expansion of the concrete.
- If concrete is subject to wetting and drying cycles caused by groundwater fluctuations, salt crystallisation can form in concrete pores. If pressure produced by crystal growth is greater than the tensile strength of the concrete, the concrete will crack and eventually disintegrate.

10.3.2 Risk assessment

10.3.2.1 Chlorides of sodium, potassium, and calcium are generally regarded as being non-aggressive towards mass concrete; indeed, brine containers used in salt mines have been known to be serviceable after 20 years' service. Depending upon the type of concrete, and the cement used up to 0.4% chloride is allowed in BS8110: Part 1.

10.3.2.2 In view of the past use of the site we consider the likelihood of elevated concentrations of chlorides in the ground to be low and, on this basis, have not specifically measured concentrations of chlorides.

10.4 Concrete - Acid attack

10.4.1 Hazards

10.4.1.1 Concrete being an alkaline material is vulnerable to attack by acids. Prolonged exposure of concrete structures to acidic solutions can result in complete disintegration.

10.4.2 Risk assessment

10.4.2.1 The rate of acid attack on concrete depends upon the following:

- The type of acid
- The acid concentration (pH)
- The composition of the concrete (cement/aggregate)
- The soil permeability
- Groundwater movement

10.4.2.2 British Standard BS8110: Part 1 classifies extreme environment as one where concrete is exposed to flowing groundwater that has a pH<4.5. The standard also warns that Portland Cement is not suitable for acidic conditions with a pH of 5.5 or lower.

10.4.2.3 The pH of the soil was measured exceeding 5.5 and on this basis the risk of concrete being affected by acidic conditions is considered low.

10.5 Concrete - Magnesium attack

10.5.1 Hazards

10.5.1.1 Magnesium salts (excepting magnesium hydrogen carbonate) are destructive to concrete. Corrosion of concrete occurs from cation exchange reactions where calcium in the cement paste hydrates and is replaced with magnesium. The cement loses binding power and eventually the concrete disintegrates.

10.5.2 Risk assessment

10.5.2.1 In practise 'high' concentrations of magnesium will be found in the UK only in ground having industrial residues. Following BRE Special Digest 1:2005, measurement of the concentration of magnesium is recommended if sulphate concentrations in water extract or groundwater exceed 3000mg/l. Once measured the concentration of magnesium is considered further in BRE Special Digest in establishing the concrete mix to resist chemical attack.

10.5.2.2 We are not aware the site has been subject to any manufacturing processes which would have included magnesium containing compounds, and in addition sulphate concentrations did not exceed 3000mg/l. On this basis we have not measured the concentration of magnesium in soils at the site and would consider the risk of soils at the site promoting attack on concrete to be low.

- 10.5.2.3 BS EN 206-1:2000 '*Concrete - Part 1: Specification, performance, production and conformity*' does, however, provide exposure classes for concrete in contact with water, with varying concentrations of magnesium for the design/specification for concrete mixes. Given the history of the site, we would consider the risk of magnesium requiring special consideration with respect to enhancement of exposure class for this contaminant in isolation to be low.

10.6 Concrete - Ammonium attack

10.6.1 Hazards

- 10.6.1.1 Ammonium salts, like magnesium salts act as weak acids and attack hardened concrete paste resulting in softening and gradual decrease in strength of the concrete.

10.6.2 Risk assessment

- 10.6.2.1 UK guidance is not available on the concentration of ammonium which may affect concrete. BS EN 206-1: 2000 '*Concrete - Part 1: Specification, performance, production and conformity*' does, however, provide exposure classes for concrete in contact with water with varying concentrations of ammonia for the design/specification for concrete mixes.
- 10.6.2.2 As no groundwater was present in the borehole upon our return monitoring visits, we have not been able to obtain water samples for measurement of concentration of ammonia. However, the site has no history which provides evidence of the uses of ammonia on site, and therefore the risk of concrete being affected by ammonia is considered low.

10.7 Plastic Pipes

10.7.1 Hazards

- 10.7.1.1 Plastic pipes are predominantly manufactured from PVC and PE but other materials can be used. In general, they perform well but it is known that chemical attack and permeation of contaminants through the pipes can result from use in contaminated land. A published review on plastic pipes reports the following:
- Polyethylene (PE) - good resistance to solvents, acids and alkalis
 - Poly vinyl chloride (PVC) - most common form of pipe. Good general resistance to chemical attack but can be attacked by solvents such as ketones, chlorinated hydrocarbons and aromatics.
 - Polypropylene (PP) - chemically resistant to acids, alkalis and organic solvents but not recommended for use with storing oxidising acids, chlorinated hydrocarbons and aromatics.
 - Poly vinylidene fluoride (PVDF) - inert to most solvents, acids and alkalis as well as chlorine, bromide and other halogens
 - Polytetrafluoroethylene (PTFE) - one of the most inert thermoplastics available. PTFE has good chemical resistance to solvents, acids and alkalis

10.7.1.2 A survey carried out by the Water Research Centre (WRc) on reported incidents of permeation (more than 25), only two involved PVC with these incidents relating to spillages of fuel.

10.7.2 Assessment

10.7.2.1 A survey carried out by the Water Research Centre (WRc) on reported incidents of permeation (more than 25), only two involved PVC with these incidents relating to spillages of fuel.

10.7.2.2 The UK Water Industry research (UKWIR) have published a document entitled '*Guidance for the selection of Water supply pipes to be used in Brownfield sites*'. The publication defines brownfield sites as

'Land or premises that have been used or developed. They may also be vacant, or derelict. However, they are not necessarily contaminated'

10.7.2.3 The subject site has previously been developed and on this basis could potentially be considered brownfield in accordance with the UKWIR document. Following the preliminary risk assessment procedures described in the UKWIR document however, (paragraph 2.4.2) there is no evidence to indicate that chemicals have ever been used or stored on site or adjacent to the development. On this basis it is considered unlikely that there will be a requirement to use barrier water supply pipes. We recommend however, that Thames Water is consulted on this to gain their opinion and requirements.

11 Waste characterisation

11.1	The Landfill Directive
11.2	Characterisation of soil types
11.3	Waste characterisation procedure
11.4	Hazardous waste classification
11.5	Landfill waste acceptance criteria
11.6	Naturally deposited soils not affected by artificial contaminants
11.7	Basic characterisation
11.8	Treatment of waste
11.9	Reuse of soils - Materials Management Plans

11.1 The Landfill Directive

11.1.1 The Landfill Directive represents an important change in the way we dispose of waste. It encourages waste minimisation by promoting increased levels of recycling and recovery. The Landfill Directive became law in 1999 and was transcribed into the Landfill (England and Wales) Regulations which came into force in 2002. These Regulations were amended in 2005 by introducing criteria to classify soils for disposal to landfill. It is the duty of the waste producer (the client) to classify the soils for this purpose.

11.2 Characterisation of soil types

11.2.1 Our investigations consider two soil types which may be generated as wastes as part of construction operations, potentially contaminated soil and uncontaminated soil. A full hazard assessment and subsequent testing for waste acceptance criteria is undertaken on soils which are not considered to be naturally deposited or are likely to be affected by artificial contamination. For soils that are unlikely to be affected by artificial contamination (such as natural soils), specific testing in relation to the classification process is not necessary.

11.3 Waste characterisation procedure

11.3.1 The Environment Agency publication, '*Waste Sampling and Testing for Disposal to Landfill*' (2013), provides an appropriate procedure for establishing if the soils are hazardous or non-hazardous and for determining the appropriate landfill class. This guidance applies to soils that are identified as potentially contaminated. Uncontaminated, natural soils are considered separately (see Section 11.6).

11.3.2 Hazardous waste classification

11.3.2.1 The first stage for characterising a potentially 'contaminated' soil for disposal to landfill is to establish its chemical status by first identifying potential sources/types of chemical contamination (desk study) followed by intrusive site investigations to obtain samples for undefined testing of soil samples to measure concentrations of chemical contaminants. Such data provides information to partly complete a basic characterisation.

11.3.2.2 Laboratory test data is then compared with the Environment Agency publication '*Guidance on the classification and assessment of waste. Technical Guidance WM3 (2018, version 1.1)*'. With reference to this document a hazard assessment has been carried out to enable classification of the material as hazardous or non-hazardous and to subsequently establish the European Waste Catalogues (EWC) code (ref Section 11.3.4).

11.3.3 Landfill waste acceptance criteria

11.3.3.1 The second stage for characterising a potentially 'contaminated' soil for disposal to landfill is by determining the appropriate landfill class. If the soil is deemed hazardous then measurement of organic contaminants and leachable inorganic contaminants is necessary for comparison with values listed in the Environment Agency publication '*Waste Sampling and Testing for Disposal to Landfill* (2013) Table 5.3. Similarly, should the soil be deemed as non-hazardous then such testing may also be undertaken to determine if it is potentially inert. This document also provides guidance on sampling materials and frequency as well as test procedures and quality assurance of testing.

11.3.3.2 The above procedures are described with respect to the subject site in Sections 11.4 (hazardous waste classification) and 11.5 (landfill waste acceptance criteria), leading to the basic characterisation of soils for disposal. Subject to the results of the characterisation and anticipated development methodology, consideration should be given by the developer to reduce volumes of disposal or treatment to allow reclassification.

11.3.4 European Waste Catalogues (EWC) coding

11.3.4.1 The EWC 2002 is a catalogue of all wastes, grouped according to generic industry, process or waste type. It is divided into twenty main chapters, each with a two digit code between 01 and 20. Following the EWC, in our opinion, soils considered as part of this investigation would be categorised within 'Group 17' of the EWC catalogue, which comprises 'Construction and Demolition Wastes (including excavated soils from contaminated sites)'.

11.3.4.2 The Catalogue further categorises the waste, such that soils considered as part of this investigation would be classified as either 17 05 04 defined as '*soil and stones (other than those mentioned in 17 05 03)*'; or 17 05 03* defined as soil or stones containing dangerous substances (where hazardous wastes are described by entries followed by an asterisk).

11.4 Hazardous waste classification

11.4.1 Soil types

- 11.4.1.1 Based on soils exposed in exploratory excavations, in combination with anticipated construction works, we assume soils requiring off-site disposal will comprise Topsoil, Made Ground, Taplow Gravel Member and Chalk.

11.4.2 Classification as hazardous or non-hazardous waste

- 11.4.2.1 The Environment Agency publication '*Waste Sampling and Testing for Disposal to Landfill*' (March 2013) provides the following procedure for establishing if the soils are hazardous or non-hazardous. The first stage in classifying a potentially 'contaminated' soil for disposal is to establish its chemical status by first identifying potential sources/types of chemical contamination (desk study) followed by intrusive site investigations to obtain samples for laboratory testing of soil samples to measure concentrations of chemical contaminants.
- 11.4.2.2 An assessment of potential sources of contamination is presented in our desk study report STR4832-P01. Laboratory testing has been set as deemed appropriate to our source assessment.
- 11.4.2.3 We have carried out an analysis of test data for each chemical contaminant considered in this investigation. A conservative approach has been adopted for the analysis whereby the maximum test value for each contaminant has been adopted as a preliminary screening process to determine if the soils are hazardous or non-hazardous. Should the analysis indicate potentially hazardous properties then a process of zoning by further analysing the site history, geological conditions and analytical data may be undertaken.
- 11.4.2.4 Laboratory test data measures the concentration of anions, which are unlikely to exist in the pure metallic form in the soil, but probably exist as a compound. Following guidance provided in the Environment Agency Technical Guidance WM3 '*Guidance on the classification and assessment of waste*' (2018), we have reviewed a variety of compounds for each of the metallic and semi metallic elements we have tested.
- 11.4.2.5 To determine the hazardous waste properties for each element, we have reviewed chemical compounds listed in Table 3.2 of Annex VI of the European Regulation (1272/2008) for Classification, Labelling and Packaging (CLP) of chemicals which has now superseded the Approved Supply List (Published by the Health and Safety Executive) for the classification of hazardous chemicals in the UK. In order to provide a 'worst case' scenario, initially we adopt the most severe hazardous properties (risk phrases) associated with the various compounds for each element under review. If measured concentrations produce a hazardous outcome then the element or elements are reassessed on a site specific basis. For review of organic contamination, we have directly adopted the threshold concentrations for the appropriate organic compounds listed in Table 3.2.

- 11.4.2.6 The compound or compounds adopted for each element is used to convert the measured metallic concentration to the substance concentration using their respective molecular weights. This derived conversion factor is then used in the threshold concentration spreadsheet (refer paragraph 11.4.2.8).
- 11.4.2.7 Our assessment of each of the chemical substances is maintained on our files and is available for confidential review/audit by the Environment Agency.
- 11.4.2.8 A spreadsheet detailing the hazard assessment is presented in Appendix K1.
- 11.4.2.9 The spreadsheet indicates Made Ground soils are **non-hazardous**.

11.5 Landfill waste acceptance criteria

- 11.5.1 We have scheduled testing of **two** samples to measure the parameters listed in Table 5.3 (landfill waste acceptance criteria) included in '*Waste Sampling and Testing for Disposal to Landfill*' (2013). A copy of the test result certificate is presented in Appendix G. The source of the composite samples is detailed below:

Composition of soil samples for classification testing		
Strata	Source	Soil Type
Made Ground (COMP01)	BH01 at 0.3m	Reddish brown, gravelly, clayey sand with gravel of igneous rock and occasional asphalt.
	WS02 at 0.3m	
	WS03 at 0.2m	
	WS04 at 0.2m	
	WS05 at 0.2m	
	HP01 at 0.2m	
	HP02 at 0.2m	
Made Ground (COMP02)	WS03 at 0.4m	Brown gravelly, clayey sand with gravels of brick, igneous rock and flint.
Table 11.5.1		

- 11.5.2 The samples were deemed representative of Made Ground soils as described in Section 6. The combined sample was then quartered in the laboratory to produce a representative sample for subsequent testing.
- 11.5.3 Laboratory test data has been compared with the landfill waste acceptable criteria to allow the assessment to be completed. A tabulated copy this comparison is presented in Appendix K2.
- 11.5.4 Comparison of test data with landfill waste acceptance criteria indicates that both types of Made Ground soils are suitable for disposal at **an inert waste** landfill site.
- 11.5.5 Topsoil**
- 11.5.5.1 Some limited Topsoil was present on site within areas of soft landscaping. We have not specifically tested these soils as we assume they can be reused within the proposed development and laboratory testing indicates it is fit for purpose with respect to concentrations of chemical contaminants for a residential development.

- 11.5.5.2 It should be noted that due to the organic content of the topsoil, laboratory testing is likely to indicate the soils are non-hazardous rather than inert for disposal to landfill due to elevated Total Organic Carbon (TOC).

11.6 Naturally deposited soils not affected by artificial contaminants

- 11.6.1 With reference to the Environment Agency's publications *Waste Sampling and Testing for Disposal to Landfill* (2013) and *Waste acceptance at landfills* (2010), naturally occurring soils not likely to be affected by contamination can be classified as inert waste, with a EWC code of 17 05 04. Should any of the naturally deposited soils be suspected to contain contamination (by virtue of visual or olfactory evidence) upon excavation, then such soils should be stockpiled appropriately and additional testing carried out as considered necessary. Based on evidence obtained during our investigations, we are of the opinion that the Taplow Gravel Member and Chalk Formations at the site are not likely to be affected by chemical contamination and thus can be classified as **inert waste**.

11.7 Basic characterisation

- 11.7.1 Based on the preceding assessment, we have produced three basic characterisation schedules relating to the Made Ground, Taplow Gravel Member and Chalk Formations, which are presented in Appendix K3. These schedule should be provided together with a copy of this report to an appropriately licensed landfill facility to demonstrate the material can be deposited at this facility.
- 11.7.2 We understand that some landfill sites have licences which have restrictions on concentrations of chemical contaminants and thus we recommend this report is provided to the selected landfill facility to confirm (or otherwise) it can accept the waste. Please be aware that landfill sites are obligated to undertake in house quality assurance tests and thus may require further WAC testing for any soils encountered as part of this investigation. There is no obligation on any landfill operator to accept waste if they choose not to and waste operators may require additional testing of untested waste soils prior to acceptance at landfill in accordance with the landfill regulations.

11.8 Treatment of waste

- 11.8.1 Treatment of wastes prior to disposal is now a requirement of the landfill directive applied by the Landfill (England and Wales) Regulations 2002. Landfill cannot accept untreated waste (be it hazardous or non-hazardous), thus waste producers have the choice of treating it themselves on site or treating it elsewhere prior to disposal to landfill. The regulations require:

'10 – (1) The operator of a landfill shall ensure that the landfill is only used for landfilling waste which is subject to prior treatment unless:

- a) It is inert waste for which treatment is not technically feasible; or*
- b) It is waste other than inert waste and treatment would not reduce its quantity or the hazards which it poses to human health or the environment.'*

11.8.2 Regulation 2 defines treatment as: *'physical, thermal, chemical or biological processes (including sorting) that change the characteristics of waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery.'*

11.8.3 A treatment option must comply with the definition of treatment. This involves a 'three point test' against which treatment is assessed i.e.

1. It must be a physical, thermal, chemical or biological process including sorting
2. It must change the characteristics of the waste: and
3. It must do so in order to:
 - a) Reduce its volume: or
 - b) Reduce its hazardous nature: or
 - c) Facilitate its handling: or
 - d) Enhance its recovery.

11.8.4 Treatment of inert wastes

11.8.4.1 Inert waste does not need to be treated if it is not technically feasible however treatment should reduce the amount of waste which goes to landfill and enhance its recovery (by re-use or recycling). Inert wastes are often suitable for recycling, for example as an aggregate or an engineering fill material. A fact sheet on treatment of inert wastes is available on the following website www.environment-agency.gov.uk

11.8.4.2 Clearly, excavations in the Taplow Gravel Member and Chalk Formations will generate inert wastes which could be reused on site or off site for bulk filling, subject of course to maintenance of an acceptable water content and provided that it is fit for its intended purpose.

12 Further investigations

12.1	Further investigations
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12.1 At this stage however, no further investigations are considered necessary if a piled foundation solution is to be adopted. If a raft foundation is considered, further investigations to determine settlement characteristics and dissolution features would be required to prove feasibility.

12.2 We would be pleased to provide proposals with costings on further instructions.

2 Introduction

2.1	Objectives
2.2	Status of this report
2.3	Client instructions and confidentiality
2.4	Site location and scheme proposals
2.5	Report format and investigation standards
2.6	Report distribution
2.7	Soiltechnics liability

2.1 Objectives

- 2.1.1 This report describes a ground investigation carried out at Eaton Court, Oxford Road, Reading, RG1 7LL.
- 2.1.2 The objective of the ground investigation was to establish ground conditions at the site, sufficient to identify possible foundation solutions for the development and provide parameters necessary for the design and construction of foundations.
- 2.1.3 The investigation included an evaluation of potential chemical and gaseous contamination of the site leading to the production of a risk assessment in relation to contamination.
- 2.1.4 The investigation has also been produced to support a planning application for the site by satisfying National Planning Policy Framework which relate to ground conditions.
- 2.1.5 Our brief also included investigations and testing to allow classification of soils at the site to be disposed of to landfill.

2.2 Status of this report

- 2.2.1 This report is final based on our current instruction.

2.3 Client instructions and confidentiality

- 2.3.1 The investigation was initially prepared in February 2021 and revised in August 2021 acting on instructions received from Morph Structures Limited, on behalf of Cannon Capital Development Limited. This latest revision is dated February 2026 for Ivaro Ltd, who have reliance on the report.
- 2.3.2 This latest revision (2026) has been undertaken as at least 3 years has lapsed since time of the previous issue, and due to minor changes in the development layout.
- 2.3.3 This report has been prepared for the sole benefit of our above-named clients, but this report, and its contents, remains the property of Soiltechnics Limited until payment in full of our invoices in connection with production of this report.

2.3.4 Our original investigation proposals were outlined in our quote sent to Morph Structures Limited, referenced QS10619 Rev200 and dated 14th December 2020. The investigation was subsequently amended to utilise the budget as efficiently as possible due to some access restrictions on site.

The principal changes were:

- i) Removal of mechanically excavated trial pits as the information could be largely obtained using windowless sampling boreholes and hand dug trial pits, which were less obtrusive.
- ii) An additional day of windowless sampling boreholes to replace the mechanically excavated trial pits.

2.3.5 The investigation process was also determined to maintain as far as possible the original investigation budget costs.

2.4 Site location and scheme proposals

2.4.1 The National Grid reference for the site is 470890,173430. A plan showing the location of the site is presented on Drawing 01, and a drawing of the development proposals are appended.

2.4.2 We understand the scheme comprises the following the partial demolition of the existing buildings and change of use and redevelopment of existing office buildings into 40 x1 bedroom and 12 x2 bedroom dwelling units. Including a 2-storey roof extension to accommodate 15 further dwelling units. Along with car parking, cycle parking and associated landscaping, amenity space, plant and refuse areas, and access arrangements.

2.5 Report format and investigation standards

2.5.1 Sections 2 to 6 of this report describe the factual aspects of the investigation with Section 7 presenting an engineering assessment of the investigatory data. Section 8 provides a risk assessment of chemical contamination based on readily available historic records, inspection of the soils and laboratory testing. Section 9 provides a similar risk assessment in relation to gaseous contamination with Section 10 providing a risk assessment relating to construction materials likely to be in contact with the ground. Section 11 provides a classification of waste soils for off-site disposal under the waste acceptance criteria.

2.5.2 Geotechnical aspects

2.5.2.1 Geotechnical investigations were carried out generally, and where practical following the recommendations of BS EN 1997:2 2007 '*Eurocode 7 – Geotechnical Design – Part 2: Ground Investigation and Testing*'. From a geotechnical viewpoint this is deemed to be a Ground Investigation Report (GIR) as set out in BS EN 1997:2. This report does not constitute a Geotechnical Design Report as defined in section 2.8 of BS EN 1997-1:2004+A1:2013 '*Eurocode 7 – Geotechnical Design – Part 1: General Rules*' and in particular will exclude assessment of lifetime actions to buildings from geotechnical influences.

2.5.3 Geo-environmental aspects

2.5.3.1 The investigation process also followed the principles of BS 10175:2026 '*Investigation of potentially Contaminated Sites – Code of Practice*'. A desk study report for this project was produced, referenced R-STR4832-P01. We recommend this report is read in conjunction with the desk study report.

2.5.3.2 Fieldwork combined the exploratory investigation and main investigation stages into one phase with the extent of these works described in Sections 4 and 6 of this report. Any supplementary investigations deemed necessary are identified in Section 12.

2.5.3.3 This investigation has been carried out and reported based on our understanding of best practice. Improved practices, technology, new information and changes in legislation may necessitate an alteration to the report in whole or part after publication. Hence, should the development commence after expiry of one year from the publication date of this report then we would recommend the report be referred back to Soiltechnics for reassessment. Equally, if the nature of the development changes, Soiltechnics should be advised and a reassessment carried out if considered appropriate.

2.6 Report distribution

- 2.6.1 This report has been prepared to assist in the design and planning process of the development and normally will require distribution to the following parties, subject to Soiltechnics liabilities defined below, although this list may not be exhaustive:

Table summarising parties likely to require information contained in this report

Party	Reason
Client	For information / reference and cost planning
Developer / Contractor / project manager	To ensure procedures are implemented, programmed and costed
Planning department	Potentially to discharge planning conditions
Environment Agency	If ground controlled waters are affected and obtain approvals to any remediation strategies
Independent inspectors such as NHBC / Building Control	To ensure procedures are implemented and compliance with building regulations
Project design team	To progress the design
Principal Designer (PD)	To advise in construction risk identification and management under the Construction (Design and Management) Regulations
Waste recycling operators	For recycling or reducing hazardous properties

Table 2.6.1

2.7 Soiltechnics liability

- 2.7.1 Soiltechnics disclaims any responsibility to our Client and others in respect of any matters outside the scope of this report. This report has been prepared with reasonable skill, care and diligence in accordance with the terms of our contract, taking account of the manpower, resources, investigations and testing devoted to it by agreement with our Client. This report is confidential to our Client and Soiltechnics accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

3 Desk study information and site observations

3.1	General
3.2	Description of the site
3.3	Injurious and invasive weeds and asbestos
3.4	History of the site
3.5	Geology and geohydrology of the area
3.6	Enquiries with statutory undertakers
3.7	Unexploded Ordnance (UXO) Risk

3.1 General

3.1.1 A full desk study has previously been undertaken for the site by Soiltechnics Limited and is presented in the report referenced STR4832-P01. This section provides a brief summary of the salient points. In addition, we have also undertaken the following, which is reported in this section:

- a) Consultation with Statutory Undertakers
- b) Consultation with UXO specialists
- c) Site reconnaissance

3.2 Description of the site

3.2.1 The site comprises a commercial property off Oxford Road and Eaton Place in Reading. The local topography is generally flat, reducing slightly in level to the north-east toward the River Thames, the channel of which is approximately 1km distant. The closest recorded surface water feature is a small tributary of the River Thames, some 402m to the north of the site.

3.2.2 At time of the reporting, the enabling works had commenced including the stripping out of the existing office buildings and partial demolition.

3.2.3 The site is roughly square in shape and occupied by a two to three storey building in an L-shaped plan arrangement located in the south and east of the site. The north-west quadrant is occupied by a multi-level car park. The remaining site area is a mixture of block paved car parking areas, landscaped areas and access pathways. The site itself is essentially flat although levels appear to have been reduced to accommodate the north-west car park area.

3.2.4 The surrounding land uses are residential to the south, mixed residential and commercial to the east, commercial to the north and mixed residential commercial to the west. A listed building, the Royal Meteorological Society, adjoins the southeast corner of the site.

- 3.2.4 A plan showing observed site features and location of exploratory points is presented on Drawing 02.



Photograph 1 Looking north to the site, showing the southern boundary and main entrance.



Photograph 2 Facing north, showing the surface level car park, multi-level car park and rear entrance.



Photograph 3 Facing south, showing the carpark and rear of the existing building



Photograph 4 Internal view of the multi-level car park

3.3 Asbestos

3.3.1 Our investigations exclude surveys to identify the presence or indeed absence of asbestos on site. It should be noted however, that where intrusive investigations were undertaken, we did not observe any obvious evidence of potential asbestos containing materials. This information does not constitute a site-specific risk assessment and we recommend specialists in the identification and control / disposal of asbestos are appointed prior to commencement of any works on site.

3.3.2 The presence of asbestos on site may have considerable effects on the cost / timescale in developing the site. There is good guidance in relation to Asbestos available on the Health and Safety Executive (HSE) web site.

3.4 History of the site

3.4.1 A full history of the site based on old Ordnance Survey maps provided by Envirocheck is presented in our revised desk study report.

3.4.2 In summary, in the late 1800s, the south-west of the site was occupied by residential housing while the remainder of the site was undeveloped (public and private gardens). There was little significant change until the late 1950s, when a warehouse was recorded in the eastern part of the site. Further warehouses are recorded in the 1970s. The current building is recorded from 1990.

3.4.3 The surrounding land was developed. In the 1950s/1960s, a works and builder's yard were recorded on adjacent sites to the north and north-east respectively.

3.5 Geology of the area

3.5.1 With reference to our previous desk study report, the geology beneath the site can be summarised as follows:

Summary of Geology and likely aquifer containing strata					
Strata	Bedrock or superficial	Approximate thickness	Typical soil type	Likely permeability	Recorded aquifer designation
Taplow Gravel Member	Superficial	3.5m – 6.1m	Sands and Gravels	Permeable	Secondary A Aquifer
White Chalk Subgroup	Bedrock	200m	Chalk	Permeable	Principal aquifer
Table 3.5.1.1					

3.5.2 Water abstractions

3.5.2.1 The closest groundwater abstraction point lies 284m to the east of the site with water abstracted for retail purposes, including drinking purposes. There are no surface water abstractions within 500m. The site is not located within a zone protecting a potable water supply abstracting from a principal aquifer (i.e., a source protection zone).

3.5.3 Shallow mining and natural subsidence hazards

- 3.5.3.1 With reference to the desk study report, there are twenty-six recorded man-made cavities within 1000m of the site, all of which are noted to be associated with chalk mining. The nearest is located 345m to the south of the site. In addition, we have also identified a subsidence incident that occurred in 2000 approximately 400m to the south of the site (Field Road). The incident was attributed to the collapsed underground chalk workings, which were grouted as part of a remediation scheme.
- 3.5.3.2 The report also records forty-four natural cavities within 1000m of the site. The nearest is located some 176m east of the site and is recorded as a cluster of solution pipes. The site itself is recorded in an area at low risk of ground dissolution hazards but a high risk is recorded 24m to the south-east.
- 3.5.3.3 Following discussions with the Local Authority, it was recommended in our previous report that a search be undertaken of the national databases of natural and non-coal mining cavities held by Peter Brett Associates to provide additional information.

3.6 Enquiries with statutory undertakers

- 3.6.1 We have contacted the following Statutory Undertakers (SUs) to obtain copies of their records in order to avoid damaging their apparatus during our fieldwork activities:
- a) BT Openreach Ltd
 - b) Scotia Gas Networks
 - c) Thames Water
 - d) ESP Utilities Group
 - e) Zayo Group
 - f) Scottish and Southern Electricity
- 3.6.2 Copies of responses received prior to publication of this report are presented in Appendix L. These records have been obtained solely for the purposes described above. Some of these records have been obtained from the Internet and from our database without contacting the statutory undertaker direct. Occasionally, SU information is recorded on drawings larger than A3, and thus cannot be easily presented in this report. In such cases we will copy the correspondence but not incorporate the drawing in this report and maintain the records on our office file.
- 3.6.3 In addition, we have visited the Linesearch web site (www.linesearch.org) which provides a report on national grid networks (National Gas and Electricity Transmission Networks). Again, a copy of their report is presented in Appendix L.
- 3.6.4 Normally Statutory Undertakers drawings record the approximate location of their services. We recommend further on-site investigations be undertaken to confirm the position of the apparatus and thus establish the effect on the proposed development and the necessity or otherwise for the permanent or temporary diversion of the service to allow the construction of the development to safely and successfully proceed.

- 3.6.5 It should be noted that statutory undertakers' records normally exclude private services.

3.7 Unexploded Ordnance (UXO) Risk

- 3.7.1 Prior to our fieldwork activities we obtained a desk study risk review report from MACC International. The risk review concluded that there was not a credible risk of encountering UXO during the ground investigation. It should be noted that this preliminary risk review does not constitute a detailed risk assessment for the purposes of the construction phase.

4 Fieldwork

4.1	General
4.2	Site restrictions
4.3	Exploratory trial pits
4.4	Light cable and tool percussion borehole
4.5	Windowless sampling boreholes
4.6	Insitu testing
4.7	Measurement of landfill type gases in gas monitoring standpipes
4.8	Sampling strategies

4.1 General

4.1.1 Fieldwork was undertaken on the 8th and 9th February 2021 and comprised the following activities:

- Excavation of two exploratory hand-dug trial pits
- Excavation of two exploratory borehole using cable and tool percussion drilling techniques
- Excavation of five exploratory boreholes formed using windowless sampling equipment

4.1.2 A plan of the site showing observed/existing site features and approximate position of exploratory points is presented on Drawing 02.

4.1.3 The extent of fieldwork activities and position of exploratory points were determined by Soiltechnics.

4.1.4 Exploratory points were positioned to avoid known locations of underground services and to provide a reasonable coverage of the site. Prior to commencement of exploratory excavations an electronic cable locating tool was used to scan the area of the excavation. If we received a response to this equipment, then the excavation would be relocated.

4.1.5 All soils exposed in excavations were described in accordance with BS EN ISO 14688 '*Identification and Classification of soil*' and for chalk described in accordance with CIRIA C574 '*Engineering in chalk*'.

4.2 Site restrictions

4.2.1 The location of excavations was limited to areas outside of the main building and where access would not be significantly restricted for site users. We were unable to complete windowless sampling boreholes within the multi-level car park area due to the low headroom. As such, hand dug trial pits were completed instead.

4.3 Exploratory trial pits

- 4.3.1 Trial pits HP01 and HP02 were excavated using hand tools to a maximum depth of 1.2m. An electrically powered breaker was used to loosen surface asphalt prior to excavation.
- 4.3.2 The trial pits were completed to confirm the depth of Made Ground beneath the multi-level car park area. Sampling and logging was carried out as trial pit excavations proceeded. Soil samples for subsequent laboratory determination of concentration of chemical contaminants were taken from the sides of trial pits and stored in new plastic containers which were labelled and sealed
- 4.3.3 On completion, the trial pit excavations were backfilled with excavated material, which was compacted using handheld ramming tools. The surface was reinstated to match the original surroundings. A Geotechnical Engineer supervised the excavations.
- 4.3.4 Trial pit records are presented in Appendix D.

4.4 Light cable and tool percussion borehole

- 4.4.1 Boreholes BH1 and BH2 were excavated using light cable percussion boring techniques as described in EN ISO 22475-1:2006 forming 150mm diameter holes. Temporary casing was advanced within the borehole excavation to maintain the stability of the hole. When groundwater was encountered, the excavation was temporarily halted to allow for groundwater observations to be made. Following groundwater observations, the casing was advanced within the hole and the location of the water strike recorded.
- 4.4.2 Soil samples for subsequent laboratory determination of concentration of chemical contaminants were taken from 'intact' bulk disturbed samples obtained in the cutting shoe of the drilling rig. A sub sample was obtained discarding soil, which would have been in contact with the drilling rig cutting shoe. In all cases samples were stored in new plastic containers, which were labelled and sealed. If as a consequence of visual or olfactory evidence, a sample was suspected to be contaminated by organic material, the sample was stored in an amber glass jar with a PTFE sealing washer.
- 4.4.3 Bulk soil samples for identification or subsequent 'classification' laboratory testing were taken from borehole cutting equipment. The sample were placed in a plastic bag and subsequently sealed and labelled. Soil samples were obtained where possible to meet category B quality classes 3 to 5 as described in BS EN 1997-2:2007 (table 3.1).

- 4.4.4 On completion of BH1, the borehole was backfilled with excavated soils to 15m depth, bentonite pellets to 4m and then a combined gas and groundwater monitoring standpipe was installed from ground level to 4m depth. On completion of BH2, the borehole was backfilled with excavated soils to 10m depth and then a combined gas and groundwater monitoring standpipe was installed from ground level to 10m depth. The standpipes were installed following the recommendations of BS EN ISO 22475-1:2006 '*Geotechnical Investigation and Testing – Sampling methods and groundwater measurements – Part 1: Technical Principles for execution*' (figure 6) and BS8576:2013 '*Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)*' (figure 7).
- 4.4.5 Water levels in the standpipes have been measured during return visits to the site. The water levels were measured using a measuring tape calibrated in 1mm intervals with an electronic end piece, which emits an alarm sound in contact with water. Water levels are measured from ground levels at the borehole position. Records of water levels are presented in Section 6.
- 4.4.6 A description of measurement of landfill type gases in gas monitoring standpipes is provided in subsequent report paragraphs below.
- 4.4.7 The borehole excavations were formed by drillers who are NVQ Level 2 qualified in Land Drilling under the Construction Awards Alliance CAA with samples relogged by an experienced Geotechnical Engineer.
- 4.4.8 Records of boreholes formed by light cable and tool percussion drilling techniques are presented in Appendix E1.

4.5 Windowless sampling boreholes

- 4.5.1 Boreholes WS01 to WS05 were formed using windowless sampling equipment. Windowless sampling comprises driving 1m long steel sample tubes which are screw coupled together or coupled to extension rods and fitted with a screw on cutting edge. The sample tubes are of various diameters, generally commencing with 100mm and reducing, with depth, to 50mm and include a disposable plastic liner which is changed between sampling locations in order to limit the risk of cross contamination. On completion of excavation the liner containing the sample is cut open and the soil sample logged by a geo-environmental engineer. The sample tubes are considered thick walled with reference to BS EN ISO 22475-1:2006 clause 3.3.11.
- 4.5.2 Samples for determination concentration of chemical contaminants are taken from samples obtained in the disposable tubes as sub-samples.
- 4.5.3 Soil samples for subsequent laboratory 'classification' testing were taken from samples obtained in the disposable tubes. The sample was placed in a plastic bag and subsequently sealed and labelled. Samples for determination of water content were placed in sealable tubs and appropriately labelled. These samples were obtained with a view to achieve category B sampling methods to meet quality class 3 (for fine grained soils only) as described in BS EN ISO 22475-1: 2006 (table 3). Sample sizes were appropriate for the laboratory test being considered.

4.5.4 In some locations, surface hardstanding was broken out prior to excavation of the borehole. The hardstanding was reinstated on completion.

4.5.5 Records of boreholes formed using windowless sampling techniques are presented in Appendix E2.

4.6 Insitu testing

4.6.1 Standard Penetration Testing (SPT) was carried out at regular frequencies in the boreholes. The test was carried out in accordance with BS EN ISO 22476-3:2005. Key details of the test, as required by BS EN ISO 22476-3 are recorded in Appendix C1. The drive rods were type AW. Samples taken from the open sampler (SPT) were placed in a plastic bag, sealed and labelled. In coarse granular soils, a solid 60° cone may have been used to replace the SPT cutting shoe. This test is reported as SPT(C). Summary of standard penetration testing is recorded on borehole logs.

4.6.2 A graphical summary of standard penetration test results is presented on Drawing 04.

4.6.3 A pocket penetrometer was used in cohesive soils and is deemed to measure the apparent ultimate bearing capacity of the soil under test. The pocket penetrometer is calibrated in kg/m². The reading can be approximately converted to an equivalent undrained shear strength by multiplying the result by a factor of 50. Details of pocket penetrometer determinations are tabulated in Appendix C2. An average of measurements taken at a specific depth are recorded on borehole records. The pocket penetrometer is not covered by British Standards.

4.7 Measurement of landfill type gases in gas monitoring standpipes

4.7.1 The concentrations of landfill type gases collected within the gas monitoring standpipe installed in borehole BH1 was measured using a portable infra-red gas analyser (model GA2000 plus or GA5000, manufactured by Geotechnical Instruments). Initially the gas analyser was connected to the gas valve on the top of the standpipe to allow the flow rate to be measured. Essentially this is a measurement of gas pressure produced in the standpipe, which is compared with atmospheric pressure at the time of measurement to produce an equivalent gas 'flow' in l/hr. The equipment used is capable of measuring to an accuracy of 0.1l/hr; below this the gas analyser records zero flow. Following BS8485:2015 '*Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*' (clause 6.3.4), we assume flows of 0.1l/hr when the gas analyser reads zero, thus producing a pessimistic gas flow rate in our assessment of ground gases.

4.7.2 Following measurement of 'flow' the gas analyser pumps gases contained in the standpipe through the analyser. Initial readings of gas concentrations are noted manually, followed by subsequent recordings at regular time periods until 'steady state' concentrations are achieved. The analyser records 'peak' and 'steady' concentrations of the following gases:

- Methane (CH₄)
- Carbon dioxide (CO₂)
- Oxygen (O₂)

4.7.3 The ambient atmospheric temperature and barometric pressure was also recorded at the site. To determine if the atmospheric pressure is rising or falling we interrogate the internet on a daily basis.

4.7.4 Methane in concentrations of between 5 to 15% in air is potentially explosive. The 5% methane concentration in air is defined as the Lower Explosive Limited (LEL). The gas analyser measures a percentage of the LEL. For example, 10% LEL equates to 10% of 5%, i.e. 0.5% methane concentration in air.

4.8 Sampling strategies

4.8.1 Geotechnical

4.8.1.1 In general we adopted a judgemental sampling strategy in relation to geotechnical aspects of the investigation. The location and frequency of sampling was carried out in consideration of the following:

- i) Topography
- ii) Geology (including Made Ground)
- iii) Nature of development proposals

4.8.2 Environmental

4.8.2.1 Details of sampling with respect to contamination issues are described in Section 8.

5 Laboratory testing

5.1	Classification testing
5.2	Chemical testing

5.1 Classification testing

5.1.1 Laboratory testing was carried out on samples retrieved from site. The method of testing is recorded on the laboratory test certificates, Appendix F. The following table summarises the classification testing scheduled:

Table summarising classification testing			
Location	Depth (m)	Soil type	Testing scheduled (determination of)
BH1	1.5-1.95	Taplow Gravel	Particle size distribution
	2.5-2.95		
BH2	2.0-2.5		
WS01	2.0-3.0		
WS05	1.8-2.8		
BH2	0.5	Taplow Gravel	Liquid limit, plastic limit and plasticity index
	3.4	Chalk	
	10.0		
BH2	15.5	Chalk	Liquid limit, plastic limit and plasticity index BRE SD1 Suite D
BH1	6.0-6.45	Chalk	Dry density and saturation moisture content for chalk
	9.0-9.45		
	12-12.45		
	16.5-16.95		
BH2	16.5		
	19.5		
Table 5.1.1			

Table 5.1.1

5.2 Chemical testing

5.2.1 Chemical testing was carried out based on ground conditions and with reference to the contamination Initial Conceptual Model as presented in Section 8. The test methods are recorded on the chemical test certificates, Appendix G. The following table summarises the chemical testing scheduled:

Table summarising chemical testing			
Location	Depth (m)	Soil type	Testing scheduled (Refer to Appendix B for details).
WS01	0.2	Topsoil	Suite 1, suite 2 and asbestos screening
BH2	0.2-0.4	Made Ground	
COMP01	0.0	Made Ground	BRE Suite and full two-staged WAC
COMP02	0.0		BRE Suite and full two-staged WAC
BH1	0.3	Made Ground	Suite 1 and asbestos screening
WS02	0.3		
WS03	0.3		
BH1	0.6	Taplow Gravel	Suite 4
WS03	0.6	Made Ground	
WS01	0.7	Taplow Gravel	Suite 1, suite 8 and asbestos screening
WS01	3.2	Taplow Gravel	Suite 8
WS05	1.5		
WS02	3.3	Chalk	
WS04	3.8		
Table 5.2.1			

6 Ground conditions encountered

6.1	Soils
6.2	Groundwater
6.3	Evidence of contamination
6.4	Obstructions and instability

6.1 Soils

6.1.1 Each exploratory excavation encountered a similar profile of soils considered to be Topsoil or Made Ground overlying Taplow Gravel Member and subsequently Seaford and Newhaven Chalk Formations which will be referred to as Chalk throughout this report.

6.1.2 With the exception of Made Ground, the investigation generally confirmed published geological records.

6.1.3 Topsoil

6.1.3.1 Topsoil was encountered in WS01 only and comprised dark brown, clayey organic sand which extended to 0.3m depth.

6.1.4 Made Ground

6.1.4.1 Made Ground was encountered in all other locations and generally comprised either brick pavers overlying a creamish brown sand to between 0.15-0.2m or asphalt overlying a reddish-brown gravelly sand, with gravel of igneous type rock, to between 0.3-0.5m depth.

6.1.4.2 The Made Ground encountered in WS03 from 0.25-0.65m depth comprised a brown, gravelly, clayey sand with gravels of brick, igneous type rock and flint.

6.1.4.3 The maximum depth of Made Ground was 0.65m in WS03.

6.1.5 Taplow Gravel Member

6.1.5.1 The Taplow Gravel Member deposits were encountered in all locations and extended to depths of between 3.15-3.75m. The deposits generally comprised dense to very dense creamish brown or orangish brown clayey sand, sand and gravel or sandy gravel. The gravel was flint and calcareous deposits. In WS01, WS04, WS05 and BH2 the near surface material generally comprised a soft to firm, orangish brown, sandy, gravelly clay with gravels of flint. These soils extended to a maximum depth of 1.7m.

6.1.6 Seaford and Newhaven Chalk Formations (Chalk)

- 6.1.6.1 The Chalk deposits were encountered in all locations except WS05 (which did not penetrate the Taplow Gravel) and extended beyond the final depth of excavation in all locations.
- 6.1.6.2 Within the windowless sampler holes, to 8.2m in BH1 and 10.0m in BH2, the material generally comprised structureless chalk composed of creamish white, sandy, gravelly clay (Grade Dm) with gravels of weak, low density chalk and some flint gravels throughout.
- 6.1.6.3 Below 8.2m depth within BH1, the material was excavated as a sandy, clayey gravel (grade Dc) with gravels of creamish white, weak, low to medium density chalk and some flint gravels throughout. Below 10.0m in BH2, the Chalk was excavated as off-white slightly gravelly clayey silt (grade Dm), interbedded with silty clayey gravel (grade Dc).
- 6.1.6.4 Based on the SPT results, it is likely the chalk is structured at around 12m in BH1 and 8m depth in BH2 and will be of a higher Grade. However, it is not possible to determine the exact nature due to the disturbance of the soil structure caused by shell and auger methods of extraction. BH2 was terminated at 21.8m due to refusal of sampling equipment.

6.2 Groundwater

- 6.2.1 Groundwater inflows were observed in the deeper boreholes. A summary of our observations is tabulated below:

Table summarising groundwater observations			
Exploratory point	Date of observation	Depth (m) below ground levels	Observations
BH1	08.02.21	8.2	Slow inflow filling the borehole to 8.13m in 20 minutes.
	09.02.21	8.4	Water level at start of drilling
	24.02.21	Dry	Measured during return visit
	10.03.21	Dry	
	25.03.21	Dry	
	15.09.21	3.78	
BH2	11.08.21	8.0	Medium inflow filling borehole to 6.8m in 20 minutes.
	11.08.21	8.9	Standing water level on completion of drilling
	15.09.21	6.97	Measured during return visit

Table 6.3.1

- 6.2.2 It should be noted that the standpipe in BH1 was installed to 4m and BH2 to 10m.
- 6.2.3 It should be noted that water levels will vary depending generally on recent weather conditions and only long-term monitoring of levels in standpipes will provide a measure of seasonal variations in groundwater levels.

6.3 Evidence of contamination

6.3.1 During excavation of our exploratory points, no evidence of contamination was noted.

6.4 Obstructions and instability

6.4.1 During excavation of the windowless sampling boreholes, the granular Taplow Gravel Member deposits were collapsing in when attempting the drill the 5th metre and as such, many of the boreholes were terminated at 4m depth. It is likely that some instability of trench sides in the granular Taplow Gravel will occur.

6.4.2 No obstructions were encountered within any of the boreholes. However, BH2 was terminated at 21.8m due to the strength of the chalk and refusal of sampling equipment.

7 Geotechnical Appraisal

7.1	General description of the development
7.2	Building regulations and this report section
7.3	The geological model
7.4	Dissolution Features
7.5	Building foundation solution
7.6	Piled foundation design
7.7	Influence of trees and other major vegetation
7.8	Ground Floor Construction
7.9	Effect of existing development on new foundations
7.10	Trench stability and excavation
7.11	Infiltration Potential
7.12	Pavement Foundations

7.1 General description of the development

7.1.1 The following assessments are made on the investigatory data presented in the preceding sections of this report and are made with reference to specific nature of the development. Should scheme proposals change then it may be necessary to review the investigation and report.

7.1.2 We understand that the project will comprise development of three buildings comprising commercial space on the ground floors with residential apartments above. A total of 131 apartments will be spread throughout the three buildings which will be between four to seven storeys high. The development also includes undercroft car parking, cycle parking, servicing bay and associated landscaping, amenity space, plant and refuse areas, and access arrangements.

7.2 Building regulations and this report section

7.2.1 Building Regulations

7.2.1.1 Current Approved Document A of the building Regulations references Eurocodes and their UK National Annexes as practical guidance in meeting part A requirements. Approved document A advises there may be alternative ways of achieving compliance with requirements where it can be demonstrated that the use of withdrawn standards no longer maintained by the British Standards Institution continues to meet Part A requirements.

7.2.2 This report section

7.2.2.1 This chapter of the report provides both a foundation strategy for the proposed development and geotechnical design parameters to comply with Eurocode 7 (BSEN1997-1:2004 '*Geotechnical Design – part 1 General Rules*' and the corresponding UK National Annex).

7.2.3 Geotechnical terms

7.2.3.1 Definitions of geotechnical terms used in the following paragraphs are provided in Appendix A.

7.2.4 This report

7.2.4.1 This report is a ground investigation report (GIR) and does not constitute a Geotechnical Design Report as defined in section 2.8 of BS EN 1997-1:2004 'Eurocode 7 – Geotechnical Design – Part 1: General Rules' and in particular will exclude assessment of lifetime actions to buildings from geotechnical influences.

7.3 The geological model

7.3.1 Strata

7.3.1.1 Five shallow boreholes up to 4m depth and two deep boreholes to 21.74m depth, formed at the site each encountered a reasonably consistent profile of soils which are summarised in the following table:

Summary of ground conditions encountered at the site					
Strata	Summary soil type	Depth to base of strata		Groundwater	
		Range	Model	Range	Model
Made Ground	Creamish or reddish brown gravelly sand.	Up to 0.65m	0.65m	None	-
Taplow Gravel Member	Orangish brown sandy clay, sand or sand and gravel	3.15-3.75m	3.5m	None	-
Chalk (Grade Dm)	Structureless creamish white, sandy, gravelly clay. Flint present.	8.2-10m	9m	8-8.2m	8m
Chalk (Grade Dm and Dc)	Structureless sandy, clayey gravel of weak, low density chalk and structureless creamish white, sandy, gravelly clay. Flint present.	>21m	>21m	8.2m	8.2m

Table 7.3.1.1

7.3.1.2 It should be noted that based on the SPT results, it is likely the chalk is structured at around 12m in BH1 and 8m depth in BH2 and will be of a higher Grade. However, it is not possible to determine the exact nature due to the disturbance of the soil structure caused by shell and auger methods of extraction.

7.3.2 Groundwater

7.3.2.1 We have reviewed some of the BGS recorded boreholes in the local area which have observed groundwater at between 8-10m depth. In addition, groundwater was encountered at 8.2m in BH1 and 8.0m in BH2 during drilling. During a subsequent monitoring visit the level in BH2 was recorded at 6.97m. Two return monitoring visits to BH1 recorded the standpipe to be dry although a third measured water at 3.78m. On this basis, the presence of groundwater will need to be considered during construction.

7.4 Dissolution Features

7.4.1 Chalk is typically rich in Calcium Carbonate. CIRIA report PR11 (and C574) states 'The presence of dissolution features should be expected on all calcium carbonate rich chalk sites'. Dissolution features in general comprise the following:

- Sinkhole, formed by dissolution of near surface chalks reducing their volume and creating a surface depression.
- Dissolution pipe, a cone or pipe like cavity typically in filled with chalk which has subsided into the cavity, with the infill chalk much weaker than the surrounding chalk.
- Swallow holes, a surface feature where a void in the chalk continuously or intermittently 'swallows' wholly or partially a surface stream.

7.4.2 Assessment of the risk to foundations posed by dissolution features

7.4.2.1 Dissolution features pose a hazard to foundations because of the presence of one or more of the following:

1. Large variations in intact chalk horizon
2. Loose chalk or superficial deposits infilling pipes
3. Cavities or caves within the chalk
4. Dissolution widened discontinuities in the chalk affecting its load carrying capacity

These features are generally located above the groundwater table level.

7.4.2.2 Clearly the risk that these hazards present to a building relates to its vulnerability, which in turn relates to the foundation type. A building on shallow spread type foundations and ground bearing floors is more vulnerable than piled foundations extending through the base of these features supporting a suspended ground floor slab.

7.4.2.3 Research described in CIRIA report C574 concludes that the majority of recent ground subsidence occurring on the chalk outcrop was induced by man. The most common activities triggering subsidence are as follows

- Dynamic and static loading
- Leaking drains
- Leaking water supply pipes
- Water flows from soakaways
- Overzealous garden watering in dry weather

7.4.3 Risk assessment and mitigation

7.4.3.1 Unfortunately in many cases it is not possible to confidently discount the presence of dissolution features, but we have assessed the risk based on the following:

Item	Observation / enquiry	Assessed risk
Surface features	No obvious evidence of any surface depressions in topography local to the site	Low
Variation in density of near surface soils	In both BH1 and BH2 the first two SPTs below the groundwater table were lower, with N-values of 8 and 10 in BH1 and 13 and 26 in BH2. The N-values then increased to over 30 below 12m in BH1 and 9.5m in BH2. Likely indicative of weathered chalk.	Low
Variation in intact chalk horizon	The depth to top of chalk was relatively similar across the site however the depth to competent chalk was observed from 8.2m depth in BH1 and 10m depth in BH2.	Low
Adverse movement in nearby buildings	No adverse movement in neighbouring properties close to the site (viewed from public roads / footways only)	Low
Envirocheck data base	Assessed risk considered low on site however a high risk area is located 24m south east.	High
Enquiries to local authority building control	Local building control do not hold records of sinkholes in the local area	Unknown
Table 7.4.3.1		

7.4.3.2 Based on the above, the risk of the site being subject to dissolution features is considered moderate to high.

7.4.4 Risk mitigation measures

7.4.4.1 As infiltration systems are likely to be utilised at the site we recommend water is not concentrated in isolated locations but evenly distributed in say level trench type soakaways to minimise the risk of promoting the formation of dissolution features. Again, such soakaways need to be positioned remote from buildings and remote from settlement sensitive features.

7.4.4.2 Water supply pipes need to be watertight and flexible to minimise risks of leaks. Heavy vibration from compaction plant shall not be used.

7.5 Building foundation solution

7.5.1 Due to the size, linking of the proposed buildings, and the moderate to high possibility of dissolution features being present on site, it is likely that a piled foundation design will be adopted. It should also be noted that a raft solution is considered potentially feasible, however, consideration would have to be given to differential settlement across the likely unevenly loaded raft. Further investigations to determine settlement characteristics and dissolution features would be required to prove feasibility.

7.6 Piled foundation design

- 7.6.1 A preliminary assessment of single pile capacity has been undertaken to assist the foundation designer in establishing a foundation layout who will also retain design responsibility. The assessment has been undertaken in accordance with BS EN1997-1:2004 + A1:2013 and BS 8004:2015. It is recommended that the design and installation of the piles are determined by a specialist piling contractor who has experience in pile installation in these or similar ground conditions.
- 7.6.2 It is assumed that the piles will be installed using replacement piling techniques; i.e. CFA piles.
- 7.6.3 The calculations have been undertaken with the aid of PILE, a specialist geotechnical software programme developed by OASYS. The analyses have been undertaken without explicit verification of serviceability limit state. Accordingly, set R4 partial factors have been adopted for Combination 2. However, as a general guide, the settlement of a single pile at working loads (factor of safety > 2) is typically of the order of 1% of the pile diameter.
- 7.6.4 A model factor of 1.4 has been adopted in the analyses. The value may be reduced to 1.2 if the resistance is verified by a maintained load test taken to the required, unfactored ultimate resistance.
- 7.6.5 Shaft resistance within any Made Ground is assumed to be zero. It is further assumed that the Made Ground will not cause downdrag on the pile.
- 7.6.7 Unit base and shaft resistance within the chalk has been derived using the guidance provided in CIRIA C574 Engineering in Chalk. Accordingly, unit base resistance is conservatively assumed to be 1000kN/m². Unit shaft resistance within the chalk has been derived using an effective stress approach adopting a beta value of 0.45 and capped at 100kN/m².
- 7.6.8 The variation of single pile resistance in relation to pile toe level is presented below for three different pile diameters. It should be noted that the resistance of a single pile is reduced in the vicinity of other piles. Accordingly, detailed design of the piled foundation arrangement should take into account spacing between piles and pile group effects.

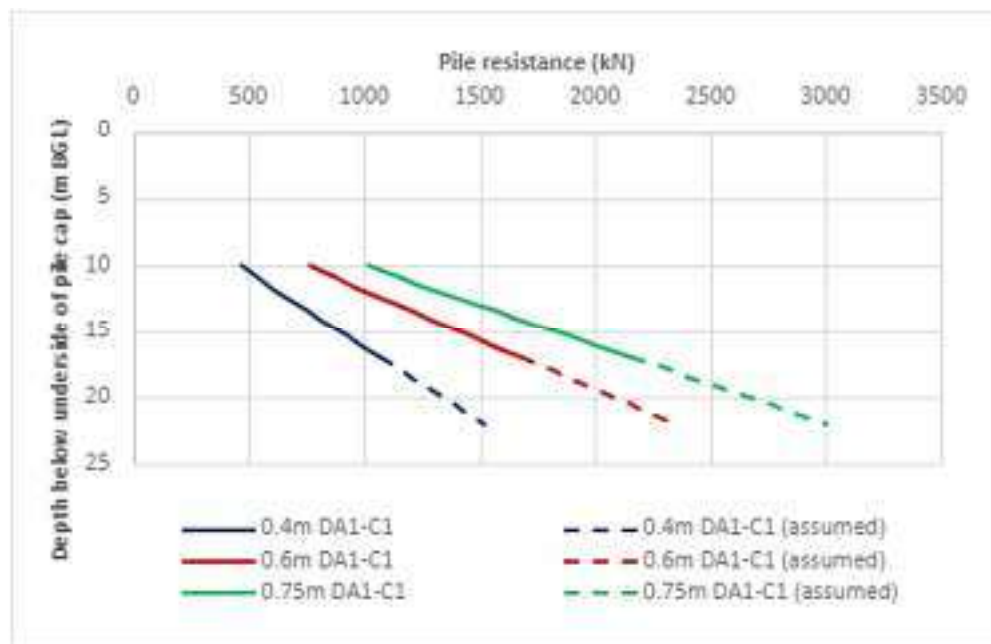


Figure 2 – Variation of pile resistances against depth – Combination 1

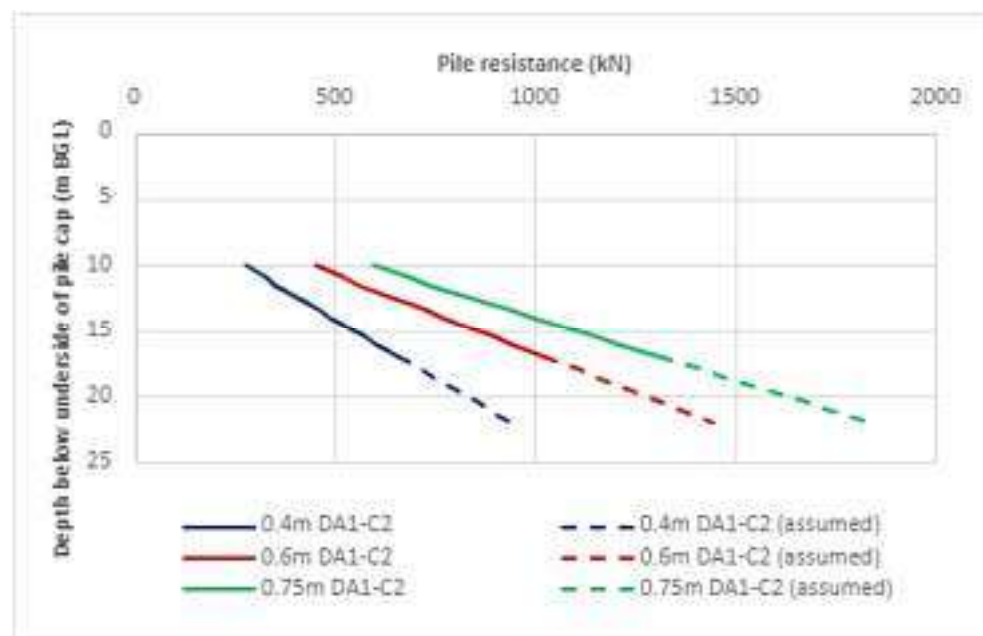


Figure 1 - Variation of pile resistances against depth - Combination 2

7.6.9

As the maximum depth of excavation was 21.8m in BH2, the maximum depth the pile design parameters in accordance with EC7 can be designed to is 16.8m (5m short of the borehole termination depth). As such, the solid line on the graph denotes this. The dashed lines indicate parameters to 21.8m depth, however, further investigation and reassessment would be required to rely on these depth. It should be noted that given the borehole terminated due to the density of the chalk at 21.8m there is a potential that the grade of chalk has changed and higher endbearing resistances could be achieved.

7.7 Influence of trees and other major vegetation

- 7.7.1 There are a few mature trees and vegetation present on site however if a piled foundation option is adopted then the piles will extend through the zone of influence from any vegetation and thus there is no risk from vegetation on site.

7.8 Ground Floor Construction

- 7.8.1 If a piled foundation is selected then a suspended floor could also be adopted supported off piled foundations.

7.9 Effect of existing development on new foundations

- 7.9.1 Clearly the existing foundations will create obstructions in the ground which may become difficult when trying to design pile locations. If existing foundations will stay insitu then pile locations will need to be considered, however if existing foundations are removed then the proposed piles can extend through the deepend Made Ground and continue to produce end bearing support in the chalk deposits.

7.10 Trench stability and excavation

- 7.10.1 It is difficult to predict the stability of trench sides from borehole investigations. Generally, we would anticipate over break/instability in Made Ground and granular Taplow Gravel deposits, potentially requiring shoring to maintain an open excavation.
- 7.10.2 Based on groundwater observations in exploratory excavations, we consider it is unlikely that groundwater will be encountered in excavations extending to depths of up to 5m. Beyond this depth the risks of encountering groundwater increase significantly with groundwater inflows promoting collapse of trench sides and the construction of a successful spread type foundation difficult.
- 7.10.3 We recommend any trench excavation requiring human entry is shored as necessary to conform with current best practice, and accepted by the Health and safety Executive (HSE) and in particular, following guidance provided in the HSE publication '*Health and safety in construction (HSG 150)*' (www.hse.gov.uk)

7.11 Infiltration Potential

- 7.11.1 It is possible that the predominantly granular deposits of the Taplow Gravel Member soils could dispose of stormwater using infiltration systems. If should such a system is considered as a drainage option, we recommend soil infiltration tests be carried out in accordance with Building Research Establishment Digest 365 (2016) "*soakaway design*" to allow the design of infiltration systems. We would be pleased to carry out such testing on further instructions.

7.11.2 Siting of infiltration systems

7.11.2.1 Concentrated ingress of water into Chalk can initiate new dissolution features, particularly in low density Chalk, and destabilise loose backfill of existing ones. For this reason and following recommendations contained in CIRIA report C574 'Engineering in Chalk', soakaways should be sited well away from foundations for structures, roads or railways, as indicated below

- In areas where dissolution features are known to be prevalent, soakaways should be avoided if at all possible, but if avoidable, should be sited at least 20m away from any foundations.
- Where chalk is of low density, or its density is not known, soakaways should be sited at least 10m away from any foundations.
- Where chalk is of medium density (or higher) the closest part of the soakaway should be at least 5m away from buildings

As a precautionary approach, we assess the Chalk to be low density for the purpose of soakaway design and thus sited a minimum of 10m distant from foundations. Due to the nature of the proposed development, it may not be possible to locate soakaways 10m distant from all buildings and thus, it may not be a viable drainage option.

7.11.3 Consultation with the Environment Agency

7.11.3.1 As the Chalk is a vitally important aquifer, the Environment Agency and Local Authority must be consulted when planning soakaway installations where chalk underlies the site

7.11.4 Code for sustainable homes (credits under Sur1)

7.11.4.1 The use of infiltration systems for disposal of stormwater collected by the development will assist in achieving credits under Sur 1 which are mandatory under the code for sustainable homes.

7.12 Pavement Foundations

7.12.1 Criteria for design of the pavement foundation.

7.12.1.1 The thickness of the pavement foundation (typically unbound granular materials- or sub-base and capping materials) is derived from a combination of the following:

- Number of passes of standard (80kN) axles from construction traffic (HGV). ie construction traffic loading which the foundation is required to carry.
- The location of the water table.
- Weather conditions at the time of construction.
- The strength of the subgrade, determined by measurement of the California Bearing Ratio (CBR).

7.12.1.2 For road designs meeting the requirements of the Highways Agency, then subgrade CBR will derive a foundation layer thickness relating to differing subgrade stiffness's. (refer interim advice note 73/06).

7.12.2 Methods of determination of CBR values

7.12.2.1 The following table identifies common methods of determination of CBR values

Common methods of CBR determination				
Method	reference	Outline methodology	Advantages	Disadvantages
Direct on soil in CBR mould	BS1377 and Interim advice note 73/06 (2009)	Soil sample in steel mould. Can be undisturbed or disturbed (recompacted in mould). Load measured to force 50mm diameter steel plunger 2.5 and 5mm into soil to derive CBR	BS procedure Department for transport procedure	CBR measured at water content at time of test. CBR may not reflect changes in water content during life of pavement. Unsuitable for very coarse grained (> 20mm) soils
Plate bearing test	Interim advice note 73/06 (2009)	Load required to displace a 762mm diameter steel plate 1.25mm into the subgrade to derive a CBR	Department for transport procedure. Suitable for coarse grained soils	CBR measured at water content at time of test. CBR may not reflect changes in water content during life of pavement. Reasonably slow procedure.
Dynamic cone	Interim advice note 73/06 (2009)	Record number of blows of 8kg drop weight falling 575mm to drive 20mm 60-degree steel cone 50 to 550mm into the subgrade.	Department for transport procedure. Reasonably rapid assessment.	CBR measured at water content at time of test. CBR may not reflect changes in water content during life of pavement. Unsuitable for very coarse-grained soils
Soil classification characteristics	LR 1132 structural design of bituminous roads (Transport Research laboratory)	Measurement of plasticity or particle size distributions, and knowledge of location of water table required to derive CBR for varying construction conditions	CBR derive for subgrade during life of pavement. Simple testing. Relates to long term research and experience at the TRL	Interim Advice note 73/06 (section 5.5) says this should only be used samples cannot be taken for laboratory testing.
Undrained shear strength	TRRL report 889 Strength of clay fill subgrades: its prediction in relation to road performance.	$CBR = Cu/23$, where Cu is the undrained shear strength (kN/m ²).	Cu could be measured by hand held shear vane rapidly and in great quantities. Relates to long term research and experience at the TRL	Cu measured at water content at time of test. Derived CBR may not reflect changes in water content during life of pavement. Unsuitable for coarse grained soils

Table 7.12.2.1

7.12.2.2 Methodology can sometimes be dictated by design manuals of a local highway authority who may adopt the road network, and would probably favour methods described in Interim advice note 73/06.

7.12.2.3 As the project will not include roads which will be offered for adoption, we have determined CBR values based on soil classification.

7.12.3 Location of the pavement formation

- 7.12.3.1 We anticipate that the proposed access road and associated hardstanding areas will be located at or about existing ground levels with formation located on Taplow Gravel soils.

7.12.4 Derivation for subgrade CBR from soil classification data

- 7.12.4.1 Equilibrium CBR (California Bearing Ratio) values (with reference to Transport and Road Research Laboratory (TRRL) Report LR1132 '*Structural design of Bituminous Roads*') are derived from knowledge of soil classification data (particle size distribution for granular soils), the location of the water table, pavement thickness, and weather conditions at the time of construction. Assuming non-plastic soils, a low water table, a 'thin' pavement and average construction conditions, a CBR in excess of 20% could be adopted for preliminary foundation design purposes based on these documents. We recommend this CBR be utilised for design purposes and reassessed immediately prior to construction. It should also be noted that the thickness of the pavement foundation also relates to the amount and loading from construction traffic, which is discussed in detail in the Transport and Road Research Laboratory (TRRL) Report LR1132 '*Structural design of Bituminous Roads*'.

7.12.5 Settlement

- 7.12.5.1 Made Ground deposits at the site exhibit a degree of variation in compactness. Some long-term settlement of hardstandings will occur due to consolidation of the Made Ground deposits and from applied loads, particularly uniformly distributed loads. It is difficult to accurately predict levels of settlement, as potentially applied loading patterns are not known. Assuming a constantly applied uniformly distributed load of say 10kN/m², settlement in the order of 15mm could occur within 5 to 10 years of construction. Equally, some differential settlement could occur in the long term, if hardstandings are not uniformly loaded. We suggest that pavements under transient (vehicular) loads are unlikely to generate significant levels of settlement.

7.12.6 Treatment of formation

- 7.12.6.1 Once formation levels have been established it is recommended that the formation be trimmed and rolled following current requirements of the Highways Agency Specification for Highways Works (clause 616) (refer www.dft.gov.uk/ha/standards/mchw/vol1) Such a process will identify any soft areas, which we recommend be either excavated out and backfilled with a suitable well compacted material similar to those exposed in the sides of the resulting excavation, or large cobbles of a good quality stone rolled into the formation to stabilise the 'soft' area.

7.12.7 Subgrade frost susceptibility

- 7.12.7.1 The Taplow Gravel Member deposits soils are considered frost susceptible and this may override the CBR criteria for pavement foundation design purposes.

7.12.8 Moisture susceptibility

- 7.12.8.1 The silty nature of the Taplow Gravel Member will render them moisture susceptible with small increases in moisture content giving rise to a rapid loss of support to construction plant. We therefore recommend, as soon as formation is trimmed and rolled, that sub-base is laid in order to avoid deterioration of the subgrade in wet or frosty conditions.

8 Chemical contamination

8.1	General
8.2	Source-pathway-receptor model
8.3	Updated conceptual model
8.4	Laboratory testing
8.5	Final conceptual model
8.6	Risk assessment in relation to use of infiltration systems
8.7	Risk assessment summary and recommendations
8.8	Statement with respect to National Planning Policy Framework
8.9	On site monitoring

8.1 General

- 8.1.1 A phase I contamination assessment of the site was presented in our previous report STR4832-P01. This section of the report provides an update to the source-pathway-receptor model following the findings of fieldwork. It then describes the Phase II contamination assessment that has been undertaken, updates the initial conceptual model and provides any recommendations regarding remediation.

8.2 Source-pathway-receptor model

8.2.1 Summary of the site condition and development proposals

- 8.2.1.1 The site is currently a commercial building with associated multi-level car park, paved car parking areas and soft landscaping. We understand development proposals are for a mixed-use development, including refurbishment (fully described in Section 2) with associated external parking areas, soft landscaping and amenity space.

8.2.2 Receptors

- 8.2.2.1 On the basis that the current site is restricted to commercial activities, an adult is considered the appropriate critical receptor. As the development is residential led, the critical human receptor for the proposed site use is a child under the age of six years. Groundwater and existing/proposed vegetation are also considered potentially sensitive receptors.

8.2.3 Pathways

- 8.2.3.1 There is not considered to be any change to pathways to current site users. With regard to end users, based on development proposals, the site at ground level will be mostly covered by the proposed buildings and undercroft car park. Some limited areas of soft landscaping are present, but these are generally located within planters or boundary hedges/isolated trees within hardstanding. The majority of soft landscaping appears to be situated on the first floor, between the proposed buildings and over the undercroft car park. On this basis, there will be limited opportunity for future site users to access existing Made Ground soils and therefore, although previously identified pathways to future site users remain possible, they are considered low likelihood.
- 8.2.3.2 Similarly, although pathways to groundwater and vegetation remain, they are also considered low likelihood based on current development proposals.

8.2.4 Sources

- 8.2.4.1 During fieldwork we confirmed our previous suggestion that Made Ground would be present on site, although it was relatively limited and comprised sub-base type material (sands and gravels). These soils extended to a maximum depth of 0.65m. The gravels were predominantly igneous rock, flint and brick, which are unlikely to be a source of significant contamination. In addition, there was no visual or olfactory evidence of significant contamination such as hydrocarbons or solvents. On this basis, Made Ground is considered a potential source, albeit low likelihood.
- 8.2.4.2 During our site reconnaissance, we did not identify any additional contamination sources to those previously identified in the phase I assessment.

8.3 Updated Conceptual Model

- 8.3.1 Based on our revised assessment of potential contaminative sources, identified receptors and viable pathways to receptors described in preceding paragraphs, we have produced an updated conceptual model in the form of a table which is presented in Appendix I.
- 8.3.2 Based on the updated conceptual model there are risks which exceed the low category which in our opinion are unacceptable and require further investigation by laboratory testing of soil/water samples to refine the risk assessment.

8.4 Laboratory testing

8.4.1 Testing regime

- 8.4.1.1 Potential sources of chemical contamination and viable pathways and receptors have been identified on site. As such, we have undertaken the following laboratory testing with the following table summarising the chemical testing scheduled as well as a rationale for the testing.

Table summarising scheduled testing					
Location	Depth (m)	Strata	Targeted sampling?	Scheduled testing (Refer to Appendix B for details)	Rationale
WS01	0.2	Topsoil	N	Suite 1, suite 2 (leachate) and asbestos screening	General site coverage
BH2	0.2-0.4	Made Ground	N		
BH1	0.3	Made Ground	N	Suite 1 and asbestos screening	General site coverage
WS02	0.3				
WS03	0.3				
BH1	0.6	Taplow Gravel	N	Suite 4	General site coverage
WS01	0.7				
WS03	0.6	Made Ground	N	Suite 4	General site coverage

Table 8.4.1.1

8.4.1.2 Obviously, additional testing (quantity and types) would allow a more accurate risk assessment to be made. The results of laboratory determination of concentration of chemical contaminants are presented in Appendix G.

8.4.2 Criteria for assessment of test data – Human receptors

8.4.2.1 Assessment of laboratory test data has been carried out with reference to current nationally recognised documents listed in the final page of Appendix B. Due to changes in guidance on contaminated land, items 6-8 and item 10 in the document listing above have been withdrawn. In the absence of alternative guidance however we have used these documents. Where new guidance is available, this has been followed in preference to superseded guidance.

8.4.2.2 The Land Quality Management (LQM) and the Chartered Institute of Environmental Health (CIEH) have derived Suitable for Use Levels (S4ULs) which are presented in 'The LQM/CIEH S4ULs for Human Health Risk Assessment' (2015). S4ULs have been used as a screening tool to assess the risks posed to the health of humans from exposure to soil contamination in relation to appropriate land uses. Where published S4ULs are not available, we have adopted C4SLs (Category 4 Screening Levels) produced by DEFRA or SGVs (Soil Guideline Values) as appropriate. In the absence of any of these criteria we have adopted Soil Screening Values (SSV) derived by Soiltechnics and by Atkins (SSV^{ATK}). The CLEA model used to derive SSVs has been used with toxicology data presented by the EA, LQM/CIEH and Atkins (in that order of preference). SSVs produced by Atkins are presented on their ATRISK^{SOIL} website.

8.4.2.3 S4ULs, C4SLs, SGVs, SSVs and SSV^{ATK}s represent ‘intervention values’; indications to an assessor that soil concentrations above these levels might present an unacceptable risk to the health of site users. These guideline values have been produced using conceptual exposure models, which use assumptions and are applied to differing end uses of land. If the values are exceeded, it does not necessarily imply there is an actual risk to health and site-specific circumstances should be taken into account. Conversely, where a critical pathway or chemical form of the contaminant has not been evaluated, a risk may be present even if the adopted guideline value has not been exceeded.

8.4.2.4 For evaluation of test data in relation to polycyclic aromatic hydrocarbon (PAH), phenols and total petroleum hydrocarbon (TPH) contamination, we have compared measured concentrations with corresponding S4ULs. The S4UL fractions are dependent on the Soil Organic Matter (SOM) content of the soils. We have adopted the relevant guideline values based on SOM testing.

8.4.2.5 We have followed procedures outlined by the CIEH to compare measured concentrations of metals and PAH contaminants against guideline values. TPH contamination results are compared directly with the relevant guideline values.

8.4.2.6 We have adopted an industrial/commercial land use for current site users and a residential without uptake land use for proposed end users of the site. In the absence of guidelines, we have adopted industrial guideline values for assessment of construction operatives.

8.4.3 Criteria for assessment of test data – Vegetation

8.4.3.1 Guidance published by Forest Research in “BPG Note 5 - Best Practice Guidance for Land Regeneration” suggests that a residential without plant uptake or industrial/commercial CLEA model should be adopted for this receptor although specific guideline values are provided for copper and zinc at 130mg/kg and 300mg/kg respectively. As a practice we have adopted the industrial / commercial CLEA model for assessment of test data for vegetation.

8.4.4 Criteria for assessment of test data – Controlled waters

8.4.4.1 For interpretation of test data in relation to water receptors we have directly compared measured values with relevant screening values. Details of the source data and adopted threshold values are outlined on the summary tables in Appendix H.

8.4.4.2 Following our receptor assessment (outlined above), and in consideration of the pathways and migration potential for contaminants on site, the critical receptor for the site is considered to be the underlying secondary A and principal aquifers, thus we have adopted drinking waters as the critical receptor, and this has been utilised within our assessment model in Appendix H

8.4.5 Evaluation of test data – Human receptors

8.4.5.1 Tables summarising and analysing test data are presented in Appendix H. The following table summarises the outcome of the analyses.

Table Summarising assessment of test data for Human receptors					
Analysis tables	Receptor group	Critical receptor	CLEA model	Inorganic contaminants	Organic contaminants
1	Current site users and construction operatives	Adult	Industrial / commercial	No exceedances	No exceedances
2	Future site users	Child	Residential without plant uptake	No exceedances	No exceedances

Table 8.4.5.1

8.4.5.2 Based on the above, laboratory testing has not identified any measured concentrations of contaminants which exceed current guideline values for human receptors. The concentrations of contaminants measured on soil samples taken from the site are considered unlikely to exhibit significant contamination from a perspective of human receptors

8.4.5.3 In addition, asbestos was not detected in any of the seven samples submitted for screening.

8.4.5.4 Based on the above evaluation, we are of the opinion that the near surface soils are unlikely to exhibit significant contamination from a perspective of human receptors.

8.4.6 Evaluation of test data – Vegetation

8.4.6.1 As none of the concentrations of commonly occurring organic or inorganic contaminants are above guideline values for residential users, and copper and zinc are below the BPG5 guideline values of 130mg/kg and 300mg/kg respectively, the risk of near surface soils to vegetation receptors is considered to be very low. In addition, the site is not considered to be significantly sensitive from an ecological perspective with only small areas of soft landscaping present.

8.4.7 Evaluation of test data – Controlled waters

8.4.7.1 *Inorganic contaminants*

8.4.8.1.1 With reference to Table 3 in Appendix H, the measured leachable concentrations of inorganic contaminants tested in two samples from WS01 at 0.2m and BH2 at 0.2-0.4m depth are all below the relevant guideline outlined in Section 8.4.4.

8.4.7.2 *Organic contaminants (polycyclic aromatic hydrocarbons)*

8.4.7.2.1 For the analysis of PAH contamination, the sum of the following contaminants has been compared to a UKDWS.

- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Benzo(ghi)perylene
- Indeno(1,2,3-cd)pyrene

8.4.7.2.2 The summed concentration of the PAH 'suite' does not exceed the UKDWS. In addition, the leachable concentration of benzo(a)pyrene and naphthalene, do not exceed their respective guideline values.

8.4.7.3 *Summary*

8.4.7.3.1 Based on the above evaluation, we are of the opinion that the near surface soils are unlikely to exhibit significant contamination with respect to water resources.

8.5 Final conceptual model

8.5.1 Having now completed analysis of laboratory testing, we can now update our conceptual model which is presented in Appendix I.

8.5.2 Based on the final conceptual model none of the assessed risks exceed the low category and, on this basis, no remedial action is considered necessary at this stage to render the site fit for purpose.

8.6 Risk assessment in relation to use of infiltration systems

8.6.1 With reference to Environment Agency publication "*The Environment Agency's approach to groundwater protection*" 2018, outside of SPZ1, the EA will support sustainable drainage systems for new discharges to ground. This is subject to an appropriate risk assessment to demonstrate that ground conditions are suitable and infiltration systems do not present an unacceptable risk of promoting mobilisation of contaminants or creating new pathways for contaminant migration.

8.6.2 The permeability of the near surface Taplow Gravel Member and Chalk deposits in combination with the site located over a secondary A and principal aquifer suggests the site is sensitive to migration of contaminants. The site is not located within or close to a source protection zone however the potential for dissolution features in the chalk will need to be considered. We have carried out leachate testing in one sample of a suite of contaminants with our assessment provided above. Essentially, measured concentrations of leachable contaminants fall below EQS values for the local environment and on this basis the risk of infiltration systems promoting mobilisation of contaminants at the site is considered low. All discharges to groundwater are subject to compliance with the Water Framework Directive (2000/60/EC) and Groundwater Daughter Directive (2006/118/EC).

8.7 Risk assessment summary and recommendations

8.7.1 Based on our assessments described above, we can provide the following summary and recommendations for each identified receptor.

8.7.2 Current site users

8.7.2.1 As no source of significant chemical contamination has been identified on site, we are of the opinion that the site represents a low risk of causing harm to the health of identified current users of the site.

8.7.3 End users

8.7.3.1 As no source of significant chemical contamination has been identified on site, we are of the opinion that the site represents a low risk of causing harm to the health of future end users of the developed site, based on current development proposals

8.7.4 Construction operatives and other site investigators

8.7.4.1 The risk of damage to health of construction operatives and other site investigators is, in our opinion, low. As a precautionary approach, however, we recommend adequate hygiene precautions are adopted on site. Such precautions would be:

- Wearing protective clothing particularly gloves to minimise ingestion from soil contaminated hands.
- Avoiding dust by dampening the soils during the works.
- Wearing masks if processing produce dust.

8.7.4.2 Guidance on safe working practices can be obtained from the following documents

- The Health and Safety Executive Publication *“Protection of Workers and the General Public during the Development of Contaminated Land”* (HMSO) and
- *“A Guide to Safer Working on Contaminated Sites”* (CIRIA Report 132).

8.7.4.3 In addition, reference should be made to the Health and Safety Executive. In all cases work shall be undertaken following the requirements of the Health and Safety at Work Act 1974 and regulations made under the Act including the COSHH regulations.

8.7.5 Controlled waters

8.7.5.1 As no source of significant chemical contamination has been identified on site, we are of the opinion that the site represents a low risk of causing harm to water receptors

8.7.6 Vegetation

8.7.6.1 As no source of significant chemical contamination has been identified on site, we are of the opinion that the site represents a low risk of causing harm to vegetation.

8.8 Statement with respect to National Planning Policy Framework

- 8.8.1 Based on investigations completed to date with respect to chemical contamination, we are of the opinion the proposed development will be safe and suitable for use for the purpose for which it is intended without the need for any remedial action).

8.9 On Site Monitoring

- 8.9.1 We have attempted to identify the potential for chemical contamination on the site, however, areas, which have not been investigated at this stage, may exhibit higher levels of contamination. If such areas are exposed at any time during construction we will be pleased to re-attend site to assess what action is required to allow the development of safely proceed.

9 Gaseous contamination

9.1	General
9.2	Conceptual model
9.3	Source assessment update
9.4	Gas migration
9.5	Updated conceptual model
9.6	Development categorisation
9.7	Monitoring observations
9.8	Classification of site characteristic gas situation
9.9	Gas protective measures – new buildings
9.10	Statement with respect to National Planning Policy Framework

9.1 General

- 9.1.1 A Phase 1 gas contamination assessment is presented in our preliminary investigation report ref STR4832-P01. This section of the report provides an update to the assessment following the intrusive investigation.

9.2 Initial conceptual model

- 9.2.1 Our initial conceptual model, presented in the preliminary investigation report, is tabled below for ease of reference.

Conceptual model		
Potential source origin	Potential pathway	Receptors at risk
Mineworkings	Via underlying permeable soils	End users
Carbonate deposits		Construction operatives
Made Ground		Buildings

Table 9.2.1

- 9.2.2 Based on the conceptual model, intrusive investigations were required to refine the risk and determine whether a monitoring regime would be required.

9.3 Source assessment update

- 9.3.1 Exploratory excavations identified limited Made Ground overlying Taplow Gravel and Chalk Formation. The Made Ground generally comprised sands and gravels and is not considered to be a potential source of landfill gas.
- 9.3.2 The intrusive excavations confirmed the presence of carbonate-rich Chalk beneath the site, considered to have a very low generation potential for carbon dioxide.

9.4 Gas migration

- 9.4.1 Intrusive investigations have confirmed the ground conditions inferred in our preliminary investigation. On this basis, there is no change to our pathway assessment.

9.5 Updated Conceptual model

- 9.5.1 Based on the findings of our ground investigation, we have updated our initial conceptual model to remove Made Ground as a possible source of landfill gas.

Conceptual model		
Potential source origin	Potential pathway	Receptors at risk
Mineworkings	Via underlying permeable soils	End users
Carbonate deposits		Construction operatives Buildings
Table 9.5.1		

- 9.5.2 On this evidence we are of the opinion that the site is at risk of being affected by ground gases (carbon dioxide/methane) sufficient to potentially cause harm to human end users of the site, construction operatives or indeed buildings. On this basis, we have installed monitoring standpipes in boreholes, and implemented a monitoring regime, generally following procedures described in BS8576:2013 to quantify the risk and, if appropriate, identify mitigation measures.

9.6 Development categorisation

- 9.6.1 With reference to BS 8485:2015+A1:2019 (table 3), the proposed building type would be classified as *'Type B - Private or commercial/public, possibly multiple'*.

9.7 Monitoring observations

- 9.7.1 One standpipe has been installed in BH1 at the site in accordance with BS9576:2013, Section 9. Following BS8576:2013 (Figure 6) and CIRIA Report C665 (Tables 5.5a and 5.5b) we have provisionally assessed the site as low risk of generation potential of source ideally requiring six monitoring visits over 3 months. At this stage, we propose to complete three monitoring visits with the remaining visits undertaken if data suggests the assessment requires refining.
- 9.7.2 We have returned to site for all three of the proposed monitoring visits to obtain measurements of landfill type gases at atmospheric conditions in the range of 999 to 1018mb and temperatures in the range of 9°C to 16°C. Essentially, we detected concentrations of methane of 0.1% and concentrations of carbon dioxide measured in the range of 0.2 to 0.4%. If flows were detected during our monitoring visits, then these are recorded, but where no flow is detected then we have assumed flow at the detection limit of the monitoring equipment at 0.1l/s.
- 9.7.3 Gas monitoring results are summarised in Appendix J.

9.8 Classification of site characteristic gas situation

9.8.1 Using test data and with reference to Table 4 of BS 8485:2015+A1:2019, the site would be classified as characteristic gas situation one.

9.8.2 Clearly further monitoring will increase the accuracy of this risk assessment, however in our opinion we have followed current best practice with respect to investigations completed to date, the monitoring regime and analysis of data, and again in our opinion, the data categories used in the analysis is considered to be '*representative and comprehensive*' as defined in section 6.3.7 of BS 8485:2015+A1:2019.

9.8.3 In addition we have assessed the sufficiency of data in accordance with annex F of BS8576:2013. The following table summarises our assessment.

Action	Result
From current results (concentration, flow rates and pressure) estimate likely risk associated with ground gas (note steady state flow results are to be used, not peak values that only last a few seconds on opening the gas tap)	Current estimate of risk GSV = gas concentration x borehole flow rate. GSV = 0.4/100 x 0.1 = 0.0004l/hr Characteristic situation CS1 (Maximum limit is 0.07l/hr)
What increase in gas concentration is required to increase the estimated risk and level of gas protection to be provided?	Estimate increase in gas concentration Keeping the flow rate constant, the gas concentration would need to exceed 70% to move into the next band. I.e., needs to increase by 175 times the current worst-case scenario.
What increase in flow rate is required to increase the estimated risk and level of gas protection to be provided?	Estimate increase in flow rate: Keeping the concentration constant, the flow rate would need to exceed 17.5l/hr to move into the next risk band, i.e., to needs to increase 175 times the current worst-case scenario.
Is the increase in gas concentration feasible given the known source of the gas?	No Current measured gas concentrations are very low, consistent with the main source being limited to natural carbonate deposits. An increase up to 70% CO ₂ is not considered likely from this source.
Is the increase in flow rate feasible when compared to gas generation and migration model results, the collected gas monitoring data and the conceptual site model?	No Again, flow has not exceeded the detection limit of the equipment and based on ground conditions, an increase of 175 times the current measured rate is not considered feasible.
Decide whether further monitoring is required.	Based on the above analysis, further gas monitoring is not required.

Table 9.8.3

9.9 Gas protective measures – new buildings

9.9.1 Based on monitoring, development categorisation (section 9.6 above), and the site characteristic gas situation (section 9.8 above) and with reference to Table 4 of BS 8485:2015+A1:2019, the development does not require any gas protective measures.

9.10 Statement with respect to National Planning Policy Framework

- 9.10.1 Based on investigations completed to date with respect to gaseous contamination, we are of the opinion the proposed development will be safe and suitable for use for the purpose for which it is intended (without the need for any remedial action) thus meeting the requirements of the National Planning Policy Framework section 178, and compliant with the Building Regulations Part C, *'Site preparation and resistance to contaminants and moisture*.



Key:

- Proposed Bin Store (Fortnight Collection)
- Proposed Cycle Store

PLEASE NOTE: All drawing information is indicative and subject to further design development & detail design. Position and extent of all utilities (overground & underground), easements, topographical features & trees to be confirmed and subject to further surveys. Exact site boundary position TBC through land registry plan and further on site investigations. Layout design is drawn for feasibility & discussion purposes only and has been based on PDF survey information that is subject to a full measured building survey.

This sketch is indicative only and based on incomplete survey information. Core areas are assumed to contain vertical circulation but remain unverified. The proposal is subject to full measured, structural, and M&E surveys, and is for feasibility/discussion purposes only.

Further design development will be required to address:

A compliant fire strategy, including means of escape, protected lobbies, evacuation lift requirements, and fire-rated construction;

Acoustic and thermal performance in line with Building Regulations, including potential enhancements between residential uses;

Ventilation to habitable spaces and shared areas per Approved Document F, plus assessment of overheating risk (Part O);

Structural capacity of the existing building to support residential conversion and associated loadings;

Natural light provision and daylight/sunlight performance in accordance with BRE guidance;

Services coordination, including drainage, vertical risers, and ventilation routes;

Access and inclusivity, including potential lift upgrades and Part M compliance;

Waste and cycle storage arrangements;

Assessment of hazardous materials (e.g., asbestos) within the existing fabric.

All elements remain subject to detailed technical input, further surveys, and compliance with current planning and building regulations.



Project rg+p prj. reference

Eaton Court, Reading 103-225

Status

Feasibility

Client

BMR Property Group

Package

/ Permitted Development - Class AA

Sheet Title

Proposed Ground Floor Plan

Scale

1:500@A3

Date

08.09.2025

Drawn by

EAB RTM

Drawing reference

103-225_(SK)017A

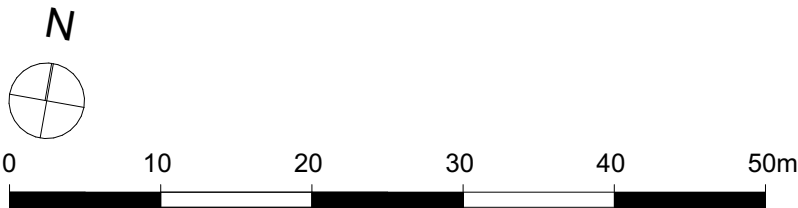
London | Birmingham | Leicester
0203 327 0381 | 0121 309 0071 | 0116 204 5800
rg+p.co.uk - design@rg+p.co.uk

Notes:
All designs should be constructed in strict accordance with building regulations.
In addition any materials, components and fixings in/or connected to a façade should be non-combustible if the top storey of the building is above 11m.

All dimensions to be checked on site. Do not scale off this drawing for construction purposes.
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Proposed Ground Floor Plan

Scale 1:500@A3

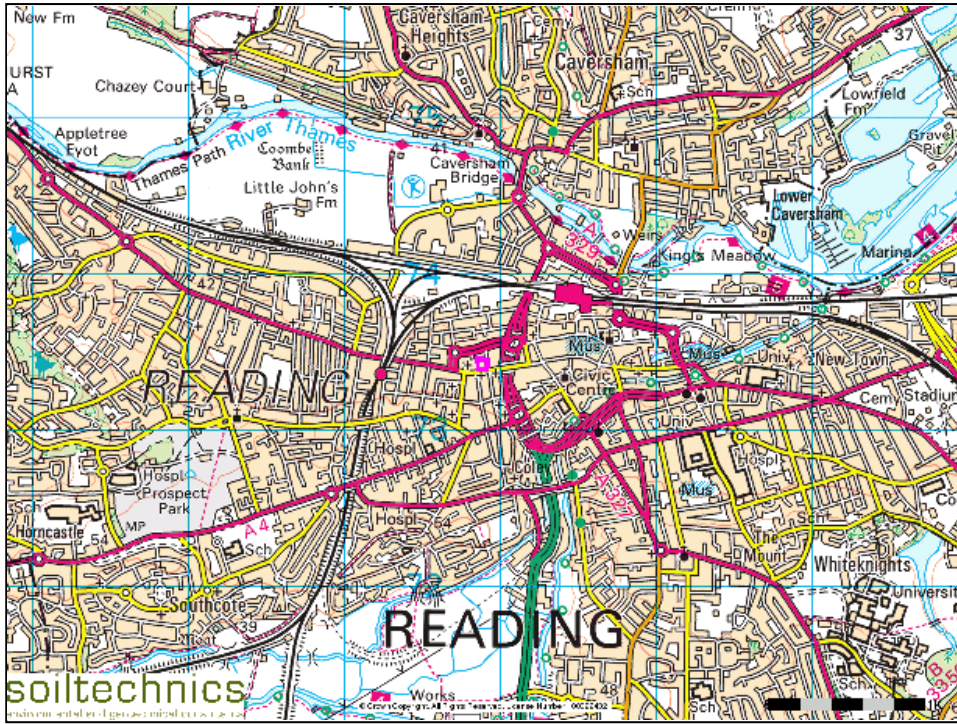


Accommodation Schedule - Class AA

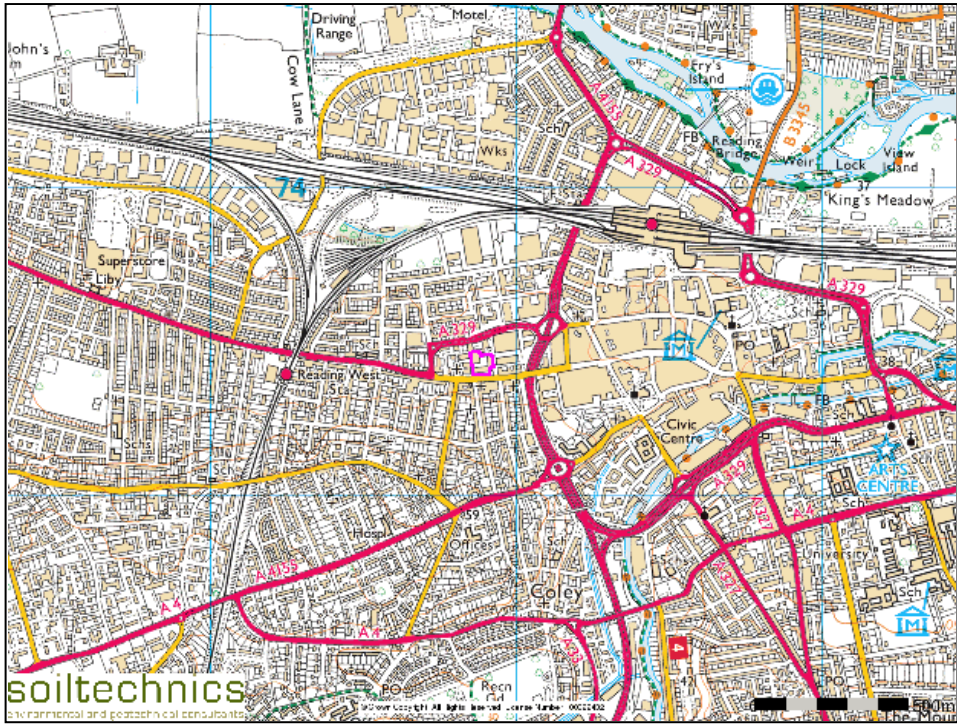
Level	Storey Height (m)	1B1P		1B2P		2B3P		2B4P		Refuse & Cycle	Total Units	Total Beds	GIA (m2)	NSA (m2)	NSA/GIA
		40m²	NSA	50m²	NSA	61m²	NSA	70m²	NSA						
GF	-	-	-	-	-	-	-	-	-	139m²	-	-	-	-	-
01	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
02	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
03	8	309m²	1	51m²	0	m²	0	m²	0	0	9	9	548m²	360m²	66%
04	4	163m²	1	55m²	1	62m²	0	m²	0	0	6	7	354m²	279m²	79%
Total	0.00	12	471m²	2	106m²	1	62m²	0	m²	139m²	15	16	902m²	639m²	71%
Mix			80.0%		13.3%		6.7%		0.0%						

Please note all apartments are minimum NDSS areas.

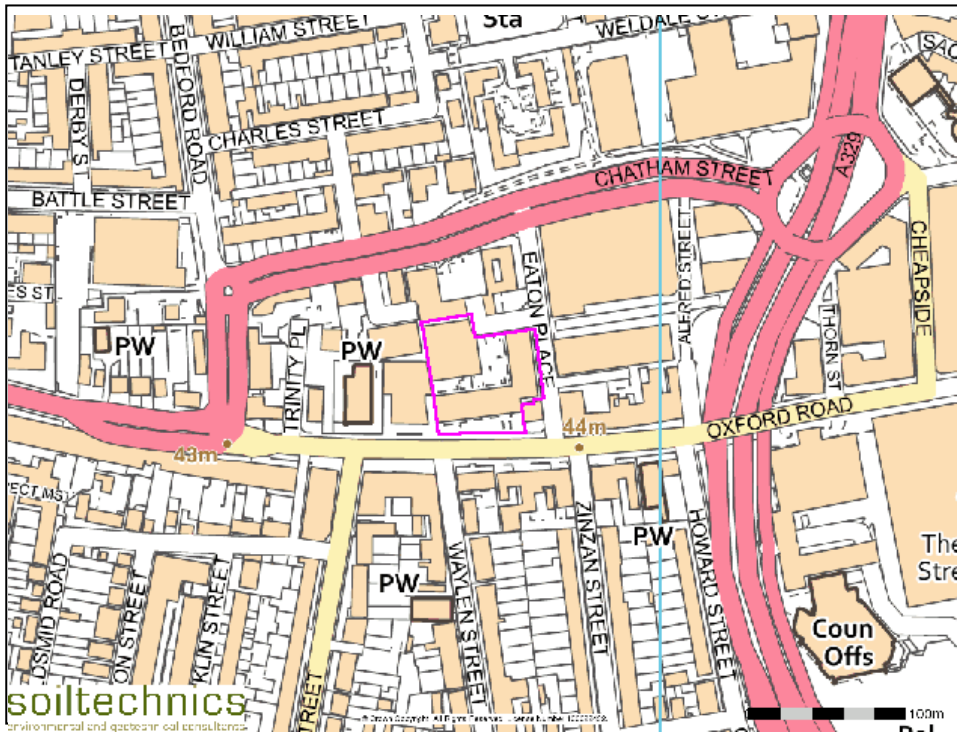
Total Units	15
Total Cycle Spaces	40
Total Car Parking Spaces	89 & 10 Visitor Spaces



Neighbourhood extract from Ordnance Survey map



Town extract from Ordnance Survey map



Detail extract from Ordnance Survey map

Title	Scale	Drawing number
Site location plan	Not to scale	01



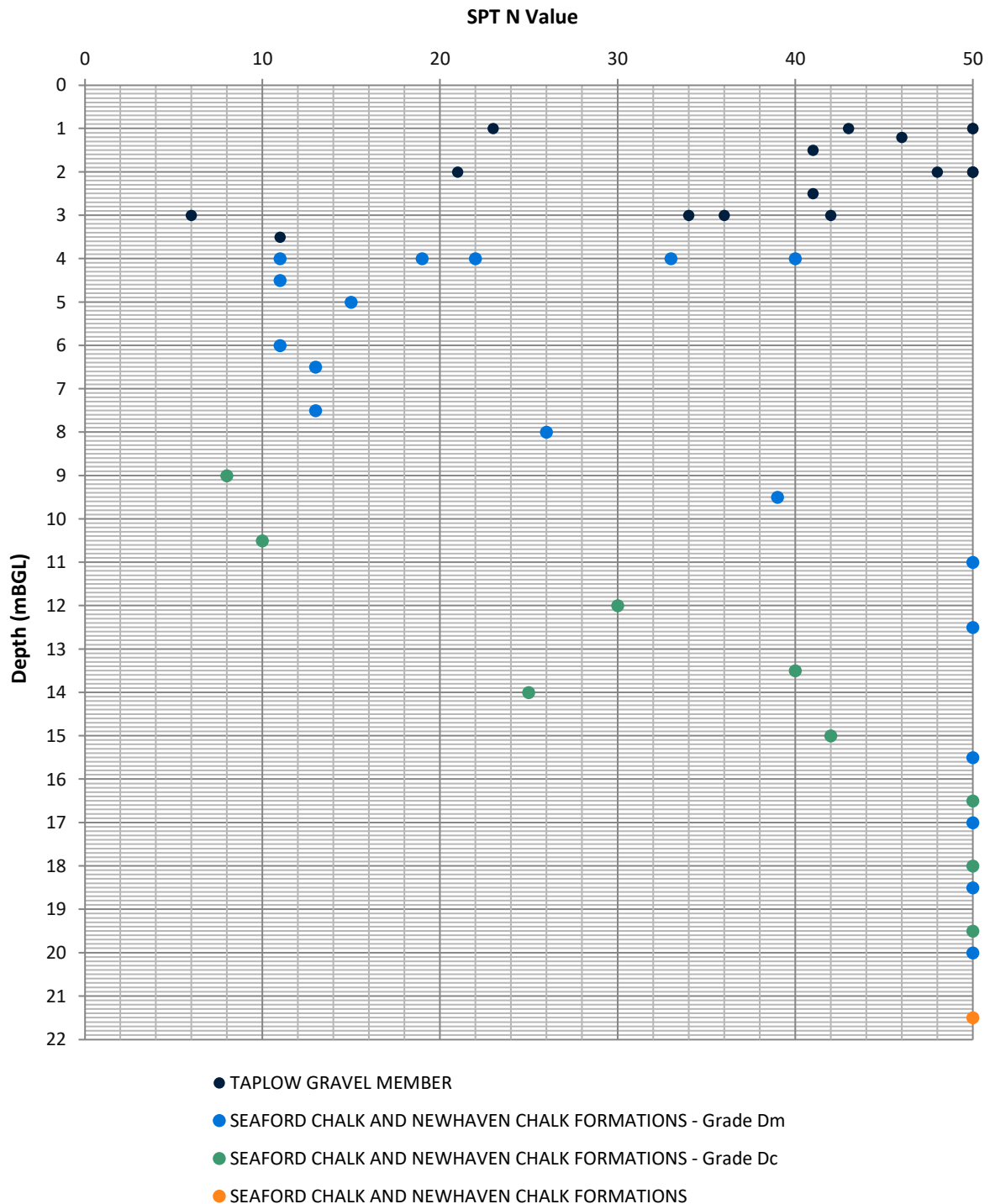
- Key**
- BH** Cable percussive borehole
 - WS** Dynamic windowless sampling borehole
 - HP** Hand dug trial pit
 - Standpipe installed
 - Photographic record
 - Site boundary

B	BH2 added	AM			13.08.2021
A	First issue	KD	KB	KB	06.08.2021
REV	DESCRIPTION	PRODUCED BY	CHECKED BY	REVIEWED BY	DATE

soiltechnics
environmental ■ geotechnical ■ building fabric

PROJECT Eaton Court, Reading		
TITLE Exploratory hole plan (current layout)		
PROJECT NO. STR4832	SCALE AT A3 1:500	DRAWING NO. 02

Plot summarising Standard Penetration Test (SPT) results versus depth filtered by geology



Definition of geotechnical terms used in this report - foundations

Strip foundations.

A foundation providing a continuous longitudinal ground bearing.

Trench fill concrete foundation.

A trench filled with mass concrete providing continuous longitudinal ground bearing.

Pad foundation.

An isolated foundation to spread a concentrated load.

Raft foundation.

A foundation continuous in two directions, usually covering an area equal to or greater than the base area of the structure.

Substructure.

That part of any structure (including building, road, runway or earthwork) which is below natural or artificial ground level. In a bridge this includes piers and abutments (and wing walls), whether below ground level or not, which support the superstructure.

Piled foundations and end bearing piles. A pile driven or formed in the ground for transmitting the weight of a structure to the soil by the resistance developed at the pile point or base and the friction along its surface. If the pile supports the load mainly by the resistance developed at its point or base, it is referred to as an end-bearing pile; if mainly by friction along its surface, as a friction pile.

Bored cast in place pile.

A pile formed with or without a casing by excavating or boring a hole in the ground and subsequently filling it with plain or reinforced concrete.

Driven pile.

A pile driven into the ground by the blows of a hammer or a vibrator.

Precast pile.

A reinforced or pre-stressed concrete pile cast before driving.

Driven cast in place pile.

A pile installed by driving a permanent or temporary casing, and filling the hole so formed with plain or reinforced concrete.

Displacement piles.

Piled formed by displacement of the soil or ground through which they are driven.

Skin friction.

The frictional resistance of the surrounding soil on the surface of cofferdam or caisson walls, and pile shafts.

Downdrag or negative skin friction. A downwards frictional force applied to the shaft of a pile caused by the consolidation of compressible strata, e.g. under recently placed fill. Downdrag has the effect of adding load to the pile and reducing the factor of safety.

Definition of geotechnical terms used in this report – bearing values

To Eurocode 7

Formal definitions of Eurocode terms are provided in BS EN 1990:2002 '*Eurocode – Basis of Structural Design*'. The following are considered informal definitions relating to the context of the geotechnical design report.

Bearing resistance

Calculated ability of a foundation to resist applied actions considered for ultimate and serviceability limit states.

Ultimate limit state (ULS) considerations

Partial factors applied to soil parameters, and actions (applied loads) in bearing resistance calculations to avoid risk of failure of the foundation in bearing.

Serviceability limit state (SLS) considerations

Calculations to determine bearing resistance of a foundation which will generate acceptable levels of settlement under applied actions

Characteristic geotechnical parameters

These are based on results and derived values from laboratory field tests, complemented by well-established experience.

Pre-Eurocode 7 methods.

Ultimate bearing capacity.

The value of the gross loading intensity for a particular foundation at which the resistance of the soil to displacement of the foundation is fully mobilised.

Presumed bearing value.

The net loading intensity considered appropriate to the particular type of ground for preliminary design purposes. The particular value is based on calculation from shear strength tests or other field tests incorporating a factor of safety against shear failure.

Allowable bearing pressure.

The maximum allowable net loading intensity at the base of the foundation, taking into account the ultimate bearing capacity, the amount and kind of settlement expected and our estimate of ability of the structure to accommodate this settlement.

Factor of safety.

The ratio of the ultimate bearing capacity to the intensity of the applied bearing pressure or the ratio of the ultimate load to the applied load.

Definition of geotechnical terms used in this report – road pavements

The following definitions are based on Transport and Road Research Laboratory (TRRL) Report LR1132.

Equilibrium CBR values.

A prediction of the CBR value, which will be attained at formation level under the completed pavement.

Thin pavement.

A thin pavement (which includes both bound and unbound pavement construction materials) is 300mm thick (very lightly trafficked road) and a thick pavement is 1200mm thick (typical of motorway construction).

Definition of geo-environmental terms used in this report

Conceptual model

Textual and/or schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the basis of the information obtained from the investigatory process.

Contamination

Presence of a substance which is in, on or under land, and which has the potential to cause harm or to cause pollution of controlled water.

Controlled water

Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three mile limit of territorial waters.

Harm

Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case of humans, including property.

Pathway

Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.

Receptor

Persons, living organisms, ecological systems, controlled waters, atmosphere, structures and utilities that could be adversely affected by the contaminant(s).

Risk

Probability of the occurrence of, and magnitude of the consequences of, an unwanted adverse effect on a receptor.

Risk assessment

Process of establishing, to the extent possible, the existence, nature and significance of risk.

Definition of environmental risk/hazard terms used in this report

Based on CIRIA report C552 '*Contaminated land risk assessment – A guide to good practice*'.

Potential hazard severity definition

Category	Definition
Severe	Acute risks to human health, catastrophic damage to buildings/property, major pollution of controlled waters
Medium	Chronic risk to human health, pollution of sensitive controlled waters, significant effects on sensitive ecosystems or species, significant damage to buildings or structures
Mild	Pollution of non-sensitive waters, minor damage to buildings or structures
Minor	Requirement for protective equipment during site works to mitigate health effects, damage to non-sensitive ecosystems or species

Probability of risk definition

Category	Definition
High likelihood	Pollutant linkage may be present, and risk is almost certain to occur in long term, or there is evidence of harm to the receptor
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term
Low likelihood	Pollutant linkage may be present, and there is a possibility of the risk occurring, although there is no certainty that it will do so
Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are improbable

Level of risk for potential hazard definition

Probability of risk	Potential severity			
	Severe	Medium	Mild	Minor
High likelihood	Very high	High	Moderate	Low/Moderate
Likely	High	Moderate	Low/Moderate	Low
Low likelihood	Moderate	Low/Moderate	Low	Very low
Unlikely	Low/Moderate	Low	Very low	Very low

See below for definitions of 'very high' to 'very low'

Definition of environmental risk/hazard terms used in this report

Based on CIRIA report C552 '*Contaminated land risk assessment – A guide to good practice*'.

Risk classifications and likely action required:

Very high risk

High probability that severe harm could arise to a designated receptor from an identified hazard OR there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised is likely to result in substantial liability. Urgent investigation and remediation are likely to be required.

High risk

Harm is likely to arise to a designated receptor from an identified hazard. This risk, if realised, is likely to result in substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the long term.

Moderate risk

It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is likely that the harm would be relatively mild. Investigation is normally required to clarify risks and to determine potential liability. Some remedial works may be required in the long term.

Low risk

It is possible that harm could arise to a designated receptor from an identified hazard but it is likely that this harm, if realised, would at worst normally be mild.

Very low risk

It is a low possibility that harm could arise to a designated receptor. On the event of such harm being realised it is not likely to be severe.

List of documents used in assessment of chemical contamination

No.	Title	Publication reference / publisher
1	Human health toxicological assessment of contaminants in soil	EA Science Report – SC050021/SR2
2	Updated technical background to the CLEA model	EA Science Report – SC050021/SR3
3	CLEA Software (Version 1.03 beta) Handbook	EA Science Report - SC050021/SR4
4	Guidance on comparing Soil Contamination Data with a Critical Concentration	CIEH
5	The LQM/CIEH S4ULs for Human Health Risk Assessment (2015)	LQM/CIEH
6	Assessment of Risks to Human Health from Land Contamination: An overview of the development of soil guideline values and related research	R&D Publication, Contaminated Land Report CLR 7
7	Contaminants of Soil: Collation of Toxicological Data and Intake Values for Humans	R&D Publication, Contaminated Land Report CLR 9
8	The Contaminated Land Exposure Assessment Model (CLEA): Technical Basis and Algorithms	R&D Publication, Contaminated Land Report CLR 10
9	Model Procedures for the Management of Land Contamination	R&D Publication, Contaminated Land Report CLR 11
10	Contaminants in Soil: Collection of Toxicological Data and Intake Values for Human Values	R&D Publications, Tox. 6
11	Soil Guideline Values for Contamination (2002)	R&D Publications, SGV 10
12	Soil Guideline Values (2009)	EA Science Reports – SC050021
13	Atkins ATRISK ^{SOIL} (2011)	http://www.atrisksoil.co.uk
14	Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination (September 2014)	CL:AIRE

CIEH	Chartered institute of Environmental Health
LQM	Land Quality Management
EA	Environment Agency
CL:AIRE	Contaminated Land: Applications in Real Environments

Testing suite summary

Table summarising testing suites		
Suite	Parameters	Medium
Suite 1	Arsenic, beryllium, boron, cadmium, chromium (total and VI), copper, lead, mercury, nickel, selenium, vanadium zinc, cyanide (free, total and complex), organic matter content, PAH (16 speciated), pH, phenol (total), TOC	Soil
Suite 2	Arsenic, boron (water soluble), beryllium, cadmium, chromium (total), copper, lead, mercury, nickel, selenium, vanadium, zinc, cyanide (free, total and complex, PAH (16 speciated), pH, phenol (total), sulfate (water soluble), sulfide, nitrate	Leachate
Suite 3	Arsenic, boron (water soluble), beryllium, cadmium, chromium (total), copper, lead, mercury, nickel, selenium, vanadium, zinc, cyanide (free, total and complex, PAH (16 speciated), pH, phenol (total), sulfate (water soluble), sulfide, nitrate	Water
Suite 4	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, MTBE, PAH (16 speciated), organic matter	Soil
Suite 5	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, MTBE, PAH (16 speciated)	Leachate
Suite 6	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, MTBE, PAH (16 speciated)	Water
Suite 7	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, TOC, organic matter	Soil
Suite 8	Sulphur (total), sulphate (water and acid soluble), pH	Soil
Suite 9	Sulphate, ammoniacal nitrogen, dissolved magnesium, pH	Water
Suite 10	VOC, SVOC, TOC, organic matter	Soil
Suite 11	VOC, SVOC	Leachate
Suite 12	VOC, SVOC	Water
Suite 13	Organotins dibutyltin/ tributyl-tin/tetrabutyltin/triphenyl-tin, tetraethyl-lead/tetramethyl-lead	Soil
Suite 14	Organotin	Leachate
Suite 15	Organotin	Water
Suite 16	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, VOC, SVOC	Soil, water, leachate
Suite 17	TPH Texas Banding Aliphatic/Aromatic Split, BTEX, SVOC, VOC, arsenic, boron (water soluble), beryllium, cadmium, chromium (total), copper, lead, mercury, nickel, selenium, vanadium, zinc, cyanide (free, total and complex, pH, phenol (total), sulfate (water soluble), sulfide, nitrate	Soil, water, leachate
Concrete BRE suite	pH, sulphate (water and acid soluble), magnesium (water soluble), ammonia (water soluble), chloride, nitrate	Soil

Table summarising Standard Penetration Test (SPT) results

Location	Start Depth (m)	Penetration (mm)					
		Seating 1-2	Main 1-4	Total Seating	Total Main	Total Seating	Total Main
BH1	1.50	1/3	5/8/11/17	4	41	150	300
BH1	2.50	2/5	8/9/11/13	7	41	150	300
BH1	3.50	1/2	2/3/3/3	3	11	150	300
BH1	4.50	4/7	2/3/3/3	11	11	150	300
BH1	6.00	1/2	2/3/3/3	3	11	150	300
BH1	7.50	2/2	3/3/3/4	4	13	150	300
BH1	9.00	1/1	1/2/2/3	2	8	150	300
BH1	10.50	1/0	1/3/3/3	1	10	150	300
BH1	12.00	3/4	5/7/8/10	7	30	150	300
BH1	13.50	5/6	8/9/10/13	11	40	150	300
BH1	15.00	4/7	8/10/11/13	11	42	150	300
BH1	16.50	8/17	33/17	25	50	145	100
BH1	18.00	7/16	30/20	23	50	150	115
BH1	19.50	10/15	38/12	25	50	135	95
BH2	1.20	2/2	6/12/14/14	4	46	150	300
BH2	2.00	6/12	14/16/20	18	50	150	185
BH2	3.00	7/8	10/12/7/5	15	34	150	300
BH2	4.00	3/2	2/2/3/4	5	11	150	300
BH2	5.00	2/3	3/4/4/4	5	15	150	300
BH2	6.50	1/3	2/3/4/4	4	13	150	300
BH2	8.00	2/3	4/6/8/8	5	26	150	300
BH2	9.50	1/7	8/13/9/9	8	39	150	300
BH2	11.00	6/8	9/7/15/19	14	50	150	255
BH2	12.50	3/5	8/9/12/21	8	50	150	265
BH2	14.00	19/25	25	44	25	100	10
BH2	15.50	5/6	9/13/14/14	11	50	150	255
BH2	17.00	7/10	19/20/11	17	50	150	165
BH2	18.50	7/12	13/14/15/8	19	50	150	230
BH2	20.00	8/8	8/9/14/19	16	50	150	231
BH2	21.50	8/10	25/25	18	50	150	85
WS01	1.00	2/4	6/6/6/5	6	23	150	300
WS01	2.00	5/11	11/14/16/9	16	50	150	275
WS01	3.00	17/8	17/15/11/13	25	56	120	300
WS01	4.00	11/12	14/10/8/8	23	40	150	300
WS02	2.00	5/5	6/5/5/5	10	21	150	300
WS02	3.00	2/3	1/2/2/1	5	6	150	300
WS02	4.00	4/5	4/6/6/6	9	22	150	300
WS03	1.00	21/4	23/21/6	25	50	80	160

Table summarising Standard Penetration Test (SPT) results

Location	Start Depth (m)	Penetration (mm)					
		Seating 1-2	Main 1-4	Total Seating	Total Main	Total Seating	Total Main
WS03	2.00	14/11	15/12/10/11	25	48	150	300
WS03	3.00	12/11	11/10/9/12	23	42	150	300
WS03	4.00	6/7	9/10/8/6	13	33	150	300
WS04	1.00	6/10	10/12/10/11	16	43	150	300
WS04	2.00	15/10	15/16/16/3	25	50	120	230
WS04	3.00	12/9	6/10/11/9	21	36	150	300
WS04	4.00	7/5	5/4/5/5	12	19	150	300
WS05	1.00	18/7	20/24/6	25	50	150	150
WS05	2.00	9/10	17/15/14/10	19	56	150	300

Table summarising Pocket Penetrometer results

* Signifies that instrument limit reached.

Location	Start Depth (m)	Results 1-3	Average	Undrained Shear Strength (kN/m ²)
WS01	0.50	2/1.75/2	1.92	96
WS01	0.80	2/2/2	2.00	100
WS01	1.10	2/2/2	2.00	100
WS01	1.40	2/2/2	2.00	100
WS01	1.60	2/2.25/2.25	2.17	108
WS01	3.80	2.25/2.25/2.25	2.25	113
WS01	3.90	2/2/2	2.00	100
WS02	3.40	2/2/2	2.00	100
WS02	3.90	2/2.25/2.25	2.17	108
WS02	4.10	2.5/2.25/2	2.25	113
WS02	4.30	2.5/2.5/2.5	2.50	125
WS02	4.50	2.5/2.5/2.5	2.50	125
WS02	4.80	2.5/2.5/2.5	2.50	125
WS03	3.90	2/2.25/2.25	2.17	108
WS04	0.70	1.5/1.75/1.5	1.58	79
WS04	0.80	1.5/1.5/1.75	1.58	79
WS04	1.00	1.5/1.5/1.5	1.50	75
WS04	1.20	1.5/1.75/1.75	1.67	83
WS04	1.50	1.75/2/2	1.92	96
WS04	3.80	1.5/1.5/1.5	1.50	75
WS04	4.00	1.75/1.25/1.5	1.50	75
WS04	4.20	1.5/2/1.5	1.67	83
WS04	4.40	1.75/1.75/2	1.83	92

Key to legends

Composite materials, soils and lithology					
	Topsoil		Made Ground		Boulders
	Clay		Coal		Cobbles
	Gravel		Limestone		Mudstone
	Sand		Sandstone		Silt
					Siltstone
					Chalk
					Concrete
					Peat

Note: Composite soil types are signified by combined symbols.

Key to 'test results' and 'sampling' columns

Test result		Sampling	
Depth	Records depth that the test was carried out (i.e.: at 2.10m or between 2.10m and 2.55m)	From (m) To (m)	Records depth of sampling
	PP – Pocket penetrometer result reported as an equivalent undrained shear strength (kN/m ²) by applying a factor of 50.		D Disturbed sample
			B Bulk disturbed sample
			ES Environmental sample
Result	SV – Hand held shear vane result reported as an undrained shear strength (kN/m ²). Where multiple readings are taken at the same level the average value is shown on the log. * Signifies that instrument limit reached.	Type	W Water sample
			U Undisturbed thick-walled sample 100mm diameter sampler
			UT Undisturbed thin walled sample 100mm diameter sampler
			UTF Failed undisturbed sample

Water observations

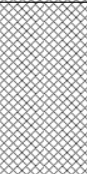
Described at foot of log and shown in the 'water strike' column.

▼ Water level observed after specified delay in drilling

∇ Water strike

Density

Density recorded in brackets determined by qualitative field assessment or inferred from density testing and soil descriptions from across the site (i.e.: [Medium dense]).

STRATA				WATER STRIKES	IN SITU TESTING		SAMPLING		
DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
ASPHALT. (MADE GROUND)	0.07						0.20		ES
Reddish brown gravelly SAND. Gravel is igneous rock. (MADE GROUND - SUBBASE)									
Orangish brown SAND and GRAVEL. Gravel is fine to coarse subangular to subrounded flint. (TAPLOW GRAVEL MEMBER)	0.30						0.40		ES
							0.80		ES
TRIAL PIT TERMINATED AT 1.20m	1.20						1.10		ES

Notes Trial pit sides remained upright and stable upon completion.	Title Trial pit record	Dimensions (w x l) 0.30m x 0.30m	Date(s) 09/02/2021
	Method Hand tools	Logged by RT	Sheet number Sheet 1 of 1
Groundwater observations No groundwater encountered.	Level (m OD) -	Compiled by KD	Revision
	Co-ordinates -	Checked by KB	HP01

STRATA				WATER STRIKES	IN SITU TESTING		SAMPLING		
DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
ASPHALT. (MADE GROUND)	0.10						0.25		ES
Reddish brown gravelly SAND. Gravel is igneous rock. (MADE GROUND - SUBBASE)									
									
Orangish brown SAND and GRAVEL. Gravel is fine to coarse subangular to subrounded flint. (TAPLOW GRAVEL MEMBER)	0.45						0.60		ES
									
									
TRIAL PIT TERMINATED AT 0.80m	0.80								
									
									

Notes Trial pit sides remained upright and stable upon completion.	Title Trial pit record	Dimensions (w x l) 0.30m x 0.30m	Date(s) 09/02/2021
	Method Hand tools	Logged by RT	Sheet number Sheet 1 of 1
Groundwater observations No groundwater encountered.	Level (m OD) -	Compiled by KD	Revision
	Co-ordinates -	Checked by KB	HP02

Key to legends

Composite materials, soils and lithology					
	Topsoil		Made Ground		Boulders
	Clay		Coal		Cobbles
	Gravel		Limestone		Mudstone
	Sand		Sandstone		Silt
					Siltstone
					Peat
					Concrete
					Chalk

Note: Composite soil types are signified by combined symbols.

Key to 'test results' and 'sampling' columns

Test result		Sampling	
Depth	Records depth that the test was carried out (i.e.: at 2.10m or between 2.10m and 2.55m)	From (m) To (m)	Records depth of sampling
Result	PP – Pocket penetrometer result reported as an equivalent undrained shear strength (kN/m ²) by applying a factor of 50.		D Disturbed sample
	SV – Hand held shear vane result reported as an undrained shear strength (kN/m ²). Where multiple readings are taken at the same level the average value is shown on the log. * Signifies that instrument limit reached.		B Bulk disturbed sample
			ES Environmental sample
		Type	W Water sample
	SPT – Standard Penetration Test result (N value) (uncorrected) ^{1,2,3} SPT(c) – Standard Penetration Test result (solid cone) (N value) (uncorrected) ^{1,2,3}		U Undisturbed thick-walled sample 100mm diameter sampler
	UT – Undisturbed sample 100mm diameter sampler with number of blows of driving equipment required to obtain sample		UT Undisturbed thin walled sample 100mm diameter sampler
			UTF Failed undisturbed sample

Note 1: Seating blows recorded in brackets.

Note 2: Casing depth records depth of casing when SPT or SPT(c) was carried out.

Note 3: Water depth records depth of water when SPT or SPT(c) was carried out.

Water observations

Described at foot of log and shown in the 'water strike' column.

 Water level observed after specified delay in drilling

 Water strike

Installation details

	Gravel filter		Bentonite
	Slotted pipe		Unslotted pipe
	Arisings		Grout
	Extensometer magnet		Vibrating wire piezometer

Density

Density recorded in brackets determined by qualitative field assessment or inferred from density testing and soil descriptions from across the site (i.e.: [Medium dense]).

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	BLOCK PAVERS. (MADE GROUND)	0.10										0.30	0.80	ES
	Creamish brown SAND. (MADE GROUND - SUBBASE)	0.20												D
	Reddish brown gravelly clayey SAND. Gravel is igneous rock. (MADE GROUND)	0.50										0.50		ES
	Dense orangish brown sandy GRAVEL of fine to coarse subrounded to subangular flint. (TAPLOW GRAVEL MEMBER)											0.60		B
												1.00		D
												1.00		ES
												1.50	1.95	B
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Structureless CHALK composed of sandy clayey GRAVEL. Gravel is weak low to medium density and creamish white. Matrix is uncompact and creamish white. Occasional gravel of coarse angular black flint throughout. (SEAFORD CHALK AND NEWHAVEN CHALK FORMATIONS - Grade Dc)	8.20				C 6.00 - 6.45	(3) 11	4.00	DAMP			6.00	6.45	B
						C 7.50 - 7.95	(4) 13	4.00	DAMP			7.50	7.95	B
						C 9.00 - 9.45	(2) 8	9.00	8.50			9.00	9.45	B

CONTINUED ON NEXT SHEET

Notes	Chiselling details		Drilling details		Title		Date(s)	
	Depth (m)	Duration (hh:mm)	Diameter	Base depth (m)			08/02/2021 - 09/02/2021	
			150	20.00	Method	Logged by	Sheet number	
Groundwater observations	Water added details		Casing details		Level (m OD)		Compiled by	
	Depth (m)	Water Added (l)	Diameter	Base depth (m)	-		KD	
			170	20.00	Co-ordinates		Checked by	
					-		KB	
							BH1	

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
						C 10.50 - 10.95	(1) 10	10.50	8.50			10.50	10.95	B
						C 12.00 - 12.45	(7) 30	12.00	9.80			12.00	12.45	B
						C 13.50 - 13.95	(11) 40	13.50	11.00			13.50	13.95	B
						C 15.00 - 15.45	(11) 42	13.50	11.50			15.00	15.45	B

CONTINUED ON NEXT SHEET

Notes Service avoidance pit hand dug to 1.2m depth.	Chiselling details		Drilling details		Title		Date(s)
	Depth (m)	Duration (hh:mm)	Diameter	Base depth (m)	Borehole record		08/02/2021 - 09/02/2021
			150	20.00	Method Cable tool percussion	Logged by RT	Sheet number Sheet 3 of 4
Groundwater observations Groundwater strike at 8.2m depth, filling borehole to 8.13m after 20 minutes. Water level recorded at 8.4m depth the following morning.	Water added details		Casing details		Level (m OD)	Compiled by	Revision
	Depth (m)	Water Added (l)	Diameter	Base depth (m)	-	KD	
			170	20.00	Co-ordinates -	Checked by KB	BH1

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
						C 16.50 - 16.74	(25/145mm) 50/100mm	16.50	9.00			16.50	16.95	B
						C 18.00 - 18.26	(23) 50/115mm	18.00	9.00			18.00	18.45	B
						C 19.50 - 19.73	(25/135mm) 50/95mm	19.50	9.50			19.50	19.95	B
	BOREHOLE TERMINATED AT 20.00m	20.00												

Notes	Chiselling details		Drilling details		Title		Date(s)
	Depth (m)	Duration (hh:mm)	Diameter	Base depth (m)	Borehole record		08/02/2021 - 09/02/2021
					Method	Logged by	Sheet number
Service avoidance pit hand dug to 1.2m depth.			150	20.00	Cable tool percussion	RT	Sheet 4 of 4
Groundwater observations	Water added details		Casing details		Level (m OD)	Compiled by	Revision
	Depth (m)	Water Added (l)	Diameter	Base depth (m)	-	KD	
					Co-ordinates	Checked by	BH1
Groundwater strike at 8.2m depth, filling borehole to 8.13m after 20 minutes. Water level recorded at 8.4m depth the following morning.			170	20.00	-	KB	

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	BRICK pavers. (MADE GROUND)	0.08										0.20	0.40	ES
	Orangish brown slightly gravelly SAND. Gravel is subangular to angular flint. (MADE GROUND)	0.20										0.50		D
	Pinkish brown slightly clayey SAND and GRAVEL. Gravel is granite and quartz. (MADE GROUND)	0.45										0.50		D
	Firm orangish brown slightly gravelly sandy CLAY. Gravel is subrounded to subangular flint and calcareous deposits. (TAPLOW GRAVEL MEMBER)	1.20				C 1.20 - 1.65	(4) 46	1.20				1.20		D
	Dense orangish brown very gravelly SAND. Gravel is subrounded to subangular flint and calcareous deposits. (TAPLOW GRAVEL MEMBER)	2.00				C 2.00 - 2.34	(18) 50/185mm	1.70				2.00	2.50	D B
	Dense orangish brown and brown sandy GRAVEL. Gravel is subangular to angular flint. (TAPLOW GRAVEL MEMBER)	3.40				C 3.00 - 3.45	(15) 34	3.00	2.80			3.00		D
	Structureless CHALK composed of off white and creamish white slightly gravelly silty CLAY. Gravel is weak, low density, off white and subangular to subrounded. (SEAFORD CHALK AND NEWHAVEN CHALK FORMATIONS - Grade Dm)	4.00				S 4.00 - 4.45	(5) 11	4.00				4.00		D
	Structureless CHALK composed of off white and creamish white slightly gravelly silty CLAY. Gravel is extremely weak, low density, off white and subrounded to subangular. Some subangular to angular flint gravels present. (SEAFORD CHALK AND NEWHAVEN CHALK FORMATIONS - Grade Dm)	5.00				S 5.00 - 5.45	(5) 15	4.50				5.00		D
	...	6.00				S 6.00 - 6.45	(4) 13	6.00				6.50		D
	...	6.80												

CONTINUED ON NEXT SHEET

Notes	Chiselling details		Drilling details		Title		Date(s)
	Depth (m)	Duration (hh:mm)	Diameter	Base depth (m)	Method	Logged by	Sheet number
Groundwater observations Groundwater strike at 8m depth, filling borehole to 6.8m depth.			150	21.50	Shell and auger	GL	Sheet 1 of 3
	Water added details		Casing details		Level (m OD)	Compiled by	Revision
	Depth (m)	Water Added (l)	Diameter	Base depth (m)	-	AM	0
	1.70 - 3.40	340	170	19.50	Co-ordinates	Checked by	BH2
					-	KB	

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING					
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE			
	Structureless CHALK composed of off white slightly gravelly clayey SILT. Gravel is extremely weak, low density, off white and subrounded to subangular. Some flint gravels present. (SEAFORD CHALK AND NEWHAVEN CHALK FORMATIONS - Grade Dm)	10.00			S 8.00 - 8.45	(5) 26	8.00	7.50			8.00		D				
													9.00		D		
									S 9.50 - 9.95	(8) 39	9.00	8.90			9.50		D
															10.00		D
									S 11.00 - 11.40	(14) 50/255mm	11.00	9.00			11.00		D
	Structureless CHALK composed of silty clayey GRAVEL. Clasts are extremely weak and weak, low density, off white chalk with some black specs. Matrix is off white. Frequent flint gravels present. (SEAFORD CHALK AND NEWHAVEN CHALK FORMATIONS - Grade Dc)	13.50			S 12.50 - 12.92	(8) 50/265mm	12.50	8.20			12.00		D				
													12.50		D		
										S 14.00 - 14.11	(44/100mm) 25/10mm	14.00	8.70			13.50	
											14.00	15.00	B				

CONTINUED ON NEXT SHEET

Notes	Chiselling details		Drilling details		Title		Date(s)
	Depth (m)	Duration (hh:mm)	Diameter	Base depth (m)	Borehole record		11/08/2021
	14.10 - 14.50	00:30	150	21.50	Method	Logged by	Sheet number
Groundwater observations	Water added details		Casing details		Level (m OD)		Revision
	Depth (m)	Water Added (l)	Diameter	Base depth (m)	-		0
	11.00 - 21.80	1	170	19.50	Co-ordinates	Checked by	BH2
Inspection pit excavated to 1.2m depth.					Shell and auger	GL	Sheet 2 of 3
Groundwater strike at 8m depth, filling borehole to 6.8m depth.						AM	
						KB	

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Structureless CHALK composed of off white slightly gravelly clayey SILT. Gravel is extremely weak, low density, off white and subrounded to subangular. Some flint gravels present. (SEAFORD CHALK AND NEWHAVEN CHALK FORMATIONS - Grade Dm)	15.50				S 15.50 - 15.90	(11) 50/255mm	15.00	9.00			15.50		D
	Structureless CHALK composed of GRAVEL. Clasts are weak to moderately weak, low density, off white. (SEAFORD CHALK AND NEWHAVEN CHALK FORMATIONS - Grade Dc)	16.50										16.50		D
	Structureless CHALK composed of off white slightly gravelly clayey SILT. Gravel is extremely weak, low and medium density, off white and subrounded to subangular. Some flint gravels present. (SEAFORD CHALK AND NEWHAVEN CHALK FORMATIONS - Grade Dm)	17.00				S 17.00 - 17.32	(17) 50/165mm	17.00	9.10			17.00		D
						S 18.50 - 18.88	(19) 50/230mm	18.00	8.80			18.50		D
	Structureless CHALK composed of GRAVEL. Clasts are weak to moderately weak, low density, off white. (SEAFORD CHALK AND NEWHAVEN CHALK FORMATIONS - Grade Dc)	19.50										19.50	20.00	D
	Structureless CHALK composed of off white slightly gravelly clayey SILT. Gravel is extremely weak, low and medium density, off white and subrounded to subangular. Some flint gravels present. (SEAFORD CHALK AND NEWHAVEN CHALK FORMATIONS - Grade Dm)	20.00				S 20.00 - 20.38	(16) 50/231mm	19.50	8.00			20.00		D
	CHALK - No recovery. (SEAFORD CHALK AND NEWHAVEN CHALK FORMATIONS)	21.50				S 21.50 - 21.74	(18) 50/85mm	19.50	8.70			21.50	21.80	D
	BOREHOLE TERMINATED AT 21.80m													

Notes	Chiselling details		Drilling details		Title		Date(s)
	Depth (m)	Duration (hh:mm)	Diameter	Base depth (m)	Borehole record		11/08/2021
					Method	Logged by	Sheet number
Groundwater observations	21.00 - 21.20	00:25	150	21.50	Shell and auger	GL	Sheet 3 of 3
	Water added details		Casing details		Level (m OD)		Revision
	Depth (m)	Water Added (l)	Diameter	Base depth (m)	-		0
					Co-ordinates	Checked by	BH2
			170	19.50	-	KB	

Key to legends

Composite materials, soils and lithology					
	Topsoil		Made Ground		Boulders
	Clay		Coal		Cobbles
	Gravel		Limestone		Mudstone
	Sand		Sandstone		Silt
					Siltstone
					Chalk
					Concrete
					Peat

Note: Composite soil types are signified by combined symbols.

Key to 'test results' and 'sampling' columns

Test result		Sampling	
Depth	Records depth that the test was carried out (i.e.: at 2.10m or between 2.10m and 2.55m)	From (m) To (m)	Records depth of sampling
Result	PP – Pocket penetrometer result reported as an equivalent undrained shear strength (kN/m ²) by applying a factor of 50.		D Disturbed sample
	SV – Hand held shear vane result reported as an undrained shear strength (kN/m ²). Where multiple readings are taken at the same level the average value is shown on the log. * Signifies that instrument limit reached.		B Bulk disturbed sample
	SPT – Standard Penetration Test result (N value) (uncorrected) ^{1,2,3}		ES Environmental sample
	SPT(c) – Standard Penetration Test result (solid cone) (N value) (uncorrected) ^{1,2,3}	Type	W Water sample
	UT – Undisturbed sample 100mm diameter sampler with number of blows of driving equipment required to obtain sample		U Undisturbed thick-walled sample 100mm diameter sampler
			UT Undisturbed thin walled sample 100mm diameter sampler
			UTF Failed undisturbed sample

Water observations

Described at foot of log and shown in the 'water strike' column.

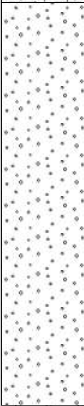
-  Water level observed after specified delay in drilling
-  Water strike

Installation details

	Gravel filter		Bentonite
	Slotted pipe		Unslotted pipe
	Arisings		Grout
	Extensometer magnet		Vibrating wire piezometer

Density

Density recorded in brackets determined by qualitative field assessment or inferred from density testing and soil descriptions from across the site (i.e.: [Medium dense]).

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	Dark brown clayey organic SAND with fine rootlets throughout. (TOPSOIL)	0.30				C 1.00 - 1.45	(6) 23			PP 0.50	PP=96	0.20	3.00	ES
	Soft to firm orangish brown sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded fl int. (TAPLOW GRAVEL MEMBER)			PP=100							0.70	ES		
				PP=100							1.50	ES		
				PP=100										
	Creamish brown clayey SAND. (TAPLOW GRAVEL MEMBER)	1.70				C 2.00 - 2.42	(16) 50/275mm			PP=100	1.80	ES		
	Very dense creamish brown very sandy clayey GRAVEL of fine to coarse subangular to angular flint. (TAPLOW GRAVEL MEMBER)	2.00								PP=108	2.00	B		
										3.20	ES			
	Structureless CHALK composed of creamish white sandy gravelly CLAY. Gravel is weak and creamish white e. Occasional gravel of fine to medium angular black flint throughout. (SEAFORD CHALK AND NEWHAVEN CHALK FORMATIONS - Grade Dm)	3.60				C 4.00 - 4.45	(23) 40			PP 3.80	PP=113	3.80	ES	
		4.45								PP 3.90	PP=100			
						BOREHOLE TERMINATED AT 4.45m								

Notes Hand pit dug to 1.2m depth for service clearance. Borehole terminated at 4m due to collapse of borehole when attempting to drill the 5th meter.	Title Dynamic windowless sampling record			Date(s) 08/02/2021	
	Recovery details		Method Windowless sampling	Logged by RT	Sheet number Sheet 1 of 1
	Range (m)	Recovery (%)			
	1.00 - 2.00 2.00 - 3.00 3.00 - 4.00	80 90 100	Level (m OD) - Co-ordinates -	Compiled by KD Checked by KB	Revision WS01

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING				
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE		
	BLOCK PAVERS. (MADE GROUND)	0.10														
	Creamish brown SAND. (MADE GROUND - SUBBASE)	0.20													0.30	
	Reddish brown gravelly clayey SAND. Gravel is igneous rock. (MADE GROUND)	0.40														
	Medium dense orangish brown sandy GRAVEL of fine to coarse subrounded to subangular flint. (TAPLOW GRAVEL MEMBER)														1.00	3.00
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING					
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE			
	ASPHALT. (MADE GROUND)	0.10															
	Reddish brown gravelly SAND. Gravel is igneous rock and asphalt. (MADE GROUND - SUBBASE)	0.25													0.30	ES	
	Brown gravelly clayey SAND. Gravel is brick, igneous rock and flint. (MADE GROUND)	0.65															0.60
	Very dense becoming dense orangish brown clayey SAND and GRAVEL. Gravel is fine to coarse subrounded to subangular flint. (TAPLOW GRAVEL MEMBER)														1.00 1.00	3.00	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	BLOCK PAVERS. (MADE GROUND)	0.10				C 1.00 - 1.45	(16) 43	1.00		PP 0.70 PP 0.80 PP 1.00 PP 1.20 PP 1.50	PP=79 PP=79 PP=75 PP=83 PP=96	0.50		ES
	Creamish brown SAND. (MADE GROUND)	0.15												
	Reddish brown gravelly clayey SAND. Gravel is igneous rock. (MADE GROUND - SUBBASE)	0.30												
	Soft to firm orangish brown sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded fl int. (TAPLOW GRAVEL MEMBER)											0.80		ES
														
														
														
														
														
														
Very dense orangish brown gravelly clayey SAND. Gravel is fine to coarse subangular to angular flint . (TAPLOW GRAVEL MEMBER)	1.70		C 2.00 - 2.35	(25/120mm) 50/230mm	1.00				1.70	2.50	B			
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														

INSTALL	STRATA				WATER STRIKES	SPT TESTING				OTHER IN SITU TESTING		SAMPLING		
	DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	CASING DEPTH (m)	WATER LEVEL (m)	TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
	BLOCK PAVERS. (MADE GROUND)	0.10				C 1.00 - 1.30	(25) 50/150mm	1.00				0.40		ES
	Creamish brown SAND. (MADE GROUND)	0.15												
	Reddish brown gravelly clayey SAND. Gravel is igneous rock. (MADE GROUND - SUBBASE)	0.30												
	Soft to firm orangish brown sandy gravelly CLAY. Gravel is fine to coarse subangular to angular flint. (TAPLOW GRAVEL MEMBER)	0.50										0.80	1.30	B
	Dense orangish brown clayey SAND. (TAPLOW GRAVEL MEMBER)													
	Orangish brown gravelly clayey SAND. Gravel is fine to medium subangular to angular flint. (TAPLOW GRAVEL MEMBER)	1.35										1.50		ES
	Dense creamish brown sandy clayey GRAVEL of fine to coarse subangular to angular flint. (TAPLOW GRAVEL MEMBER)	1.80				C 2.00 - 2.45	(19) 56	1.00				1.80	2.80	B
														
														
														
	BOREHOLE TERMINATED AT 2.80m	2.80												

Notes Hand pit dug to 0.8m depth for service clearance. Borehole terminated at 2.8m due to collapse of borehole sides to 2.5m depth.	Title Dynamic windowless sampling record			Date(s) 09/02/2021	
	Recovery details		Method Windowless sampling	Logged by RT	Sheet number Sheet 1 of 1
	Range (m)	Recovery (%)			
	0.80 - 1.80 1.80 - 2.80	80 100	Level (m OD) -	Compiled by KD	Revision
Groundwater observations No groundwater encountered.			Co-ordinates -	Checked by KB	WS05



Environmental Chemistry
SOCOTEC UK
Ashby Rd, Bretby,
Burton-on-Trent, UK
DE15 0YZ

Certificate of Analysis

Project No: 21081239

Client: SOCOTEC Materials Testing

Quote Number: BEC210417972

Project Reference: Soiltechnics Limited

Site Name: STR4832 Eaton Court, Reading

Contact: Darren Berrill

Address: SOCOTEC Central
Leofric Business Park
Progress Close
Coventry

Post Code: CV3 2TF

E-Mail: Darren.Berrill@socotec.com

Phone No: 02475 310700

Number of Samples Received: 1

Date Received: 18/08/2021

Analysis Date: 25/08/2021

Date Issued: 26/08/2021

Job Status: Complete

Report Type: Final Version 01

This report supersedes any versions previously issued by the laboratory

A handwritten signature in black ink, appearing to read 'Jones', with a horizontal line underneath.

Account Manager
Emily Jones

A handwritten signature in black ink, appearing to read 'R. Batham', with a horizontal line underneath.

Authorised by the Operations Manager
Becky Batham



Client: SOCOTEC Materials Testing

Project Name: STR4832 Eaton Court, Reading

Project No: 21081239

Date Issued: 26/08/2021

Samples Analysed

<u>Sample Reference</u>	<u>Text ID</u>	<u>Sample Date</u>	<u>Sample Type</u>
45388534 - BH2 @ 15.50 (6)-0-D	21081239-001	11/08/2021 00:00:00	SOLID



Client: SOCOTEC Materials Testing
 Project Name: STR4832 Eaton Court, Reading
 Project No: 21081239
 Date Issued: 26/08/2021

Analysis Results

					Sample ID
					001
					Customer ID
					45388534 - BH2 @ 15.50 (6)-0-D
					Sample Type
					SOLID
					Sampling Date
					11/08/2021
Analysis	Method Code	MDL	Units	Accred.	
pH (2.5:1 extraction)	PHSOIL	1	pH units	N	9.1
Chloride as Cl	KONECL	2	mg/kg	N	10
Nitrate as NO3	KONENO3	2	mg/kg	N	11.9
Sulphur as S	WSLM59	0.005	% m/m	N	0.021
Magnesium as Mg (2:1 Extract)	ICPWSMG	0.1	mg/l	N	2.1
Water Soluble Sulphate as SO4 2:1 Ext	ICPWSS	10	mg/l	N	16
Acid Soluble Sulphate as SO4	ICPACIDS	20	mg/kg	N	330
Total Moisture at 35°C	CLANDPREP	0.1	%	N	21.1
Description of Solid Material	CLANDPREP		-	N	CHALK

Deviating Sample Report

Sample Reference	Text ID	Reported Name	Incorrect Container	Incorrect Label	Headspace	Incorrect/No Preservative	No Sampling Date	Holding Time
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Analysis Method

<u>Analysis</u>	<u>Analysis Type</u>	<u>Analysis Method</u>
CLANDPREP	PHYS	As Received
ICPACIDS	METALS	Air Dried & Ground
ICPWSMG	METALS	Air Dried & Ground
ICPWSS	METALS	Air Dried & Ground
KONECL	INORGANIC	Air Dried & Ground
KONENO3	INORGANIC	Air Dried & Ground
KONENS	INORGANIC	Air Dried & Ground
KONENS.	INORGANIC	Air Dried & Ground
PHSOIL	INORGANIC	As Received
WSLM59	INORGANIC	Air Dried & Ground

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

Additional Information

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

Results within this report relate only to the samples tested.

In the accreditation column of analysis report the 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 105° c.

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

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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

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.

End of Certificate of Analysis



Determination of Saturated Moisture Content

Client: Soiltechnics Limited
Client Address: Cedar Barn
Walgrave
Northampton
Postcode: NN6 9PY

Report No: 51064511/21/01
Batch Number: DAM0082677

Site: STR4832 Eaton Court, Reading

Test Results:

Date Received: 13/08/2021
Tested From: 13/08/2021
Type of Sample: Disturbed
Description: Chalk

Date Sampled: 11/08/2021
Sampled By: Client
Sampling Certificate: Not Received

Laboratory Reference	Location	Depth	Bulk Density [Mg/m ³]	Dry Density [Mg/m ³]	Moisture Content [%]	Saturated Moisture Content (%)
45388535	BH2	16.5m	1.96	1.54	28	27.9
45388536	BH2	19.5m	2.00	1.58	26	26.1

Comments:

Certified that the laboratory testing was carried out in accordance with BS 1377-2: 1990: Method 3.3

Page: 1 of 1

Date: 25/08/2021 **Signed:** _____

[] D. Berrill - General Manager

[] M. Chandler - Laboratory Manager

For and on behalf of SOCOTEC UK Limited

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

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SOCOTEC UK Limited. Registered in England No. 2880501. Registered Office: SOCOTEC House, Bretby Business Park, Ashby Road, Burton on Trent DE15 0YZ

Liquid and Plastic Limits and Plasticity Indices

Report No: DAM0082677/534/M1 **Report Date:** 26 August 2021

Client: SOILTECHNICS LIMITED **Our Contract Ref:** 51064511

Address: CEDAR BARN
WHITE LODGE
WALGRAVE
NORTHAMPTON, NORTHANTS
NN6 9PY **Tested By:** SOCOTEC Central

Client Contact: Not Advised **Date Sampled:** 11 Aug 2021

Site: STR4832 Eaton Court, Reading **Date Received:** 13 Aug 2021

Material Supplier: Client **Date Tested:** 23 Aug 2021

Material Source: Site **Sample Type:** DISTURBED

Method of preparation: BS1377-1:1990 7.4.3 & BS 1377-2:1990 4.2 **Sampling Certificate:** Not Received

Samples Submitted by: Client

Sampled by: Client

Results:

Sample Reference	Client's Ref	Location	Description	Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing on 425 µm
45388530	15	BH2 Surface	Gravelly Sandy Silty Orange CLAY	N/A	39	16	23	*34
45388532	7	BH2 Surface	White CLAY with Silt and Chalk	N/A	28	21	7	*48
45388533	14	BH2 Surface	White CLAY with Chalk and Gravel	N/A	32	24	8	*59
45388534	6	BH2 Surface	White CLAY with Gravel and Chalk	N/A	30	22	8	*83

* Washed over 425µm BS Test Sieve

** As received, coarse particles removed by hand prior to test

Certified that the Liquid and Plastic Limits and Plasticity Indices were determined in accordance with BS1377-2:1990
Clauses 4.4, 5.0 and 5.4 respectively
Certified that the Moisture Content was determined in accordance with BS1377-2:1990 3.2

Signed:



Darren Berrill - General Manager
for and on behalf of SOCOTEC UK Limited



TEST CERTIFICATE

Particle Size Distribution

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Tested in Accordance with: BS 1377-2: 1990

Client: Soiltechnics Limited
Client Address: Cedar Barn, White Lodge,
Walgrave, Northampton,
NN6 9PY
Contact: Alexa Band
Site Address: Eaton Court, Reading

Client Reference: STR4832 L1
Job Number: 21-60115
Date Sampled: 08/02/2021
Date Received: 03/03/2021
Date Tested: 09/03/2021
Sampled By: Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 1790014

Hole No.: BH1

Sample Reference: 4

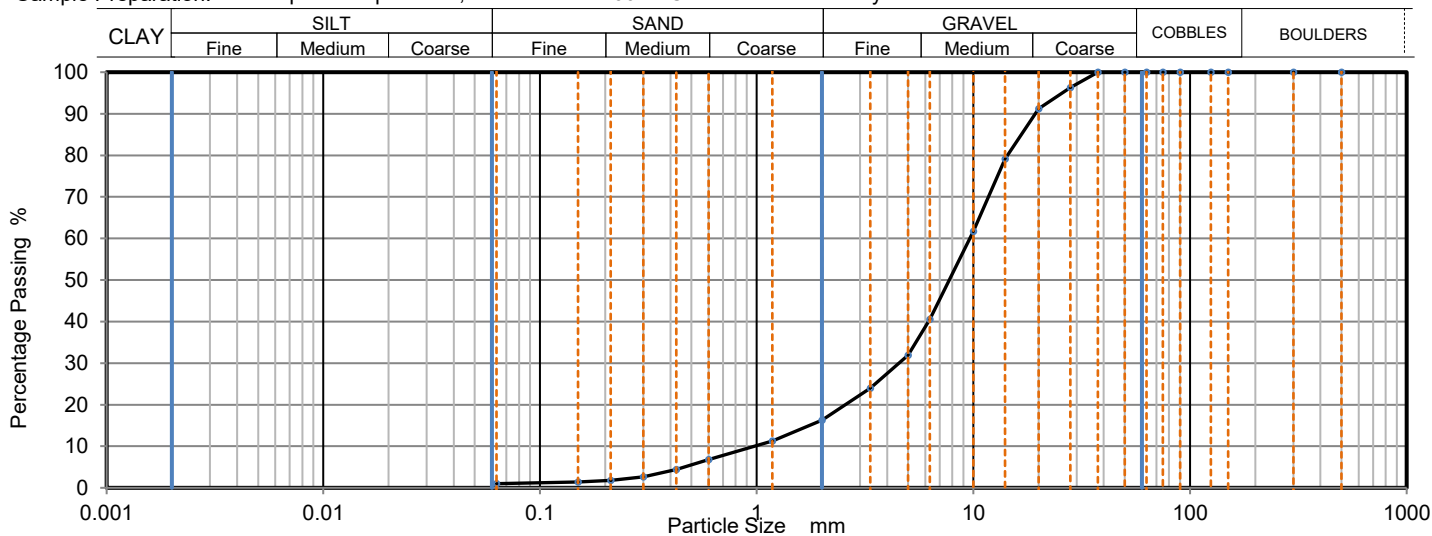
Sample Description: Brown sandy GRAVEL

Sample Preparation: Sample was quartered, oven dried at 106.1 °C and broken down by hand.

Depth Top [m]: 1.50

Depth Base [m]: 1.95

Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	96		
20	91		
14	79		
10	62		
6.3	41		
5	32		
3.35	24		
2	16		
1.18	11		
0.6	7		
0.425	4		
0.3	3		
0.212	2		
0.15	1		
0.063	1		

Sample Proportions	% dry mass
Very coarse	0
Gravel	84
Sand	15
Fines <0.063mm	1

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

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

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

Remarks: Re-issue 1: Sample Reference amended.

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Particle Size Distribution

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Tested in Accordance with: BS 1377-2: 1990

Client: Soiltechnics Limited
Client Address: Cedar Barn, White Lodge,
Walgrave, Northampton,
NN6 9PY
Contact: Alexa Band
Site Address: Eaton Court, Reading

Client Reference: STR4832 L1
Job Number: 21-60115
Date Sampled: 08/02/2021
Date Received: 03/03/2021
Date Tested: 09/03/2021
Sampled By: Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 1790015

Hole No.: BH1

Sample Reference: 5

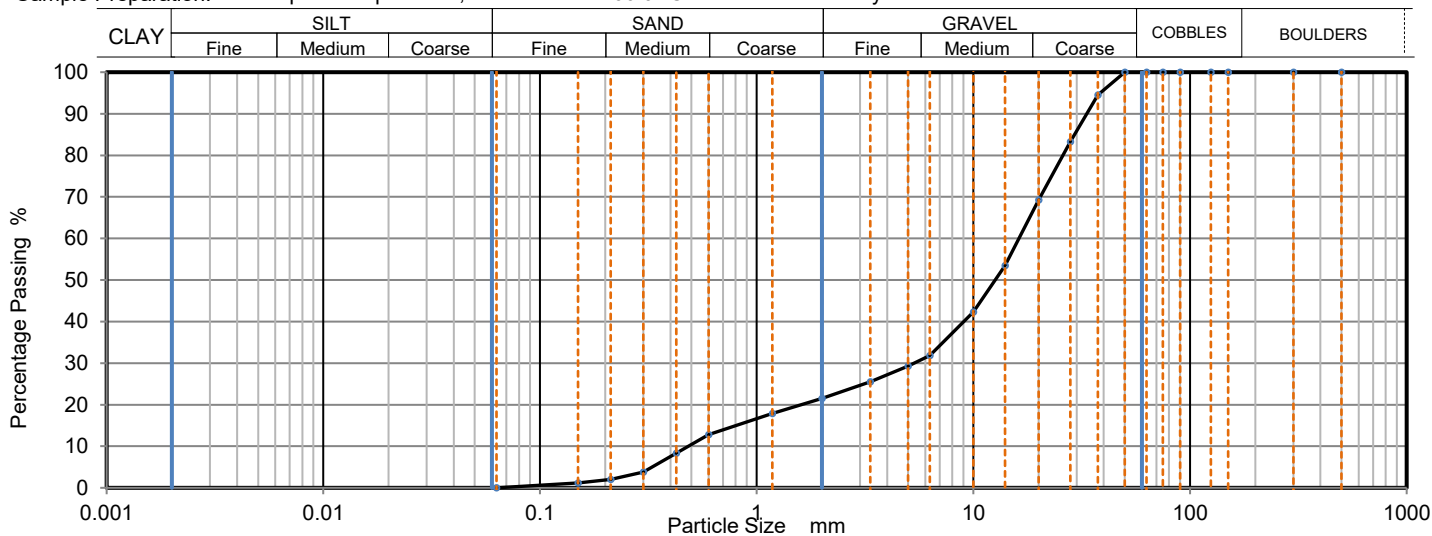
Sample Description: Yellowish brown sandy GRAVEL

Sample Preparation: Sample was quartered, oven dried at 106.0 °C and broken down by hand.

Depth Top [m]: 2.50

Depth Base [m]: 2.95

Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	95		
28	83		
20	69		
14	54		
10	42		
6.3	32		
5	29		
3.35	26		
2	22		
1.18	18		
0.6	13		
0.425	8		
0.3	4		
0.212	2		
0.15	1		
0.063	1		

Sample Proportions	% dry mass
Very coarse	0
Gravel	79
Sand	21
Fines <0.063mm	1

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

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

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

Remarks: Re-issue 1: Sample Reference amended.

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Particle Size Distribution

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Tested in Accordance with: BS 1377-2: 1990

Client: Soiltechnics Limited
Client Address: Cedar Barn, White Lodge,
Walgrave, Northampton,
NN6 9PY
Contact: Alexa Band
Site Address: Eaton Court, Reading

Client Reference: STR4832 L1
Job Number: 21-60115
Date Sampled: 09/02/2021
Date Received: 03/03/2021
Date Tested: 09/03/2021
Sampled By: Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 1790020

Hole No.: WS05

Sample Reference: 4

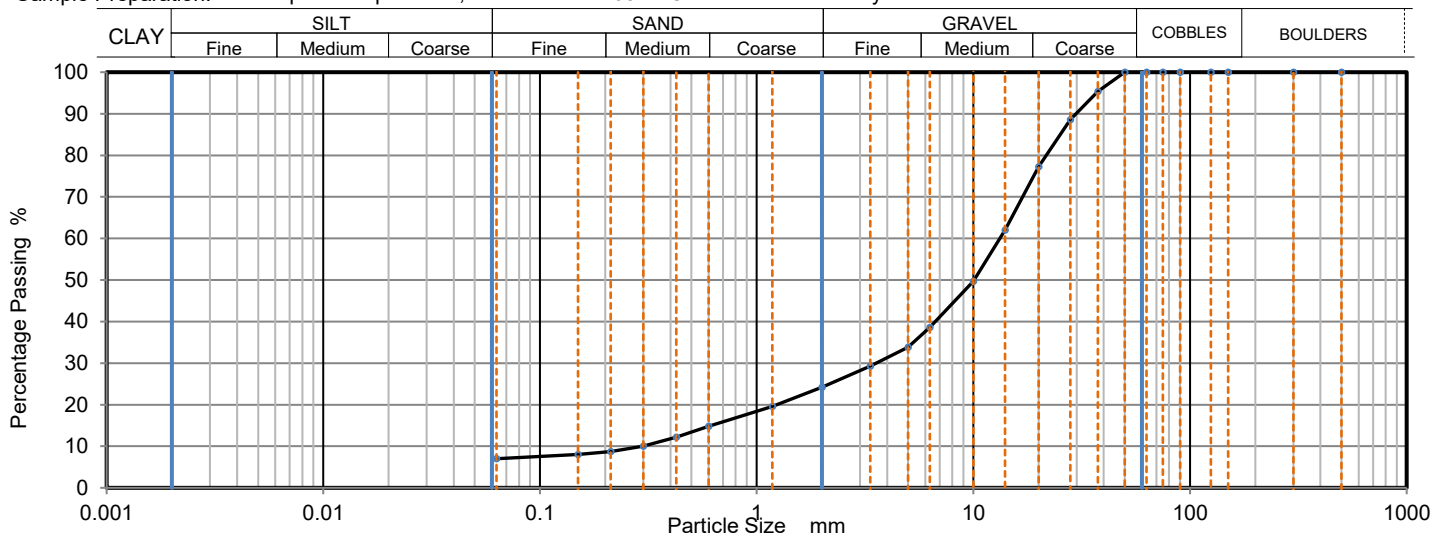
Sample Description: Multicolor slightly clayey sandy GRAVEL

Sample Preparation: Sample was quartered, oven dried at 108.7 °C and broken down by hand.

Depth Top [m]: 1.80

Depth Base [m]: 2.80

Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	95		
28	89		
20	77		
14	62		
10	50		
6.3	39		
5	34		
3.35	29		
2	24		
1.18	20		
0.6	15		
0.425	12		
0.3	10		
0.212	9		
0.15	8		
0.063	7		

Sample Proportions	% dry mass
Very coarse	0
Gravel	76
Sand	17
Fines <0.063mm	7

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

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

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

Remarks: Re-issue 1: Sample Reference amended.

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

Particle Size Distribution

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Tested in Accordance with: BS 1377-2: 1990

Client: Soiltechnics Limited
Client Address: Cedar Barn, White Lodge,
Walgrave, Northampton,
NN6 9PY
Contact: Alexa Band
Site Address: Eaton Court, Reading

Client Reference: STR4832 L1
Job Number: 21-60115
Date Sampled: 08/02/2021
Date Received: 22/02/2021
Date Tested: 09/03/2021
Sampled By: Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 1791004

Hole No.: WS01

Sample Reference: 5

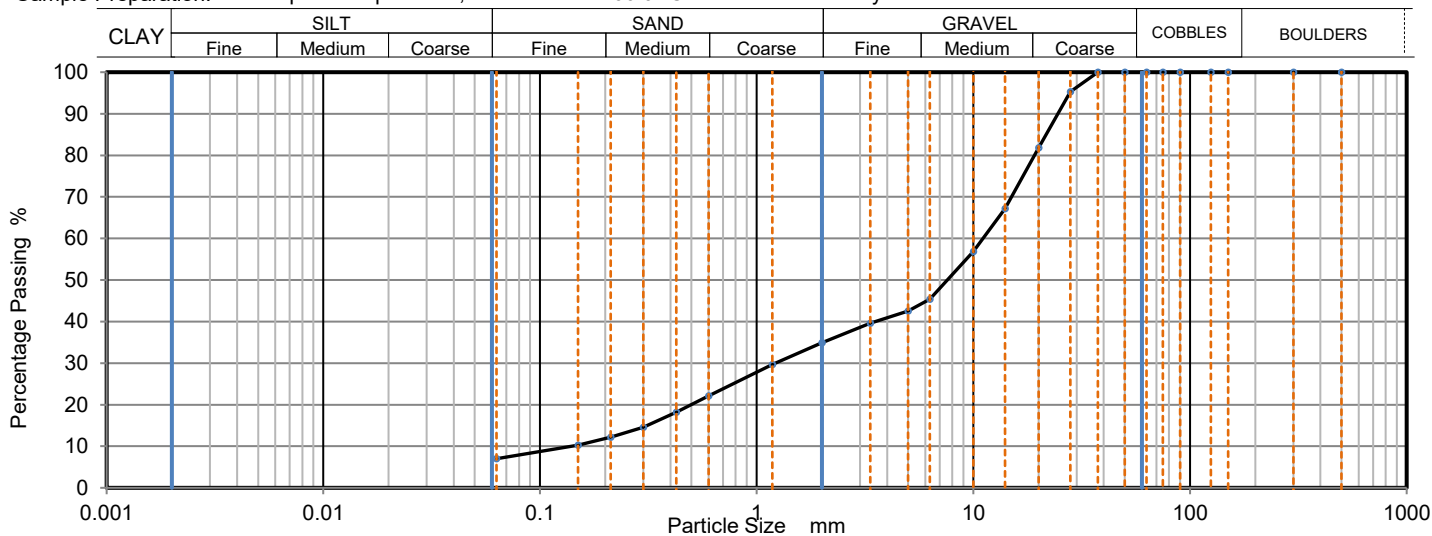
Sample Description: Brown slightly clayey sandy GRAVEL

Sample Preparation: Sample was quartered, oven dried at 106.0 °C and broken down by hand.

Depth Top [m]: 2.00

Depth Base [m]: 3.00

Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	95		
20	82		
14	67		
10	57		
6.3	45		
5	43		
3.35	40		
2	35		
1.18	30		
0.6	22		
0.425	18		
0.3	15		
0.212	12		
0.15	10		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0
Gravel	65
Sand	27
Fines <0.063mm	8

Grading Analysis	
D100	mm 37.5
D60	mm 11.1
D30	mm 1.22
D10	mm 0.134
Uniformity Coefficient	83
Curvature Coefficient	1

Uniformity Coefficient and Coefficient of Curvature calculated in accordance with BS EN ISO 14688-2: 2004 + A1: 2013

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

Remarks: Re-issue 1: Sample Reference amended.

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

Summary of Saturation Moisture Content Test Results

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Tested in Accordance with: BS 1377-2: 1990: Clause 3.3

Client: Soiltechnics Limited
Client Address: Cedar Barn, White Lodge,
Walgrave, Northampton,
NN6 9PY
Contact: Alexa Band
Site Address: Eaton Court, Reading

Client Reference: STR4832 L1
Job Number: 21-60115
Date Sampled: 08/02/2021
Date Received: 03/03/2021
Date Tested: 04/03/2021
Sampled By: Client

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	SMC	Bulk density	Dry density	MC								
		Reference	Depth Top	Depth Base	Type														
			m	m				%	Mg/m3	Mg/m3	%								
1790016	BH1	8	6.00	6.45	B	White CHALK with fragments of flintstone	Supplied lump of chalk fails to comply with volume requirements as per BS1377-2 Clause 3.3.5.1	28	1.96	1.53	28								
1790017	BH1	10	9.00	9.45	B	White CHALK with fragments of flintstone		27	1.98	1.57	26								
1790018	BH1	12	12.00	12.45	B	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377-2 Clause 3.3.5.1	28	2.00	1.53	31								
1790019	BH1	15	16.50	16.95	B	White CHALK with fragments of flintstone	Supplied lump of chalk fails to comply with volume requirements as per BS1377-2 Clause 3.3.5.1	23	1.98	1.65	20								

Note: SMC - Saturation Moisture Content; MC - Moisture Content

Comments: Re-issue 1: Sample Reference amended.

Signed:

Monika Janoszek
PL Deputy Head of Geotechnical Section
for and on behalf of i2 Analytical Ltd

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.



Lauren Wenham
Soiltechnics Ltd
White Lodge
Cedar Barn
Walgrave
NN6 9PY

DETS Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 21-02128

Site Reference: Eaton Court, Reading

Project / Job Ref: STR4832-D1

Order No: POR009623

Sample Receipt Date: 11/02/2021

Sample Scheduled Date: 23/02/2021

Report Issue Number: 1

Reporting Date: 02/03/2021

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Soil Analysis Certificate						
DETS Report No: 21-02128	Date Sampled	08/02/21	08/02/21	09/02/21	09/02/21	08/02/21
Soiltechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Eaton Court, Reading	TP / BH No	BH10.3018	BH10.6019	COMP010.001	COMP020.001	WS010.201
Project / Job Ref: STR4832-D1	Additional Refs	BH1	BH1	COMP01	COMP02	WS01
Order No: POR009623	Depth (m)	0.30	0.60	0.00	0.00	0.20
Reporting Date: 02/03/2021	DETS Sample No	527391	527392	527393	527394	527396

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected			Not Detected
pH	pH Units	N/a	MCERTS	8.7	8.5	8.7	8.5	7.3
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2			< 2
Complex Cyanide	mg/kg	< 2	NONE	< 2	< 2			< 2
Free Cyanide	mg/kg	< 2	NONE	< 2	< 2			< 2
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS			539	880	
Total Sulphate as SO ₄	%	< 0.02	MCERTS			0.05	0.09	
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS			30	37	
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS			0.03	0.04	
Total Sulphur	%	< 0.02	NONE			0.03	0.03	
Organic Matter	%	< 0.1	MCERTS	0.3	0.3			4.2
Total Organic Carbon (TOC)	%	< 0.1	MCERTS					
Loss on Ignition @ 450°C	%	< 0.01	NONE	0.40	0.55			5.20
Ammonium as NH ₄	mg/kg	< 0.5	NONE			3	4	
Ammonium as NH ₄	mg/l	< 0.05	NONE			0.30	0.40	
W/S Chloride (2:1)	mg/kg	< 1	MCERTS			75	19	
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS			37.5	9.4	
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	< 3	MCERTS			13	3	
Water Soluble Nitrate (2:1) as NO ₃	mg/l	< 1.5	MCERTS			6.6	1.6	
Arsenic (As)	mg/kg	< 2	MCERTS	9	11			9
Beryllium (Be)	mg/kg	< 0.5	MCERTS	< 0.5	< 0.5			< 0.5
W/S Boron	mg/kg	< 1	NONE	< 1	< 1			< 1
Cadmium (Cd)	mg/kg	< 0.2	NONE	0.4	0.2			0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	4	8			12
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2			< 2
Copper (Cu)	mg/kg	< 4	MCERTS	6	6			22
Lead (Pb)	mg/kg	< 3	MCERTS	40	14			106
W/S Magnesium	mg/l	< 0.1	NONE			1.2	1.1	
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1			< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	4	7			6
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3			< 3
Vanadium (V)	mg/kg	< 1	MCERTS	7	13			20
Zinc (Zn)	mg/kg	< 3	MCERTS	84	38			91
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2			< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



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Soil Analysis Certificate						
DETS Report No: 21-02128	Date Sampled	08/02/21	08/02/21	08/02/21	08/02/21	08/02/21
Soiltechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Eaton Court, Reading	TP / BH No	WS010.702	WS013.206	WS020.301	WS023.305	WS030.301
Project / Job Ref: STR4832-D1	Additional Refs	WS01	WS01	WS02	WS02	WS03
Order No: POR009623	Depth (m)	0.70	3.20	0.30	3.30	0.30
Reporting Date: 02/03/2021	DETS Sample No	527398	527399	527400	527401	527402

Determinand	Unit	RL	Accreditation	(n)			
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	7.9	8.1	8.9	8.5
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2
Complex Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2
Free Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	< 200	412	473	
Total Sulphate as SO ₄	%	< 0.02	MCERTS	< 0.02	0.04	0.05	
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	< 10	24	< 10	
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	< 0.01	0.02	< 0.01	
Total Sulphur	%	< 0.02	NONE	< 0.02	< 0.02	< 0.02	
Organic Matter	%	< 0.1	MCERTS	0.5	< 0.1		1.1
Total Organic Carbon (TOC)	%	< 0.1	MCERTS				
Loss on Ignition @ 450°C	%	< 0.01	NONE	1.26	0.60		1.40
Ammonium as NH ₄	mg/kg	< 0.5	NONE				
Ammonium as NH ₄	mg/l	< 0.05	NONE				
W/S Chloride (2:1)	mg/kg	< 1	MCERTS				
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS				
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	< 3	MCERTS				
Water Soluble Nitrate (2:1) as NO ₃	mg/l	< 1.5	MCERTS				
Arsenic (As)	mg/kg	< 2	MCERTS	15	14		9
Beryllium (Be)	mg/kg	< 0.5	MCERTS	0.8	< 0.5		< 0.5
W/S Boron	mg/kg	< 1	NONE	< 1	< 1		< 1
Cadmium (Cd)	mg/kg	< 0.2	NONE	< 0.2	0.8		< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	15	7		10
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2		< 2
Copper (Cu)	mg/kg	< 4	MCERTS	8	10		11
Lead (Pb)	mg/kg	< 3	MCERTS	13	55		154
W/S Magnesium	mg/l	< 0.1	NONE				
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1		< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	25	7		9
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3		< 3
Vanadium (V)	mg/kg	< 1	MCERTS	27	11		18
Zinc (Zn)	mg/kg	< 3	MCERTS	32	136		62
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2		< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 21-02128	Date Sampled	08/02/21	09/02/21	09/02/21		
Soiltechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Eaton Court, Reading	TP / BH No	WS030.602	WS043.805	WS051.503		
Project / Job Ref: STR4832-D1	Additional Refs	WS03	WS04	WS05		
Order No: POR009623	Depth (m)	0.60	3.80	1.50		
Reporting Date: 02/03/2021	DETS Sample No	527403	527404	527405		

Determinand	Unit	RL	Accreditation	(n)			
Asbestos Screen ^(S)	N/a	N/a	ISO17025				
pH	pH Units	N/a	MCERTS	8.2	8.4		
Total Cyanide	mg/kg	< 2	NONE				
Complex Cyanide	mg/kg	< 2	NONE				
Free Cyanide	mg/kg	< 2	NONE				
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	518	< 200		
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.05	< 0.02		
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	10	< 10		
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.01	< 0.01		
Total Sulphur	%	< 0.02	NONE	< 0.02	< 0.02		
Organic Matter	%	< 0.1	MCERTS				
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	0.9			
Loss on Ignition @ 450°C	%	< 0.01	NONE				
Ammonium as NH ₄	mg/kg	< 0.5	NONE				
Ammonium as NH ₄	mg/l	< 0.05	NONE				
W/S Chloride (2:1)	mg/kg	< 1	MCERTS				
W/S Chloride (2:1)	mg/l	< 0.5	MCERTS				
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	< 3	MCERTS				
Water Soluble Nitrate (2:1) as NO ₃	mg/l	< 1.5	MCERTS				
Arsenic (As)	mg/kg	< 2	MCERTS				
Beryllium (Be)	mg/kg	< 0.5	MCERTS				
W/S Boron	mg/kg	< 1	NONE				
Cadmium (Cd)	mg/kg	< 0.2	NONE				
Chromium (Cr)	mg/kg	< 2	MCERTS				
Chromium (hexavalent)	mg/kg	< 2	NONE				
Copper (Cu)	mg/kg	< 4	MCERTS				
Lead (Pb)	mg/kg	< 3	MCERTS				
W/S Magnesium	mg/l	< 0.1	NONE				
Mercury (Hg)	mg/kg	< 1	MCERTS				
Nickel (Ni)	mg/kg	< 3	MCERTS				
Selenium (Se)	mg/kg	< 2	MCERTS				
Vanadium (V)	mg/kg	< 1	MCERTS				
Zinc (Zn)	mg/kg	< 3	MCERTS				
Total Phenols (monohydric)	mg/kg	< 2	NONE				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
 Subcontracted analysis (S)



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 21-02128	Date Sampled	08/02/21	08/02/21	08/02/21	08/02/21	08/02/21
Soiltechnics Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Eaton Court, Reading	TP / BH No	BH10.3018	BH10.6019	WS010.201	WS010.702	WS020.301
Project / Job Ref: STR4832-D1	Additional Refs	BH1	BH1	WS01	WS01	WS02
Order No: POR009623	Depth (m)	0.30	0.60	0.20	0.70	0.30
Reporting Date: 02/03/2021	DETS Sample No	527391	527392	527396	527398	527400

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.25	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.71	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.63	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.35	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.48	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.80	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.25	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.80	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.29	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.24	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	4.8	< 1.6	< 1.6



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Soil Analysis Certificate - Speciated PAHs

DETS Report No: 21-02128	Date Sampled	08/02/21	08/02/21			
Soiltechnics Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Eaton Court, Reading	TP / BH No	WS030.301	WS030.602			
Project / Job Ref: STR4832-D1	Additional Refs	WS03	WS03			
Order No: POR009623	Depth (m)	0.30	0.60			
Reporting Date: 02/03/2021	DETS Sample No	527402	527403			

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6			



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Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 21-02128	Date Sampled	08/02/21				
Soiltechnics Ltd	Time Sampled	None Supplied				
Site Reference: Eaton Court, Reading	TP / BH No	WS030.602				
Project / Job Ref: STR4832-D1	Additional Refs	WS03				
Order No: POR009623	Depth (m)	0.60				
Reporting Date: 02/03/2021	DETS Sample No	527403				

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01			
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05			
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	50			
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	50			
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01			
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05			
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2			
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2			
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2			
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3			
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10			
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21			
Total >C5 - C35	mg/kg	< 42	NONE	50			



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 21-02128	Date Sampled	08/02/21				
Soiltechnics Ltd	Time Sampled	None Supplied				
Site Reference: Eaton Court, Reading	TP / BH No	WS030.602				
Project / Job Ref: STR4832-D1	Additional Refs	WS03				
Order No: POR009623	Depth (m)	0.60				
Reporting Date: 02/03/2021	DETS Sample No	527403				

Determinand	Unit	RL	Accreditation				
Benzene	ug/kg	< 2	MCERTS	< 2			
Toluene	ug/kg	< 5	MCERTS	< 5			
Ethylbenzene	ug/kg	< 2	MCERTS	< 2			
p & m-xylene	ug/kg	< 2	MCERTS	< 2			
o-xylene	ug/kg	< 2	MCERTS	< 2			
MTBE	ug/kg	< 5	MCERTS	< 5			



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Leachate Analysis Certificate						
DETS Report No: 21-02128		Date Sampled	08/02/21			
Soiltechnics Ltd		Time Sampled	None Supplied			
Site Reference: Eaton Court, Reading		TP / BH No	WS010.201			
Project / Job Ref: STR4832-D1		Additional Refs	WS01			
Order No: POR009623		Depth (m)	0.20			
Reporting Date: 02/03/2021		DETS Sample No	527397			

Determinand	Unit	RL	Accreditation				
pH	pH Units	N/a	ISO17025	7.2			
Total Cyanide	ug/l	< 5	NONE	< 5			
Complex Cyanide	ug/l	< 5	NONE	< 5			
Free Cyanide	ug/l	< 5	NONE	< 5			
Sulphate as SO ₄	mg/l	< 1	ISO17025	< 1			
Ammoniacal Nitrogen as NH ₄	ug/l	< 50	NONE	111			
Nitrate as NO ₃	mg/l	< 0.5	ISO17025	1.2			
Antimony	ug/l	< 5	ISO17025	< 5			
Arsenic	ug/l	< 5	ISO17025	< 5			
Boron	ug/l	< 5	ISO17025	19			
Cadmium	ug/l	< 0.4	ISO17025	< 0.4			
Chromium	ug/l	< 5	ISO17025	< 5			
Chromium (hexavalent)	ug/l	< 20	NONE	< 20			
Chromium III	ug/l	< 20	NONE	< 20			
Copper	ug/l	< 5	ISO17025	7			
Iron	ug/l	< 5	ISO17025	111			
Lead	ug/l	< 5	ISO17025	< 5			
Mercury	ug/l	< 0.05	ISO17025	< 0.05			
Nickel	ug/l	< 5	ISO17025	< 5			
Selenium	ug/l	< 5	ISO17025	< 5			
Zinc	ug/l	< 2	ISO17025	5			
Total Phenols (monohydric)	ug/l	< 10	NONE	< 10			

Subcontracted analysis ⁽⁵⁾



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Leachate Analysis Certificate - Speciated PAH						
DETS Report No: 21-02128	Date Sampled	08/02/21				
Soiltechnics Ltd	Time Sampled	None Supplied				
Site Reference: Eaton Court, Reading	TP / BH No	WS010.201				
Project / Job Ref: STR4832-D1	Additional Refs	WS01				
Order No: POR009623	Depth (m)	0.20				
Reporting Date: 02/03/2021	DETS Sample No	527397				

Determinand	Unit	RL	Accreditation				
Naphthalene	ug/l	< 0.01	NONE	0.73			
Acenaphthylene	ug/l	< 0.01	NONE	0.08			
Acenaphthene	ug/l	< 0.01	NONE	0.04			
Fluorene	ug/l	< 0.01	NONE	0.08			
Phenanthrene	ug/l	< 0.01	NONE	0.26			
Anthracene	ug/l	< 0.01	NONE	0.04			
Fluoranthene	ug/l	< 0.01	NONE	0.13			
Pyrene	ug/l	< 0.01	NONE	0.12			
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01			
Chrysene	ug/l	< 0.01	NONE	< 0.01			
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01			
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01			
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01			
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01			
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01			
Benzo(ghi)perylene	ug/l	0.008	NONE	< 0.008			
Total EPA-16 PAHs	ug/l	< 0.01	NONE	1.48			

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

DETS Report No: 21-02128			Date Sampled	09/02/21			Landfill Waste Acceptance Criteria Limits			
Soiltechnics Ltd			Time Sampled	None Supplied						
Site Reference: Eaton Court, Reading			TP / BH No	COMP010.001						
Project / Job Ref: STR4832-D1			Additional Refs	COMP01						
Order No: POR009623			Depth (m)	0.00						
Reporting Date: 02/03/2021			DETS Sample No	527393						
Determinand			Unit	MDL						
TOC ^{MU}			%	< 0.1	0.3			3%		
Loss on Ignition			%	< 0.01	0.80			--		
BTEX ^{MU}			mg/kg	< 0.05	< 0.05			6		
Sum of PCBs			mg/kg	< 0.1	< 0.1			1		
Mineral Oil ^{MU}			mg/kg	< 10	< 10			500		
Total PAH ^{MU}			mg/kg	< 1.7	< 1.7			100		
pH ^{MU}			pH Units	N/a	8.7			--		
Acid Neutralisation Capacity			mol/kg (+/-)	< 1	2.9			--		
Eluate Analysis				2:1 mg/l	8:1 mg/l		Cumulative 10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic ^U				< 0.01	< 0.01		< 0.2	0.5	2	25
Barium ^U				0.05	0.09		0.9	20	100	300
Cadmium ^U				< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium ^U				< 0.005	< 0.005		< 0.20	0.5	10	70
Copper ^U				< 0.01	0.02		< 0.5	2	50	100
Mercury ^U				< 0.0005	< 0.0005		< 0.005	0.01	0.2	2
Molybdenum ^U				0.005	0.003		< 0.1	0.5	10	30
Nickel ^U				< 0.007	< 0.007		< 0.2	0.4	10	40
Lead ^U				< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony ^U				< 0.005	< 0.005		< 0.05	0.06	0.7	5
Selenium ^U				< 0.005	< 0.005		< 0.05	0.1	0.5	7
Zinc ^U				0.006	< 0.005		< 0.2	4	50	200
Chloride ^U				30	8		107	800	15000	25000
Fluoride ^U				< 0.5	< 0.5		< 1	10	150	500
Sulphate ^U				18	7		81	1000	20000	50000
TDS				151	96		1021	4000	60000	100000
Phenol Index				< 0.01	< 0.01		< 0.5	1	-	-
DOC				5.5	9.2		88.3	500	800	1000
Leach Test Information										
Sample Mass (kg)				0.18						
Dry Matter (%)				96						
Moisture (%)				4.2						
Stage 1										
Volume Eluate L2 (litres)				0.34						
Filtered Eluate VE1 (litres)				0.19						

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
 Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepancies with current legislation
 M Denotes MCERTS accredited test
 U Denotes ISO17025 accredited test

Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

DETS Report No: 21-02128			Date Sampled	09/02/21			Landfill Waste Acceptance Criteria Limits									
Soiltechnics Ltd			Time Sampled	None Supplied												
Site Reference: Eaton Court, Reading			TP / BH No	COMP020.001												
Project / Job Ref: STR4832-D1			Additional Refs	COMP02												
Order No: POR009623			Depth (m)	0.00												
Reporting Date: 02/03/2021			DETS Sample No	527394												
Determinand			Unit	MDL												
TOC ^{MU}			%	< 0.1	0.5			3%			5%			6%		
Loss on Ignition			%	< 0.01	1.40			--			--			10%		
BTEX ^{MU}			mg/kg	< 0.05	< 0.05			6			--			--		
Sum of PCBs			mg/kg	< 0.1	< 0.1			1			--			--		
Mineral Oil ^{MU}			mg/kg	< 10	< 10			500			--			--		
Total PAH ^{MU}			mg/kg	< 1.7	< 1.7			100			--			--		
pH ^{MU}			pH Units	N/a	8.5			--			>6			--		
Acid Neutralisation Capacity			mol/kg (+/-)	< 1	2.3			--			To be evaluated			To be evaluated		
Eluate Analysis				2:1	8:1		Cumulative	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)								
				mg/l	mg/l		10:1									
							mg/kg									
Arsenic ^U				< 0.01	< 0.01		< 0.2	0.5	2	25						
Barium ^U				< 0.02	< 0.02		0.1	20	100	300						
Cadmium ^U				< 0.0005	< 0.0005		< 0.02	0.04	1	5						
Chromium ^U				0.007	< 0.005		< 0.20	0.5	10	70						
Copper ^U				< 0.01	0.02		< 0.5	2	50	100						
Mercury ^U				< 0.0005	< 0.0005		< 0.005	0.01	0.2	2						
Molybdenum ^U				0.004	0.002		< 0.1	0.5	10	30						
Nickel ^U				< 0.007	< 0.007		< 0.2	0.4	10	40						
Lead ^U				< 0.005	< 0.005		< 0.2	0.5	10	50						
Antimony ^U				< 0.005	< 0.005		< 0.05	0.06	0.7	5						
Selenium ^U				< 0.005	< 0.005		< 0.05	0.1	0.5	7						
Zinc ^U				0.007	< 0.005		< 0.2	4	50	200						
Chloride ^U				5	11		104	800	15000	25000						
Fluoride ^U				< 0.5	< 0.5		< 1	10	150	500						
Sulphate ^U				18	10		111	1000	20000	50000						
TDS				116	114		1142	4000	60000	100000						
Phenol Index				< 0.01	< 0.01		< 0.5	1	-	-						
DOC				7.5	20.9		194	500	800	1000						
Leach Test Information																
Sample Mass (kg)				0.19												
Dry Matter (%)				92.5												
Moisture (%)				8.2												
Stage 1																
Volume Eluate L2 (litres)				0.34												
Filtered Eluate VE1 (litres)				0.20												

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Samples Descriptions page describes if the test is performed on the dried or as-received portion
 Stated limits are for guidance only and DETS Ltd cannot be held responsible for any discrepancies with current legislation
 M Denotes MCERTS accredited test
 U Denotes ISO17025 accredited test



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 21-02128	
Soiltechnics Ltd	
Site Reference: Eaton Court, Reading	
Project / Job Ref: STR4832-D1	
Order No: POR009623	
Reporting Date: 02/03/2021	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
\$ 527391	BH10.3018	BH1	0.30	4.1	Light brown sandy gravel with stones
\$ 527392	BH10.6019	BH1	0.60	3.3	Light brown sandy gravel with stones
\$ 527393	COMP010.001	COMP01	0.00	3.9	Light brown sandy gravel with stones and concrete
\$ 527394	COMP020.001	COMP02	0.00	7.4	Brown sandy gravel with stones and brick
\$ 527396	WS010.201	WS01	0.20	16.5	Brown loamy sand with vegetation
\$ 527398	WS010.702	WS01	0.70	7.9	Light brown sandy clay with stones
\$ 527399	WS013.206	WS01	3.20	4.2	Brown sandy gravel with stones
\$ 527400	WS020.301	WS02	0.30	4.6	Light brown sandy gravel with stones and brick
\$ 527401	WS023.305	WS02	3.30	15.3	White chalk with stones
\$ 527402	WS030.301	WS03	0.30	6.2	Brown sandy gravel with stones and concrete
\$ 527403	WS030.602	WS03	0.60	4.4	Brown sandy gravel with stones and concrete
\$ 527404	WS043.805	WS04	3.80	18.2	White chalk
\$ 527405	WS051.503	WS05	1.50	5.1	Light brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/5}

Unsuitable Sample ^{4/5}

\$ samples exceeded recommended holding times



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 21-02128

Soiltechnics Ltd

Site Reference: Eaton Court, Reading

Project / Job Ref: STR4832-D1

Order No: POR009623

Reporting Date: 02/03/2021

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphénylcarbazine followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



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Water Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 21-02128

Soiltechnics Ltd

Site Reference: Eaton Court, Reading

Project / Job Ref: STR4832-D1

Order No: POR009623

Reporting Date: 02/03/2021

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR detection	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

Parameter	Matrix Type	Suite Reference	Expanded Uncertainty Measurement	Unit
TOC	Soil	BS EN 12457	13.49	%
Loss on Ignition	Soil	BS EN 12457	17	%
BTEX	Soil	BS EN 12457	14	%
Sum of PCBs	Soil	BS EN 12457	23	%
Mineral Oil	Soil	BS EN 12457	9	%
Total PAH	Soil	BS EN 12457	20	%
pH	Soil	BS EN 12457	0.399	Units
Acid Neutralisation Capacity	Soil	BS EN 12457	18	%
Arsenic	Leachate	BS EN 12457	16.63	%
Barium	Leachate	BS EN 12457	14.29	%
Cadmium	Leachate	BS EN 12457	14.44	%
Chromium	Leachate	BS EN 12457	18.06	%
Copper	Leachate	BS EN 12457	21.27	%
Mercury	Leachate	BS EN 12457	24.13	%
Molybdenum	Leachate	BS EN 12457	12.55	%
Nickel	Leachate	BS EN 12457	20.08	%
Lead	Leachate	BS EN 12457	13.43	%
Antimony	Leachate	BS EN 12457	18.85	%
Selenium	Leachate	BS EN 12457	18.91	%
Zinc	Leachate	BS EN 12457	13.71	%
Chloride	Leachate	BS EN 12457	16	%
Fluoride	Leachate	BS EN 12457	19.4	%
Sulphate	Leachate	BS EN 12457	19.63	%
TDS	Leachate	BS EN 12457	12	%
Phenol Index	Leachate	BS EN 12457	14	%
DOC	Leachate	BS EN 12457	10	%
Clay Content	Soil	BS 3882: 2015	15	%
Silt Content	Soil	BS 3882: 2015	14	%
Sand Content	Soil	BS 3882: 2015	13	%
Loss on Ignition	Soil	BS 3882: 2015	17	%
pH	Soil	BS 3882: 2015	0.399	Units
Carbonate	Soil	BS 3882: 2015	16	%
Total Nitrogen	Soil	BS 3882: 2015	12	%
Phosphorus (Extractable)	Soil	BS 3882: 2015	24	%
Potassium (Extractable)	Soil	BS 3882: 2015	20	%
Magnesium (Extractable)	Soil	BS 3882: 2015	26	%
Zinc	Soil	BS 3882: 2015	14.9	%
Copper	Soil	BS 3882: 2015	16	%
Nickel	Soil	BS 3882: 2015	17.7	%
Available Sodium	Soil	BS 3882: 2015	23	%
Available Calcium	Soil	BS 3882: 2015	23	%
Electrical Conductivity	Soil	BS 3882: 2015	10	%



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DETS Report No: 21-10238

Site Reference: Eaton Court, Reading

Project / Job Ref: STR4832

Order No: POR010752

Sample Receipt Date: 19/08/2021

Sample Scheduled Date: 19/08/2021

Report Issue Number: 1

Reporting Date: 31/08/2021

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



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Soil Analysis Certificate						
DETS Report No: 21-10238	Date Sampled	11/08/21	11/08/21			
Soiltechnics Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Eaton Court, Reading	TP / BH No	BH020.201	BH020.201			
Project / Job Ref: STR4832	Additional Refs	BH2	BH2			
Order No: POR010752	Depth (m)	0.20 - 0.40	0.20 - 0.40			
Reporting Date: 31/08/2021	DETS Sample No	560393	560394			

Determinand	Unit	RL	Accreditation	(n)				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected				
pH	pH Units	N/a	ISO17025	7.9				
Total Cyanide	mg/kg	< 2	NONE	< 2				
Complex Cyanide	mg/kg	< 2	NONE	< 2				
Free Cyanide	mg/kg	< 2	NONE	< 2				
Organic Matter (SOM)	%	< 0.1	NONE	0.8				
Loss on Ignition @ 450°C	%	< 0.01	ISO17025	1				
Arsenic (As)	mg/kg	< 2	ISO17025	11				
Beryllium (Be)	mg/kg	< 0.5	ISO17025	< 0.5				
W/S Boron	mg/kg	< 1	NONE	< 1				
Cadmium (Cd)	mg/kg	< 0.2	ISO17025	0.8				
Chromium (Cr)	mg/kg	< 2	ISO17025	6				
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2				
Copper (Cu)	mg/kg	< 4	ISO17025	8				
Lead (Pb)	mg/kg	< 3	ISO17025	64				
Mercury (Hg)	mg/kg	< 1	ISO17025	< 1				
Nickel (Ni)	mg/kg	< 3	ISO17025	7				
Selenium (Se)	mg/kg	< 2	ISO17025	< 3				
Vanadium (V)	mg/kg	< 1	ISO17025	11				
Zinc (Zn)	mg/kg	< 3	ISO17025	102				
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 21-10238	Date Sampled	11/08/21				
Soiltechnics Ltd	Time Sampled	None Supplied				
Site Reference: Eaton Court, Reading	TP / BH No	BH020.201				
Project / Job Ref: STR4832	Additional Refs	BH2				
Order No: POR010752	Depth (m)	0.20 - 0.40				
Reporting Date: 31/08/2021	DETS Sample No	560393				

Determinand	Unit	RL	Accreditation	(n)				
Naphthalene	mg/kg	< 0.1	ISO17025	< 0.1				
Acenaphthylene	mg/kg	< 0.1	ISO17025	< 0.1				
Acenaphthene	mg/kg	< 0.1	ISO17025	< 0.1				
Fluorene	mg/kg	< 0.1	ISO17025	< 0.1				
Phenanthrene	mg/kg	< 0.1	ISO17025	< 0.1				
Anthracene	mg/kg	< 0.1	ISO17025	< 0.1				
Fluoranthene	mg/kg	< 0.1	ISO17025	< 0.1				
Pyrene	mg/kg	< 0.1	ISO17025	< 0.1				
Benzo(a)anthracene	mg/kg	< 0.1	ISO17025	< 0.1				
Chrysene	mg/kg	< 0.1	ISO17025	< 0.1				
Benzo(b)fluoranthene	mg/kg	< 0.1	ISO17025	< 0.1				
Benzo(k)fluoranthene	mg/kg	< 0.1	ISO17025	< 0.1				
Benzo(a)pyrene	mg/kg	< 0.1	ISO17025	< 0.1				
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	ISO17025	< 0.1				
Dibenz(a,h)anthracene	mg/kg	< 0.1	ISO17025	< 0.1				
Benzo(ghi)perylene	mg/kg	< 0.1	ISO17025	< 0.1				
Total EPA-16 PAHs	mg/kg	< 1.6	ISO17025	< 1.6				

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Leachate Analysis Certificate						
DETS Report No: 21-10238	Date Sampled	11/08/21				
Soiltechnics Ltd	Time Sampled	None Supplied				
Site Reference: Eaton Court, Reading	TP / BH No	BH020.201				
Project / Job Ref: STR4832	Additional Refs	BH2				
Order No: POR010752	Depth (m)	0.20 - 0.40				
Reporting Date: 31/08/2021	DETS Sample No	560394				

Determinand	Unit	RL	Accreditation				
pH	pH Units	N/a	ISO17025	8.5			
Total Cyanide	ug/l	< 5	NONE	< 5			
Complex Cyanide	ug/l	< 5	NONE	< 5			
Free Cyanide	ug/l	< 5	NONE	< 5			
Sulphate as SO ₄	mg/l	< 1	ISO17025	2			
Ammoniacal Nitrogen as NH ₄	ug/l	< 50	ISO17025	1010			
Nitrate as NO ₃	mg/l	< 0.5	ISO17025	< 0.5			
Antimony	ug/l	< 5	ISO17025	< 5			
Arsenic	ug/l	< 5	ISO17025	< 5			
Boron	ug/l	< 5	ISO17025	< 5			
Cadmium	ug/l	< 0.4	ISO17025	< 0.4			
Chromium	ug/l	< 5	ISO17025	< 5			
Chromium (hexavalent)	ug/l	< 20	NONE	< 20			
Chromium III	ug/l	< 20	NONE	< 20			
Copper	ug/l	< 5	ISO17025	< 5			
Iron	ug/l	< 5	ISO17025	< 5			
Lead	ug/l	< 5	ISO17025	< 5			
Mercury	ug/l	< 0.05	ISO17025	< 0.05			
Nickel	ug/l	< 5	ISO17025	< 5			
Selenium	ug/l	< 5	ISO17025	< 5			
Zinc	ug/l	< 2	ISO17025	5			
Total Phenols (monohydric)	ug/l	< 10	NONE	< 10			

Subcontracted analysis ⁽⁵⁾



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Leachate Analysis Certificate - Speciated PAH						
DETS Report No: 21-10238	Date Sampled	11/08/21				
Soiltechnics Ltd	Time Sampled	None Supplied				
Site Reference: Eaton Court, Reading	TP / BH No	BH020.201				
Project / Job Ref: STR4832	Additional Refs	BH2				
Order No: POR010752	Depth (m)	0.20 - 0.40				
Reporting Date: 31/08/2021	DETS Sample No	560394				

Determinand	Unit	RL	Accreditation				
Naphthalene	ug/l	< 0.01	NONE	0.18			
Acenaphthylene	ug/l	< 0.01	NONE	0.01			
Acenaphthene	ug/l	< 0.01	NONE	0.05			
Fluorene	ug/l	< 0.01	NONE	0.05			
Phenanthrene	ug/l	< 0.01	NONE	0.17			
Anthracene	ug/l	< 0.01	NONE	< 0.01			
Fluoranthene	ug/l	< 0.01	NONE	0.10			
Pyrene	ug/l	< 0.01	NONE	0.07			
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01			
Chrysene	ug/l	< 0.01	NONE	< 0.01			
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01			
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01			
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01			
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01			
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01			
Benzo(ghi)perylene	ug/l	0.008	NONE	< 0.008			
Total EPA-16 PAHs	ug/l	< 0.16	NONE	0.63			



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 21-10238	
Soiltechnics Ltd	
Site Reference: Eaton Court, Reading	
Project / Job Ref: STR4832	
Order No: POR010752	
Reporting Date: 31/08/2021	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
560393	BH020.201	BH2	0.20 - 0.40	3.7	Light brown sandy gravel with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/S}

Unsuitable Sample ^{U/S}



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 21-10238

Soiltechnics Ltd

Site Reference: Eaton Court, Reading

Project / Job Ref: STR4832

Order No: POR010752

Reporting Date: 31/08/2021

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



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Water Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 21-10238

Soiltechnics Ltd

Site Reference: Eaton Court, Reading

Project / Job Ref: STR4832

Order No: POR010752

Reporting Date: 31/08/2021

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR detection	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

Human health (soils)

Scenario	
End user	Current site user
Receptor	Industrial/Commercial
SOM	1.00%
Mercury GAC based upon	Elemental mercury

Contaminant	Guideline source	Guideline value (mg/kg)	Max value (mg/kg)	Location	BH1	BH1	BH2	COMP01	COMP02	WS01	WS01	WS01	WS02	WS02
				Depth (m)	0.30	0.60	0.20 - 0.40	0.00	0.00	0.20	0.70	3.20	0.30	3.30
				Date	08/02/21	08/02/21	11/08/21	09/02/21	09/02/21	08/02/21	08/02/21	08/02/21	08/02/21	08/02/21
Inorganics - Metals														
Arsenic	C4SL	640	15		9	11	11			9	15		14	
Beryllium	S4UL	12	0.8		<0.5	<0.5	<0.5			<0.5	0.8		<0.5	
Boron	S4UL	240,000	<LoD		<1	<1	<1			<1	<1		<1	
Cadmium	C4SL	410	0.8		0.4	0.2	0.8			0.2	<0.2		0.8	
Chromium (III)	S4UL	8,600	15		4	8	6			12	15		7	
Chromium (VI)	C4SL	49	<LoD		<2	<2	<2			<2	<2		<2	
Copper	S4UL	68,000	22		6	6	8			22	8		10	
Cyanide - Free	ATK	34	<LoD		<2	<2	<2			<2	<2		<2	
Lead	C4SL	6,000	154		40	14	64			106	13		55	
Mercury	S4UL	58	<LoD		<1	<1	<1			<1	<1		<1	
Nickel	S4UL	980	25		4	7	7			6	25		7	
Selenium	S4UL	12,000	<LoD		<3	<3	<3			<3	<3		<3	
Vanadium	S4UL	9,000	27		7	13	11			20	27		11	
Zinc	S4UL	730,000	136		84	38	102			91	32		136	
Inorganics - Miscellaneous														
Asbestos Screen		N/A			Not Detected	Not Detected	Not Detected			Not Detected	Not Detected		Not Detected	
pH		N/A	8.9		8.7	8.5	7.9	8.7	8.5	7.3	7.9	8.1	8.9	8.5
Organic matter		N/A			0.3	0.3	0.8			4.2	0.5		<0.1	
Organics - PAH & Phenol														
Acenaphthene	S4UL	84,000	<LoD		<0.1	<0.1	<0.1			<0.1	<0.1		<0.1	
Acenaphthylene	S4UL	83,000	<LoD		<0.1	<0.1	<0.1			<0.1	<0.1		<0.1	
Anthracene	S4UL	500,000	<LoD		<0.1	<0.1	<0.1			<0.1	<0.1		<0.1	
Benzo(a)anthracene	S4UL	170	0.35		<0.1	<0.1	<0.1			0.35	<0.1		<0.1	
Benzo(a)pyrene	C4SL	77	0.8		<0.1	<0.1	<0.1			0.8	<0.1		<0.1	
Benzo(b)fluoranthene	S4UL	44	0.8		<0.1	<0.1	<0.1			0.8	<0.1		<0.1	
Benzo(ghi)perylene	S4UL	3,900	0.24		<0.1	<0.1	<0.1			0.24	<0.1		<0.1	
Benzo(k)fluoranthene	S4UL	1,200	0.25		<0.1	<0.1	<0.1			0.25	<0.1		<0.1	
Chrysene	S4UL	350	0.48	<0.1	<0.1	<0.1			0.48	<0.1		<0.1		
Dibenz(a,h)anthracene	S4UL	3.5	<LoD	<0.1	<0.1	<0.1			<0.1	<0.1		<0.1		
Fluoranthene	S4UL	23,000	0.71	<0.1	<0.1	<0.1			0.71	<0.1		<0.1		
Fluorene	S4UL	63,000	<LoD	<0.1	<0.1	<0.1			<0.1	<0.1		<0.1		
Indeno(1,2,3-cd)pyrene	S4UL	500	0.29	<0.1	<0.1	<0.1			0.29	<0.1		<0.1		
Naphthalene	S4UL	190	<LoD	<0.1	<0.1	<0.1			<0.1	<0.1		<0.1		
Phenanthrene	S4UL	22,000	0.25	<0.1	<0.1	<0.1			0.25	<0.1		<0.1		
Phenol	S4UL	760	<LoD	<2	<2	<2			<2	<2		<2		
Pyrene	S4UL	54,000	0.63	<0.1	<0.1	<0.1			0.63	<0.1		<0.1		
TPH CWG and BTEX														
Benzene	C4SL	98	<LoD											
Toluene	S4UL	56,000	<LoD											
Ethylbenzene	S4UL	5,700	<LoD											
o-Xylene	S4UL	6,600	<LoD											
m & p-xylene	S4UL	5,900	<LoD											
Xylenes (sum of)	S4UL	5,900	<LoD											
EC05-EC06 Aliphatic	S4UL	3,200	<LoD											
EC>06-EC08 Aliphatic	S4UL	7,800	<LoD											
EC>08-EC10 Aliphatic	S4UL	2,000	<LoD											
EC>10-EC12 Aliphatic	S4UL	9,700	<LoD											
EC>12-EC16 Aliphatic	S4UL	59,000	<LoD											
EC>16-EC21 Aliphatic	S4UL	1,600,000	<LoD											
EC>21-EC35 Aliphatic	S4UL	1,600,000	50											
EC5–EC7 (benzene)	S4UL	26,000	<LoD											
EC7–EC8 (toluene)	S4UL	56,000	<LoD											
EC>08-EC10 Aromatic	S4UL	3,500	<LoD											
EC>10-EC12 Aromatic	S4UL	16,000	<LoD											
EC>12-EC16 Aromatic	S4UL	36,000	<LoD											
EC>16-EC21 Aromatic	S4UL	28,000	<LoD											
EC>21-EC35 Aromatic	S4UL	28,000	<LoD											
VOC														
MTBE	CL:AIRE	7,900	< LoD											

Human health (soils)

Scenario	
End user	Current site user
Receptor	Industrial/Commercial
SOM	1.00%
Mercury GAC based upon	Elemental mercury

Contaminant	Guideline source	Guideline value (mg/kg)	Max value (mg/kg)	Location	WS03	WS03	WS04	WS05
				Depth (m)	0.30	0.60	3.80	1.50
				Date	08/02/21	08/02/21	09/02/21	09/02/21
Inorganics - Metals								
Arsenic	C4SL	640	15		9			
Beryllium	S4UL	12	0.8		< 0.5			
Boron	S4UL	240,000	<LoD		< 1			
Cadmium	C4SL	410	0.8		< 0.2			
Chromium (III)	S4UL	8,600	15		10			
Chromium (VI)	C4SL	49	<LoD		< 2			
Copper	S4UL	68,000	22		11			
Cyanide - Free	ATK	34	<LoD		< 2			
Lead	C4SL	6,000	154		154			
Mercury	S4UL	58	<LoD		< 1			
Nickel	S4UL	980	25		9			
Selenium	S4UL	12,000	<LoD		< 3			
Vanadium	S4UL	9,000	27		18			
Zinc	S4UL	730,000	136		62			
Inorganics - Miscellaneous								
Asbestos Screen		N/A			Not Detected			
pH		N/A	8.9		8.5		8.2	8.4
Organic matter		N/A			1.1			
Organics - PAH & Phenol								
Acenaphthene	S4UL	84,000	<LoD		< 0.1	< 0.1		
Acenaphthylene	S4UL	83,000	<LoD		< 0.1	< 0.1		
Anthracene	S4UL	500,000	<LoD		< 0.1	< 0.1		
Benzo(a)anthracene	S4UL	170	0.35		< 0.1	< 0.1		
Benzo(a)pyrene	C4SL	77	0.8		< 0.1	< 0.1		
Benzo(b)fluoranthene	S4UL	44	0.8		< 0.1	< 0.1		
Benzo(ghi)perylene	S4UL	3,900	0.24		< 0.1	< 0.1		
Benzo(k)fluoranthene	S4UL	1,200	0.25		< 0.1	< 0.1		
Chrysene	S4UL	350	0.48		< 0.1	< 0.1		
Dibenz(a,h)anthracene	S4UL	3.5	<LoD		< 0.1	< 0.1		
Fluoranthene	S4UL	23,000	0.71		< 0.1	< 0.1		
Fluorene	S4UL	63,000	<LoD		< 0.1	< 0.1		
Indeno(1,2,3-cd)pyrene	S4UL	500	0.29		< 0.1	< 0.1		
Naphthalene	S4UL	190	<LoD		< 0.1	< 0.1		
Phenanthrene	S4UL	22,000	0.25		< 0.1	< 0.1		
Phenol	S4UL	760	<LoD		< 2			
Pyrene	S4UL	54,000	0.63		< 0.1	< 0.1		
TPH CWG and BTEX								
Benzene	C4SL	98	<LoD			< 0.002		
Toluene	S4UL	56,000	<LoD			< 0.005		
Ethylbenzene	S4UL	5,700	<LoD			< 0.002		
o-Xylene	S4UL	6,600	<LoD			< 0.002		
m & p-xylene	S4UL	5,900	<LoD			< 0.002		
Xylenes (sum of)	S4UL	5,900	<LoD			< LoD		
EC05-EC06 Aliphatic	S4UL	3,200	<LoD			< 0.01		
EC>06-EC08 Aliphatic	S4UL	7,800	<LoD			< 0.05		
EC>08-EC10 Aliphatic	S4UL	2,000	<LoD			< 2		
EC>10-EC12 Aliphatic	S4UL	9,700	<LoD			< 2		
EC>12-EC16 Aliphatic	S4UL	59,000	<LoD			< 3		
EC>16-EC21 Aliphatic	S4UL	1,600,000	<LoD			< 3		
EC>21-EC35 Aliphatic	S4UL	1,600,000	50			50		
EC5–EC7 (benzene)	S4UL	26,000	<LoD			< 0.01		
EC7–EC8 (toluene)	S4UL	56,000	<LoD			< 0.05		
EC>08-EC10 Aromatic	S4UL	3,500	<LoD			< 2		
EC>10-EC12 Aromatic	S4UL	16,000	<LoD			< 2		
EC>12-EC16 Aromatic	S4UL	36,000	<LoD			< 2		
EC>16-EC21 Aromatic	S4UL	28,000	<LoD			< 3		
EC>21-EC35 Aromatic	S4UL	28,000	<LoD			< 10		
VOC								
MTBE	CL:AIRE	7,900	< LoD			< 0.005		

Human health (soils)

Scenario	
End user	Current site user
Receptor	Industrial/Commercial
SOM	1.00%
Mercury GAC based upon	Elemental mercury

Contaminant	Guideline source	Guideline value	Max value	Location	BH1	BH1	BH2	COMP01	COMP02	WS01	WS01	WS01	WS02	WS02
				Depth (m)	0.30	0.60	0.20 - 0.40	0.00	0.00	0.20	0.70	3.20	0.30	3.30

Human health (soils)

Scenario	
End user	Current site user
Receptor	Industrial/Commercial
SOM	1.00%
Mercury GAC based upon	Elemental mercury

Contaminant	Guideline source	Guideline value	Max value	Location	WS03	WS03	WS04	WS05
				Depth (m)	0.30	0.60	3.80	1.50

Human health (soils)

Scenario	
End user	Current site user
Receptor	Industrial/Commercial
SOM	1.00%
Mercury GAC based upon	Elemental mercury

Contaminant	Guideline source	Guideline value	Max value	Location	BH1	BH1	BH2	COMP01	COMP02	WS01	WS01	WS01	WS02	WS02
				Depth (m)	0.30	0.60	0.20 - 0.40	0.00	0.00	0.20	0.70	3.20	0.30	3.30

Human health (soils)

Scenario	
End user	Current site user
Receptor	Industrial/Commercial
SOM	1.00%
Mercury GAC based upon	Elemental mercury

Contaminant	Guideline source	Guideline value	Max value	Location	WS03	WS03	WS04	WS05
				Depth (m)	0.30	0.60	3.80	1.50

Human health (soils)

Scenario	
End user	Proposed site user
Receptor	Residential without homegrown produce
SOM	6.00%
Mercury GAC based upon	Elemental mercury

Contaminant	Guideline source	Guideline value (mg/kg)	Max value (mg/kg)	Location	BH1	BH1	BH2	COMP01	COMP02	WS01	WS01	WS01	WS02	WS02
				Depth (m)	0.30	0.60	0.20 - 0.40	0.00	0.00	0.20	0.70	3.20	0.30	3.30
				Date	08/02/21	08/02/21	11/08/21	09/02/21	09/02/21	08/02/21	08/02/21	08/02/21	08/02/21	08/02/21
Inorganics - Metals														
Arsenic	C4SL	40	15		9	11	11			9	15		14	
Beryllium	S4UL	2	0.8		<0.5	<0.5	<0.5			<0.5	0.8		<0.5	
Boron	S4UL	11,000	<LoD		<1	<1	<1			<1	<1		<1	
Cadmium	C4SL	150	0.8		0.4	0.2	0.8			0.2	<0.2		0.8	
Chromium (III)	S4UL	910	15		4	8	6			12	15		7	
Chromium (VI)	C4SL	21	<LoD		<2	<2	<2			<2	<2		<2	
Copper	S4UL	7,100	22		6	6	8			22	8		10	
Cyanide - Free	ATK	34	<LoD		<2	<2	<2			<2	<2		<2	
Lead	C4SL	330	154		40	14	64			106	13		55	
Mercury	S4UL	1	<LoD		<1	<1	<1			<1	<1		<1	
Nickel	S4UL	180	25		4	7	7			6	25		7	
Selenium	S4UL	430	<LoD		<3	<3	<3			<3	<3		<3	
Vanadium	S4UL	1,200	27		7	13	11			20	27		11	
Zinc	S4UL	40,000	136		84	38	102			91	32		136	
Inorganics - Miscellaneous														
Asbestos Screen		N/A			Not Detected	Not Detected	Not Detected			Not Detected	Not Detected		Not Detected	
pH		N/A	8.9		8.7	8.5	7.9	8.7	8.5	7.3	7.9	8.1	8.9	8.5
Organic matter		N/A			0.3	0.3	0.8			4.2	0.5		<0.1	
Organics - PAH & Phenol														
Acenaphthene	S4UL	6,000	<LoD		<0.1	<0.1	<0.1			<0.1	<0.1		<0.1	
Acenaphthylene	S4UL	6,000	<LoD		<0.1	<0.1	<0.1			<0.1	<0.1		<0.1	
Anthracene	S4UL	37,000	<LoD		<0.1	<0.1	<0.1			<0.1	<0.1		<0.1	
Benzo(a)anthracene	S4UL	15	0.35		<0.1	<0.1	<0.1			0.35	<0.1		<0.1	
Benzo(a)pyrene	C4SL	5	0.8		<0.1	<0.1	<0.1			0.8	<0.1		<0.1	
Benzo(b)fluoranthene	S4UL	4	0.8		<0.1	<0.1	<0.1			0.8	<0.1		<0.1	
Benzo(ghi)perylene	S4UL	360	0.24		<0.1	<0.1	<0.1			0.24	<0.1		<0.1	
Benzo(k)fluoranthene	S4UL	110	0.25		<0.1	<0.1	<0.1			0.25	<0.1		<0.1	
Chrysene	S4UL	32	0.48		<0.1	<0.1	<0.1			0.48	<0.1		<0.1	
Dibenz(a,h)anthracene	S4UL	0.32	<LoD		<0.1	<0.1	<0.1			<0.1	<0.1		<0.1	
Fluoranthene	S4UL	1,600	0.71		<0.1	<0.1	<0.1			0.71	<0.1		<0.1	
Fluorene	S4UL	4,500	<LoD		<0.1	<0.1	<0.1			<0.1	<0.1		<0.1	
Indeno(1,2,3-cd)pyrene	S4UL	46	0.29		<0.1	<0.1	<0.1			0.29	<0.1		<0.1	
Naphthalene	S4UL	13	<LoD		<0.1	<0.1	<0.1			<0.1	<0.1		<0.1	
Phenanthrene	S4UL	1,500	0.25		<0.1	<0.1	<0.1			0.25	<0.1		<0.1	
Phenol	S4UL	2,300	<LoD		<2	<2	<2			<2	<2		<2	
Pyrene	S4UL	3,800	0.63		<0.1	<0.1	<0.1			0.63	<0.1		<0.1	
TPH CWG and BTEX														
Benzene	C4SL	3	<LoD											
Toluene	S4UL	3,900	<LoD											
Ethylbenzene	S4UL	440	<LoD											
o-Xylene	S4UL	480	<LoD											
m & p-xylene	S4UL	430	<LoD											
Xylenes (sum of)	S4UL	430	<LoD											
EC05-EC06 Aliphatic	S4UL	160	<LoD											
EC>06-EC08 Aliphatic	S4UL	530	<LoD											
EC>08-EC10 Aliphatic	S4UL	150	<LoD											
EC>10-EC12 Aliphatic	S4UL	770	<LoD											
EC>12-EC16 Aliphatic	S4UL	4,400	<LoD											
EC>16-EC21 Aliphatic	S4UL	110,000	<LoD											
EC>21-EC35 Aliphatic	S4UL	110,000	50											
EC5-EC7 (benzene)	S4UL	1,400	<LoD											
EC7-EC8 (toluene)	S4UL	3,900	<LoD											
EC>08-EC10 Aromatic	S4UL	270	<LoD											
EC>10-EC12 Aromatic	S4UL	1,200	<LoD											
EC>12-EC16 Aromatic	S4UL	2,500	<LoD											
EC>16-EC21 Aromatic	S4UL	1,900	<LoD											
EC>21-EC35 Aromatic	S4UL	1,900	<LoD											
VOC														
MTBE	CL-AIRE	220	< LoD											

Human health (soils)

Scenario			
End user	Proposed site user		
Receptor	Residential without homegrown produce		
SOM	6.00%		
Mercury GAC based upon	Elemental mercury		

Contaminant	Guideline source	Guideline value (mg/kg)	Max value (mg/kg)	Location	WS03	WS03	WS04	WS05
				Depth (m)	0.30	0.60	3.80	1.50
				Date	08/02/21	08/02/21	09/02/21	09/02/21
Inorganics - Metals								
Arsenic	C4SL	40	15		9			
Beryllium	S4UL	2	0.8		< 0.5			
Boron	S4UL	11,000	<LoD		< 1			
Cadmium	C4SL	150	0.8		< 0.2			
Chromium (III)	S4UL	910	15		10			
Chromium (VI)	C4SL	21	<LoD		< 2			
Copper	S4UL	7,100	22		11			
Cyanide - Free	ATK	34	<LoD		< 2			
Lead	C4SL	330	154		154			
Mercury	S4UL	1	<LoD		< 1			
Nickel	S4UL	180	25		9			
Selenium	S4UL	430	<LoD		< 3			
Vanadium	S4UL	1,200	27		18			
Zinc	S4UL	40,000	136		62			
Inorganics - Miscellaneous								
Asbestos Screen		N/A			Not Detected			
pH		N/A	8.9		8.5		8.2	8.4
Organic matter		N/A			1.1			
Organics - PAH & Phenol								
Acenaphthene	S4UL	6,000	<LoD		< 0.1	< 0.1		
Acenaphthylene	S4UL	6,000	<LoD		< 0.1	< 0.1		
Anthracene	S4UL	37,000	<LoD		< 0.1	< 0.1		
Benzo(a)anthracene	S4UL	15	0.35		< 0.1	< 0.1		
Benzo(a)pyrene	C4SL	5	0.8		< 0.1	< 0.1		
Benzo(b)fluoranthene	S4UL	4	0.8	< 0.1	< 0.1			
Benzo(ghi)perylene	S4UL	360	0.24	< 0.1	< 0.1			
Benzo(k)fluoranthene	S4UL	110	0.25	< 0.1	< 0.1			
Chrysene	S4UL	32	0.48	< 0.1	< 0.1			
Dibenz(a,h)anthracene	S4UL	0.32	<LoD	< 0.1	< 0.1			
Fluoranthene	S4UL	1,600	0.71	< 0.1	< 0.1			
Fluorene	S4UL	4,500	<LoD	< 0.1	< 0.1			
Indeno(1,2,3-cd)pyrene	S4UL	46	0.29	< 0.1	< 0.1			
Naphthalene	S4UL	13	<LoD	< 0.1	< 0.1			
Phenanthrene	S4UL	1,500	0.25	< 0.1	< 0.1			
Phenol	S4UL	2,300	<LoD	< 2				
Pyrene	S4UL	3,800	0.63	< 0.1	< 0.1			
TPH CWG and BTEX								
Benzene	C4SL	3	<LoD		< 0.002			
Toluene	S4UL	3,900	<LoD		< 0.005			
Ethylbenzene	S4UL	440	<LoD		< 0.002			
o-Xylene	S4UL	480	<LoD		< 0.002			
m & p-xylene	S4UL	430	<LoD		< 0.002			
Xylenes (sum of)	S4UL	430	<LoD		< LoD			
EC05-EC06 Aliphatic	S4UL	160	<LoD		< 0.01			
EC>06-EC08 Aliphatic	S4UL	530	<LoD		< 0.05			
EC>08-EC10 Aliphatic	S4UL	150	<LoD		< 2			
EC>10-EC12 Aliphatic	S4UL	770	<LoD		< 2			
EC>12-EC16 Aliphatic	S4UL	4,400	<LoD		< 3			
EC>16-EC21 Aliphatic	S4UL	110,000	<LoD		< 3			
EC>21-EC35 Aliphatic	S4UL	110,000	50		50			
EC5-EC7 (benzene)	S4UL	1,400	<LoD		< 0.01			
EC7-EC8 (toluene)	S4UL	3,900	<LoD		< 0.05			
EC>08-EC10 Aromatic	S4UL	270	<LoD		< 2			
EC>10-EC12 Aromatic	S4UL	1,200	<LoD		< 2			
EC>12-EC16 Aromatic	S4UL	2,500	<LoD		< 2			
EC>16-EC21 Aromatic	S4UL	1,900	<LoD		< 3			
EC>21-EC35 Aromatic	S4UL	1,900	<LoD		< 10			
VOC								
MTBE	CL:AIRE	220	< LoD		< 0.005			

Controlled water screening

Scenario	
Receptor	Drinking water
Surface water type	N/A
Hydrometric area	N/A

Contaminant	Guideline source	Guideline value (µg/l)	Max value (µg/l)	Location	BH2	WS01
				Depth (m)	0.20 - 0.40	0.20
				Type	ES	ES
				Date	11/08/21	08/02/21
Inorganics - Metals						
Arsenic	UK DWS	10	<LoD		< 5	< 5
Boron	UK DWS	1,000	19		< 5	19
Cadmium	UK DWS	5	<LoD		< 0.4	< 0.4
Chromium (total)	UK DWS	50	<LoD		<LoD	<LoD
Chromium (III)	-	-	<LoD		< 5	< 5
Chromium (VI)	-	-	<LoD		< 20	< 20
Copper	UK DWS	2000	7		< 5	7
Iron	UK DWS	200	111		< 5	111
Lead	UK DWS	10	<LoD		< 5	< 5
Mercury	UK DWS	1	<LoD		< 0.05	< 0.05
Nickel	UK DWS	20	<LoD		< 5	< 5
Selenium	UK DWS	10	<LoD		< 5	< 5
Zinc	Int. DWS	3000	5		5	5
Inorganics - Miscellaneous						
pH	-	-	8.5		8.5	7.2
Cyanide - Total	UK DWS	50	<LoD		< 5	< 5
Cyanide - Free	-	-	<LoD		< 5	< 5
Ammonia (as N)	-	-	1010		1010	111
Nitrate (as NO3)	UK DWS	50,000	1200		< 500	1200
Sulphate	UK DWS	250,000	2000		2000	< 1000
Organics - PAH & Phenol						
Naphthalene	-	-	0.73		0.18	0.73
Acenaphthylene	-	-	0.08		0.01	0.08
Acenaphthene	-	-	0.05		0.05	0.04
Fluorene	-	-	0.08	0.05	0.08	
Phenanthrene	-	-	0.26	0.17	0.26	
Anthracene	-	-	0.04	< 0.01	0.04	
Fluoranthene	-	-	0.13	0.1	0.13	
Pyrene	-	-	0.12	0.07	0.12	
Benzo(a)anthracene	-	-	<LoD	< 0.01	< 0.01	
Chrysene	-	-	<LoD	< 0.01	< 0.01	
Benzo(b)fluoranthene	-	-	<LoD	< 0.01	< 0.01	
Benzo(k)fluoranthene	-	-	<LoD	< 0.01	< 0.01	
Benzo(a)pyrene	UK DWS	0.01	<LoD	< 0.01	< 0.01	
Indeno(1,2,3-cd)pyrene	-	-	<LoD	< 0.01	< 0.01	
Dibenz(a,h)anthracene	-	-	<LoD	< 0.01	< 0.01	
Benzo(ghi)perylene	-	-	<LoD	< 0.008	< 0.008	
PAH (sum of 4)	UK DWS	0.1	<LoD	<LoD	<LoD	
Phenol	-	-	<LoD	< 10	< 10	
Organics - TPH CWG						
Organics - Free phase indicator						
Organics - SVOCs						
Phenol	-	-	<LoD	< 10	< 10	

Analysis of test data in relation to concentrations of inorganic chemical contaminants

Adopted Model: Industrial/Commercial and BPG5
Receptor: Vegetation

Test procedure			Summary of test data					Initial comparison	Outlier test				Normality test			UCL	
Contaminant	Guideline source	Guideline value	No. of tests	Min.	Max.	Mean	No. of tests above guideline value	Initial screening				Concentration	Shapiro-Wilk Normality test	Probability plot test	Data normally distributed?	95% UCL of mean	Contaminant
		mg/kg		mg/kg	mg/kg	mg/kg			Pass outlier test?	Number of outliers	Location of outlier					Depth	mg/kg
Arsenic	S4UL	640	7	9.0	15.0	11.1	0	Mean value below guideline					normal	not normal	n	15.2	Arsenic
Beryllium	S4UL	12	7	0.5	0.8	0.5	0	Mean value below guideline					not normal	not normal	n	0.7	Beryllium
Boron	S4UL	240000	7	1.0	1.0	1.0	0	Mean value below guideline					not normal	not normal	n	1.0	Boron
Cadmium	S4UL	190	7	0.2	0.8	0.4	0	Mean value below guideline					not normal	not normal	n	0.9	Cadmium
Chromium (III)	S4UL	8600	7	4.0	15.0	8.9	0	Mean value below guideline					normal	normal	y	11.6	Chromium (III)
Copper	BPG5	130	7	6.0	22.0	10.1	0	Mean value below guideline					not normal	not normal	n	19.3	Copper
Cyanide (total)	ATK	34	7	2.0	2.0	2.0	0	Mean value below guideline					not normal	not normal	n	2.0	Cyanide (total)
Lead	C4SL	6000	7	13.0	154.0	63.7	0	Mean value below guideline					normal	normal	y	101.2	Lead
Mercury#	S4UL	58	7	1.0	1.0	1.0	0	Mean value below guideline					not normal	not normal	n	1.0	Mercury#
Nickel	S4UL	980	7	4.0	25.0	9.3	0	Mean value below guideline					not normal	not normal	n	21.0	Nickel
Selenium	S4UL	12000	7	3.0	3.0	3.0	0	Mean value below guideline					not normal	not normal	n	3.0	Selenium
Vanadium	S4UL	9000	7	7.0	27.0	15.3	0	Mean value below guideline					normal	normal	y	20.3	Vanadium
Zinc	BPG5	300	7	32.0	136.0	77.9	0	Mean value below guideline					normal	normal	y	104.9	Zinc

S4UL Suitable for Use Level as published by LQM/CIEH
C4SL Category 4 Screening Level
C4SL (lower) (upper) Category 4 Screening Level for Lead at lower or upper bound of range
ATK Soil Screening Value derived by Atkins
BPG5 Guideline from BPG Note 5 as published by Forest Research

Assumed to be elemental mercury as initial screening value

Title	Table number
Analysis of test data in relation to concentrations of inorganic chemical contaminants.	1

Ground gas and groundwater monitoring results

Notes

- 1) The instrument limit of detection has been adopted where no gas flows or concentrations have been recorded (indicated in grey italics).
2) Atmospheric temperature (*) data sourced from local weather station data.
3) CH4 = methane; CO2 = carbon dioxide; O2 = oxygen; PPM = parts per million CO = carbon monoxide; H2S = hydrogen sulphide.
4) Gas Screening Values (GSVs) are rounded to 3 decimal places.

Worst case scenario									0.1	0.1	0.1	0.4	0.4	18.6	18.6	1	1	0.00	0.00	0.00	0.00	ONE	
Average scenario									0.1	0.1	0.1	0.3	0.3	18.7	18.7	1	1	0.00	0.00	0.00	0.00	ONE	
Date	Time	Location	Install Reference	Install Response Zone		Atmospheric Pressure (mB)	Atmospheric Temperature (°C) *	Depth to Water (m)	Gas Steady Flow	CH ₄ (%v/v)		CO ₂ (%v/v)		O ₂ (%v/v)		Other Gases (PPM)		GSV (CH ₄)		GSV (CO ₂)		Indicative CIRIA Characteristic Situation	Notes
				Response Zone (mBGL)	Flooded				l/Hr	Peak	Steady	Peak	Steady	Minimum	Average	CO	H ₂ S	Peak	Steady	Peak	Steady		
24/02/2021	12:05	BH1	1	1.00 - 4.00	No	1018	16	Dry	0.1	0.1	0.1	0.2	0.2	18.7	18.7	1	1	0.000	0.000	0.000	0.000	ONE	
10/03/2021	15:35	BH1	1	1.00 - 4.00	No	999	9	Dry	0.1	0.1	0.1	0.4	0.4	18.6	18.6	1	1	0.000	0.000	0.000	0.000	ONE	
25/03/2021	13:40	BH1	1	1.00 - 4.00	No	1014	13	Dry	0.1	0.1	0.1	0.3	0.3	18.8	18.8	1	1	0.000	0.000	0.000	0.000	ONE	

Table comparing cumulative compound concentrations with hazardous waste threshold values

Category of danger		Irritant	Harmful	Toxic	Carcinogenic		Corrosive	Toxic for reproduction		Mutagenic		Ecotoxic					
Risk Phrase	Contaminant	Highest concentration	Xi	Xn	T+	T	Carc Cat 1 or 2	Carc Cat 3	C R34	C R35	Repr Cat 1 or 2	Repr Cat 3	Muta Cat 2	Muta Cat 3	ΣN : R50-53/0.25	ΣN : 50-53	ΣN : 50-53
															+ΣN : R51-53/2.5	+ΣN : R50	+ΣN : 51-53
															+ΣN : R52-53/25		+ΣN : 52-53
																	+ΣN : R53
			H4	H5	H6	H6	H7	H7	H8	H8	H10	H10	H11	H11	H14	H14	H14
			(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)			
Metals																	
Arsenic	15.00				0.0020	0.0023	0.0023								#REF!	0.0023	0.0023
Beryllium	0.80	0.0002			0.0002	0.0002	0.0002										0.0002
Copper	22.00	0.0055	0.0055													0.0055	0.0055
Cadmium	0.80		0.0001			0.0001	0.0001										
Chromium	15.00						0.0024									0.0024	0.0024
Lead	154.00		0.0166								0.0166	0.0166				0.0166	0.0166
Mercury	1.00			0.0001												0.0001	0.0001
Nickel	25.00		0.0032					0.0032				0.0032				0.0032	0.0032
Selenium	3.00					0.0003										0.0003	0.0003
Zinc	136.00	0.0986	0.0986				0.0377		0.0284					0.0639		0.0986	0.0986
Vanadium	27.00	0.0040				0.0040					0.0040			0.0040			0.0040
PAH																	
Naphthalene	0.00		0.0000													0.0000	0.0000
Benzo(a)anthracene	0.35					0.0000	0.0000									0.0000	0.0000
Chrysene	0.48					0.0000	0.0000						0.0000			0.0000	0.0000
Benzo(b)fluoranthene	0.80					0.0001	0.0001									0.0001	0.0001
Benzo(k)fluoranthene	0.25					0.0000	0.0000									0.0000	0.0000
Benzo(a)pyrene	0.80						0.0001			0.0001		0.0001				0.0001	0.0001
Dibenzo(a,h)anthracene	0.00					0.0000	0.0000									0.0000	0.0000
Total (or greatest)		0.1083	0.1240	0.0023	0.0071	(0.0377)	(0.0032)	0.0284	0.0000	(0.0166)	(0.0166)	(0.0001)	(0.0639)	#REF!	0.1293	0.1335	
Threshold		1%	1%	0.10%	3%	0.10%	1%	5%	1%	0.50%	3%	0.10%	1%	1	25%	25%	
Exceeded Y/N		N	N	N	N	N	N	N	N	N	N	N	N	#REF!	N	N	

Title

Hazard assessment spreadsheet

Table number

1 of 1

Landfill Waste Acceptance Criteria

Parameter	Inert waste landfill	Stable non-reactive hazardous waste in non-hazardous landfill	Hazardous waste landfill	Laboratory test data	
				COMP01	COMP02
				0	0
Parameters determined on the waste					
Total organic carbon (w/w %)	3%	5%	6%*	0.3	0.5
Loss on ignition			10%*	0.8	1.4
BTEX (mg kg ⁻¹)	6			< 0.05	< 0.05
PCBs (7 congeners) (mg kg ⁻¹)	1			< 0.1	< 0.1
Mineral oil C ₁₀ - C ₄₀ (mg kg ⁻¹)	500			< 10	< 10
PAH (17 congeners)	100			< 1.7	< 1.7
pH		>6		8.7	8.5
Acid neutralisation capacity pH 6 (mol kg ⁻¹)		To be evaluated	To be evaluated	2.9	2.3
Acid neutralisation capacity pH 4 (mol kg ⁻¹)		To be evaluated	To be evaluated		
Limit values (mg kg ⁻¹) for compliance test using BN 12457-3 at L/S 10 l kg ⁻¹					
As (arsenic)	0.5	2	25	< 0.2	< 0.2
Ba (barium)	20	100	300	0.9	0.1
Cd (cadmium)	0.04	1	5	< 0.02	< 0.02
Cr (chromium (total))	0.5	10	70	< 0.20	< 0.20
Cu (Copper)	2	50	100	< 0.5	< 0.5
Hg (mercury)	0.01	0.2	2	< 0.005	< 0.005
Mo (molybdenum)	0.5	10	30	< 0.1	< 0.1
Ni (nickel)	0.4	10	40	< 0.2	< 0.2
Pb (lead)	0.5	10	50	< 0.2	< 0.2
Sb (antimony)	0.06	0.7	5	< 0.05	< 0.05
Se (selenium)	0.1	0.5	7	< 0.05	< 0.05
Zn (zinc)	4	50	200	< 0.2	< 0.2
Cl (chloride)	800	15,000	25,000	107	104
F (fluoride)	10	150	500	< 1	< 1
SO ₄ (sulphate)	1000#	20,000	50,000	81	111
Total Dissolved Solids (TDS) ⁺	4,000	60,000	100,000	1021	1142
Phenol index	1			< 0.5	< 0.5
Dissolved organic carbon at own pH or pH 7.5-8.0 [@]	500	800	1000	88.3	194

Primary classification	NON- HAZARDOUS	NON- HAZARDOUS
Secondary classification	INERT	INERT

Title

Comparison of test data to landfill waste acceptance criteria
(Table 5.1) (Secondary classification)

Table number

1 of 1

Landfill Waste Acceptance Criteria

Key

* Either TOC or LOI must be used for hazardous waste.

If an inert waste does not meet the SO₄ L/S10 limit, alternative limit values of 1500 mg l-1 SO₄ at Co (initial eluate from the percolation test (prCEN/TS 14405:2003)) AND 6000 mg kg-1 SO₄ at L/S10 (either from the percolation test or batch test BS EN 12457-3), can be used to demonstrate compliance with the acceptable criteria for inert wastes.

+ The value for TDS can be used instead of the values for Cl and SO₄.

@ DOC at pH 7.5-8.0 abd L/S10 can be determined or eluate derived from a modified version of the pH dependence Test, prEN 14429, if the limit value at own pH (BS EN 12457 eluate) is not met.

x Stable non-reactive hazardous waste in non-hazardous landfill

Title	Table number
Comparison of test data to landfill waste acceptance criteria (Table 5.1) (Secondary classification)	1 of 1

Soiltechnics Limited
Cedar Barn
White Lodge
WALGRAVE
NN6 9PY

Search address supplied Eaton Court
Reading
RG1 7NG

Your reference STR4832

Our reference ALS/ALS Standard/2020_4324817

Search date 16 December 2020

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0845 070 9148

Search address supplied: Eaton Court, Reading, RG1 7NG

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This search provides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk

Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.



For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

The map displays a residential area with the following features:

- Streets:** CHATHAM STREET, AMBROSE PLACE, EATON PLACE, PHOENIX PLACE, and a road at the bottom.
- Buildings and Landmarks:**
 - Boxing & Fitness Club
 - Holy Trinity Church
 - Multistorey Car Park
 - Mayer House (1 to 97)
 - Phoenix Place (1 to 14)
 - The Nags Head
- Routes and Paths:**
 - A red dashed line with arrows indicating a primary route, with segments labeled 42.4m and 43.5m.
 - Blue dashed lines with circular markers.
 - Yellow dashed lines with 'v' markers.
- Other Labels:**
 - 1 to 60, 1 to 37 Halcyon, 106 to 112, 96 to 98, 1 to 14, 1 to 60 Homitage.
 - Postboxes: s11A, s11B.
 - Rising Bollards.
 - Shelters.
 - LB (Landmark Building).
 - Bakery.
 - PW (Public Works).

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
941D	n/a	n/a
941C	n/a	n/a
9403	44.2	41.3
9455	44.15	42.77
9454	44.32	42.95
9402	44.35	41.7
941A	n/a	n/a
941B	n/a	n/a
9453	44.4	43.06
9401	44.4	42.22
9452	44.36	43.14
9451	44.41	43.25
931A	n/a	n/a
9302	43.82	40.7
9301	43.87	n/a
8352	43.59	42.11
9351	43.81	42.63
731C	n/a	n/a
731A	n/a	n/a
8302	43.5	40.22
8353	n/a	n/a
8351	43.41	41.75
831A	n/a	n/a
83KJ	n/a	n/a
83MJ	n/a	n/a
83NK	n/a	n/a
8301	43.69	40.28
8553	43.73	41.78
851C	n/a	n/a
8554	43.89	42.48
9566	n/a	n/a
951A	n/a	n/a
9554	44.65	43.23
8451	42.54	41.01
8503	42.44	39.34
8552	42.72	41.2
851D	n/a	n/a
8501	41.62	38.82
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.		



ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

	Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
	Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
	Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
	Trunk Surface Water
	Trunk Foul
	Storm Relief
	Trunk Combined
	Vent Pipe
	Bio-solids (Sludge)
	Proposed Thames Surface Water Sewer
	Proposed Thames Water Foul Sewer
	Gallery
	Foul Rising Main
	Surface Water Rising Main
	Combined Rising Main
	Sludge Rising Main
	Proposed Thames Water Rising Main
	Vacuum

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

	Air Valve
	Dam Chase
	Fitting
	Meter
	Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

	Control Valve
	Drop Pipe
	Ancillary
	Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

	Outfall
	Undefined End
	Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

	Public/Private Pumping Station
	Change of characteristic indicator (C.O.C.I.)
	Invert Level
	Summit

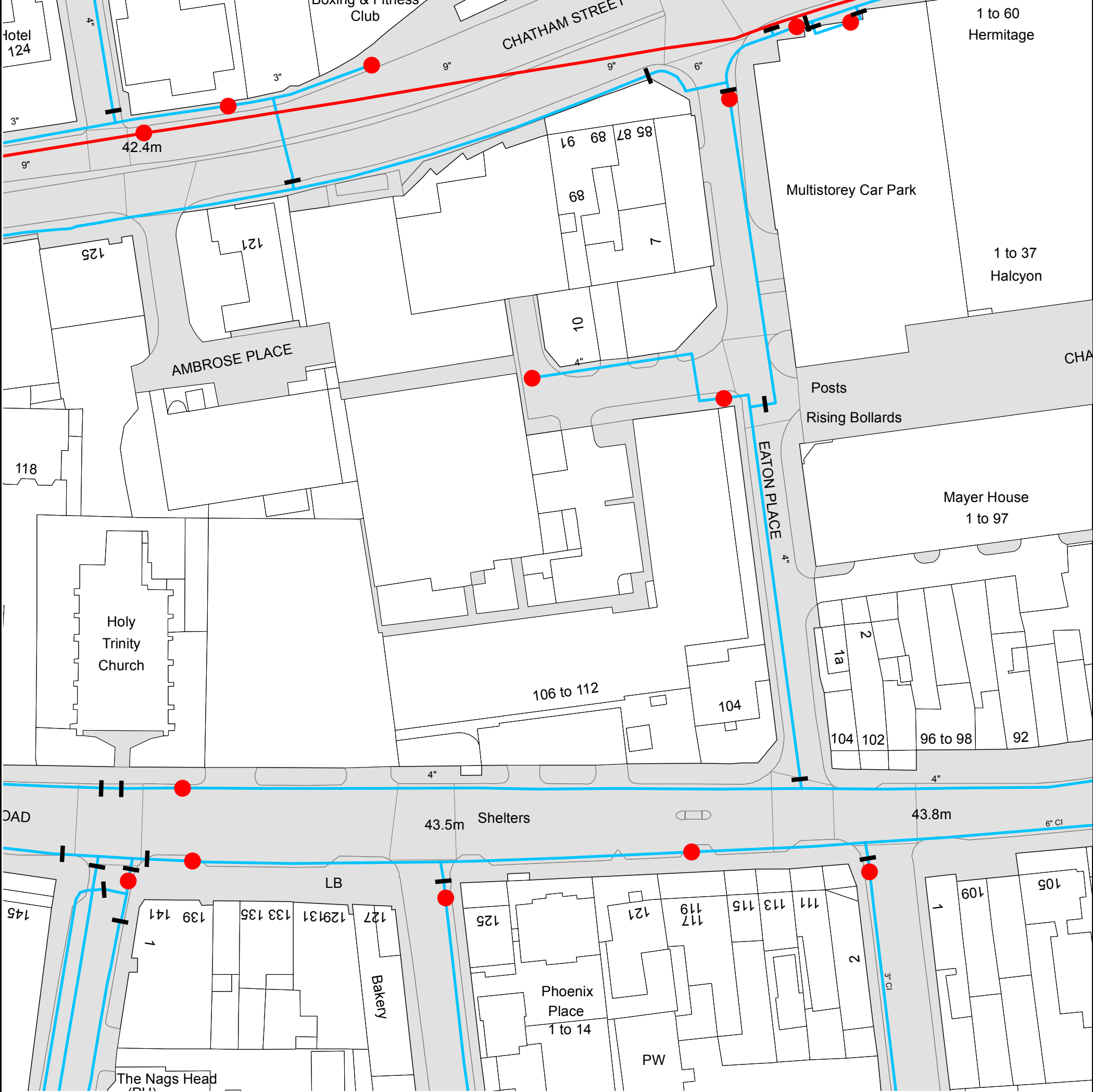
Areas

Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

	Foul Sewer
	Surface Water Sewer
	Combined Sewer
	Gully
	Culverted Watercourse
	Proposed
	Abandoned Sewer



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 470886, 173433.
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

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ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"	Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.
16"	Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.
3" SUPPLY	Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.
3" FIRE	Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.
3" METERED	Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.
	Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.
	Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Valves

	General Purpose Valve
	Air Valve
	Pressure Control Valve
	Customer Valve

Hydrants

	Single Hydrant
--	----------------

Meters

	Meter
--	-------

End Items

Symbol indicating what happens at the end of a water main.

	Blank Flange
	Capped End
	Emptying Pit
	Undefined End
	Manifold
	Customer Supply
	Fire Supply

Operational Sites

	Booster Station
	Other
	Other (Proposed)
	Pumping Station
	Service Reservoir
	Shaft Inspection
	Treatment Works
	Unknown
	Water Tower

Other Symbols

	Data Logger
--	-------------

Other Water Pipes (Not Operated or Maintained by Thames Water)

	Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.
	Private Main: Indicates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL's terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

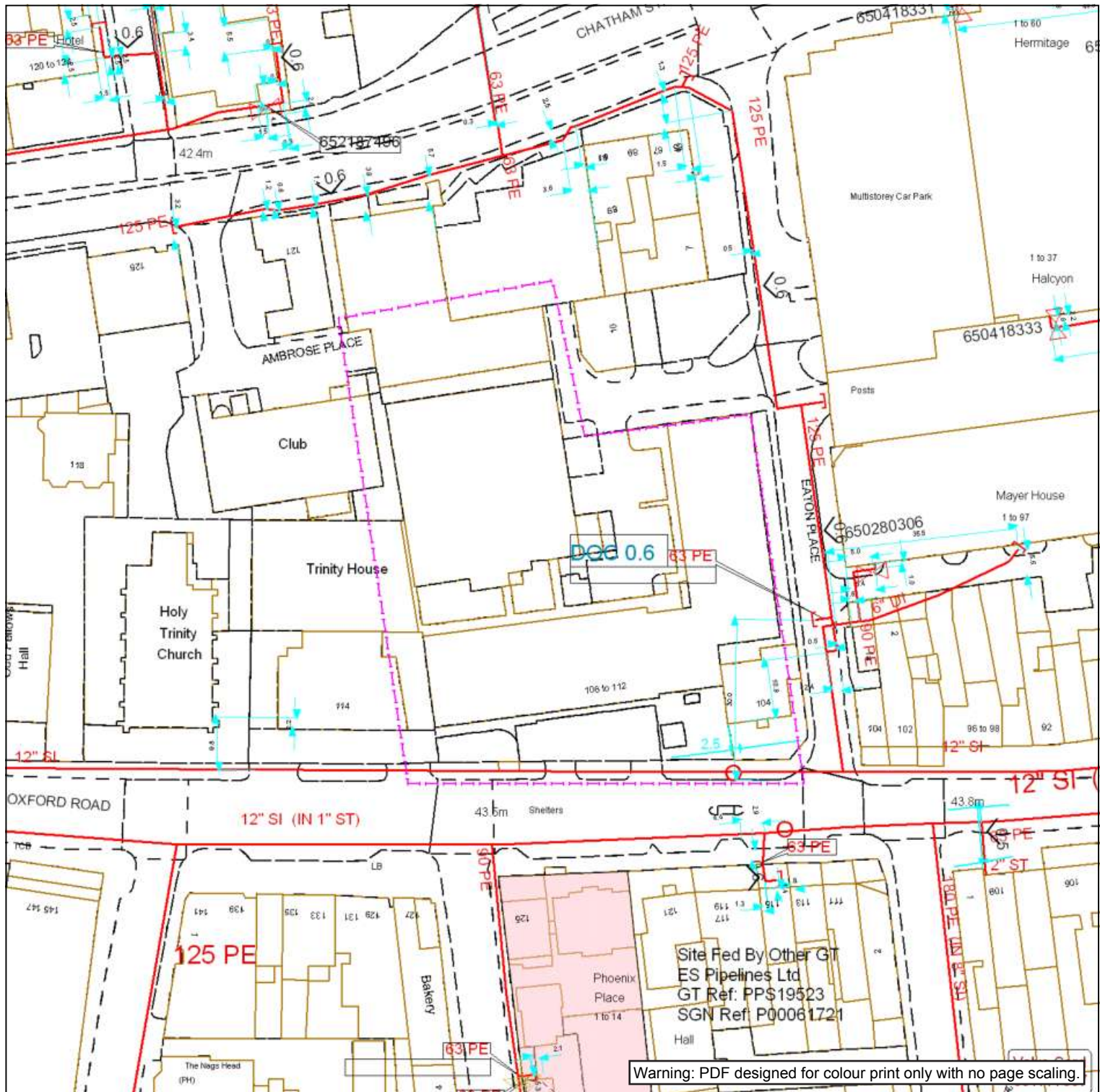
If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	BACS Payment	Telephone Banking	Cheque
Call 0845 070 9148 quoting your invoice number starting CBA or ADS / OSS	Account number 90478703 Sort code 60-00-01 A remittance advice must be sent to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW. or email ps.billing@thameswater.co.uk	By calling your bank and quoting: Account number 90478703 Sort code 60-00-01 and your invoice number	Made payable to ' Thames Water Utilities Ltd ' Write your Thames Water account number on the back. Send to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW or by DX to 151280 Slough 13

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.



Contact Us

SGN Safety Admin Team:
0800 912 1722
Email:
plantlocation@sgn.co.uk

Low Pressure Mains

Medium Pressure Mains

Intermediate Pressure Mains

High Pressure Mains

Some Examples Of Plant Items

Valve

Syphon

Depth of Cover

Valve

Syphon

Depth of Cover

Valve

Syphon

Depth of Cover

Valve

Syphon

Depth of Cover

Valve

Syphon

Digsite:

Line:

Area:

Las

GTs

SSSIs

Diameter Change

Material Change



This information is given as a guide only and its accuracy cannot be guaranteed.



This plan shows the location of those pipes owned by Scotia Gas Networks (SGN) by virtue of being a licensed Gas Transporter (GT). Gas pipes owned by other GTs or third parties may also be present in this area but are not shown on this plan. Information with regard to such pipes should be obtained from the relevant owners. No warranties are given with regard to the accuracy of the information shown on this plan. Service pipes, valves, syphons, sub-connections etc. are not shown but their presence should be anticipated. You should be aware that a small percentage of our pipes/assets may be undergoing review and will temporarily be highlighted in yellow. If your proposed works are close to one of these pipes, you should contact the SGN Safety Admin Team on 0800 912 1722 for advice. No liability of any kind whatsoever is accepted by SGN or its agents, servants or sub-contractors for any error or omission contained herein. Safe digging practices, in accordance with HS (G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that plant location information is provided to all persons (whether direct labour or sub-contractors) working for you on or near gas apparatus. Information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

Report damage immediately – KEEP EVERYONE AWAY FROM THE AREA

0800 111 999

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Plans generated by DigSAFE Pro (tm) software provided by LineasearchbeforeUdig

Date Requested: 15/12/2020
Job Reference: 20808075
Site Location: 470883 173435
Requested by:
Miss Alexa Band
Your Scheme/Reference:
STR4832

Exact Scales:
1:1000 Area or Circle dig site
1:1000 Line dig site



Date Requested: 15/12/2020

Requested by: Alexa Band

Company: Soiltechnics

Job Reference: 20808075

Your Scheme/Reference: STR4832

 ZAYO DUCT
 or  ZAYO CHAMBER
 Dig Sites: Line  Area 
 Scale on A4 paper: 1:1000



4th Floor Harmsworth House
13-15 Bouverie Street
London EC4Y 8DP

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JSM Group Ltd
Sterling House
Mutton Lane, Potters Bar
Hertfordshire, EN6 3AR
T: 01992 788 019



Protecting Lives, Cables & Pipes

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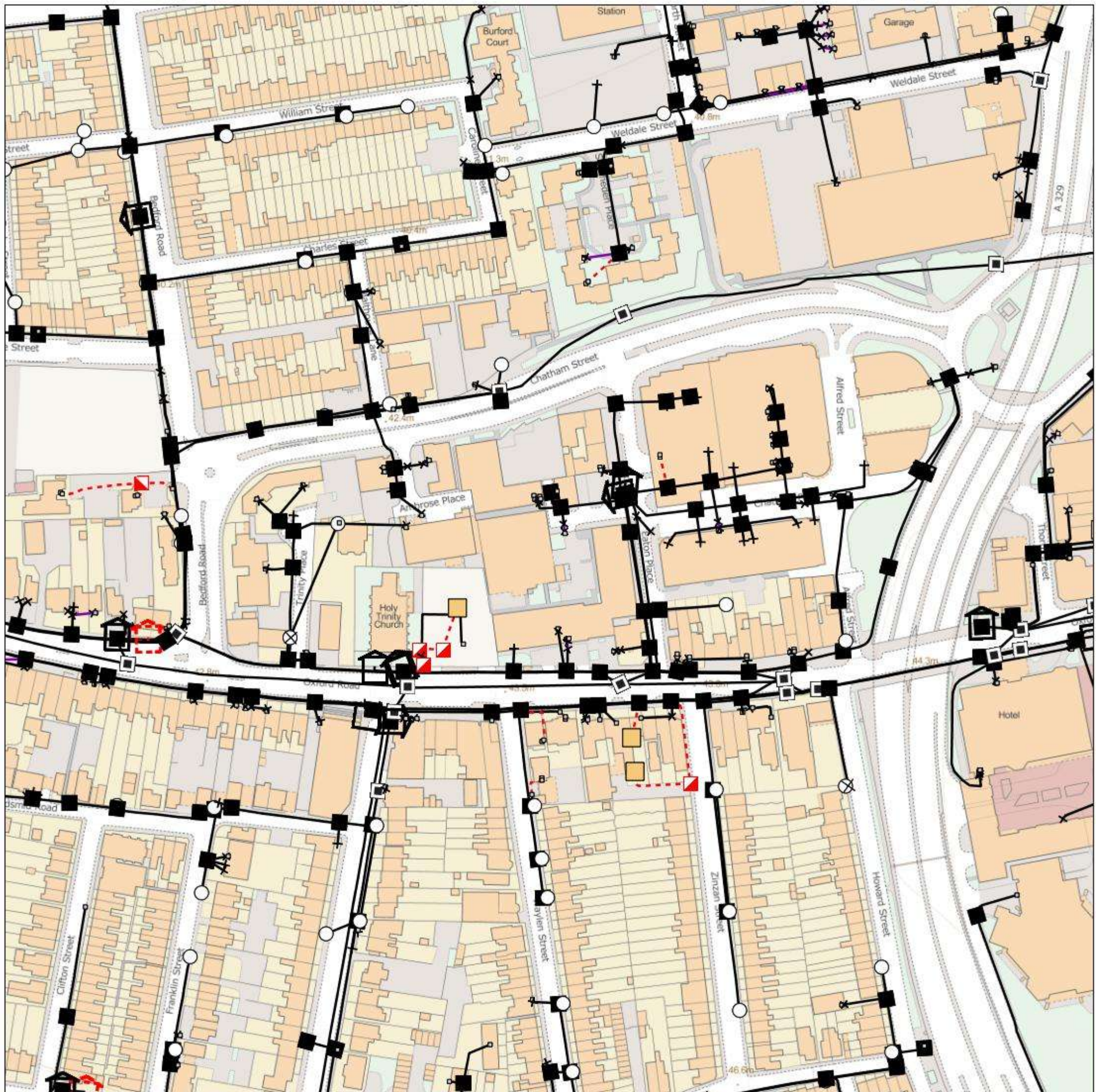


In Emergency Only and if Zayo Plant or Cables damaged call: 0800 169 1646

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zayoplantenquiries@jsmgroup.com

Maps by email Plant Information Reply



IMPORTANT WARNING

Information regarding the location of BT apparatus is given for your assistance and is intended for general guidance only. No guarantee is given of its accuracy. It should not be relied upon in the event of excavations or other works being made near to BT apparatus which may exist at various depths and may deviate from the marked route.



openreach

CLICK BEFORE YOU DIG

FOR PROFESSIONAL FREE ON SITE ASSISTANCE PRIOR TO COMMENCEMENT OF EXCAVATION WORKS INCLUDING LOCATE AND MARKING SERVICE

email cbyd@openreach.co.uk

ADVANCE NOTICE REQUIRED
(Office hours: Monday - Friday 08.00 to 17.00)
www.openreach.co.uk/cbyd

Accidents happen

If you do damage any Openreach equipment please let us know by calling 0800 023 2023 (opt 1 + opt 1) and we can get it fixed ASAP

KEY TO BT SYMBOLS

	Planned	Live	Change Of State	+	Hatchings	
PCP			Split Coupling		Built	
Pole			Duct Tee		Planned	
Box			Building		Inferred	
Manhole			Kiosk		Duct	
Cabinet			Other proposed plant is shown using dashed lines. BT Symbols not listed above may be disregarded. Existing BT Plant may not be recorded. Information valid at time of preparation. Maps are only valid for 90 days after the date of publication.			
	Pending Add	In Place	Pending Remove	Not In Use		
Power Cable						
Power Duct				N/A		

BT Ref : FZQ03105G

Map Reference : (centre) SU7088273446

Easting/Northing : (centre) 470882,173446

Issued : 15/12/2020 15:11:04

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WARNING: IF PLANNED WORKS FALL INSIDE HATCHED AREA IT IS ESSENTIAL BEFORE PROCEEDING THAT YOU CONTACT THE NATIONAL NOTICE HANDLING CENTRE. PLEASE SEND E-MAIL TO: nnhc@openreach.co.uk

Asset Owners

Terms and Conditions. Please note that this enquiry is subject always to our standard terms and conditions available at www.lineasearchbeforeudig.co.uk ("Terms of Use") and the disclaimer at the end of this document. Please note that in the event of any conflict or ambiguity between the terms of this Enquiry Confirmation and the Terms of Use, the Terms of Use shall take precedence.

Notes. Please ensure your contact details are correct and up to date on the system in case the LSBUD Members need to contact you.

Validity and search criteria. The results of this enquiry are based on the confirmed information you entered and are valid only as at the date of the enquiry. It is your responsibility to ensure that the Enquiry Details are correct, and LineasearchbeforeUdig accepts no responsibility for any errors or omissions in the Enquiry Details or any consequences thereof. LSBUD Members update their asset information on a regular basis so you are advised to consider this when undertaking any works. It is your responsibility to choose the period of time after which you need to resubmit any enquiry but the maximum time (after which your enquiry will no longer be dealt with by the LSBUD Helpdesk and LSBUD Members) is 28 days. If any details of the enquiry change, particularly including, but not limited to, the location of the work, then a further enquiry must be made.

Asset Owners & Responses. Please note the enquiry results include the following:

1. "LSBUD Members" who are asset owners who have registered their assets on the LSBUD service.
2. "Non LSBUD Members" are asset owners who have not registered their assets on the LSBUD service but LSBUD is aware of their existence. Please note that there could be other asset owners within your search area.

Below are three lists of asset owners:

1. **LSBUD Members who have assets registered within your search area. ("Affected")**
 - a. These LSBUD Members will either:
 - i. Ask for further information ("Email Additional Info" noted in status). The additional information includes: Site contact name and number, Location plan, Detailed plan (minimum scale 1:2500), Cross sectional drawings (if available), Work Specification.
 - ii. Respond directly to you ("Await Response"). In this response they may either send plans directly to you or ask for further information before being able to do so, particularly if any payments or authorisations are required.
2. **LSBUD Members who do not have assets registered within your search area. ("Not Affected")**
3. **Non LSBUD Members who may have assets within your search area.** Please note that this list is not exhaustive and all details are provided as a guide only. It is your responsibility to identify and consult with all asset owners before proceeding.

National Grid. Please note that the LSBUD service only contains information on National Grid's Gas above 7 bar asset, all National Grid Electricity Transmission assets and National Grid's Gas Distribution Limited above 2 bar asset.

For National Grid Gas Distribution Ltd below 2 bar asset information please go to www.beforeyoudig.nationalgrid.com

LSBUD Members who have assets registered on the LSBUD service within the vicinity of your search area.

List of affected LSBUD members

Asset Owner	Phone/Email	Emergency Only	Status
ESP Utilities Group	01372227560	01372227560	Await response
Scottish and Southern Electricity Networks	08000483516	08000727282	Await response
SGN	08009121722	0800111999	Await response
Zayo Group UK Ltd c/o JSM Group Ltd	01992 655 919	0800 169 1646	Await response

LSBUD Members who do not have assets registered on the LSBUD service within the vicinity of your search area. Please be aware that LSBUD Members make regular changes to their assets and this list may vary for new enquiries in the same area.

List of not affected LSBUD members

AWE Pipeline	Balfour Beatty Investments Limited	BOC Limited (A Member of the Linde Group)
Box Broadband	BP Exploration Operating Company Limited	BPA
Carrington Gas Pipeline	CATS Pipeline c/o Wood Group PSN	Cemex
Centrica Storage Ltd	Chrysaor Production (UK) Limited	CLH Pipeline System Ltd
CNG Services Ltd	Concept Solutions People Ltd	ConocoPhillips (UK) Teesside Operator Ltd
Diamond Transmission Corporation	DIO (MOD Abandoned Pipelines)	DIO (MOD Live Pipelines)
Drax Group	E.ON UK CHP Limited	EirGrid
Electricity North West Limited	ENI & Himor c/o Penspen Ltd	EnQuest NNS Limited
EP Langage Limited	ESSAR	Esso Petroleum Company Limited
Fulcrum Pipelines Limited	Gamma	Gas Networks Ireland (UK)
Gateshead Energy Company	Gigaclear Ltd	Gtt
Heathrow Airport LTD	Humbly Grove Energy	IGas Energy
INEOS FPS Pipelines	INEOS Manufacturing (Scotland and TSEP)	INOVYN ChlorVinyls Limited
INOVYN Enterprises Limited	Intergen (Coryton Energy or Spalding Energy)	Jurassic Fibre Ltd
Mainline Pipelines Limited	Manchester Jetline Limited	Manx Cable Company
Marchwood Power Ltd (Gas Pipeline)	Melbourn Solar Limited	Murphy Utility Assets
National Grid Gas (Above 7 bar), National Grid Gas Distribution Limited (Above 2 bar) and National Grid Electricity Transmission	Northumbrian Water Group	NPower CHP Pipelines
NYnet Ltd	Oikos Storage Limited	Ørsted
Perenco UK Limited (Purbeck Southampton Pipeline)	Petroineos	Phillips 66
Portsmouth Water	Premier Transmission Ltd (SNIP)	Redundant Pipelines - LPDA
RWE - Great Yarmouth Pipeline (Bacton to Great Yarmouth Power Station)	RWEnpower (Little Barford and South Haven)	SABIC UK Petrochemicals
Scottish Power Generation	Seabank Power Ltd	SES Water
Shell	Shell NOP	SSE Enterprise Telecoms
SSE Generation Ltd	SSE Utility Solutions Limited	Tata Communications (c/o JSM Construction Ltd)
Total (Colnbrook & Colwick Pipelines)	Total Finaline Pipelines	Transmission Capital

UK Power Networks	Uniper UK Ltd	University of Cambridge Granta Backbone Network
Vattenfall	Veolia ES SELCHP Limited	Veolia ES Sheffield Ltd
Wales and West Utilities	West of Duddon Sands Transmission Ltd	Western Power Distribution
Westminster City Council		

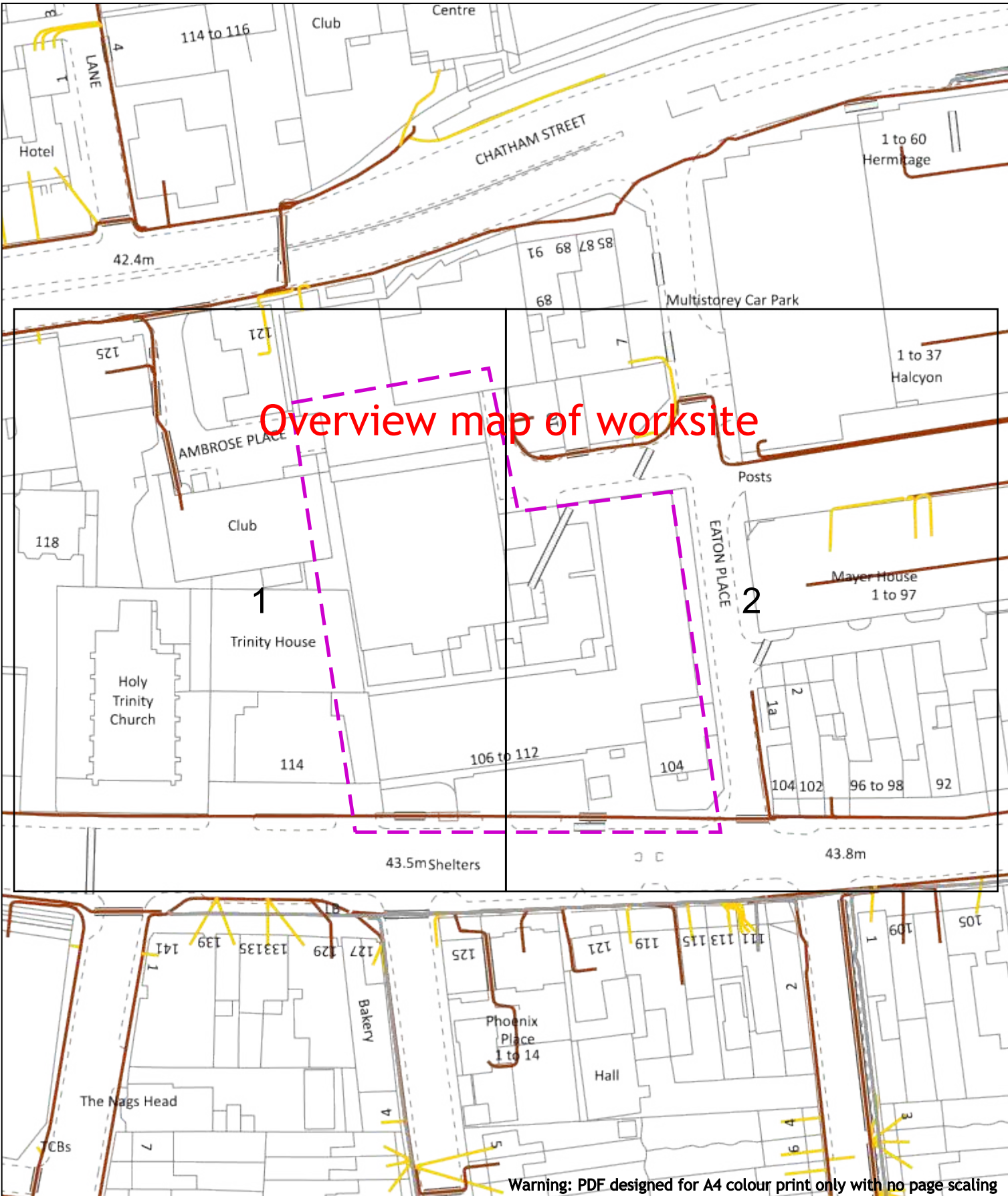
The following Non-LSBUD Members may have assets in your search area. It is **YOUR RESPONSIBILITY** to contact them before proceeding. Please be aware this list is not exhaustive and it is your responsibility to identify and contact all asset owners within your search area.

Non-LSBUD members (Asset owners not registered on LSBUD)			
Asset Owner	Preferred contact method	Phone	Status
BT	https://www.swns.bt.com/pls/mbe/welcome.home	08000232023	Not Notified
CenturyLink Communications UK Limited	plantenquiries@instalcom.co.uk	02087314613	Not Notified
CityFibre	asset.team@cityfibre.com	033 3150 7282	Not Notified
Colt	plantenquiries@catelecomuk.com	01227768427	Not Notified
Energetics Electricity	plantenquiries@lastmile-uk.com	01698404646	Not Notified
ENGIE	nrswa.uk@engie.com	01293 549944	Not Notified
GTC	https://pe.gtc-uk.co.uk/PlantEnqMembership	01359240363	Not Notified
KPN (c/-Instalcom)	kpn.plantenquiries@instalcom.co.uk	n/a	Not Notified
Mobile Broadband Network Limited	mbnlplantenquiries@turntown.com	01212 621 100	Not Notified
Sky UK Limited	nrswa@sky.uk	02070323234	Not Notified
Sota	SOTA.plantenquiries@instalcom.co.uk		Not Notified
Teliasonera	check-network@teliacompany.com	0800526015	Not Notified
Thames Water	http://www.digdat.co.uk	08450709145	Not Notified
Utility assets Ltd	assetrecords@utilityassets.co.uk		Not Notified
Verizon Business	osp-team@uk.verizonbusiness.com	01293611736	Not Notified
Virgin Media	http://www.digdat.co.uk	08708883116	Not Notified
Vodafone	osm.enquiries@atkinsglobal.com	01454662881	Not Notified

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Dig Sites Area:  Line: 

Date Requested: 15/12/2020
Job Reference: 20808075
Site Location: 470885 173421
Requested by: Miss Alexa Band
Your Scheme/Reference: STR4832
Scale: 1:1025 (When plotted at A4)

Voltages (V)				
LV (Low Voltage) and Services	Up to 1,000V			
HV (High Voltage)	Over 1,000V to 11,000V			
EHV (Extra High Voltage)	22,000V to 132,000V			
Transmission	275,000V and 400,000V			
NORMAL DEPTH TO THE TOP OF THE CABLE WHEN LAID				
	Services	LV	HV	EHV
Footpath/Unmade	0.45m	0.45m	0.6m	0.8m
Road Crossing	0.6m	0.6m	0.75m	0.9m
Agricultural	1m	1m	1m	1.1m

Legend

- Service Cable
- LV Mains
- 2-13kV
- 0.6kV
- 23kV
- 33kV
- 66kV
- 132kV
- 275kV
- 400kV
- Follow Cables
- Private Cables

Distribution Structures (Electric)

- Pole, Existing Location
- Pole Structure, Existing Location - Single
- Pole Structure, Existing Location - m
- Street Route
- Cross Section Route

WARNING

There may have been subsequent alteration to the surface levels. Trial holes must be undertaken to determine position and depths of cables. HS (G) 47 Booklet from the Health and Safety Executive - Avoiding Danger from Buried Cables - should be consulted before commencing excavation work.

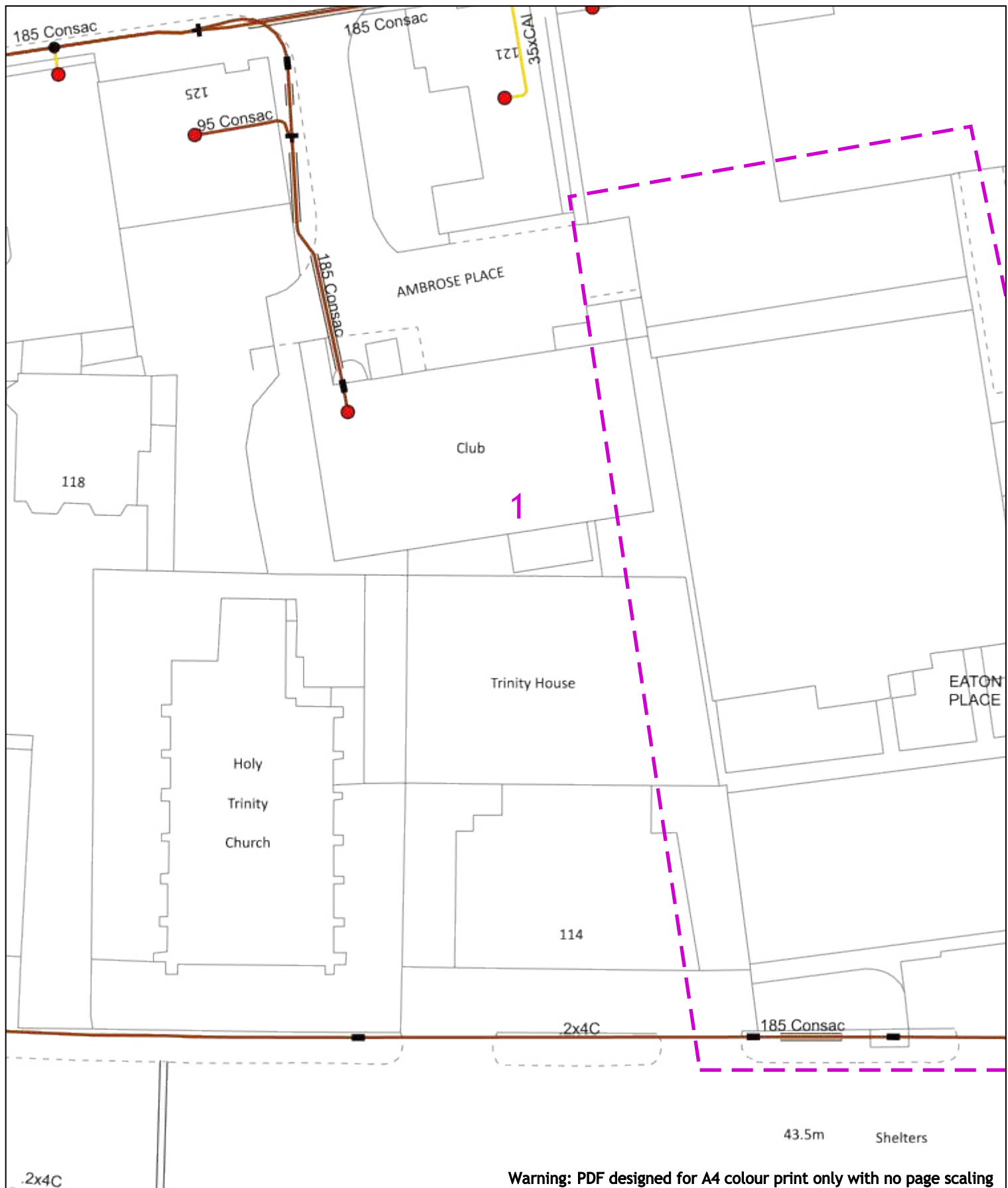
WHEN WORKING IN THE VICINITY OF OVERHEAD LINES THE HEALTH AND SAFETY GUIDANCE NOTES G56 SHOULD BE CONSULTED (AVAILABLE FROM THE HSE WEBSITE)



Scottish and Southern Energy Power Distribution Ltd.
Registered Office: Inverlorn House,
200 Dunkeld Road, Perth, PH1 3AQ
Registered in Scotland No. SC213459

If you're unsure & need to seek advice before commencing excavations, please contact:
General Enquiries: 0800 048 3516

Subject to revision - Master held by SSEN Asset Data Team:
Asset.Data@sse.com
01256 337 294



020m Dig Sites

Area:

Line:

Date Requested: 15/12/2020

Job Reference: 20808075

Site Location: 470885 173421

Requested by: Miss Alexa Band

Your Scheme/Reference: STR4832

Voltages (V)				
LV (Low Voltage) and Services	Up to 1,000V			
HV (High Voltage)	Over 1,000V to 11,000V			
EHV (Extra High Voltage)	22,000V to 132,000V			
Transmission	275,000V and 400,000V			

NORMAL DEPTH TO THE TOP OF THE CABLE WHEN LAID				
Services	LV	HV	EHV	
Footpath/Unmade	0.45m	0.45m	0.6m	0.8m
Road Crossing	0.6m	0.6m	0.75m	0.9m
Agricultural	1m	1m	1m	1.1m

Legend

Service Cable

LV Mains

2 - 3.3kV

6.6kV

11kV

22kV

33kV

66kV

132kV

275kV

400kV

EHV Cables

Private Cables

Distribution Structures (Electric)

Pole, Existing Location

Pole Structure, Existing Location - Single

Pole Structure, Existing Location - m

Street Route

Cross Section Route

WARNING

There may have been subsequent alteration to the surface levels. Trial holes must be undertaken to determine position and depths of cables. HS (G) 47 Booklet from the Health and Safety Executive - Avoiding Danger from Buried Cables - should be consulted before commencing excavation work.

WHEN WORKING IN THE VICINITY OF OVERHEAD LINES THE HEALTH AND SAFETY GUIDANCE NOTES G56 SHOULD BE CONSULTED (AVAILABLE FROM THE HSE WEBSITE)

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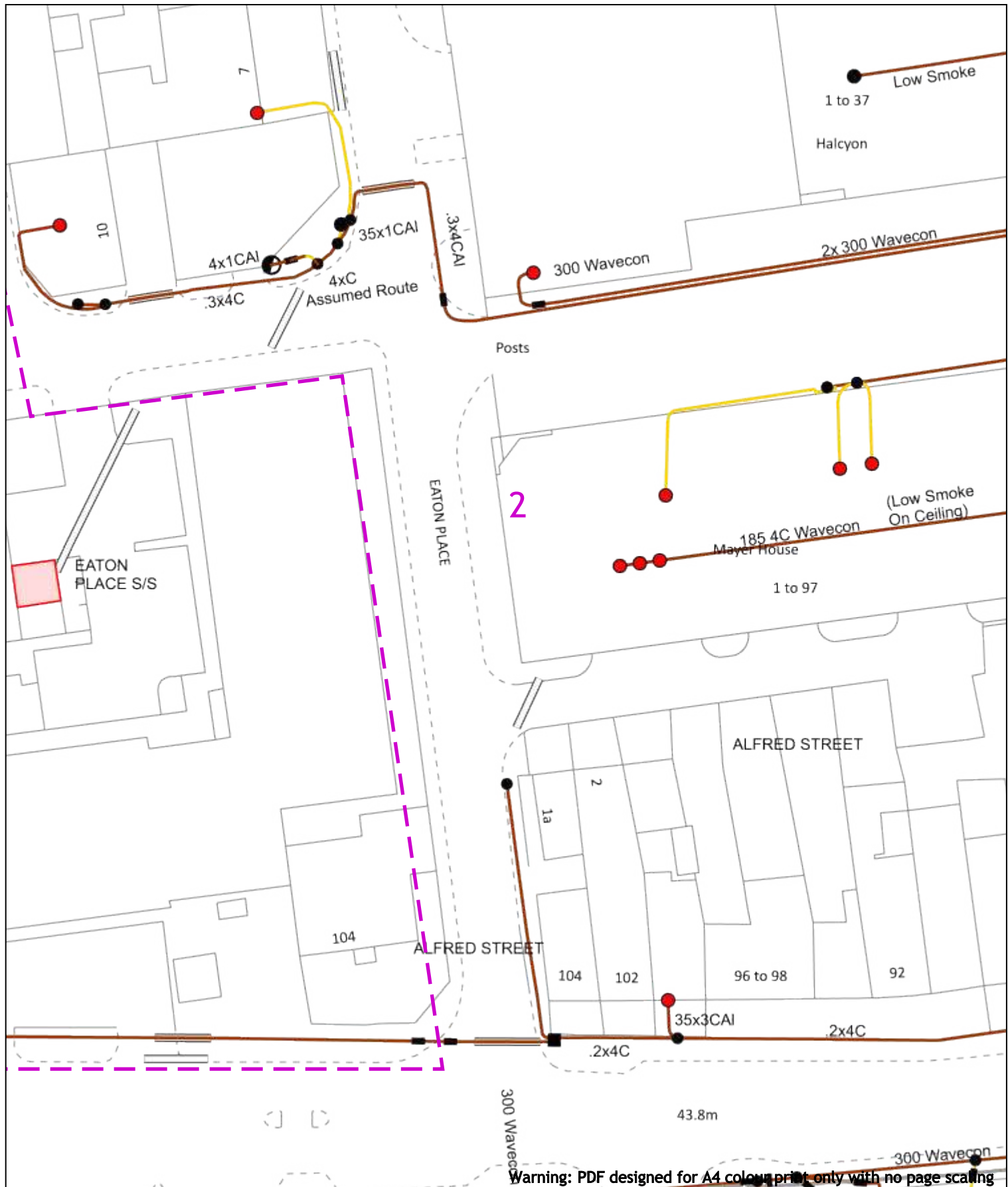
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Asset.Data@sse.com
01256 337 294

Scale: 1:500 (When plotted at A4)

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0 20m Dig Sites Area: Line:

Legend

- Service Cable
- LV (Main)
- 2-13kV
- 6.6kV
- 22kV
- 33kV
- 66kV
- 132kV
- 275kV
- 400kV
- Other Cables
- Pole Cable

Distribution Structures (Electric)

- Pole, Existing Location
- Pole Structure, Existing Location - Single
- Pole Structure, Existing Location - in
- Street Route
- Cross Section Route

Voltages (V)

Services	LV	HV	EHV
Footpath/Unmade	0.45m	0.45m	0.8m
Road Crossing	0.6m	0.6m	0.9m
Agricultural	1m	1m	1.1m

NORMAL DEPTH TO THE TOP OF THE CABLE WHEN LAID

Services	LV	HV	EHV
Footpath/Unmade	0.45m	0.45m	0.8m
Road Crossing	0.6m	0.6m	0.9m
Agricultural	1m	1m	1.1m

WARNING

There may have been subsequent alteration to the surface levels. Trial holes must be undertaken to determine position and depths of cables. HS (G) 47 Booklet from the Health and Safety Executive - Avoiding Danger from Buried Cables - should be consulted before commencing excavation work.

WHEN WORKING IN THE VICINITY OF OVERHEAD LINES THE HEALTH AND SAFETY GUIDANCE NOTES G56 SHOULD BE CONSULTED (AVAILABLE FROM THE HSE WEBSITE)

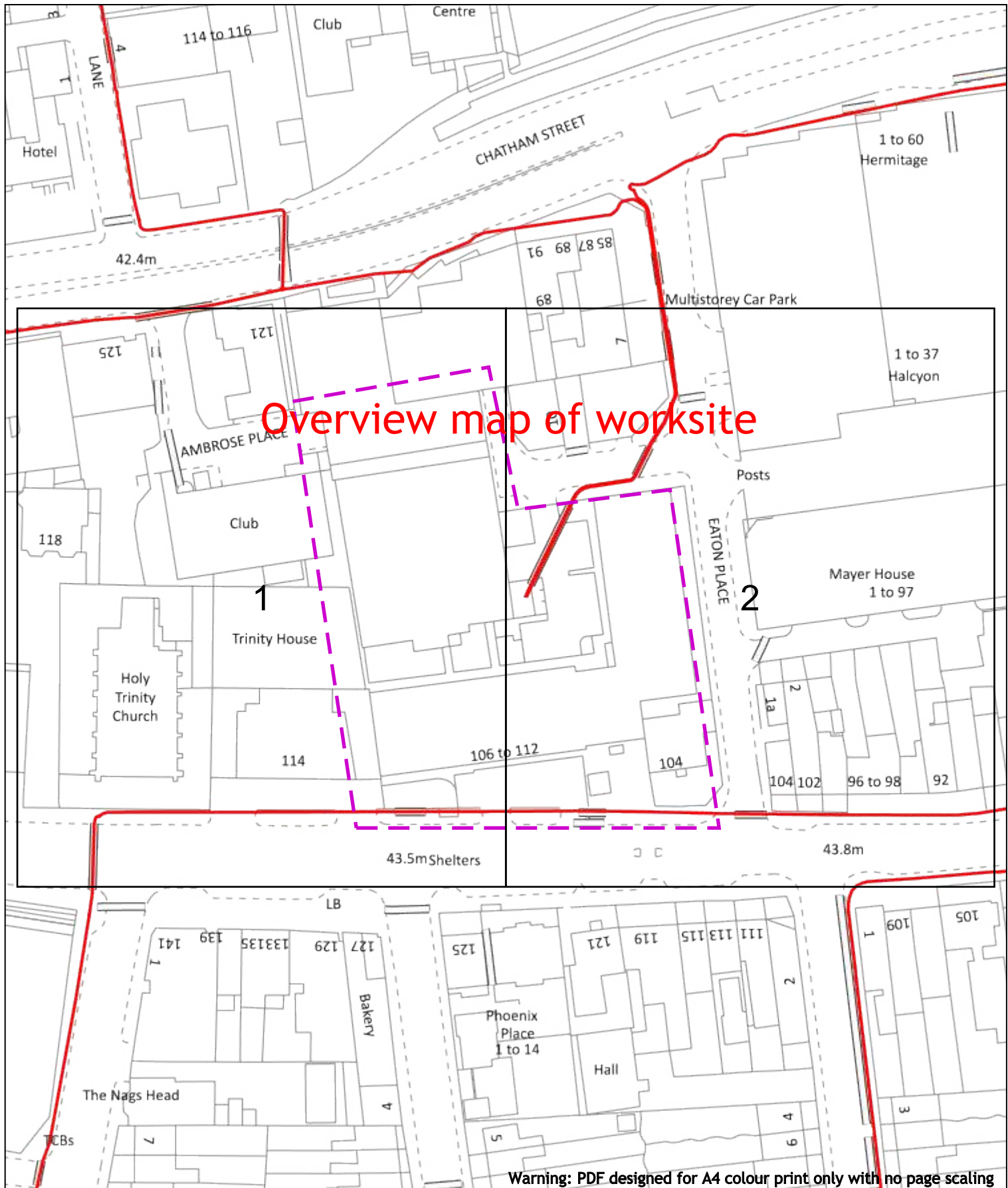
Date Requested: 15/12/2020
Job Reference: 20808075
Site Location: 470885 173421
Requested by: Miss Alexa Band
Your Scheme/Reference: STR4832

Scale: 1:500 (When plotted at A4)

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General Enquiries: 0800 048 3516

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Asset.Data@sse.com
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Overview map of worksite

Dig Sites Area: Line:

Date Requested: 15/12/2020
Job Reference: 20808075
Site Location: 470885 173421
Requested by: Miss Alexa Band

Your Scheme/Reference: STR4832

Scale: 1:1025 (When plotted at A4)

Voltages (V)			
LV (Low Voltage) and Services	Up to 1,000V		
HV (High Voltage)	Over 1,000V to 11,000V		
EHV (Extra High Voltage)	22,000V to 132,000V		
Transmission	275,000V and 400,000V		
NORMAL DEPTH TO THE TOP OF THE CABLE WHEN LAID			
Services	LV	HV	EHV
Footpath/Unmade	0.45m	0.45m	0.8m
Road Crossing	0.6m	0.6m	0.75m
Agricultural	1m	1m	1.1m

WARNING
There may have been subsequent alteration to the surface levels. Trial holes must be undertaken to determine position and depths of cables. HS (G) 47 Booklet from the Health and Safety Executive – Avoiding Danger from Buried Cables – should be consulted before commencing excavation work.
WHEN WORKING IN THE VICINITY OF OVERHEAD LINES THE HEALTH AND SAFETY GUIDANCE NOTES G56 SHOULD BE CONSULTED (AVAILABLE FROM THE HSE WEBSITE)

Legend	
	Service Cable
	LV Mains
	2" - 3" SW
	6.6kV
	11kV
	22kV
	33kV
	66kV
	132kV
	275kV
	400kV
	Future Cables
	Pole Cable

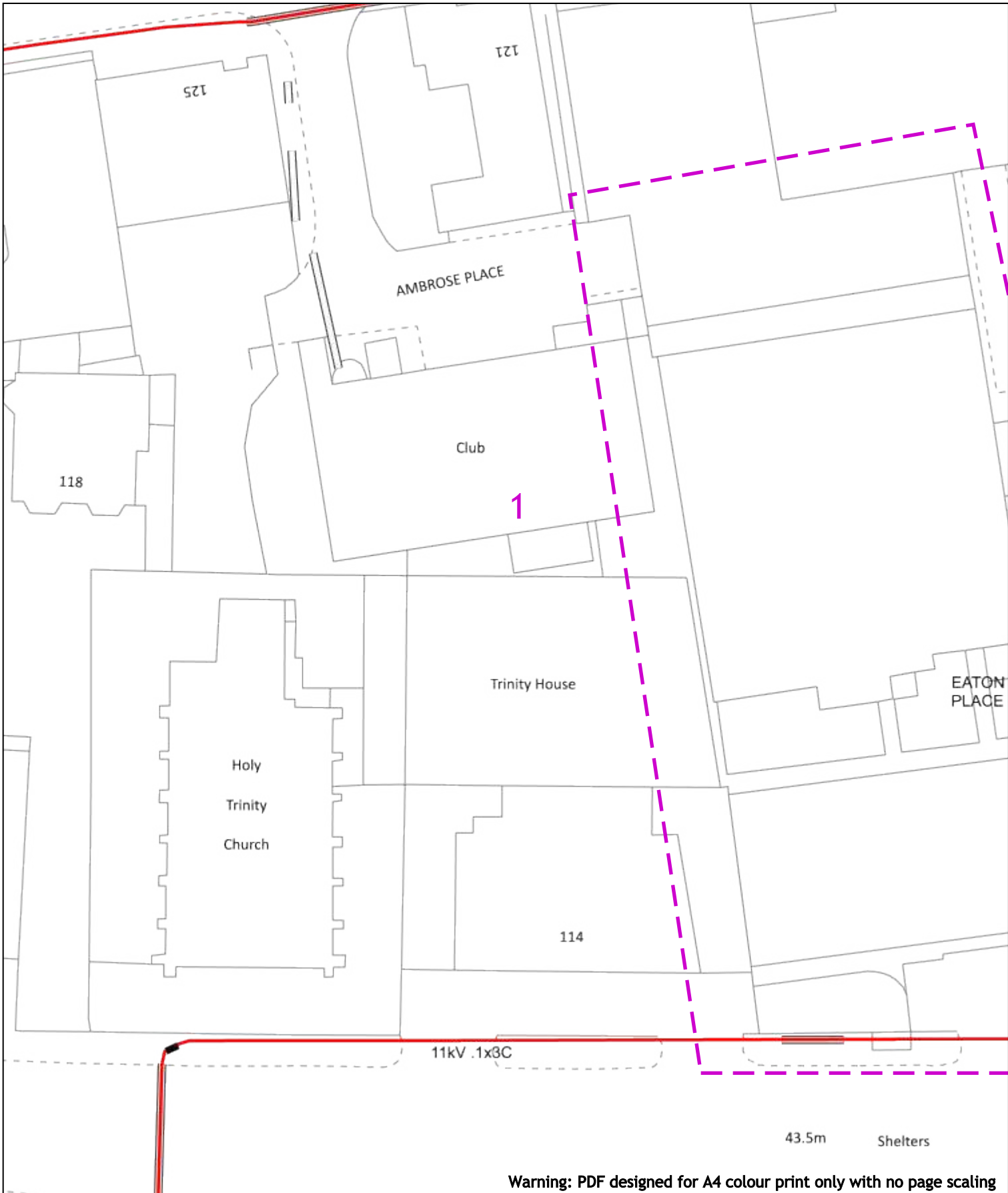
Distribution Structures (Electric)	
	Pole, Existing Location
	Pole Structure, Existing Location - Single
	Pole Structure, Existing Location - m
	Street Route
	Cross Section Route



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Registered in Scotland No. SC213459

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General Enquiries: 0800 048 3516

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01256 337 294



020m Dig Sites Area: Line:

Date Requested: 15/12/2020

Job Reference: 20808075

Site Location: 470885 173421

Requested by: Miss Alexa Band

Your Scheme/Reference: STR4832

Scale: 1:500 (When plotted at A4)

Voltages (V)

LV (Low Voltage) and Services Up to 1,000V

HV (High Voltage) Over 1,000V to 11,000V

EHV (Extra High Voltage) 22,000V to 132,000V

Transmission 275,000V and 400,000V

NORMAL DEPTH TO THE TOP OF THE CABLE WHEN LAID

Services

Footpath/Unmade

Road Crossing

Agricultural

LV

0.45m

0.6m

1m

HV

0.45m

0.6m

0.75m

1m

EHV

0.8m

0.9m

1.1m

Legend

Service Cable

LV Mains

2 - 3.3kV

0.6kV

22kV

33kV

66kV

132kV

275kV

400kV

Follow Cables

Pole Cable

Distribution Structures (Electric)

Pole, Existing Location

Pole Structure, Existing Location - Single

Pole Structure, Existing Location - m

Steel Route

Cross Section Route

WARNING

There may have been subsequent alteration to the surface levels. Trial holes must be undertaken to determine position and depths of cables. HS (G) 47 Booklet from the Health and Safety Executive - Avoiding Danger from Buried Cables - should be consulted before commencing excavation work.

WHEN WORKING IN THE VICINITY OF OVERHEAD LINES THE HEALTH AND SAFETY GUIDANCE NOTES G56 SHOULD BE CONSULTED (AVAILABLE FROM THE HSE WEBSITE)

W

E

N

S

Scottish & Southern Electricity Networks

Scottish and Southern Energy Power Distribution Ltd.

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Registered In Scotland No. SC213459

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Subject to revision – Master held by SSEN Asset Data Team:
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Updated Conceptual Model

Current site use

Proposed site use

commercial/industrial
residential without plant uptake

Source	Pathway										Receptor	Risk assessment to CIRIA C552		
	Humans						Vegetation	Water				Consequence of risk occurring via most likely pathway	Risk	
	Ingestion of air-borne dusts	Ingestion of soil	Ingestion of vegetables and soil attached to vegetables	Inhalation of air-borne dusts	Inhalation of vapours	Dermal contact with soil and dust	Root uptake, deposition to shoots and foliage contact	Percolation of water through contaminated soils	Near-surface water run-off through contaminated	Saturation of contaminated soils by flood waters				
Soils/Rocks														
Historic warehouses	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	-				Current site users	Adult	Medium	Low
	Low likelihood	Low likelihood	Unlikely	Low likelihood	Low likelihood	Low likelihood	-				Proposed site users	Child	Medium	Low/moderate
	-	-	-	-	-	-	Likely				Vegetation (current and proposed)	-	Mild	Low/moderate
	-	-	-	-	-	-	-	Low likelihood	Unlikely	Low likelihood	Water (current and proposed)	-	Medium	Low/moderate
General Made Ground	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	-				Current site users	Adult	Medium	Low
	Likely	Likely	Unlikely	Likely	Likely	Low likelihood	-				Proposed site users	Child	Medium	Moderate
	-	-	-	-	-	-	-				Vegetation (current and proposed)	-	Mild	Low
	-	-	-	-	-	-	-	Low likelihood	Unlikely	Low likelihood	Water (current and proposed)	-	Medium	Low/moderate
Adjacent works (northern boundary)	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	-				Current site users	Adult	Medium	Low
	Low likelihood	Low likelihood	Unlikely	Low likelihood	Low likelihood	Low likelihood	-				Proposed site users	Child	Medium	Low/moderate
	-	-	-	-	-	-	Likely				Vegetation (current and proposed)	-	Mild	Low/moderate
	-	-	-	-	-	-	-	Low likelihood	Unlikely	Low likelihood	Water (current and proposed)	-	Medium	Low/moderate
Adajcent dry cleaners	-	-	-	-	Unlikely	-	-				Current site users	Adult	Medium	Low/moderate
	-	-	-	-	Low likelihood	-	-				Proposed site users	Child	Medium	Low/moderate
	-	-	-	-	-	-	-	Likely	Unlikely	Low likelihood	Water (current and proposed)		Medium	Low/moderate

Title	Table number
Updated Conceptual Site Model	1

Final Conceptual Model

Current site use
Proposed site use

commercial/industrial
residential without plant uptake

Source	Pathway										Receptor	Risk assessment to CIRIA C552		
	Humans						Vegetation	Water				Consequence of risk occurring via most likely pathway	Risk	
	Ingestion of air-borne dusts	Ingestion of soil	Ingestion of vegetables and soil attached to vegetables	Inhalation of air-borne dusts	Inhalation of vapours	Dermal contact with soil and dust	Root uptake, deposition to shoots and foliage contact	Percolation of water through contaminated soils	Near-surface water run-off through contaminated	Saturation of contaminated soils by flood waters				
Soils/Rocks														
Historic warehouses	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	-				Current site users	Adult	Medium	Low
	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	-				Proposed site users	Child	Medium	Low
	-	-	-	-	-	-	Unlikely				Vegetation (current and proposed)	-	Mild	Very low
	-	-	-	-	-	-	-	Unlikely	Unlikely	Unlikely	Water (current and proposed)	-	Medium	Low
General Made Ground	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	-				Current site users	Adult	Medium	Low
	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	-				Proposed site users	Child	Medium	Low
	-	-	-	-	-	-	Unlikely				Vegetation (current and proposed)	-	Mild	Very low
	-	-	-	-	-	-	-	Unlikely	Unlikely	Unlikely	Water (current and proposed)	-	Medium	Low
Adjacent works (northern boundary)	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	-				Current site users	Adult	Medium	Low
	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely	-				Proposed site users	Child	Medium	Low
	-	-	-	-	-	-	Unlikely				Vegetation (current and proposed)	-	Mild	Very low
	-	-	-	-	-	-	-	Unlikely	Unlikely	Unlikely	Water (current and proposed)	-	Medium	Low
Dry cleaner	-	-	-	-	Unlikely	-					Current site users	Adult	Medium	Very low
	-	-	-	-	Unlikely	-					Proposed site users	Child	Medium	Very low
	-	-	-	-	-	-	-	Unlikely	Unlikely	Unlikely	Water (current and proposed)	-	Medium	Very low

Title	Table number
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