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Proposed residential development
Crockwell Farm
Great Bourton

Ground Investigation Report

Cedar Barn, White Lodge, Walgrave, Northamptonshire NN6 9PY

t: 01604 781877 **e**: mail@soiltechnics.net
f: 01604 781007 **w**: www.soiltechnics.net

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Proposed residential development
Crockwell Farm
Great Bourton
Banbury
Oxfordshire
OX17 1QT

GROUND INVESTIGATION REPORT

Soiltechnics Ltd. Cedar Barn, White Lodge, Walgrave, Northampton. NN6 9PY.
Tel: (01604) 781877 Fax: (01604) 781007 E-mail: mail@soiltechnics.net

Report originators

Prepared by	[redacted]	
	Leanne Carr B.Sc. (Hons)., AMIEnvSc	leanne.carr@soiltechnics.net Geo-environmental Engineer
Prepared by	[redacted]	
	Ian Dunkley	ian.dunkley@soiltechnics.net Senior Geo-environmental Engineer
Supervised by	[redacted]	
	Sarah Drage B.Sc, (Hons)., MIEnvSc., FGS	sarah.drage@soiltechnics.net Director

Aerial photograph of site

Approximate site boundary is highlighted in red.

Bookmarking

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Report status and format

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3	Site observations		
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List of drawings

Drawing	Principal coverage	Status	
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01	Site location plan		
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03	Plan showing site development proposals and location of exploratory points		

List of appendices

Appendix	Content	Status	
		Revision	Comments
A	Definitions of geotechnical terms used in this report		
B	Definitions of geo-environmental terms used in this report		
C	Photosheet		
D	Machine excavated trial pits		
E	Results of infiltration testing in trial pits		
F	Copies of laboratory test result certificates (Soil Engineering)		
G	Copies of laboratory test result certificates (Chemical).		
H	Hazardous waste classification spreadsheet		
I	Copies of statutory undertakers' replies		

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 comprises disused farm buildings and open yard areas located to the north of Great Bourton.

A review of readily available historical maps indicates the site been developed since the first available maps (1880s) with only minor redevelopments in onsite structures since. A suspected pond appeared to border the site in the northeast, which was subsequently infilled by 1974.

We understand the scheme will comprise the construction of two single-storey dwellings together with garden areas and access roads; and the conversion of a barn to the south to provide a third dwelling.

Ground conditions encountered

Each exploratory excavation encountered a similar profile of soils considered to be Made Ground overlying the Dyrham Formation.

No groundwater inflows were observed in any of the exploratory excavations.

Foundation solution

In our opinion naturally deposited Dyrham Formation soils will adequately support proposed buildings on concrete strip/trench fill foundations.

Instability was observed in trial pit sides due to the extraction of limestone cobbles, leading to a widening of trenches. This may result in wider than planned foundation trenches with a higher usage of concrete.

Chemical and gaseous contamination

We are of the opinion that the Made Ground soils onsite present a risk to end users and suggest that remedial action is taken. We recommend that Made Ground should be removed in its entirety from areas of proposed soft landscaping, or to a depth of 600mm if Made Ground is locally thicker (encountered in the range of 100-300mm generally).

It may be possible, through additional sampling and analysis within proposed garden areas and soft standing, to zone areas of Made Ground.

Waste disposal Primary assessment only

Initial assessment of Made Ground indicates that when assessed as a whole, soils would be classified as **hazardous.** This is due to Ecotoxic hazardous properties primarily arising from elevated levels of zinc at TP08. When the results from TP08 are omitted (see Appendix H - Table 2) the remaining 3 samples can be considered **non-hazardous**. We recommend consultation with a waste contractor to discuss the available results and consider the benefit of further testing to support the project.

2 Introduction

2.1 Objectives

2.1.1 This report describes a ground investigation carried out for a proposed residential development at Crockwell Farm, Great Broughton, Oxfordshire.

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 and primary waste categorisation.

2.2 Status of this report

2.2.1 This report is final based on our current instructions.

2.3 Client instructions and confidentiality

2.3.1 The investigation was carried out in May 2020 and reported in June 2020 acting on instructions received from March Projects Limited on behalf of our mutual client Crockwell Farm LLP.

2.3.2 This report has been prepared for the sole benefit of our above-named instructing client, 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.

2.3.3 Our original investigation proposals were outlined in our letter to march Projects Limited dated 7th April 2020 (ref L-QR9188-001). 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 445508,245686. A plan showing the location of the site is presented on Drawing 01.

2.4.2 We understand the scheme will comprise the three single-storey dwellings together with garden areas and access roads. Two of the proposed dwellings are to be newly constructed with the third comprising a renovated barn to the south of the site.

2.5.3 We have received layout drawings of the proposed scheme with the layout presented on Drawing 03.

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 brief risk assessment of chemical contamination based on readily available historic records, inspection of the soils and laboratory testing.

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 generally followed the principles of BS 10175:2011+A2:2017 *'Investigation of potentially Contaminated Sites – Code of Practice'.* 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 Soiltechnics liability

2.6.1 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 Site observations, history and geology

3.1 General

3.1.1 We have carried out a review of readily available information, including:

a) Inspection of geological maps produced by the British Geological Survey together with relevant geological memoirs

b) Consultation with statutory undertakers

c) Site reconnaissance

d) Other relevant published documents

3.2 Description of the site

3.2.1 The site comprises disused farm buildings and yard areas to the north of the small predominantly residential village of Great Bourton, itself located approximately three miles north of Banbury, Oxfordshire.

3.2.2 The general topography of the area falls to the east, towards the Oxford Canal and River Cherwell located neighbouring each other approximately 1.4km from the site. The nearest water feature, however, is a tributary of River Cherwell located approximately 320m to the north of the site.

3.2.4 The site itself comprises dilapidated barns in various states of repair, with a courtyard area surfaced in grass in the south, and a recently stripped courtyard area towards the north. The northern barn is the largest and was used to store various containers of oil, creosote and various other unmarked substances. The barn was roofed with suspected corrugated asbestos cement panels, with fragments of suspected asbestos corrugated roofing observed local to TP02 to the east of the site.

3.2.5 Two tanks were noted on or near the site (unclear if they had been used in their current locations), or along with multiple unlabelled drums in the east, which appeared to be either water filled or empty. One empty non-bunded metal tank with some obvious rusting and slight pitting was located at the crest of the neighbouring field to the west, which is suspected to have been moved from its original location. A second suspected tank or storage container was located neighbouring the northern barn in the east. Access could not be gained to inspect further due to overgrown vegetation and the safety of the barn structure. A well was observed in the centre of the site with a cover flush with the ground.

3.2.6 Site boundaries are generally undefined, with fields surrounding the site and residential properties present in the south and southeast. The Site is accessed via Stanwell Lane to the south.

3.2.7 Site levels generally fall from northwest to southeast by approximately 2m, reflecting local topography. Vegetation was present both within and close to the site including some recently felled trees in the southern courtyard area.

3.2.8 Photographs showing site conditions at the time of our investigation are presented in Appendix C. A plan showing observed site features and location of exploratory points is presented on Drawing 02.

3.3 Injurious and invasive weeds and asbestos

3.3.1 Injurious and invasive weeds

3.3.1.1 The following weeds are controlled under the Weeds Act 1959:

- Common Ragwort
- Spear Thistle
- Creeping or Field Thistle
- Broad leaved Dock
- Curled Dock

3.3.1.2 Whilst it is not an offence to have the above weeds growing on your land, you must:

- Stop them spreading to agricultural land, particularly grazing areas or land used for forage, like silage and hay
- Choose the most appropriate control method for your site
- Not plant them in the wild

Should you allow the spread of these weeds to another parties' land, Natural England could serve you with an Enforcement Notice. You can also be prosecuted if you allow animals to suffer by eating these weeds.

3.3.1.3 In addition to the above, you must not plant in the wild or cause certain invasive and non-native plants to grow in the wild as outlined in the Wildlife and Countryside act 1981. It is an offence under section 14(2) of the act to *'plant or otherwise cause to grow in the wild*' any plants listed in schedule 9, part II. This can include moving contaminated soil or plant cuttings. The offence carries a fine or custodial sentence of up to 2 years. The most commonly found invasive, non-native plants include:

- Japanese knotweed
- Giant hogweed
- Himalayan balsam
- Rhododendron ponticum
- New Zealand pigmyweed

3.3.1.4 You are not legally obliged to remove these plants or to control them. However, if you allow Japanese knotweed to spread to another parties' land, you could be prosecuted for causing a private nuisance.

3.3.1.5 The presence of such weeds on site may have considerable effects on the cost / timescale in developing the site. Japanese knotweed can cause significant damage to buildings, roads and pavements following development, if untreated prior to development.

3.3.1.6 We recommend specialists in the identification and procedures to deal with injurious and invasive weeds are appointed prior to commencement of any works on site or if appropriate purchase of the site.

3.3.2 Asbestos

3.3.2.1 Our investigations exclude surveys to identify the presence or indeed absence of asbestos on site. It should be noted that we did observe potential asbestos containing materials on site in the form of corrugated roofing on one large barn to the north of the site. Fragments of suspected asbestos corrugated roofing were observed local to TP02. We took precautions to avoid disturbance of these materials during our on-site activities and recommend a specialist be appointed to confirm or otherwise the presence of asbestos. In addition, asbestos fibres were detected in samples of soil submitted for laboratory screening. This is discussed in Section 8 and 10.

3.3.2.2 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 Overview site history

3.4.1 A review of readily available historical maps indicates the site been developed on since the first available maps (1880s) and has since undergone minor redevelopments in onsite structures. A suspected pond appeared to border the site in the northeast, which was subsequently infilled by 1974.

3.5 Geology and geohydrology of the area

3.5.1 Geology of the area

3.5.1.1 We have reviewed geological mapping of the produced by the British Geological Survey (BGS) at a scale of 1: 50,000. A summary of the recorded geological information for the site is presented in the table below:

Summary of Geology and likely aquifer containing strata					
Strata	**Bedrock or superficial**	**Approximate thickness**	**Typical soil type**	**Likely permeability**	**Aquifer designation**
Dyrham Formation	Bedrock	12 - 42m	Siltstone and mudstone, interbedded.	Marginally permeable	Secondary Undifferentiated

Table 3.5.1

3.5.1.2 Secondary undifferentiated aquifer is a designation used when it is not possible to attribute fully one of either Secondary A or Secondary B, due to the variable nature of the soils. The unit will therefore be a mix of both, which are defined as follows:

- Secondary A can be defined as: Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
- Secondary B can be defined as: layers which may store limited amounts of ground water. These groundwater stores are generally the water bearing parts of former aquifers.

3.6 Landfill and infilled ground

3.6.1 Based on publicly available sources, there are no recorded or historical landfill sites within 1km of the subject site. Historic mapping does not indicate any quarrying or infilled potentially infilled ground close to the site.

3.7 Flood risk

3.7.1 Based on publicly available sources, the site is not located within a fluvial or tidal flood plain, or within an area at risk of surface water flooding.

3.8 Enquiries with statutory undertakers

3.8.1 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) Western Power Distribution
c) Scotia Gas Networks (SGN)
d) Thames Water
e) Cadent Gas

3.8.2 Copies of responses received prior to publication of this report are presented in Appendix I. 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.

3.8.3 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 I.

3.8.4 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.

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

4 Fieldwork

4.1 General

4.1.1 Fieldwork was carried out on 1st May 2020 and comprised the formation eight trial pits.

4.1.2 A plan of the site showing observed/existing site features and position of exploratory points is presented on Drawing 02. The position of exploratory points relative to site development proposals is presented on Drawing 03. The position of exploratory points shown on these plans is approximate only.

4.1.3 The extent of fieldwork activities and position of exploratory points were determined by Soiltechnics. As boundaries were not clearly defined and the general farm compound extended to the east beyond the recorded application boundary, our reconnaissance included this area. TP02 was positioned outside of the application boundary to obtain soil samples as suspected asbestos cement was observed on the ground in the vicinity.

4.1.4 All soils exposed in excavations were described in accordance with BS EN ISO 14688 *'Identification and Classification of soil'* and BS EN ISO 14689 *'Identification and classification of rock'.*

4.2 Site restrictions

4.2.1 The buildings present onsite during the intrusive investigation were observed in a poor state of repair. Following a visual assessment and on the advice of the clients representative onsite, we did not enter any of the structures with the exception of taking a small number of general photographs.

4.3 Exploratory trial pits

4.3.1 Trial pits TP01 to TP08 were excavated to a maximum depth of 2.2m using a 360° tracked excavator. The excavations were backfilled with excavated material compacted using the back of the excavator bucket. Whilst we attempted to reinstate the excavation to its original condition some short-term settlement of the backfilling materials may occur. A Geotechnical Engineer supervised the excavations.

4.3.2 Sampling and logging was carried out as trial pit excavations proceeded. The density of granular soils encountered in excavations was gauged by the ease of excavation.

4.3.3 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. Samples from below access depth into trial pits were taken as a sub sample from soil contained in the excavator bucket, discarding any soil, which may have been in contact with the bucket. 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.

4.3.4 Soil samples for subsequent laboratory 'classification' testing were taken from the side of trial pits or from bulk samples taken from the excavator bucket. The sample was immediately placed in a plastic bag and subsequently sealed and labelled. Samples for determination of water content were placed in sealable tubs and appropriately labelled. Soil samples were obtained to meet Category A and quality class 3 to 5 as described in BS EN I997-2:2007 (table 3.1) sufficient for laboratory testing being considered. Sample sizes were also appropriate for the laboratory test being considered (refer BS EN I997-2:2007 annex L).

4.3.5 A pocket penetrometer was used in the cohesive (fine grained) soils encountered. This tool is deemed to measure the apparent ultimate bearing capacity of the soil under test. The pocket penetrometer is calibrated in kg/cm^2. The reading can be approximately converted to equivalent undrained shear strength by multiplying the results by a factor of 50. Tests were carried out in the sides of trial pits when access can be safety achieved otherwise testing was carried out on excavated intact clods. Details of pocket penetrometer determinations presented on the trial pit logs located within Appendix D. An average of measurements taken at a specific depth are recorded on trial pit records. The pocket penetrometer is not covered by British Standards.

4.3.6 Soil infiltration tests were carried out in trial pits TP01, TP02, TP04 and TP07 at depths of between 0.78m and 1.4m. Infiltration tests were carried out following the procedures described in the Building Research Establishment (BRE) DG 365 (2016) "*Soakaway Design*" Records of test results and calculations to determine a soil infiltration rate are presented in Appendix E.

4.3.7 The rate at which water placed in TP01, TP02 and TP07 dissipated very slow and only part of a full test cycle could be carried out during one day of fieldwork (the BRE document recommends three full test cycles). Test results have been used to produce an estimate of the soil infiltration rate using the methods described in the BRE publication. We will be pleased to carry out further testing (over a period of days) on further instructions.

4.3.8 Trial pit records are presented in Appendix D.

4.4 Sampling strategies

4.4.1 Geotechnical

4.4.1.1 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

4.4.2 Environmental

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

4.4.3 Sample retention

4.4.3.1 Samples are stored for a period of one month following issue of this report, unless otherwise requested.

5 Laboratory testing

5.1 Classification

5.1.1 Laboratory testing was carried out on samples retrieved from site. The method of testing is recorded on the laboratory test certificate. The following table summarises the classification testing scheduled;

Table summarising classification testing			
Exploratory point	**Depth (m)**	**Medium/soil type**	**Testing scheduled (determination of)**
TP01	1.00	Dryham Formation	Atterberg, Moisture Content
TP06	0.70	Dryham Formation	
TP03	0.80	Dryham Formation	Particle Size Distribution
TP05	1.50		
Table 5.1.1			

5.1.2 Laboratory test certificates are presented in Appendix F.

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. The following table summarises the chemical testing scheduled;

Table summarising chemical testing			
Exploratory point	**Depth (m)**	**Medium/soil type**	**Testing scheduled (Refer to Appendix A for details).**
TP01	0.30	Made Ground	Asbestos screening, Suite 1
TP06	0.10		
TP03	0.10	Topsoil	
TP02	0.20	Made Ground	Asbestos screening and subsequent quantification
TP08	0.10		Suite 17 (soil)
Table 5.2.1			

5.2.2 Copies of laboratory test result certificates are presented in Appendix G.

5.2.3 All laboratory testing was carried out by an independent specialist testing house, which operates a quality assurance scheme.

6 Ground conditions encountered

6.1 Soils / Rocks and geotechnical parameters

6.1.1 Each exploratory excavation encountered a similar profile of soils considered to be Made Ground overlying the Dyrham Formation. The composition of these stratum are described below, with relevant geotechnical parameters to support foundation design.

6.1.2 Made Ground

6.1.2.1 Made Ground was encountered within all intrusive locations to depths of between 0.1m and 0.6m. Made Ground generally comprised loose brown slightly clayey gravelly sand with rootlets and roots up to 20mm in diameter. Gravel consists of brick, sandstone, slate, limestone, flint, concrete, timber and brick.

6.1.2.2 For the purposes of foundation assessment a bulk density of 17kN/m^3 is suggested based on soil descriptions and after BS 8004:2015.

6.1.3 Dyrham Formation

6.1.3.1 Dyrham Formation was encountered in all intrusive locations to a depth exceeding the termination depths of the trial pits. Dyrham Formation comprised both fine and coarse grained soils (i.e. clay and silt as well as sand and gravel). Soils were generally observed as a sandy gravelly clay and silt with gravels consisting of fine to coarse angular to sub-angular ferruginous limestone. Bands of weak to medium strong grey and iron stained limestone were encountered within all locations between depths of 0.75m and 1.9m, except for TP01, TP06 and TP07.

6.1.3.2 Where limestone bands were penetrated they were observed as ~150mm with further silt and/or clay below. Four positions were terminated due to the competency of limestone deposits in the base (See 6.5 below).

6.1.3.3 The following table summarises test data in the Dyrham Formation.

Table summarising soil testing and derived geotechnical parameters				
Geotechnical parameter	**Method**	**Value range**	**Characteristic value**	**Comments**
Weight density	Soil descriptions	16 - 21	18	Medium strength clay after BS 8004 figure 1.
Plasticity index	Laboratory testing	12 - 17	17	Low volume change potential in line with NHBC
Undrained Shear strength (kN/m^2)	Insitu testing	113 - 200	100	Pocket penetrometer used where more clayey deposits encountered with reduced gravel content. Limited number of tests possible. Suggest conservative value adopted for 'characteristic' value for foundation design to account for variability in soils.
Table 6.1.3				

6.2 Topsoil

6.2.1 As a practice we have adopted the following policy for description of topsoil. If surface soils exhibit a visually significant organic content and darker colour than the soils it overlies (which are considered to be naturally deposited) then we will describe the soil as topsoil. In some cases, it is difficult to visually distinguish the interface between topsoil and subsoils below, which may also exhibit an organic content, and in such cases we will adopt an estimate of the interface but may also use the terms 'grading into' with some defining depths.

6.2.2 If 'topsoil' deposits include materials such as ash, brick and other man-made materials, or the topsoil overlies Made Ground deposits we will term the material 'Made Ground', even though it may still be able to support vegetable growth, and potentially reused as topsoil.

6.2.3 Topsoil can be classified following a number of test procedures as described in BS3882:2015 *'Specification for Topsoil'* to allow its uses to be determined. We do not carry out such testing unless specifically instructed to do so.

6.3 Groundwater

6.3.1 No groundwater inflows were observed in any of the exploratory excavations.

6.4 Evidence of contamination

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

6.4.2 It should be noted that fragments of suspected asbestos corrugated roofing were observed local to TP02 on the surface.

6.6 Obstructions and instability

6.6.1 Trial pit excavations were undertaken using a 450mm wide bucket. While there was some slight widening due to repeated passes with the bucket, some additional instability was encountered due to excavating cobbles of limestone up to 500mm x 500mm x 80mm. Approximate final widths are recorded on trial pit logs in Appendix D.

6.6.2 It is likely that excavations to form foundation widths will encounter cobbles of limestone leading to some widening of foundation trenches. This may lead to greater quantities of concrete being required.

7 Geotechnical Appraisal

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 the scheme will comprise the construction of two single-storey dwellings and the renovation of an existing barn, together with garden areas and access roads.

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 Eight trial pits formed at the site 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	Loose slightly clayey gravelly sand	0.1 – 0.6m	0.25m	None	-
Dyrham Formation	Firm sandy gravelly clay and silt, with bands of weak to medium strong limestone.	>2.2m	12m*	None	-

Table 7.3.1
* based on published geological records

7.4 Building foundation solution

7.4.1 In our opinion naturally deposited Dyrham Formation soils will adequately support proposed buildings on concrete strip/trench fill foundations. Based on laboratory determination of plasticity and following National House Building Council (NHBC) Standards Chapter 4.2, we recommend foundations extend to a minimum depth of 0.75m below existing or proposed ground levels whichever gives the deeper founding level. In all cases we recommend foundation excavations fully penetrate any Made Ground deposits and extend into the Dyrham Formation by a minimum of 0.3m into the naturally deposited soils, subject to an overall minimum foundation depth of 0.75m. It should be noted that there are a number of trees and major vegetation on the site which will require foundation depths exceeding the minimum depth defined above. Further guidance on this is provided in the following report paragraphs.

7.4.2 The following assessments consider new foundations for the proposed new build dwellings. Subject to loading changes, the proposed barn conversion may require underpinned foundations and the following assessments can be used. As loads have already been imposed on the ground beneath the barn, settlements will be reduced and are subject to any net increase in load. We can provide detailed assessments on settlement on receipt of proposed loadings.

7.4.3 The minimum foundation depth of 0.75m is applicable to the existing barn and underpinning should be considered if current foundations are less than 0.75m deep, to avoid any movement associated with seasonal wetting and drying of soils.

7.5 Determination of bearing resistance to BS EN1997-1:2004 (Eurocode 7)

7.5.1 Geotechnical category

7.5.1.1 In our opinion the project will comprise conventional types of structure and foundations with no exceptional risk, or difficult ground or loading conditions thus meeting the requirements of geotechnical category 2.

7.5.2 Assumptions

7.5.2.1 Eurocode 7 list assumptions made in the provision of the standard (in section 1.3). Comments against some assumptions are provided below.

Assumption	Comment
Data for the design are collected, recorded and interpreted by appropriately qualified personnel	This report follows an in-house procedure of review and checking, ultimately approved by a Director of the company who by virtue of experience in geotechnical engineering and qualification is deemed appropriately qualified
Adequate continuity and communication exist between the personnel involved in data collection, design and construction	This can be challenging in situations in which structural and geotechnical design is carried out by different individuals and indeed different organisations. Invariably the ground investigation is carried out at an early stage of a development and prior to actions on buildings being established let alone their magnitude. It is important that we the geotechnical consultant form part of the design team with continuous review of geotechnical design data in the context of the structural design process.

Table 7.5.2

7.5.3 Ultimate limit state assessment

7.5.3.1 Based on the results of the investigations, we are of the opinion soils providing support to strip / trench fill foundations are generally fine grained soils and thus bearing resistance will be determined using undrained conditions. The table below presents characteristic values (derived in section 6) and design values (applying partial factors where appropriate as tabulated below) used in our calculations to derive bearing resistances for ultimate limit states.

Table of geotechnical parameters for ULS - fine grained (undrained) soils			
Strata	**Characteristic Value**	**Design Value (approach 1)** C1 = Combination 1 C2 = Combination 2	**Derivation / comments**
Undrained shear strength (kN/m²)			
Dyrham Formation	100	100 (C1) 71 (C2)	Measured values at founding level Design value derived applying partial factors
Characteristic weight density (kN/m3)			
Dyrham Formation	16 to 21	17	Published values from BS8004:2015 Section 4.3 Figures 1&2
Table 7.5.3.1			

7.5.3.2 The following table provides derived ultimate limit state bearing resistances.

Table of bearing resistance (strip /trench fill foundations)		
Ultimate limit state derived using Design approach 1		
Foundation width (m)	**Combination 1 kN/m2**	**Combination 2 kN/m2**
0.6	R_{d1} = 530	R_{d2} = 380
0.75	R_{d1} = 530	R_{d2} = 380
0.9	R_{d1} = 530	R_{d2} = 380
Table 7.5.3.3		

7.5.3.3 It is vitally important to note that partial factors given in table A3 of the code must be applied to actions (V_{uls}) imposed on the ground at foundation formation level (including self-weight of the foundation) to satisfy the requirement of:

$$\mathbf{V_{uls} \leq R_d}$$

7.5.4 Serviceability limit state (SLS) assessment

7.5.4.1 It is a requirement to check the serviceability limit state by estimating permanent deformation of the ground (settlement) providing resistance to the applied actions. In order to determine settlement, we have used the following geotechnical parameters which are deemed characteristic of the soils supporting the foundation. These are as follows:

Table of geotechnical parameters to estimate settlement			
Symbol	**Parameter**	**Value**	**Derivation**
m_v	Coefficient of volume Compressibility.	0.15m²/MN	Engineering Geology of British Rocks and Soils - Lias Group
E_u	Undrained modulus.	15000kN/m²	Typical value for medium clay
μ_g	Geological factor	0.7	Typical value for over consolidated clays
Table 7.5.4.1			

7.5.4.2 We have estimated settlements induced from applied foundation stresses. As a practice we adopted classic techniques, calculating immediate settlement from soil modulus and longer-term settlement using consolidation theory using compressibility coefficients. The following table summarises the results of our assessment of bearing resistances (serviceability limit states) and settlement estimated from the applied bearing resistance stress.

Table of bearing resistance (strip /trench fill foundations)		
Design approach 1		
Foundation width (m)	**Bearing resistance. kN/m2**	**Settlement limit (initial and consolidation) mm**
0.6	R_{sls} = 220	25
0.75	R_{sls} = 180	25
0.9	R_{sls} = 160	25
Table 7.5.4.2		

7.5.4.3 It should be noted that the ICE Manual for Geotechnical Engineering advises '*The total settlement of clays would usually consider the dead load plus a fraction of the live load (typically about 25%), since clay consolidation will not be significantly affected by short-term transient loads (such as wind loads)'.*

7.5.4.4 Differential settlement is totally dependent upon the variation of loads (actions) imposed on the ground and consistency of the foundation supporting ground.

7.5.4.5 The above assessment for bearing and settlement assumes clay/silt continues beneath the foundation. In fact, limestone rock was encountered in bands within most excavations, with four positions terminated as a result of limestone. The presence of limestone bands will significantly reduce settlement and where foundations bear directly onto limestone settlement is likely to be neglibible. Consequently, there is the potential for differential settlement of up to say 20mm (assuming loads at the SLS limit).

7.5.4.6 It is likely settlement will be substantially achieved within say 10 years of construction. If stresses applied at foundation formation levels vary significantly then this will increase levels of differential settlement produced by variation in ground conditions alone.

7.5.4.7 Thus actions (V_{sls}) imposed on the ground at foundation formation level (including self-weight of the foundation) taking into account a consideration of live (variable) loads the following must be satisfied;

$$V_{sls} \leq R_{sls}$$

7.5.5 Reinforcement in foundations

7.5.5.1 It is possible that excavations to founding levels may encounter variable soil deposits and locally encountered limestone. These soils, as above, will settle at different levels/rates and foundations (particularly strip / trench fill concrete foundations) traversing differing soil types will be subject to some differential settlements. To minimise the effects of such differing rates of settlement we recommend foundations are reinforced to stiffen concrete and thus resist the effects of differential movement. In the event that a soft area is located in the course of foundation excavations then we recommend excavations continue to locate stiffer/denser soils.

7.6 Influence of trees and other major vegetation

7.6.1 Soil classification and new foundation design

7.6.1.1 The results of plastic and liquid limit determinations performed on samples of the Dyrham Formation indicate these deposits are soils of low volume change potential when classified in accordance with National House Building Council (NHBC) Standards, Chapter 4.2. Foundations taken down onto a depth of 0.75m will penetrate the zone of shrinkage and swelling caused by seasonal wetting and drying. Trees and other major vegetation extend this zone and will require deeper foundations. A good guide to this subject is provided in NHBC Standards, Chapter 4.2.

7.6.2 Tree species identification

7.6.2.1 There are a number of trees and other vegetation at the site and along the site boundaries, including some recently felled trees. On this basis it will be necessary to appoint a qualified Arboriculturist (listed in the Arboricultural Association Directory of Consultants – www.trees.org.uk) to determine the location, height (and mature height) and water demand of all current and former trees/major hedgerows at and close to the site, information, which will be necessary to design foundations in accordance with NHBC Standards, Chapter 4.2.

7.6.3 New planting

7.6.3.1 Any planting schemes should also take into account the effect that new trees could have on foundations when they reach maturity. Again, a good guide to this subject is provided in NHBC Standards, Chapter 4.2.

7.6.4 Influence of trees on existing buildings

7.6.4.1 Some existing trees may be within influencing distance of existing foundations as the trees grow towards maturity, which could result in future crack and movement damage. We recommend an assessment is carried out to determine which trees are within influencing distance with removal likely to be a solution to avoid future risks to existing and remaining buildings.

7.7 Ground Floor Construction

7.7.1 Ground bearing floor slabs can be adopted at this site where buildings are remote from trees and where Made Ground and Topsoil deposits are fully removed within the footprint of the building. We recommend a blanket of good quality compacted granular material be placed prior to construction of the floor slabs.

7.7.2 In areas close to existing major vegetation at the site (or where ground floors are elevated requiring in excess of 600mm of fills) then we recommend the use of a suspended ground floor with a sub floor void determined following NHBC Standards, Chapter 4.2.

7.8 Effect of existing development on new foundations

7.8.1 We have overlain the existing building footprint onto the proposed development layout on drawing 03. Clearly demolition of the existing farm buildings and removal of existing foundations will disturb near surface soils requiring new foundations to extend into soils which have not been disturbed.

7.9 Trench stability

7.9.1 Based on our observations of the stability of the sides of trial pit excavations we consider there is a possibility of some over break/instability in the sides of foundation excavations producing a wider than planned trench widths resulting in an increase in the quantity of foundation concrete to fill voids produced by instability of trench sides.

7.9.2 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 2.2m.

7.9.3 Excavations extending to depths greater than 0.75m are at an increasing risk of encountering bedded limestone deposits, which may likely require the use of breaking equipment to loosen the deposit prior to excavation.

7.9.4 The silty nature of the Dyrham Formation will render them moisture susceptible with small increases in moisture content promoting rapid deterioration. We recommend, therefore, that as soon as trench excavations are opened foundation concrete be poured as quickly as practically possible.

7.9.5 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)

7.10 Infiltration Potential

7.10.1 Requirements for use of infiltration systems

7.10.1.1 It is a requirement under H3 (3) of the current building regulations to discharge stormwater collected by a development to soakaways as a priority (as opposed to water courses and sewers).

7.10.2 Infiltration measurements

7.10.2.1 The permeability of the Dyrham Formation deposits was measured in four trial pits (TP01, TP02, TP04 and TP07) following the procedures described in Building Research Establishment (BRE) Digest 365 (2007) "*Soakaway Design*". Records of testing and calculations are presented in Appendix E. Tests were carried out at depths in the range of 0.73 to 1.4m. The following table summarises the infiltration rates recorded.

Table summarising infiltration test results

Location	Cycle no.	Cycle depth	Infiltration rate (m s^{-1})
TP01	1	0.78 to 1.02m	Insufficient infiltration over 275 minutes of monitoring.
TP02	1	0.81 to 1.13m	Insufficient infiltration over 251 minutes of monitoring.
TP04	1	0.83 to 0.98m	6.58×10^{-5}
	2	0.73 to 0.98m	3.11×10^{-5}
	3	0.83 to 0.98m	2.90×10^{-5}
TP07	1	1.25 to 1.4m	Insufficient infiltration over 82 minutes of monitoring.

Table 7.10.2

7.10.2.2 It should be noted that the rate of water dissipating in three of the trial pits (TP01, TP02 and TP07) was slow and we were not able to carry out three cycles of the test procedures described in the digest with one day's fieldwork. Further on-site testing with observations made over a period of days may allow the production of more accurate infiltration rates and allowing three cycles of the test procedure. We can carry out such testing on further instructions.

7.10.2.3 Clearly the Dyrham Formation exhibits varying degrees of permeability, with lateral migration of the water upon the limestone rock encountered at the base of TP04 offering a possible explanation for the increased permeability in this location. On this basis the use of trench type soakaways may increase the likelihood of locating more permeable soils along its length, however, there is also the potential that over a prolonged period the permeability may reduce as permeable soils may be located in isolated lenses and therefore soils may be effectively impermiable. We recommend these results are provided to a drainage designer for further assessment.

7.10.2.4 If infiltration systems are adopted as a means of stormwater disposal (including permeable pavement construction), we recommend approval for the use of soakaways is sought from the Environment Agency. It should be noted that the Groundwater Regulations 1998 require that list 1 substances (e.g. Hydrocarbons) are to be prevented from entering groundwater receptors and list 2 substances (e.g. metals) are also restricted. Typically, the Environment Agency will require details of the proposed soakaway systems, showing pollution prevention measures. They will also require geological and geo-hydrological information, (contained in this report) as well as the risks of chemical contaminants in the ground affecting water resources. It is also typical requirement that there is an 'unsaturated zone' between the base of the soakaway system and the groundwater table (saturated zone) providing attenuation capacity.

7.10.3 Contamination considerations

7.10.3.1 With reference to Environment Agency (EA) publication '*Groundwater protection: Policy and practice (GP3) Section G,* 2012, 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.

7.10.3.2 As no groundwater was encountered during investigation (up to 2.2m), nor is the site located within close proximity to a surface water feature, the site is considered to be of low risk with regards to leachable contaminants.

7.10.4 Code for sustainable homes (credits under Sur1)

7.10.4.1 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.

7.11 Pavement Foundations

7.11.1 Criteria for design of the pavement foundation.

7.11.1.1 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).

7.11.2 Location of the pavement formation

7.11.2.1 We anticipate that the proposed access road and associated hardstanding areas will be located at or about existing ground levels with formation located on Dyrham Formation soils.

7.11.3 Derivation for subgrade CBR from soil classification data

7.11.3.1 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 (plasticity index for soils exhibiting cohesion (clay type) and particle size distribution for granular soils), the location of the water table pavement thickness, and weather conditions at the time of construction. It is anticipated that excavations to formation levels will encounter cohesive soils. Assuming an average plasticity index of say 10 for cohesive soils, a low water table, a 'thin' pavement the following equilibrium CBR values are derived for varying construction conditions.

Equilibrium CBR values for differing construction conditions		
Poor	**Average**	**Good**
CBR = 2.5%	CBR = 4.5%	CBR = 6%

Table 7.11.3

7.11.3.2 We recommend these CBR values be utilised for design purposes and reassessed immediately prior to construction.

7.11.4 Treatment of formation

7.11.4.1 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.

7.11.5 Subgrade frost susceptibility

7.11.5.1 The Dyrham Formation deposits soils are considered frost susceptible and this may override the CBR criteria for pavement foundation design purposes.

7.11.6 Moisture susceptibility

7.11.6.1 The silty nature of the Dyrham Formation 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 Introduction

8.1.1 Central to the investigation of contaminated land and the assessment of risks posed by this land is that:

i) There must be contaminants(s) at concentrations capable of causing health effects (*Sources).*
ii) There must be a human or environmental receptor present, or one which makes use of the site periodically *(Receptor)*; and
iii) There must be an exposure pathway by which the receptor comes into contact with the environmental contaminant *(Pathway).*

8.1.2 The developer is responsible for determining whether land is suitable for a particular development or can be made so by remedial action. In particular, the developer should carry out an adequate investigation to inform a risk assessment to determine:

a) Whether the land in question is already affected by contamination through source – pathway – receptor pollutant linkages and how those linkages are represented in a conceptual model
b) Whether the development proposed will create new linkages e.g. new pathways by which existing contaminants might reach existing or proposed receptors and whether it will introduce new vulnerable receptors, and
c) What action is needed to break those linkages and avoid new ones, deal with any unacceptable risks and enable safe development and future occupancy of the site and neighbouring land?

8.1.3 Whilst this report does not constitute a full Stage 2 risk assessment, we have summarised the findings of our investigation to identify and outline sources, receptors, and pathways of contamination.

8.2 Source – pathway - receptor

8.2.1 Sources

8.2.1.1 A brief overview of potential sources of contamination are assessed using the following elements of the investigation process.

- History of the site
- Site reconnaissance
- Geology
- Fieldwork

8.2.1.2 Based on publicly available resources, we have identified the following potential sources of contamination. For the purposes of the assessment, we have included all observed sources within the property extent rather than the strict application boundary:

Table summarising results of source assessment

No.	Source	Origin of information	Possible contaminant	Probability of risk occurring	Likely extent of contamination
Onsite					
1	Historical farm use	Historical maps and site reconnaissance	Organics, inorganics and asbestos	Likely – low likelihood	Site wide
2	Various containers of oil, creosote and other various unmarked items observed in large barn in north	Site reconnaissance	Organics, inorganics and TPH	Likely – low likelihood	North
3	Fragments of suspected asbestos cement roofing observed on the ground local to TP02 (roofing also in place on some barns)	Site reconnaissance	Asbestos	Likely	Local to TP02 & north of site
4	North eastern tank – (no access could be gained therefore the condition and nature of tank could not be assessed)	Site reconnaissance	TPH	Low likelihood of contamination in current location	Northeast
Offsite					
7	Western tank – empty, suspected moved from original location	Site reconnaissance	TPH	Low likelihood of contamination in current location	Unknown

Table reference 8.2.1

8.2.2 Pathways

8.2.2.1 The following table summarises likely pathways of potential chemical contaminants at the site to identified receptors.

Table of likely pathways		
Receptor group	**Critical receptor**	**Pathway**
Proposed site users	Child	Ingestion air-borne dusts
		Ingestion of soil.
		Ingestion of soil attached to vegetables
		Ingestion of home grown vegetables
		Inhalation air-borne dusts
		Inhalation of vapours
		Dermal contact with dust
		Dermal contact with soil
Construction operatives	Adult	Ingestion of air-borne dusts
		Ingestion of soil
		Inhalation of air-borne dusts
		Inhalation of vapours
		Dermal contact with dust
		Dermal contact with soil
Vegetation		Root uptake, deposition to shoots and foliage contact.

Table 8.2.2

8.2.3 Receptors

8.2.3.1 Based on site characteristics and proposed development plans, the following table summarises identified and critical receptors.

Table summarising identified (viable) receptors				
Principle Receptor	**Detail**	**Viable and critical receptors**		
		Viability and justification		**Critical receptor**
Humans	Users of the current site	No	Site disused	-
	End user of the developed site	Yes	Residential development with private gardens	Child
	Construction operatives and other site investigators	Yes	-	Adult
Vegetation	Current site	Yes	Trees on site	Vegetation
	Developed site	Yes	Trees to remain	Vegetation
Controlled waters	Surface waters (Rivers, streams, ponds and above ground reservoirs)	No	Nearest surface water is tributary of River Cherwell ~320m north	-
	Ground waters (used for abstraction or feeding rivers / streams etc)	Yes	No groundwater encountered during investigation (up to 2.2m) but well observed with water at >5m. Secondary undifferentiated aquifer.	Groundwater

Table 8.2.3

8.3 Initial assessment

8.3.1 Based on our assessment of potential contaminative sources, identified receptors and viable pathways to receptors described in preceding paragraphs, there are likely pollutant linkages present onsite which require further assessment.

8.4 Laboratory testing

8.4.1 The following table summarises the chemical testing scheduled as well as a rationale for the testing;

Table summarising scheduled testing

Exploratory point	Depth (m)	Scheduled testing	Rationale
TP01	0.3	Organic and inorganic, asbestos	General site coverage
TP02	0.2	Asbestos screening (and subsequent quantification)	Suspected asbestos cement observed on the floor in proximity of TP02.
TP03	0.1	Organic and inorganic, asbestos	General site coverage
TP06	0.1	Organic and inorganic, asbestos	General site coverage
TP08	0.1	Organic and inorganic, VOC and sVOC, asbestos	Adjacent to barn where containers of oils/creosote etc observed.

Table 8.4.2

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 A.

8.4.2.2 We have adopted a residential with plant uptake land use for proposed end users of the site.

8.3.4 Criteria for assessment of test data – Construction operatives

8.3.4.1 In the absence of guidelines we have adopted industrial guideline values for assessment of construction operatives.

8.3.5 Criteria for assessment of test data – Vegetation

8.3.5.1 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.

8.3.6 Evaluation of test data – Human receptors

8.3.6.1 Review of chemical test data with respect to critical (child) receptors for current and future site uses, indicates all measured concentrations of selected contaminants and 95 percentile upper confidence limits (UCL) are below relevant adopted guideline values with the exception of arsenic, benzo[b]fluoranthene, benzo[a]pyrene, dibenzo[a,h]anthracene. The exceedances are summarised below.

Table summarising assessment of test data for human receptors

Contaminant	S4UL (mg/kg)	No' of tests	Min (mg/kg)	Max (mg/kg)	Mean (mg/kg)	No' above S4UL	Location	95% UCL (mg/kg)
Arsenic	37	4	14.0	43.0	29.3	1	TP06	44.4
Benzo[b]fluoranthene	2.6	4	0.2	6.3	1.9	1	TP01	5.4
Benzo[a]pyrene	2.2	4	0.1	5.4	1.5	1	TP01	7.2
Dibenzo[a,h]anthracene	0.24	4	0.1	0.7	0.3	1	TP01	1.0

Table 8.3.6.1

8.3.6.2 Of the four samples submitted for testing, asbestos in the form of amosite bundles was identified in a sample of Made Ground from TP02 at 0.2m.

8.3.6.3 Where guideline values are available for VOC and sVOC at TP08, all results were below detectable limits. In fact, only 3 results were greater than detectable limits and are summarised below.

Summary of Detected VOCs and/or SVOCs (where GAC value unavailable)

Compound	Type	Concentration (mg/kg)	Comments
2-Methylnaphthalene	SVOC	0.4	Used in agriculture, related to insecticides.
Carbazole	SVOC	0.2	Used in insecticides
Dibenzofuran	SVOC	0.3	

Table 8.3.6.3

8.3.7 Evaluation of test data – Vegetation

8.3.7.1 Two of the four samples tested for zinc resulted in exceedances of the adopted guideline values for vegetation. These exceedances were within the Made Ground in TP03 at 0.1m and TP08 at 0.1m.

8.3.7.2 It is difficult to quantify the phytotoxity of a contaminant as large variations exist between plant tolerances, soil effects and synergistic/antagonistic reactions between chemicals. Due to the complexities of the effects of soil contamination on different plant species, we recommend that the test results presented in this report are passed to a landscape architect for the selection of suitable planting.

8.4 Risk assessment summary

8.4.1 Future site users

8.4.1.1 With exceedances measured in two locations, and trace levels of likely insecticide in a third, we are of the opinion that the Made Ground soils onsite present a risk to end users and suggest that remedial action is taken.

8.4.1.2 The presence of buildings and hardstanding will essentially sever the pathway between the source and receptor, with the only significant residual risk in areas where soft landscaping is proposed. We recommend that Made Ground should be removed in its entirety from areas of proposed soft landscaping, or to a depth of 600mm if Made Ground is locally thicker (encountered in the range of 100-300mm generally).

8.4.1.3 Where Made Ground remains, a cover layer of a minimum of 600mm thickness in potentially productive garden areas (potentially limited to 300mm in landscaped areas) should be introduced. Where Made Ground is fully removed, a suitable growing medium will likely be required to allow landscaping, but a minimum thickness will not be required for human health protection.

8.4.1.4 It may be possible, through additional sampling and analysis within proposed garden areas and soft standing, to zone areas of Made Ground where exceedances have been observed, although, due to the density of sampling points required to provide confidence in this approach, it may not have an economic benefit.

8.4.2 Construction operatives and other site investigators

8.4.2.1 The risk of damage to health of construction operatives and other site investigators is, in our opinion, moderate due to the likely presence of asbestos within near surface soils**.** We therefore recommend appropriate measures are put in place to manage any asbestos encountered and that works are undertaken in accordance with The Control of Asbestos Regulations (CAR 2012). In addition, 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.

8.4.2.2 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).

8.4.2.3 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.

8.4.3 Vegetation

8.4.3.1 Elevated concentrations of zinc were measured in the Made Ground in two locations. We recommend that the test results presented in this report are passed to a landscape architect for the selection of suitable planting.

8.4.4 Controlled water

8.4.4.1 No specific testing for leachable contaminants has been undertaken at this stage. On the basis that Made Ground will be removed (or largely removed) from areas where permeation of water through soils is possible (i.e. soft landscaping) we consider that the pollutant linkage will essentially be severed and the risk to controlled water will be low.

8.5 On Site Monitoring

8.5.1 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.

8.5.2 Particular areas which should be visually assessed during demolition/site strip are the areas beneath the existing barns where we were not able to access, and the area around the tank to the north east.

8.6 Conclusion

8.6.1 Providing the remedial measures outline in Section 8.4 above are followed, we consider the risk of the site to any identified receptor will be low, and no further action will be required to render the site fit for the proposed development.

8.6.2 In the absence of a specific planning condition relating to contamination, we do not consider a verification report is required at this stage. However, it should be noted that other bodies such as the NHBC may require confirmation that the remediation above has been implemented. We would be happy to provide proposals for verification if required.

9 Waste characterisation

9.1 The Landfill Directive

9.1.1 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 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.

9.2 Characterisation of soil types

9.2.1 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.

9.3 Waste characterisation procedure

9.3.1 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 9.5). At this stage, our assessment is limited to the determination of whether soils are hazardous or non-hazardous and does not extend to determining landfill class.

9.3.2 Hazardous waste classification

9.3.2.1 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.

9.3.2.2 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 below).

9.3.3 Soil types

9.3.3.1 Based on soils exposed in exploratory excavations, in combination with anticipated construction works, we assume soils requiring off-site disposal will comprise Made Ground and Dyrham Formation.

9.3.4 Classification as hazardous or non-hazardous waste

9.3.4.1 An assessment of potential source of contamination is presented in Section 8 of this report. Laboratory testing has been set as deemed appropriate to our source assessment.

9.3.4.2 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.

9.3.4.3 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.

9.3.4.4 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.

9.3.4.5 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 11.3.2.8 below).

9.3.4.6 Our assessment of each of the chemical substances is maintained on our files and is available for confidential review/audit by the Environment Agency.

9.3.4.7 A spreadsheet detailing the hazard assessment for all Made Ground samples is presented in Appendix H (Table 1). The spreadsheet indicates that when all results are considered Made Ground would be classified as **hazardous.** This is due to Ecotoxic hazardous properties primarily arising from elevated levels of zinc at TP08.

9.3.4.8 When the results from TP08 are omitted (see Appendix H - Table 2) the remaining 3 samples can be considered **non-hazardous**.

9.3.4.9 We recommend consultation with a waste contractor to discuss the available results and consider the benefit of further testing to support the project. We consider possible testing options to be:

1. Budget for disposal of soils as non-hazardous with the understanding that some loads may be confirmed as hazardous during compliance testing (i.e. no further testing prior to muck away)
2. Undertake a grid of single element tests for zinc on a grid across the site to better understand the potential split of hazardous/non-hazardous (assumes no other hotspots of other contaminants elsewhere)
3. Undertake a grid of full chemical testing to support a refinement of waste classification (considered overly cautious)
4. Obtain a composite sample from Made Ground across the site and test for waste classification criteria to determine whether non-hazardous soils can be disposed of as inert (accepts that some loads may exceed the non-hazardous threshold during compliance testing)

9.3.4.10 The decision to undertake further testing is largely dictated by the chosen waste carrier and the receiving facility so consultation on these options is recommended.

9.3.5 Classification of soils containing asbestos

9.3.5.1 Asbestos in the form of amosite bundles was found to be present within the Made Ground within TP02. With reference to the Environment Agency publication '*Guidance on the classification and assessment of waste – WM3 (2018)*', wastes containing greater than 0.1% free and dispersed asbestos fibres are classified as hazardous waste. Where a waste contains identifiable pieces of ACM, then these pieces must be assessed separately. The waste is hazardous if the concentration of asbestos in the ACM exceeds 0.1%. Made Ground containing ACM would be regarded as a mixed waste and must be separated where possible using the guidance outlined for mixed waste in WM3. The following codes are therefore applicable to asbestos impacted waste, and should be utilised as considered appropriate:

- **17 06 01*** *(Insulation material containing asbestos)* – for visibly identifiable pieces of asbestos with >0.1% concentration
- **17 06 05*** (*Construction material containing asbestos)* – for asbestos contaminated soil and stones with >0.1% asbestos content.
- **17 05 04** *(Soil and stones other than those mentioned in 17 05 03)* – for the main body of the soil, which is classified as non-hazardous waste, with an asbestos content <0.1%.
- **17 05 03*** *(Soil and stones containing hazardous substances)* – for the main body of soil, when classified as hazardous waste, but with an asbestos content <0.1%

9.3.5.2 Quantification testing undertaken on the Made Ground in TP02 indicates that free and dispersed asbestos fibres are below the hazardous waste threshold of 0.1% and is therefore classified as **non-hazardous**.

9.4 Naturally deposited soils not affected by artificial contaminants

9.4.1 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 of 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 Dyrham Formation at the site are not likely to be affected by chemical contamination and thus can be classified as **inert waste.**

9.5 Reuse of Soils - Materials Management Plans

9.5.1 Where soils are to be moved and reused onsite, or are to be imported to the site, a Waste Exemption or an Environmental Permit is required.

9.5.2 An alternative is the use of a Materials Management Plan (MMP) to determine where soils are and are not considered to be a waste. By following *'The Definition of Waste: Development Industry Code of Practice'* published by CL:AIRE (produced in 2008 and revised in March 2011), soils that are suitable for reuse without the need for remediation (either chemical or geotechnical) and have a certainty of use, are not considered to be waste and therefore do not fall under waste regulations. In addition, following this guidance may present an opportunity to transfer suitable material between sites, without the need for Waste Exemptions or Environmental Permits.

9.5.3 MMPs offering numerous benefits, including maximising the use of soils onsite, minimising soils going to landfill and reducing costs and time involved in liaising with waste regulators.

9.5.4 We can provide further advice on this and provide fees for producing a Materials Management Plan on further instructions.

10 Further investigations

10.1 At this stage we do not consider further investigations to be necessary.

10.2 However, it may be beneficial to undertake further testing in relation to waste classification which is discussed in Section 9. We would be happy to provide proposals for further testing or discuss the matter further.

10.3 With reference to Section 8, it may be necessary to produce a verification report confirming that remedial action has been undertaken onsite, although we understand this is not a planning requirement on this occasion. Again, we would be happy to discuss or provide proposals on request.

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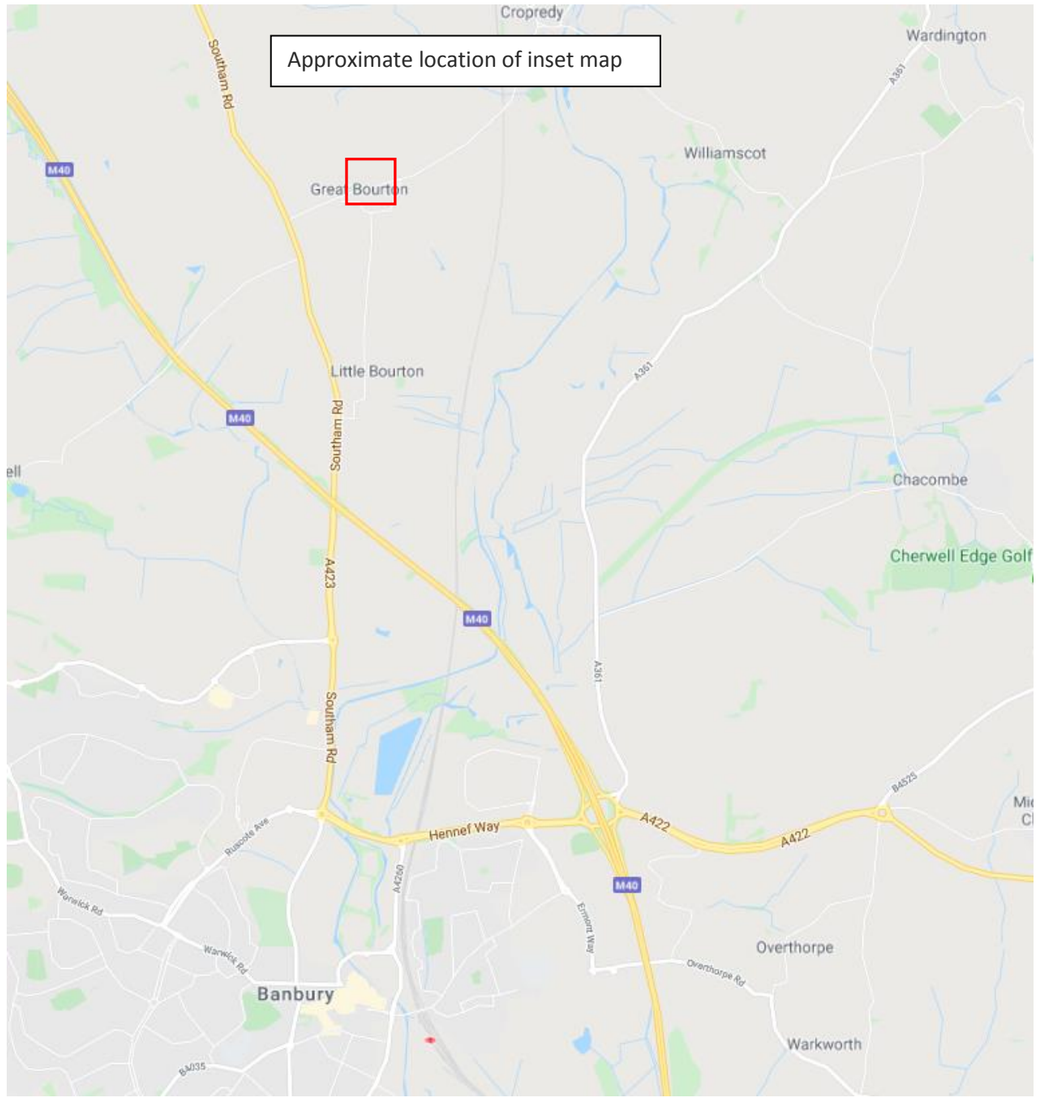
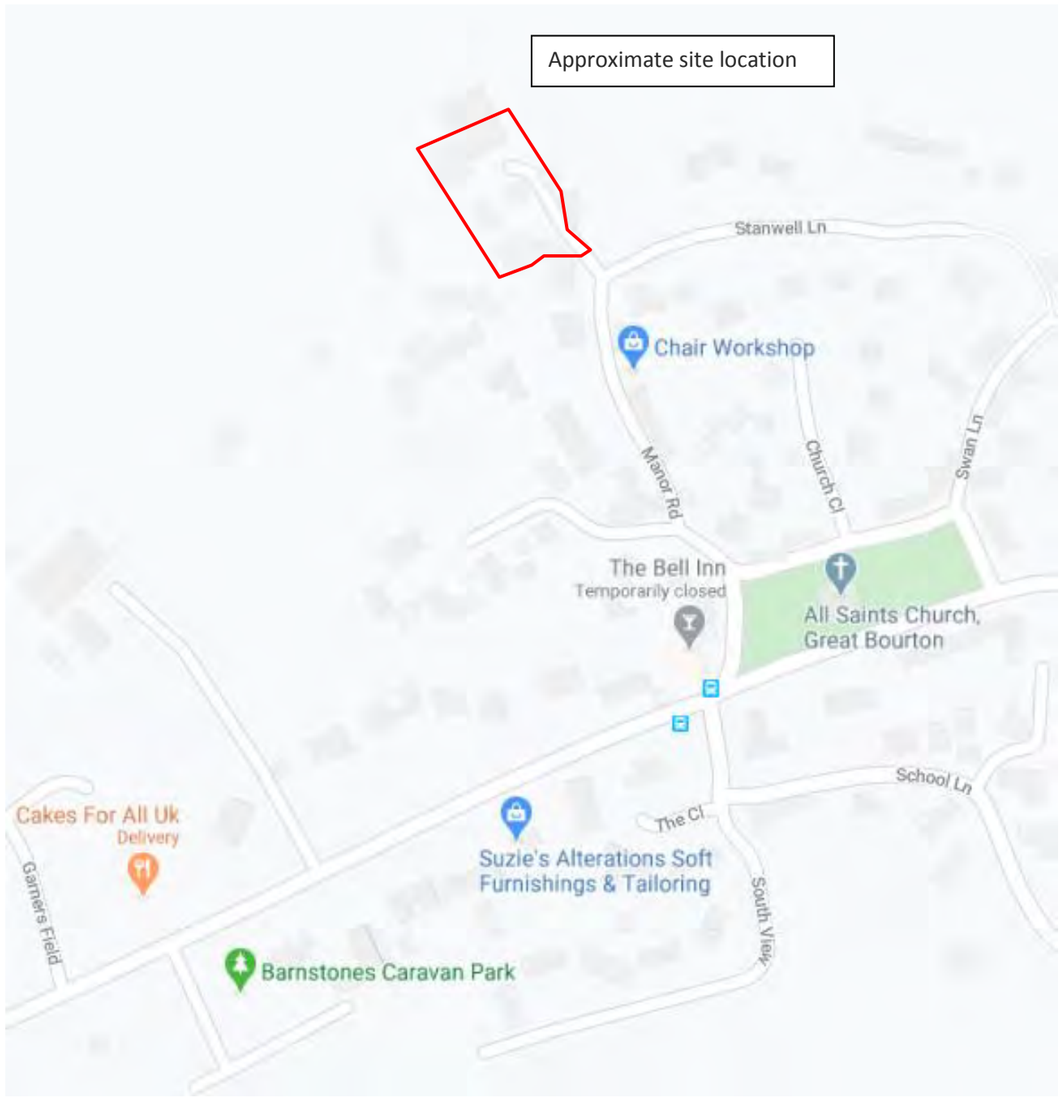
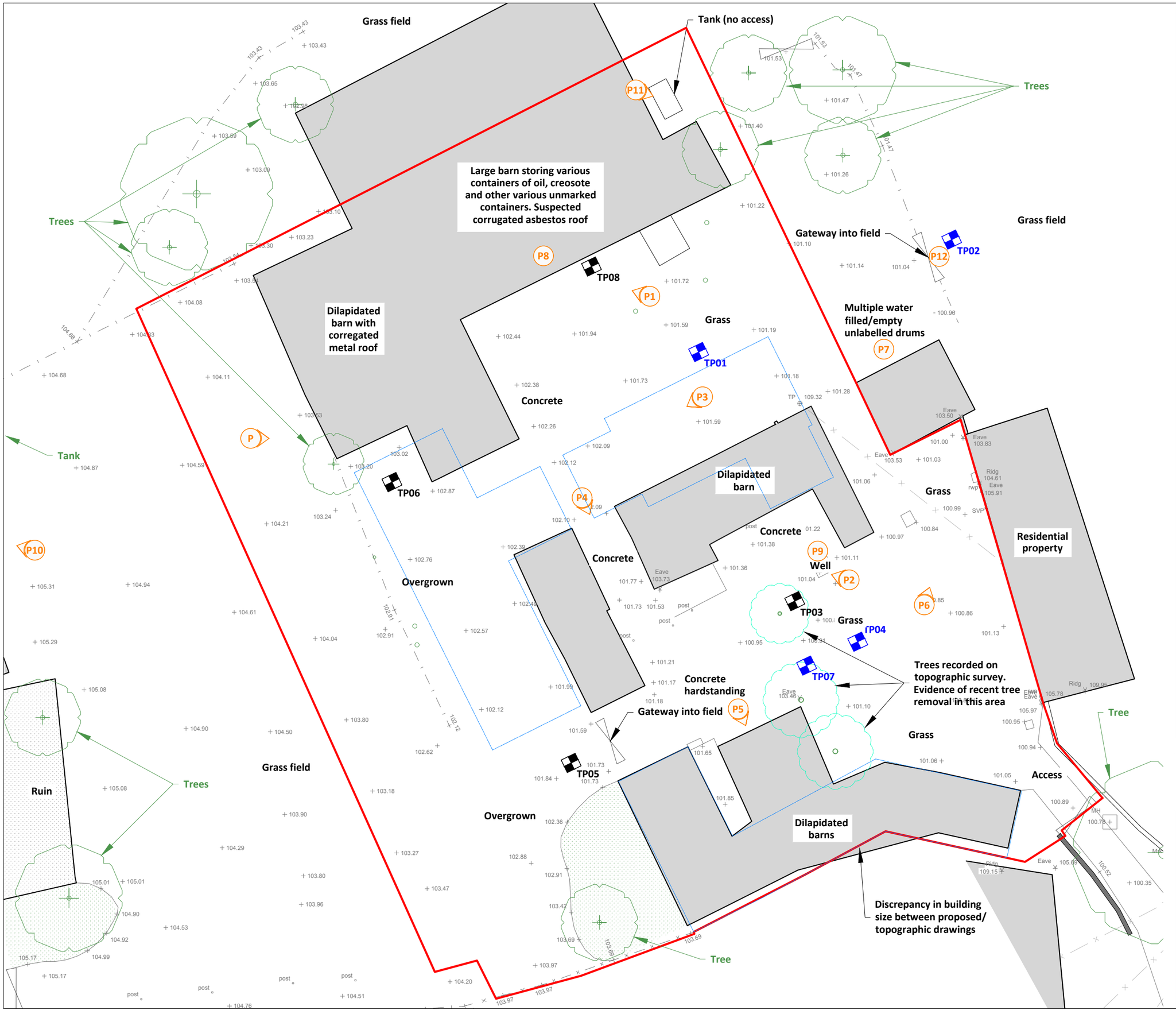




Title	Scale	Drawing number
Site location plan	Not to scale	01



Key

- TP — Approximate location of trial pit excavation
- TP — Approximate location of trial pit excavation with infiltration testing
- Approximate site boundary
- P — Approximate location and orientation of photographic record
- Approximate outline of proposed dwellings

REV	DESCRIPTION	PRODUCED BY	CHECKED BY	REVIEWED BY	DATE
A	First issue	KD	XX	XX	00.00.0000

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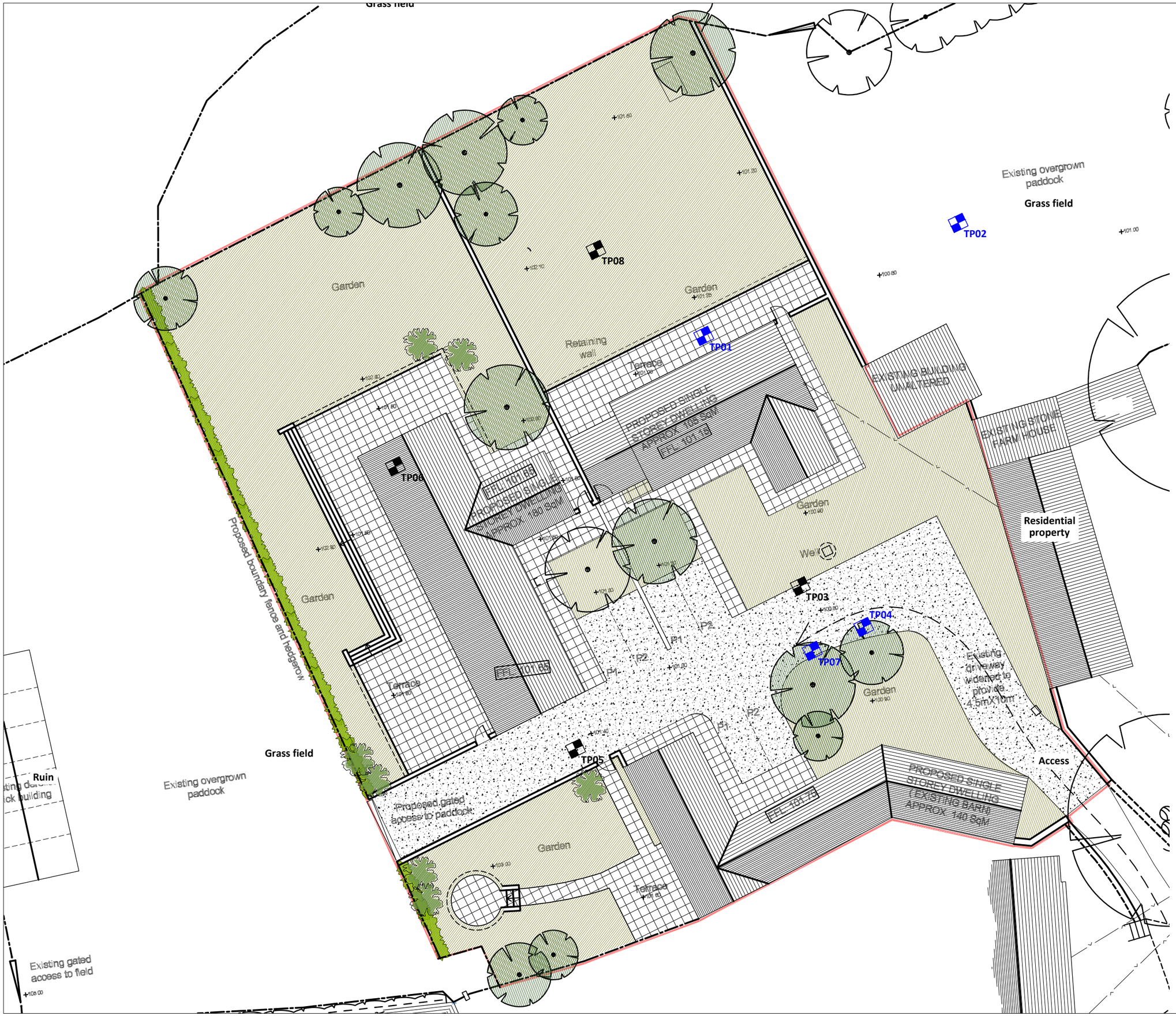
PROJECT
Crockwell Farm, Great Bourton

TITLE
Plan showing existing site features and location of exploratory points

PROJECT NO.	SCALE AT A3	DRAWING NO.
STS5055	1:250	02



Key

TP	Approximate location of trial pit excavation
TP	Approximate location of trial pit excavation with infiltration testing
	Approximate site boundary

REV	DESCRIPTION	PRODUCED BY	CHECKED BY	REVIEWED BY	DATE
A	First issue	KD	XX	XX	00.00.0000

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PROJECT
Crockwell Farm, Great Bourton

TITLE
Plan showing development proposal and location of exploratory points

PROJECT NO.	SCALE AT A3	DRAWING NO.
STS5055	1:250	03

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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 plan 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.

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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

Photo 1: The site looking northwest showing the northernmost barn and northern courtyard.

Photo 2: The site looking northwest showing the southern courtyard and dilapidated barns.

Title	Photo sheet number	Appendix
Site photographs	P1	C

Photo 3: The site looking west showing the northern courtyard and neighbouring field.

Photo 4: The site south showing the dilapidated farm buildings.

Title	Photo sheet number	Appendix
Site photographs	P1	C

Photo 5: The site south showing the dilapidated farm buildings.

Photo 6: The site north showing the neighbouring residential property.

Title	Photo sheet number	Appendix
Site photographs	P1	C

Photo 7: Multiple unlabelled empty/water filled drums in the east of the site.

Photo 8: Various containers of oil, creosote and various other unmarked substances stored within the northern barn.

Title	Photo sheet number	Appendix
Site photographs	P1	C

Photo 9: Well chamber is located to the centre of the site.

Photo 10: Empty non-bunded metal tank with some obvious rusting and slight pitting located in the neighbouring field.

Title	Photo sheet number	Appendix
Site photographs	P1	C

Photo 11: Suspected tank or storage container neighbouring the northern barn in the east. Access could not be gained to inspect further.

Photo 12: Fragment of suspected asbestos corrugated roofing observed local to TP02 located to the east of the site.

Title	Photo sheet number	Appendix
Site photographs	P1	C

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Key to legends

Composite materials, soils and lithology

Topsoil	Made Ground	Boulders
Chalk	Clay	Coal
Cobbles	Cobbles & Boulders	Concrete
Gravel	Limestone	Mudstone
Peat	Sand	Sand and Gravel
Sandstone	Silt	Silt / Clay
		Siltstone

Note: Composite soil types are signified by combined symbols.

Key to 'test results' and 'sampling' columns

Test result	
Depth	Records depth that the test was carried out (i.e.: at 2.10m or between 2.10m and 2.55m)
Result	PP – Pocket penetrometer result (kN/m^2) SV – Hand held shear vane result (kN/m^2) PP result converted to an equivalent undrained shear strength by applying a factor of 50. Where at least 3 results obtained at same depth then an average value may be reported.

Sampling		
From (m) To (m)	Records depth of sampling	
Type	D	Disturbed sample
	B	Bulk disturbed sample
	ES	Environmental sample comprising plastic and/or glass container
	W	Water sample
	CBR	Undisturbed sample in mould (California Bearing Ratio)

Water observations

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

▼ = water level observed after specified delay in excavation

▽ = water strike

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STRATA				WATER STRIKES	IN SITU TESTING		SAMPLING		
DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
[Loose to medium dense] brown slightly clayey gravelly SAND. Gravel consists of flint, concrete and brick. (MADE GROUND)							0.30		ES
Firm orange brown sandy CLAY and SILT with rare sub-angular to angular coarse ferrugenous limestone. (DYRHAM FORMATION)	0.45						0.70		B
TRIAL PIT TERMINATED AT 1.02m	1.02						1.00 1.00		B D

Notes Infiltration test performed. Trial pit sides remained upright and stable upon completion.	**Title** Trial pit record	**Dimensions (w x l)** 0.50m x 1.00m	**Date(s)** 01/05/2020
	Method Machine excavator	**Logged by** LC	**Sheet number** Sheet 1 of 1
Groundwater observations No groundwater encountered.	**Level (m OD)** -	**Compiled by** KD	**Revision** 0
	Co-ordinates -	**Checked by** ID	**TP01**

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STRATA				WATER STRIKES	IN SITU TESTING		SAMPLING		
DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
Scrub vegetation onto [loose] brown slightly clayey gravelly organic SAND with many rootlets. Gravel consists of brick, sandstone and slate. (MADE GROUND)	0.10								
[Loose to medium dense] brown slightly silty gravelly SAND. Gravel consists of brick, concrete and slate. (MADE GROUND)							0.20		ES
Firm orange brown slightly sandy slightly gravelly CLAY and SILT. Gravel consists of fine to coarse angular to sub-angular ferruginous limestone. (DYRHAM FORMATION)	0.60				PP 0.80	PP=50	0.70 0.70		B D
					PP 1.00	PP=50			
Weak grey LIMESTONE. (DYRHAM FORMATION)	1.10						1.10		D
TRIAL PIT TERMINATED AT 1.13m	1.13								

Notes
Infiltration test performed. Trial pit terminated at 1.13m due to the presence of weak grey limestone. Trial pit sides remained upright and stable upon completion.

Groundwater observations
No groundwater encountered.

Title Trial pit record	**Dimensions (w x l)** 0.50m x 1.40m	**Date(s)** 01/05/2020
Method Machine excavator	**Logged by** LC	**Sheet number** Sheet 1 of 1
Level (m OD) -	**Compiled by** KD	**Revision** 0
Co-ordinates -	**Checked by** ID	**TP02**

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STRATA				WATER STRIKES	IN SITU TESTING		SAMPLING		
DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
Grass onto brown slightly clayey gravelly SAND with rootlets and roots up to 15mm in diameter. Gravel consists of limestone and brick. Black cable observed in base of Made Ground. (MADE GROUND)							0.10		ES
Firm orange brown slightly sandy slightly gravelly CLAY and SILT. Gravel consists of fine to coarse angular to sub-angular ferruginous limestone with cobbles of limestone (up to ~500mm x ~500mm x ~80mm). (DYRHAM FORMATION)	0.30						0.80 0.80		B D
Weak iron-stained LIMESTONE cobbles with medium dense SAND partings. (DYRHAM FORMATION)	1.00						1.00		D
Firm orange brown slightly sandy slightly gravelly CLAY and SILT. Gravel consists of fine to coarse angular to sub-angular ferruginous limestone with cobbles of limestone (up to ~500mm x ~500mm x ~80mm). (DYRHAM FORMATION)	1.15								
TRIAL PIT TERMINATED AT 1.30m	1.30								

Notes Trial pit terminated at 1.3m due to the presence of iron stained limestone. Some instability in trial pit sides due to excavation of cobbles, widening pit width to ~1.0m.	**Title** Trial pit record	**Dimensions (w x l)** 0.60m x 1.40m	**Date(s)** 01/05/2020
	Method Machine excavator	**Logged by** LC	**Sheet number** Sheet 1 of 1
Groundwater observations No groundwater encountered.	**Level (m OD)** -	**Compiled by** KD	**Revision** 0
	Co-ordinates -	**Checked by** ID	**TP03**

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STRATA				WATER STRIKES	IN SITU TESTING		SAMPLING		
DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
Grass onto [loose] brown slightly clayey gravelly SAND with rootlets. Gravel consists of limestone and brick. (MADE GROUND)									
	0.10								
Firm orange brown very sandy very gravelly CLAY and SILT. Gravel consists of fine to coarse sub-angular to angular cobbles of limestone and occasional cobbles of limestone (~150mm x ~300mm x ~300mm). (DYRHAM FORMATION)							0.50		D
	0.98								
TRIAL PIT TERMINATED AT 0.98m									

Notes Infiltration test performed. Trial pit terminated at 0.98m due to the presence of limestone. Some instability in trial pit sides due to excavation of cobbles, widening pit width to ~0.7m.	**Title** Trial pit record	**Dimensions (w x l)** 0.45m x 1.30m	**Date(s)** 01/05/2020
	Method Machine excavator	**Logged by** LC	**Sheet number** Sheet 1 of 1
Groundwater observations No groundwater encountered.	**Level (m OD)** -	**Compiled by** KD	**Revision** 0
	Co-ordinates -	**Checked by** ID	**TP04**

Crockwell Farm, Great Bourton
STS5055

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STRATA				WATER STRIKES	IN SITU TESTING		SAMPLING		
DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
Grass onto [loose] brown slightly clayey gravelly organic SAND with rootlets. Gravel consists of brick and limestone. (MADE GROUND)							0.10		ES
	0.20								
Firm orange brown very sandy very gravelly CLAY and SILT. Gravel consists of fine to coarse angular to sub-angular ferruginous limestone. (DYRHAM FORMATION)							0.40		D
...between 0.3m and 0.5m depth, band of very stiff grey sandy clayey SILT verging on SILTSTONE.									
	0.75								
Weak to medium strong grey and iron stained LIMESTONE. (DYRHAM FORMATION)							0.90		D
	1.00								
Very stiff grey sandy clayey SILT. (DYRHAM FORMATION)									
	1.20								
Firm orange brown slightly sandy slightly gravelly CLAY and SILT. Gravel consists of fine to coarse angular to sub-angular ferruginous limestone. (DYRHAM FORMATION)							1.50 1.50		B D
TRIAL PIT TERMINATED AT 1.90m	1.90								

Notes Trial pit terminated at 1.9m due to the presence of limestone. Collapse of trial pit sides widening trial pit by 0.9m.	**Title** Trial pit record	**Dimensions (w x l)** 1.40m x 2.20m	**Date(s)** 01/05/2020
	Method Machine excavator	**Logged by** LC	**Sheet number** Sheet 1 of 1
Groundwater observations No groundwater encountered.	**Level (m OD)** -	**Compiled by** KD	**Revision** 0
	Co-ordinates -	**Checked by** ID	**TP05**

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STRATA				WATER STRIKES	IN SITU TESTING		SAMPLING		
DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
Grass onto [loose] brown slightly clayey silty gravelly SAND with rootlets and roots up to 7mm in diameter. Gravel consists of limestone and timber. (MADE GROUND)							0.10		ES
	0.20								
Stiff grey brown sandy CLAY. (DYRHAM FORMATION)					PP 0.50	PP=171			
							0.70		B
							0.70		D
					PP 0.80	PP=175			
					PP 1.10	PP=183			
					PP 1.40	PP=200			
	1.50								
Firm orange slightly sandy slightly gravelly CLAY and SILT. Gravel consists of fine to coarse angular to sub-angular ironstone. (DYRHAM FORMATION)							1.60		B
							1.60		D
	2.20								
TRIAL PIT TERMINATED AT 2.20m									

Notes Trial pit sides remained upright and stable upon completion.	**Title** Trial pit record	**Dimensions (w x l)** 0.80m x 1.80m	**Date(s)** 01/05/2020
	Method Machine excavator	**Logged by** LC	**Sheet number** Sheet 1 of 1
Groundwater observations No groundwater encountered.	**Level (m OD)** -	**Compiled by** KD	**Revision** 0
	Co-ordinates -	**Checked by** ID	**TP06**

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STRATA				WATER STRIKES	IN SITU TESTING		SAMPLING		
DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
Grass onto [loose] brown slightly clayey slightly gravelly SAND with rootlets. Gravel consists of limestone and brick. Cable observed in base of Made Ground. (MADE GROUND)									
	0.30								
Firm orange brown slightly sandy slightly gravelly CLAY and SILT. Gravel consists of fine to coarse sub-angular to angular cobbles of limestone with many cobbles of limestone (~150mm x ~300mm x ~300mm). (DYRHAM FORMATION)									
TRIAL PIT TERMINATED AT 1.40m	1.40								

Notes Infiltration test performed. Collapse of trial pit sides to 0.85m depth widening trial pit by 0.3m.	**Title** Trial pit record	**Dimensions (w x l)** 0.50m x 1.20m	**Date(s)** 01/05/2020
	Method Machine excavator	**Logged by** LC	**Sheet number** Sheet 1 of 1
Groundwater observations No groundwater encountered.	**Level (m OD)** -	**Compiled by** KD	**Revision** 0
	Co-ordinates -	**Checked by** ID	**TP07**

Crockwell Farm, Great Bourton
STS5055

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STRATA				WATER STRIKES	IN SITU TESTING		SAMPLING		
DESCRIPTION	DEPTH (m)	REDUCED LVL (m OD)	LEGEND		TYPE / DEPTH (m)	RESULT	FROM (m)	TO (m)	TYPE
[Loose] brown clayey slightly gravelly SAND with rootlets and roots up to 20mm diameter. Gravel consists of brick and slate. (MADE GROUND)							0.10		ES
Stiff grey brown sandy CLAY. (DYRHAM FORMATION)	0.15				PP 0.30	PP=113			
					PP 0.60	PP=125	0.50		D
Firm orange brown slightly sandy slightly gravelly CLAY and SILT. Gravel consists of fine to coarse angular to sub-angular limestone. (DYRHAM FORMATION)	0.80						1.10		B
							1.10		D
TRIAL PIT TERMINATED AT 1.35m	1.35								

Notes Trial pit terminated at 1.35m due to the presence of limestone. Trial pit sides remained upright and stable upon completion.	**Title** Trial pit record	**Dimensions (w x l)** 0.60m x 1.60m	**Date(s)** 01/05/2020
	Method Machine excavator	**Logged by** LC	**Sheet number** Sheet 1 of 1
Groundwater observations No groundwater encountered.	**Level (m OD)** -	**Compiled by** KD	**Revision** 0
	Co-ordinates -	**Checked by** ID	**TP08**

soiltechnics
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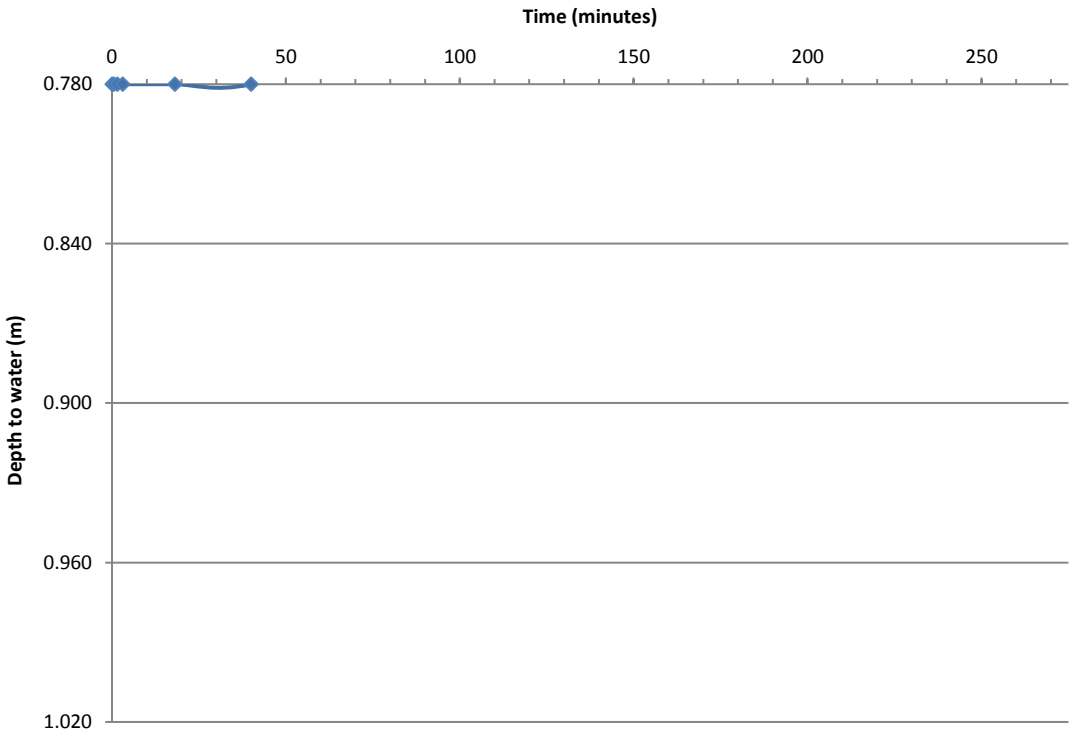
Plot showing time against depth to water:



Test observations:

TIME (mins)	DEPTH TO WATER (m)	TIME (mins)	DEPTH TO WATER (m)
0	0.78		
0.5	0.78		
1.5	0.78		
3	0.78		
18	0.78		
40	0.78		
88	0.76		
134	0.765		
191	0.77		
275	0.77		

Calculations:

Insufficient infiltration over 275 minutes of monitoring therefore unable to calculate soil infiltration rate.

Groundwater observations
No groundwater encountered.

Geology unit under test
Dyrham Formation

Depth of trial pit at start of test (m)
1.02

Title
Soil infiltration test (following BRE Digest 365 2016)

Dimensions	Co-ordinates	Ground level
0.5m x 1m	-	N/A

Trial pit number	Cycle number	Date of excavation
TP01	1	01/05/2020

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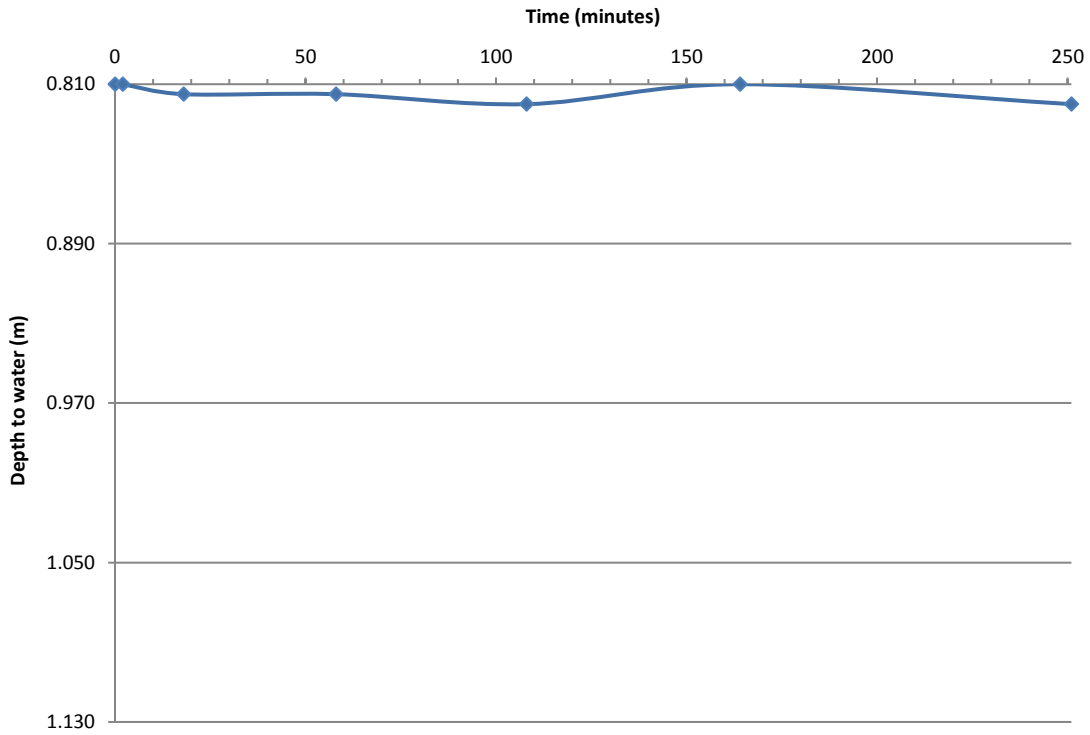
Plot showing time against depth to water:



Test observations:

TIME (mins)	DEPTH TO WATER (m)	TIME (mins)	DEPTH TO WATER (m)
0	0.81		
2	0.81		
18	0.815		
58	0.815		
108	0.82		
164	0.81		
251	0.82		

Calculations:

Insufficient infiltration over 251 minutes of monitoring therefore unable to calculate soil infiltration rate.

Groundwater observations
No groundwater encountered.

Geology unit under test
Dyrham Formation

Depth of trial pit at start of test (m)
1.13

Title
Soil infiltration test (following BRE Digest 365 2016)

Dimensions	Co-ordinates	Ground level
0.5m x 1.4m	-	N/A

Trial pit number	Cycle number	Date of excavation
TP02	1	01/05/2020

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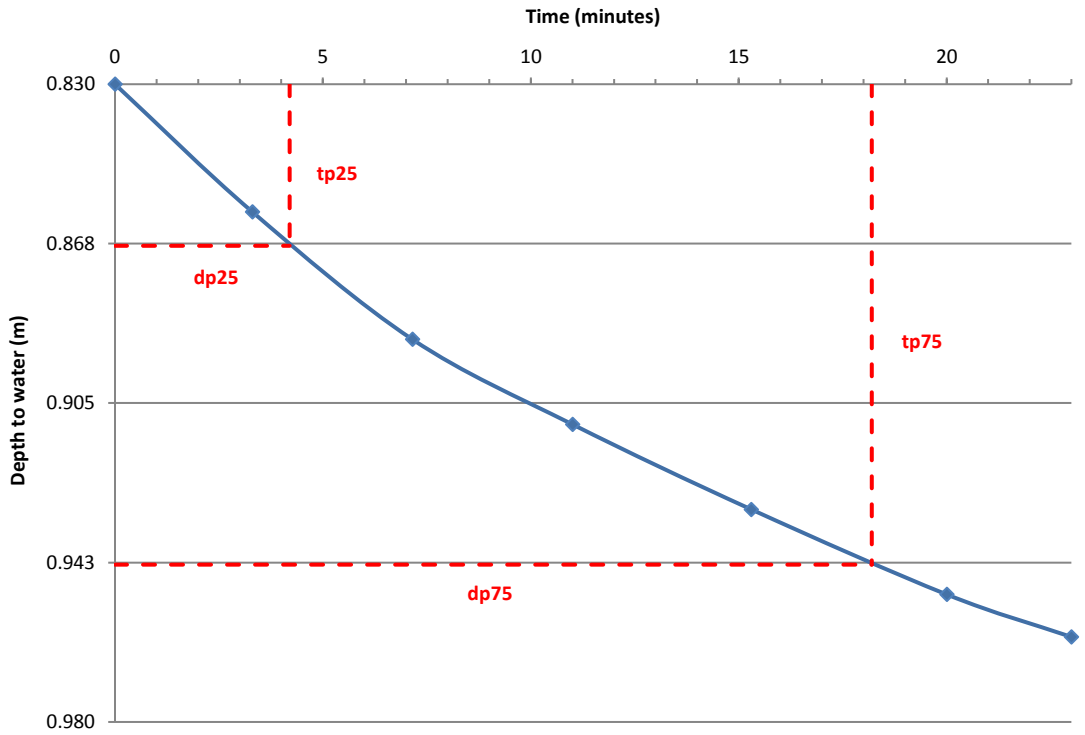
Plot showing time against depth to water:



Test observations:

TIME (mins)	DEPTH TO WATER (m)	TIME (mins)	DEPTH TO WATER (m)
0	0.83		
3.3	0.86		
7.15	0.89		
11	0.91		
15.3	0.93		
20	0.95		
23	0.96		

Calculations:

Soil infiltration rate (SIR), $f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

V_{p75-25} = *effective storage volume of water in the trial pit between 75% (d_{p75}) and 25% (d_{p25}) effective depth*
= ***0.063m³***

a_{p50} = *the internal surface area of the trial pit up to 50% effective depth and including the base*
= ***1.14m²***

$t_{p75} - t_{p25}$ = *the time for the water level to fall from 75% to 25% effective depth*
= ***14 (minutes)***
= ***840 (seconds)***

***f* = 6.58E-05 m/s**

Groundwater observations
No groundwater encountered.

Geology unit under test
Dyrham Formation

Depth of trial pit at start of test (m)
0.98

Title
Soil infiltration test (following BRE Digest 365 2016)

Dimensions	Co-ordinates	Ground level
0.6m x 1.4m	-	N/A

Trial pit number	Cycle number	Date of excavation
TP04	1	01/05/2020

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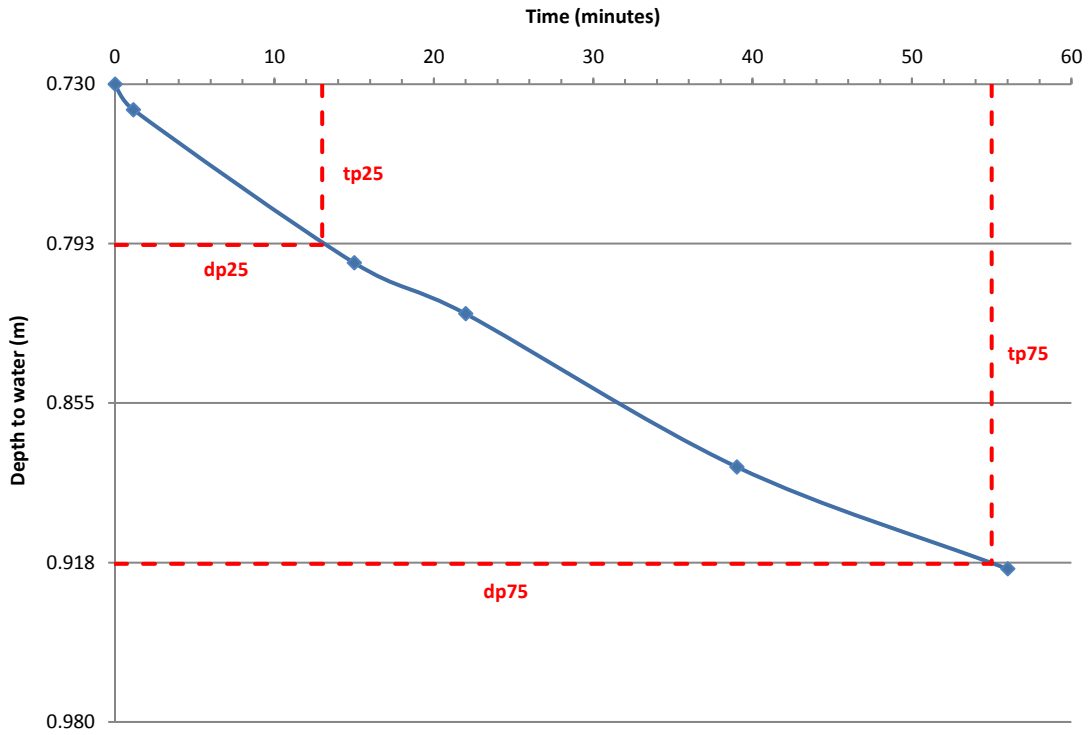
Plot showing time against depth to water:



Test observations:

TIME (mins)	DEPTH TO WATER (m)	TIME (mins)	DEPTH TO WATER (m)
0	0.73		
1.15	0.74		
15	0.8		
22	0.82		
39	0.88		
56	0.92		

Calculations:

Soil infiltration rate (SIR), $f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

V_{p75-25} = *effective storage volume of water in the trial pit between 75% (d_{p75}) and 25% (d_{p25}) effective depth*
= ***0.105m³***

a_{p50} = *the internal surface area of the trial pit up to 50% effective depth and including the base*
= ***1.34m²***

$t_{p75} - t_{p25}$ = *the time for the water level to fall from 75% to 25% effective depth*
= ***42 (minutes)***
= ***2520 (seconds)***

***f* = 3.11E-05 m/s**

Groundwater observations
No groundwater encountered.

Geology unit under test
Dyrham Formation

Depth of trial pit at start of test (m)
0.98

Title
Soil infiltration test (following BRE Digest 365 2016)

Dimensions	Co-ordinates	Ground level
0.6m x 1.4m	-	N/A

Trial pit number	Cycle number	Date of excavation
TP04	2	01/05/2020

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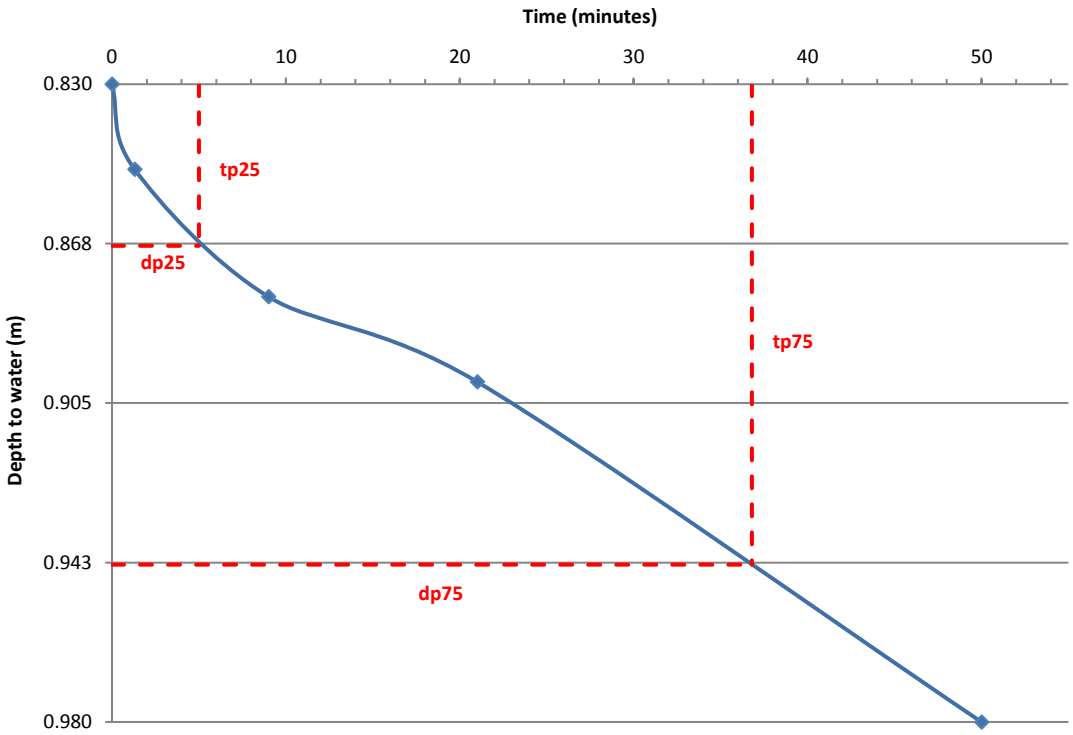
Plot showing time against depth to water:



Test observations:

TIME (mins)	DEPTH TO WATER (m)	TIME (mins)	DEPTH TO WATER (m)
0	0.83		
1.3	0.85		
9	0.88		
21	0.9		
50	0.98		

Calculations:

Soil infiltration rate (SIR), $f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

V_{p75-25} = *effective storage volume of water in the trial pit between 75% (d_{p75}) and 25% (d_{p25}) effective depth*
= ***0.063m³***

a_{p50} = *the internal surface area of the trial pit up to 50% effective depth and including the base*
= ***1.14m²***

$t_{p75} - t_{p25}$ = *the time for the water level to fall from 75% to 25% effective depth*
= ***31.8 (minutes)***
= ***1908 (seconds)***

***f* = 2.90E-05 m/s**

Groundwater observations
No groundwater encountered.

Geology unit under test
Dyrham Formation

Depth of trial pit at start of test (m)
0.98

Title
Soil infiltration test (following BRE Digest 365 2016)

Dimensions	Co-ordinates	Ground level
0.6m x 1.4m	-	N/A

Trial pit number	Cycle number	Date of excavation
TP04	3	01/05/2020

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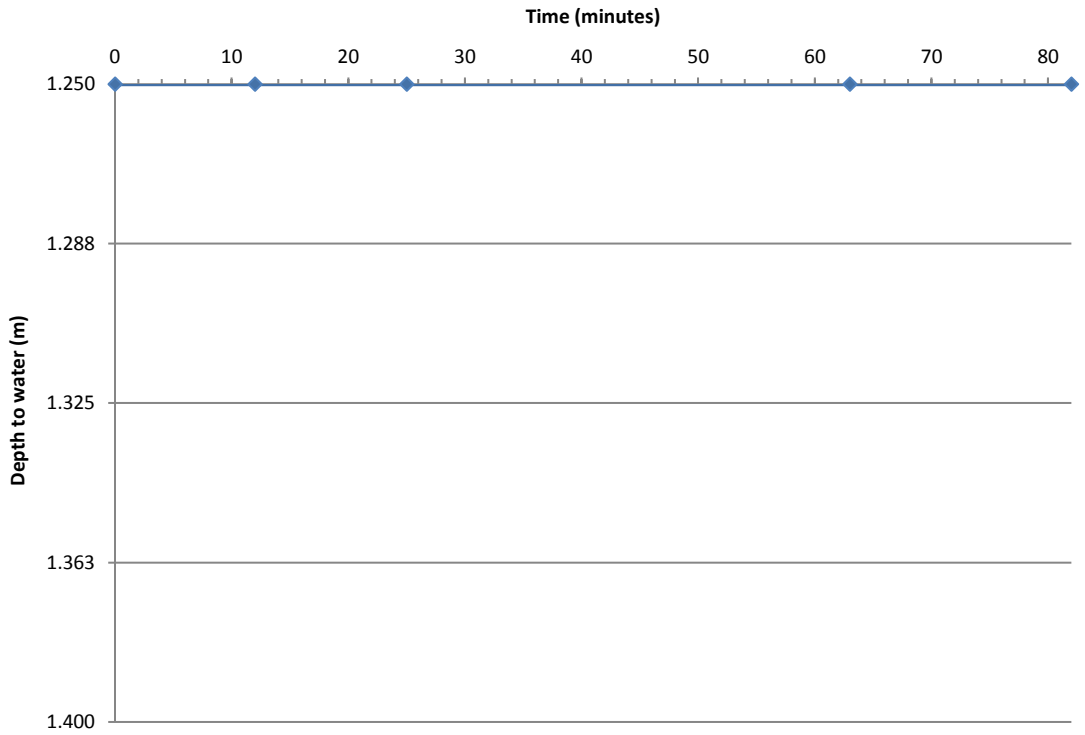
Plot showing time against depth to water:



Test observations:

TIME (mins)	DEPTH TO WATER (m)	TIME (mins)	DEPTH TO WATER (m)
0	1.25		
12	1.25		
25	1.25		
63	1.25		
82	1.25		

Calculations:

Insufficient infiltration over 82 minutes of monitoring therefore unable to calculate soil infiltration rate.

Groundwater observations
No groundwater encountered.

Geology unit under test
Dyrham Formation

Depth of trial pit at start of test (m)
1.4

Title
Soil infiltration test (following BRE Digest 365 2016)

Dimensions	Co-ordinates	Ground level
0.5m x 1.2m	-	N/A

Trial pit number	Cycle number	Date of excavation
TP07	1	01/05/2020

TEST CERTIFICATE

Liquid and Plastic Limits

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

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

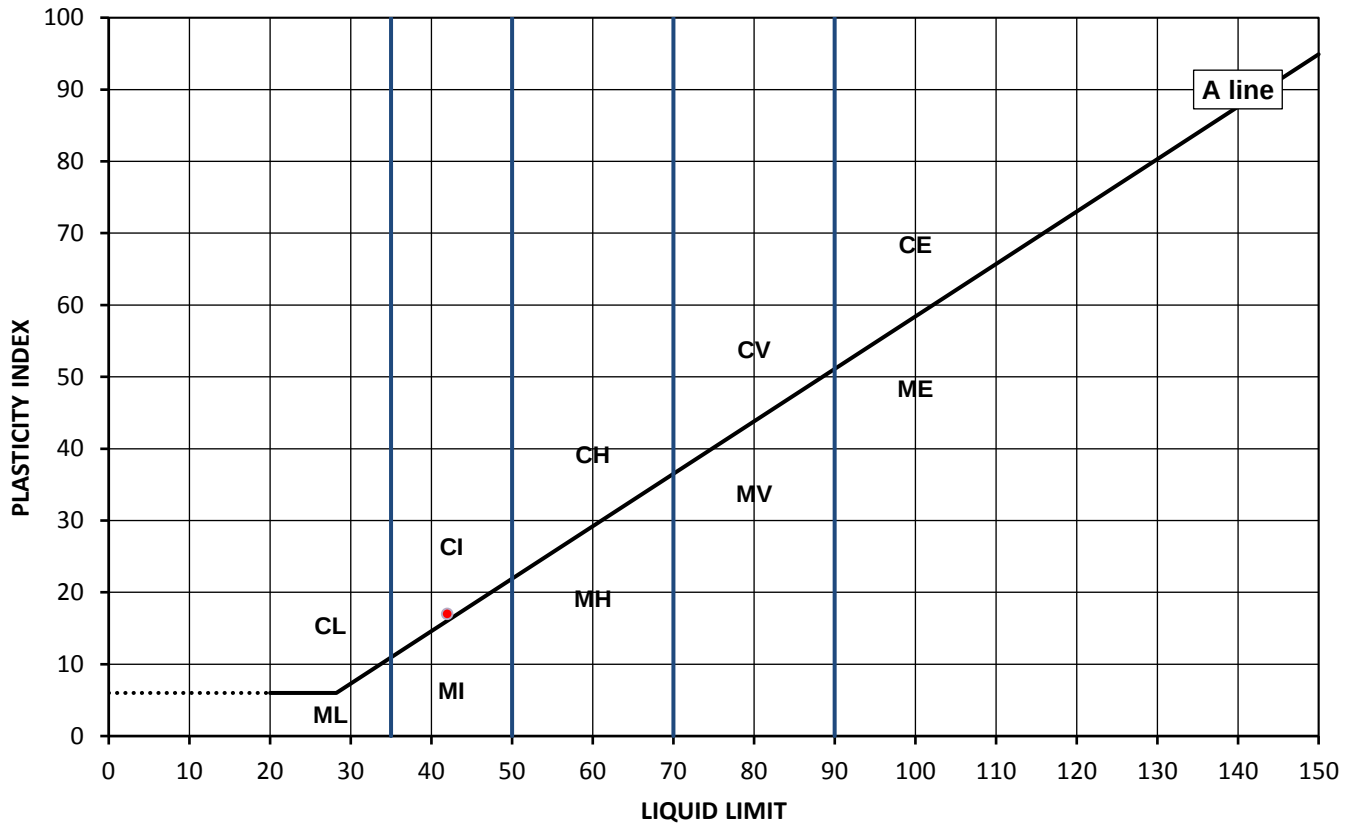
Client:	Soiltechnics Limited	Client Reference:	STS5055
Client Address:	Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY	Job Number:	20-99112
		Date Sampled:	Not Given
		Date Received:	11/05/2020
Contact:	Lauren Wenham	Date Tested:	15/05/2020
Site Address:	Crockwell Farm, Great Bourton	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	1507659	Depth Top [m]:	0.70
Hole No.:	TP06	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Yellowish brown to grey sandy CLAY		
Sample Preparation:	Tested in natural condition		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
22	42	25	17	100



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

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

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: [redacted] Aleksandra Jurochnik
L Technical Reviewer
r and on behalf of i2 Analytical Ltd

ate Reported: 26/05/2020

TEST CERTIFICATE

Liquid and Plastic Limits

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

UKAS TESTING 4041

Environmental Science

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

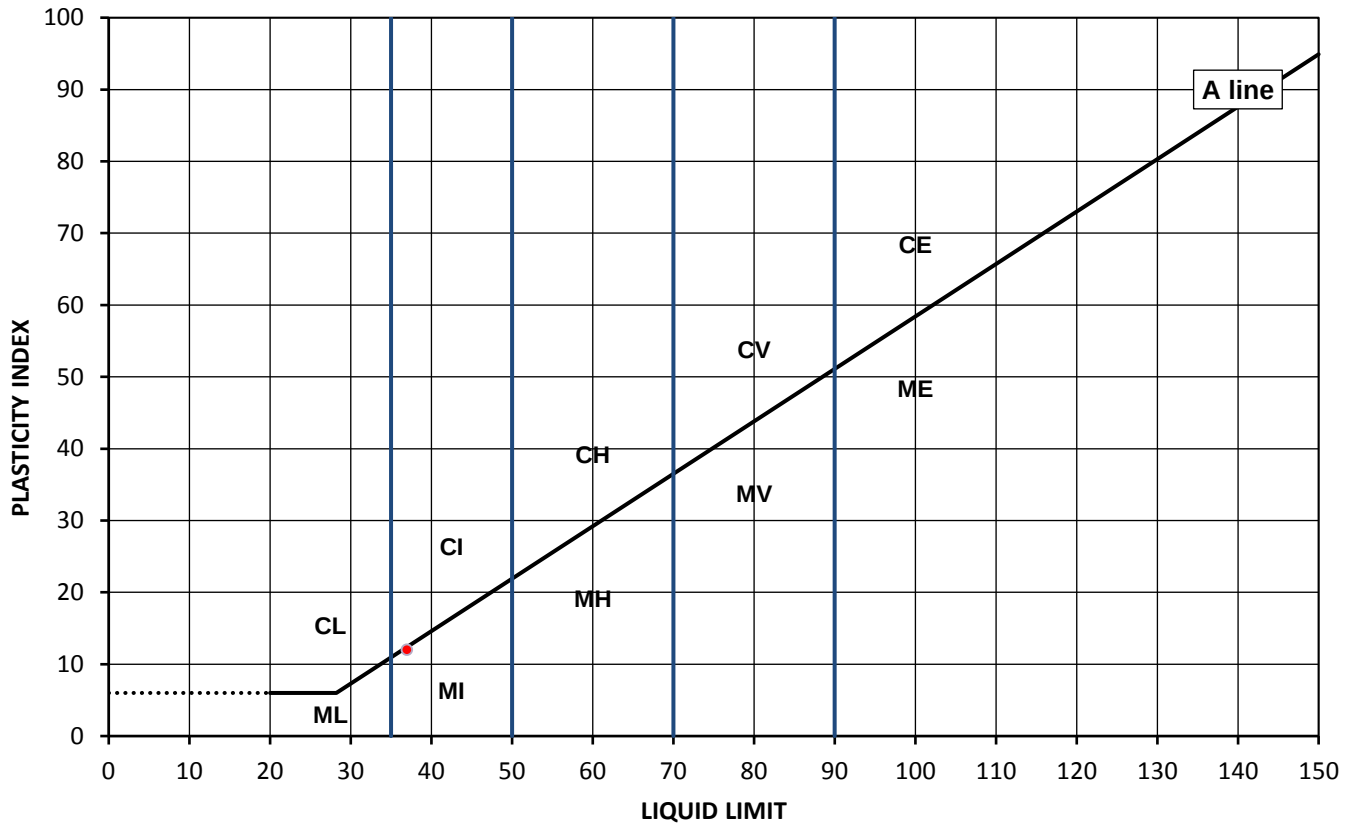
Client:	Soiltechnics Limited	Client Reference:	STS5055
Client Address:	Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY	Job Number:	20-99112
		Date Sampled:	Not Given
		Date Received:	11/05/2020
Contact:	Lauren Wenham	Date Tested:	15/05/2020
Site Address:	Crockwell Farm, Great Bourton	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	1507660	Depth Top [m]:	1.00
Hole No.:	TP01	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Yellowish brown to grey slightly gravelly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425um		

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
31	37	25	12	98



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

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

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed: [redacted]

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 26/05/2020

SUMMARY REPORT

Summary of Classification Test Results

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

Tested in Accordance with:

MC by BS 1377-2: 1990: Clause 3.2; WC by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3, Clause 4.4 and 5; PD by BS 1377-2: 1990: Clause 8.2

Client: Soiltechnics Limited

Client Address: Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY

Contact: Lauren Wenham

Site Address: Crockwell Farm, Great Bourton

Client Reference: STS5055
Job Number: 20-99112
Date Sampled: Not Given
Date Received: 11/05/2020
Date Tested: 15/05/2020
Sampled By: Not Given

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	MC	WC	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	LL	PL	PI	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
1507660	TP01	Not Given	1.00	Not Given	D	Yellowish brown to grey slightly gravelly sandy CLAY	Atterberg 1 Point	31		98	37	25	12						
1507659	TP06	Not Given	0.70	Not Given	D	Yellowish brown to grey sandy CLAY	Atterberg 1 Point	22		100	42	25	17						

Note: # Non accredited; NP - Non plastic

Comments:

Signed: [redacted]

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 26/05/2020

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

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

UKAS TESTING 4041

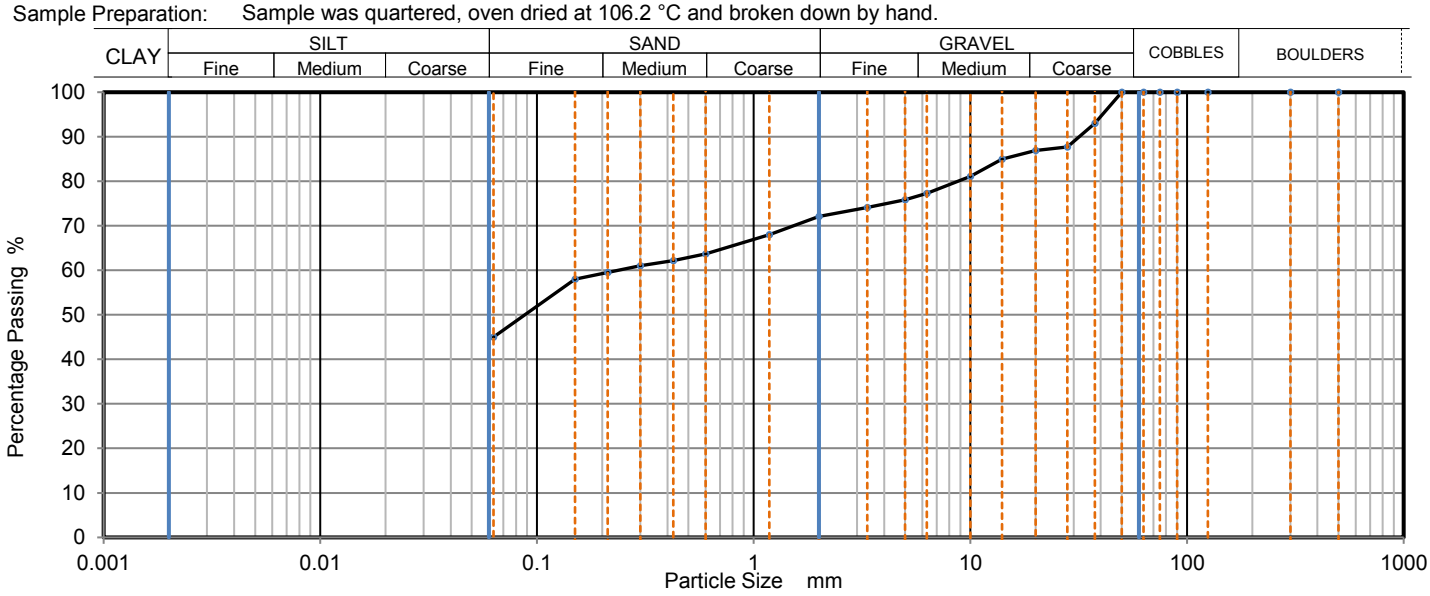
Environmental Science

Client:	Soiltechnics Limited	Client Reference:	STS5055
Client Address:	Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY	Job Number:	20-99112
		Date Sampled:	Not Given
		Date Received:	11/05/2020
Contact:	Lauren Wenham	Date Tested:	15/05/2020
Site Address:	Crockwell Farm, Great Bourton	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	1507661	Depth Top [m]:	0.80
Hole No.:	TP03	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Yellowish brown very gravelly very sandy CLAY with fragments of shale		
Sample Preparation:	Sample was quartered, oven dried at 106.2 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	93		
28	88		
20	87		
14	85		
10	81		
6.3	77		
5	76		
3.35	74		
2	72		
1.18	68		
0.6	64		
0.425	62		
0.3	61		
0.212	60		
0.15	58		
0.063	45		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	27.90
Sand	26.80
Fines <0.063mm	45.40

Grading Analysis		
D100	mm	50
D60	mm	0.237
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

Signed: [redacted]

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 26/05/2020

TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

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

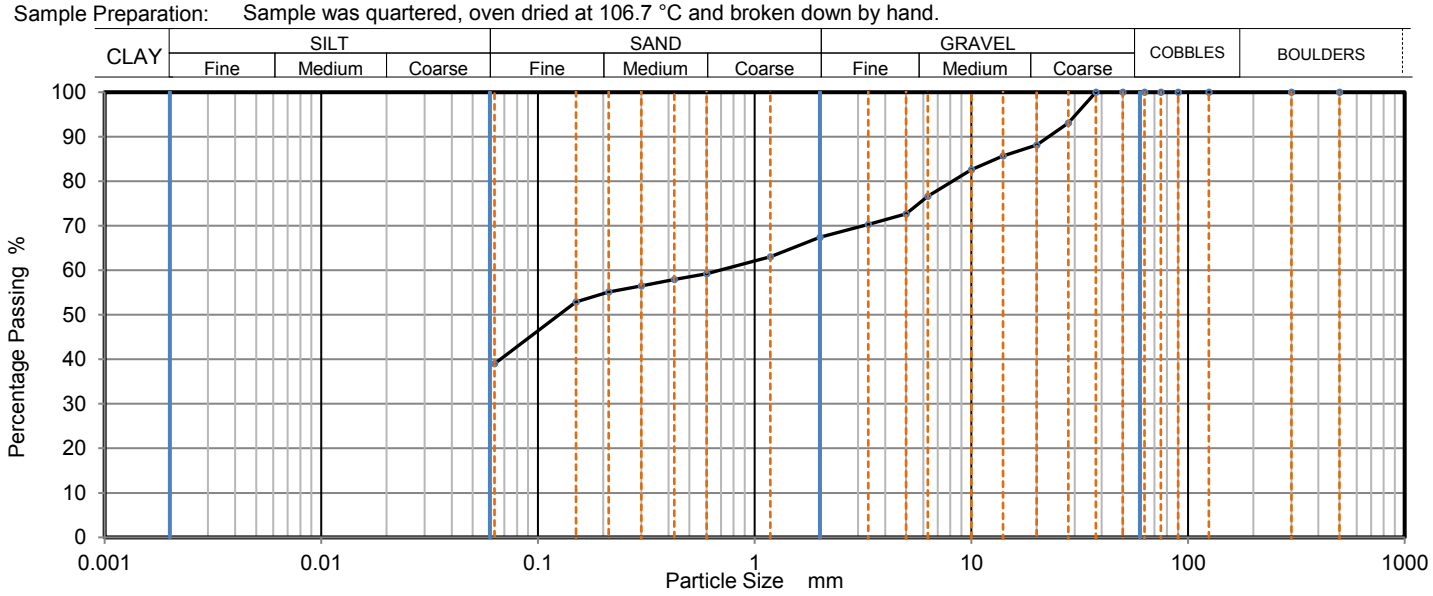
Environmental Science

Client:	Soiltechnics Limited	Client Reference:	STS5055
Client Address:	Cedar Barn, White Lodge, Walgrave, Northampton, NN6 9PY	Job Number:	20-99112
		Date Sampled:	Not Given
		Date Received:	11/05/2020
Contact:	Lauren Wenham	Date Tested:	15/05/2020
Site Address:	Crockwell Farm, Great Bourton	Sampled By:	Not Given

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

Test Results:

Laboratory Reference:	1507662	Depth Top [m]:	1.50
Hole No.:	TP05	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Yellowish brown very gravelly very sandy CLAY with fragments of shale		
Sample Preparation:	Sample was quartered, oven dried at 106.7 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	93		
20	88		
14	86		
10	83		
6.3	77		
5	73		
3.35	70		
2	67		
1.18	63		
0.6	59		
0.425	58		
0.3	57		
0.212	55		
0.15	53		
0.063	40		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	32.60
Sand	27.80
Fines <0.063mm	39.60

Grading Analysis		
D100	mm	37.5
D60	mm	0.688
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

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

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

Signed: [redacted]

Aleksandra Jurochnik
PL Technical Reviewer
for and on behalf of i2 Analytical Ltd

Date Reported: 26/05/2020

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

UKAS TESTING
4480

DETS Report No: 20-05091

Site Reference:	Crockwell Farm, Great Bourton
Project / Job Ref:	STS5055-D-1
Order No:	None Supplied
Sample Receipt Date:	12/05/2020
Sample Scheduled Date:	12/05/2020
Report Issue Number:	1
Reporting Date:	18/05/2020

Authorised by:

[redacted]

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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Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate						
DETS Report No: 20-05091	**Date Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Crockwell Farm, Great Bourton	**TP / BH No**	TP010.301	TP080.101	TP060.101	TP030.101	TP020.201
Project / Job Ref: STS5055-D-1	**Additional Refs**	TP01	TP08	TP06	TP03	TP02
Order No: None Supplied	**Depth (m)**	0.30	0.10	0.10	0.10	0.20
Reporting Date: 18/05/2020	**DETS Sample No**	476305	476306	476307	476308	476309

Determinand	**Unit**	**RL**	**Accreditation**					
Asbestos Screen (S)	N/a	N/a	**ISO17025**	Not Detected		Not Detected	Not Detected	Detected
Sample Matrix (S)	Material Type	N/a	NONE					Amosite present in bundles
Asbestos Type (S)	PLM Result	N/a	**ISO17025**					Amosite
pH	pH Units	N/a	**MCERTS**	7.9	6.7	6.8	7.4	
Total Cyanide	mg/kg	< 2	NONE	< 2	3	< 2	< 2	
Complex Cyanide	mg/kg	< 2	NONE	< 2	3	< 2	< 2	
Free Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**		11			
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**		0.01			
Sulphide	mg/kg	< 5	NONE		< 5			
Organic Matter	%	< 0.1	**MCERTS**	3.3	9	5.8	8.8	
Loss on Ignition @ 450°C	%	< 0.01	NONE	5.25		9.60	11.70	
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	**MCERTS**		15			
Water Soluble Nitrate (2:1) as NO_3	mg/l	< 1.5	**MCERTS**		7.3			
Arsenic (As)	mg/kg	< 2	**MCERTS**	14	36	43	24	
Beryllium (Be)	mg/kg	< 0.5	**MCERTS**	0.6	1.1	1.6	1.2	
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	0.5	3.7	0.8	1.1	
Chromium (Cr)	mg/kg	< 2	**MCERTS**	27	68	83	62	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	
Copper (Cu)	mg/kg	< 4	**MCERTS**	17	120	22	32	
Lead (Pb)	mg/kg	< 3	**MCERTS**	42	111	48	101	
Mercury (Hg)	mg/kg	< 1	**MCERTS**	< 1	< 1	< 1	< 1	
Nickel (Ni)	mg/kg	< 3	**MCERTS**	16	65	47	36	
Selenium (Se)	mg/kg	< 2	**MCERTS**	< 3	< 3	< 3	< 3	
Vanadium (V)	mg/kg	< 1	**MCERTS**	50	96	148	91	
Zinc (Zn)	mg/kg	< 3	**MCERTS**	92	3080	190	421	
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	

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
Subcontracted analysis (S)

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
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Maidstone
Kent ME17 2JN
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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 20-05091	**Date Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Soiltechnics Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Crockwell Farm, Great Bourton	**TP / BH No**	TP010.301	TP080.101	TP060.101	TP030.101	
Project / Job Ref: STS5055-D-1	**Additional Refs**	TP01	TP08	TP06	TP03	
Order No: None Supplied	**Depth (m)**	0.30	0.10	0.10	0.10	
Reporting Date: 18/05/2020	**DETS Sample No**	476305	476306	476307	476308	

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Phenanthrene	mg/kg	< 0.1	MCERTS	0.42	0.34	0.14	0.37	
Anthracene	mg/kg	< 0.1	MCERTS	0.19	0.15	< 0.1	< 0.1	
Fluoranthene	mg/kg	< 0.1	MCERTS	2.61	1.01	0.40	0.88	
Pyrene	mg/kg	< 0.1	MCERTS	3.16	1.04	0.35	0.87	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	2.24	0.61	0.46	0.83	
Chrysene	mg/kg	< 0.1	MCERTS	2.16	0.39	< 0.1	0.37	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	6.29	0.44	0.20	0.78	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	1.69	< 0.1	< 0.1	< 0.1	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	5.42	< 0.1	< 0.1	0.45	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	5.06	0.24	0.15	0.52	
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	0.74	< 0.1	< 0.1	< 0.1	
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	5.02	< 0.1	< 0.1	0.37	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	35	4.2	1.7	5.4	

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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 20-05091	**Date Sampled**	None Supplied				
Soiltechnics Ltd	**Time Sampled**	None Supplied				
Site Reference: Crockwell Farm, Great Bourton	**TP / BH No**	TP080.101				
Project / Job Ref: STS5055-D-1	**Additional Refs**	TP08				
Order No: None Supplied	**Depth (m)**	0.10				
Reporting Date: 18/05/2020	**DETS Sample No**	476306				

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	< 10				
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21				
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	< 42				

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Soil Analysis Certificate - BTEX / MTBE							
DETS Report No: 20-05091	**Date Sampled**	None Supplied					
Soiltechnics Ltd	**Time Sampled**	None Supplied					
Site Reference: Crockwell Farm, Great Bourton	**TP / BH No**	TP080.101					
Project / Job Ref: STS5055-D-1	**Additional Refs**	TP08					
Order No: None Supplied	**Depth (m)**	0.10					
Reporting Date: 18/05/2020	**DETS Sample No**	476306					

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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Rose Lane
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Kent ME17 2JN
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Soil Analysis Certificate - Volatile Organic Compounds (VOC)							
DETS Report No: 20-05091	**Date Sampled**	None Supplied					
Soiltechnics Ltd	**Time Sampled**	None Supplied					
Site Reference: Crockwell Farm, Great Bourton	**TP / BH No**	TP080.101					
Project / Job Ref: STS5055-D-1	**Additional Refs**	TP08					
Order No: None Supplied	**Depth (m)**	0.10					
Reporting Date: 18/05/2020	**DETS Sample No**	476306					

Determinand	Unit	RL	Accreditation					
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5				
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5				
Chloromethane	ug/kg	< 10	MCERTS	< 10				
Chloroethane	ug/kg	< 5	MCERTS	< 5				
Bromomethane	ug/kg	< 10	MCERTS	< 10				
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5				
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5				
MTBE	ug/kg	< 5	MCERTS	< 5				
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5				
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5				
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5				
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5				
Chloroform	ug/kg	< 5	MCERTS	< 5				
Bromochloromethane	ug/kg	< 5	MCERTS	< 5				
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5				
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10				
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5				
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5				
Benzene	ug/kg	< 2	MCERTS	< 2				
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5				
Trichloroethene	ug/kg	< 5	MCERTS	< 5				
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5				
Dibromomethane	ug/kg	< 5	MCERTS	< 5				
TAME	ug/kg	< 5	MCERTS	< 5				
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5				
Toluene	ug/kg	< 5	MCERTS	< 5				
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5				
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10				
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5				
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5				
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5				
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5				
Chlorobenzene	ug/kg	< 5	MCERTS	< 5				
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5				
Ethyl Benzene	ug/kg	< 2	MCERTS	< 2				
m,p-Xylene	ug/kg	< 2	MCERTS	< 2				
o-Xylene	ug/kg	< 2	MCERTS	< 2				
Styrene	ug/kg	< 5	MCERTS	< 5				
Bromoform	ug/kg	< 10	MCERTS	< 10				
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5				
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5				
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5				
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5				
Bromobenzene	ug/kg	< 5	MCERTS	< 5				
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5				
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5				
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5				
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5				
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5				
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5				
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5				
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5				
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5				
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5				
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5				
,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10				
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5				

DETS Ltd
it 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Volatile Organic Compounds TIC (VOC)		
DETS Report No: 20-05091	**Date Sampled**	None Supplied
Soiltechnics Ltd	**Time Sampled**	None Supplied
Site Reference: Crockwell Farm, Great Bourton	**TP / BH No**	TP080.101
Project / Job Ref: STS5055-D-1	**Additional Refs**	TP08
Order No: None Supplied	**Depth (m)**	0.10
Reporting Date: 18/05/2020	**DETS Sample No**	476306

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	µg/kg	< 10	< 10
2	N/a	N/a	µg/kg	< 10	< 10
3	N/a	N/a	µg/kg	< 10	< 10
4	N/a	N/a	µg/kg	< 10	< 10
5	N/a	N/a	µg/kg	< 10	< 10

There were no / other compounds identified with a match of >90%

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Unit 1, Rose Lane Industrial Estate
Rose Lane
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Maidstone
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Soil Analysis Certificate - Semi Volatile Organic Compounds (SVOC)							
DETS Report No: 20-05091	**Date Sampled**	None Supplied					
Soiltechnics Ltd	**Time Sampled**	None Supplied					
Site Reference: Crockwell Farm, Great Bourton	**TP / BH No**	TP080.101					
Project / Job Ref: STS5055-D-1	**Additional Refs**	TP08					
Order No: None Supplied	**Depth (m)**	0.10					
Reporting Date: 18/05/2020	**DETS Sample No**	476306					

Determinand	Unit	RL	Accreditation					
Phenol	mg/kg	< 0.1	NONE	< 0.1				
1,2,4-Trichlorobenzene	mg/kg	< 0.1	**ISO17025**	< 0.1				
2-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1				
Nitrobenzene	mg/kg	< 0.1	**MCERTS**	< 0.1				
0-Cresol	mg/kg	< 0.1	NONE	< 0.1				
bis(2-chloroethoxy)methane	mg/kg	< 0.1	**MCERTS**	< 0.1				
bis(2-chloroethyl)ether	mg/kg	< 0.1	**MCERTS**	< 0.1				
2,4-Dichlorophenol	mg/kg	< 0.1	**MCERTS**	< 0.1				
2-Chlorophenol	mg/kg	< 0.1	**ISO17025**	< 0.1				
1,3-Dichlorobenzene	mg/kg	< 0.1	**ISO17025**	< 0.1				
1,4-Dichlorobenzene	mg/kg	< 0.1	**ISO17025**	< 0.1				
1,2-Dichlorobenzene	mg/kg	< 0.1	**ISO17025**	< 0.1				
2,4-Dimethylphenol	mg/kg	< 0.15	**ISO17025**	< 0.15				
Isophorone	mg/kg	< 0.1	NONE	< 0.1				
Hexachloroethane	mg/kg	< 0.1	**MCERTS**	< 0.1				
p-Cresol	mg/kg	< 0.15	**MCERTS**	< 0.15				
2,4,6-Trichlorophenol	mg/kg	< 0.1	**MCERTS**	< 0.1				
2,4,5-Trichlorophenol	mg/kg	< 0.15	**MCERTS**	< 0.15				
2-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1				
4-Chloro-3-methylphenol	mg/kg	< 0.1	NONE	< 0.1				
2-Methylnaphthalene	mg/kg	< 0.1	**MCERTS**	0.4				
Hexachlorocyclopentadiene	mg/kg	< 0.1	NONE	< 0.1				
Hexachlorobutadiene	mg/kg	< 0.1	**ISO17025**	< 0.1				
2,6-Dinitrotoluene	mg/kg	< 0.1	**MCERTS**	< 0.1				
Dimethyl phthalate	mg/kg	< 0.1	NONE	< 0.1				
2-Chloronaphthalene	mg/kg	< 0.1	**MCERTS**	< 0.1				
4-Chloroanaline	mg/kg	< 0.15	NONE	< 0.15				
4-Nitrophenol	mg/kg	< 0.1	NONE	< 0.1				
4-Chlorophenyl phenyl ether	mg/kg	< 0.1	**MCERTS**	< 0.1				
3-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1				
4-Nitroaniline	mg/kg	< 0.1	NONE	< 0.1				
4-Bromophenyl phenyl ether	mg/kg	< 0.1	**MCERTS**	< 0.1				
Hexachlorobenzene	mg/kg	< 0.1	**MCERTS**	< 0.1				
2,4-Dinitrotoluene	mg/kg	< 0.1	**MCERTS**	< 0.1				
Diethyl phthalate	mg/kg	< 0.1	**MCERTS**	< 0.1				
Dibenzofuran	mg/kg	< 0.1	**MCERTS**	0.3				
Azobenzene	mg/kg	< 0.1	NONE	< 0.1				
Dibutyl phthalate	mg/kg	< 0.1	**ISO17025**	< 0.1				
Carbazole	mg/kg	< 0.1	**ISO17025**	0.2				
bis(2-ethylhexyl)phthalate	mg/kg	< 0.15	**MCERTS**	< 0.15				
Benzyl butyl phthalate	mg/kg	< 0.1	**MCERTS**	< 0.1				
Di-n-octyl phthalate	mg/kg	< 0.1	**MCERTS**	< 0.1				

DETS Ltd
it 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Semi Volatile Organic Compounds TIC (SVOC)		
DETS Report No: 20-05091	**Date Sampled**	None Supplied
Soiltechnics Ltd	**Time Sampled**	None Supplied
Site Reference: Crockwell Farm, Great Bourton	**TP / BH No**	TP080.101
Project / Job Ref: STS5055-D-1	**Additional Refs**	TP08
Order No: None Supplied	**Depth (m)**	0.10
Reporting Date: 18/05/2020	**DETS Sample No**	476306

Compound No	Compound Name	% Match	Units	RL	Estimated Concentration
1	N/a	N/a	mg/kg	< 0.1	< 0.1
2	N/a	N/a	mg/kg	< 0.1	< 0.1
3	N/a	N/a	mg/kg	< 0.1	< 0.1
4	N/a	N/a	mg/kg	< 0.1	< 0.1
5	N/a	N/a	mg/kg	< 0.1	< 0.1

There were no / other compounds identified with a match of >90%

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Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 20-05091	
Soiltechnics Ltd	
Site Reference: Crockwell Farm, Great Bourton	
Project / Job Ref: STS5055-D-1	
Order No: None Supplied	
Reporting Date: 18/05/2020	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
^ 476305	TP010.301	TP01	0.30	9.2	Brown sandy loam with stones
^ 476306	TP080.101	TP08	0.10	28.9	Brown clayey loam
^ 476307	TP060.101	TP06	0.10	19	Brown sandy clay with vegetation
^ 476308	TP030.101	TP03	0.10	40	Brown sandy clay with vegetation

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

Insufficient Sample I/S

Unsuitable Sample U/S

^ no sampling date provided; unable to confirm if samples are within acceptable holding times

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-05091
Soiltechnics Ltd
Site Reference: Crockwell Farm, Great Bourton
Project / Job Ref: STS5055-D-1
Order No: None Supplied
Reporting Date: 18/05/2020

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	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

Ian Dunkley
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: 20-05959

Site Reference:	Crockwell Farm, Great Bourton
Project / Job Ref:	STS5055-D-2
Order No:	POR008045
Sample Receipt Date:	12/05/2020
Sample Scheduled Date:	05/06/2020
Report Issue Number:	1
Reporting Date:	12/06/2020

Authorised by:

[redacted]

Kevin Old
General Manager

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

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

UKAS TESTING
4480

Soil Analysis Certificate						
DETS Report No: 20-05959	**Date Sampled**	None Supplied				
Soiltechnics Ltd	**Time Sampled**	None Supplied				
Site Reference: Crockwell Farm, Great Bourton	**TP / BH No**	TP020.201				
Project / Job Ref: STS5055-D-2	**Additional Refs**	TP02				
Order No: POR008045	**Depth (m)**	0.20				
Reporting Date: 12/06/2020	**DETS Sample No**	479504				

Determinand	Unit	RL	Accreditation					
Asbestos Quantification (S)	%	< 0.001	ISO17025	< 0.001				

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
Subcontracted analysis (S)

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

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 20-05959
Soiltechnics Ltd
Site Reference: Crockwell Farm, Great Bourton
Project / Job Ref: STS5055-D-2
Order No: POR008045
Reporting Date: 12/06/2020

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
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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	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
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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
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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
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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

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Table comparing cumulative compound concentrations with hazardous waste threshold values - all positions

Category of danger		Irritant	Harmful	Toxic		Carcinogenic		Corrosive		Toxic for reproduction		Mutagenic		Ecotoxic		
														∑N : R50-53/0.25 +∑N : R51-53/2.5 +∑N : R52-53/25	∑N : 50-53 +∑N : R50	∑N : 50-53 +∑N : 51-53 +∑N : 52-53 +∑N : R53
Risk Phrase		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			
Contaminant	Highest concentration	H4 (%)	H5 (%)	H6 (%)	H6 (%)	H7 (%)	H7 (%)	H8 (%)	H8 (%)	H10 (%)	H10 (%)	H11 (%)	H11 (%)	H14	H14	H14
Metals																
Arsenic	43.00			0.0057	0.0066	0.0066								1.8212	0.0066	0.0066
Beryllium	1.60	0.0004		0.0004	0.0004	0.0004										0.0004
Copper	120.00	0.0300	0.0300												0.0300	0.0300
Cadmium	3.70		0.0004		0.0004	0.0004										
Chromium	83.00					0.0134									0.0134	0.0134
Lead	111.00		0.0120							0.0120	0.0120				0.0120	0.0120
Mercury	0.00			0.0000											0.0000	0.0000
Nickel	65.00		0.0083				0.0083				0.0083				0.0083	0.0083
Selenium	0.00				0.0000										0.0000	0.0000
Zinc*	3080.00														0.3819	0.3819
Vanadium	148.00	0.0218			0.0218						0.0218		0.0218			0.0218
PAH																
Naphthalene	0.00		0.0000												0.0000	0.0000
Benzo(a)anthracene	2.24				0.0002	0.0002									0.0002	0.0002
Chrysene	2.16				0.0002	0.0002							0.0002		0.0002	0.0002
Benzo(b)fluoranthene	6.29				0.0006	0.0006									0.0006	0.0006
Benzo(k)fluoranthene	1.69				0.0002	0.0002									0.0002	0.0002
Benzo(a)pyrene	5.42					0.0005				0.0005		0.0005			0.0005	0.0005
Dibenzo(a,h)anthracene	0.74				0.0001	0.0001									0.0001	0.0001
TPH																
Benzene	0.00				0.0000	0.0000										
1,2,4-trimethylbenzene	0.00	0.0000	0.0000													0.0000
Hydrocarbon (C6 to C35)	0.00		0.0000			0.0000					0.0000	0.0000				0.0000
Total (or greatest)		0.0522	0.0507	0.0061	0.0305	(0.0134)	(0.0083)	0.0000	0.0000	(0.012)	(0.0218)	(0.0005)	(0.0000)	1.8212	0.4540	0.4762
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	Y	N	N

Notes:
*assuming zinc oxide

Title	Table number
Hazard assessment spreadsheet	1

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Table comparing cumulative compound concentrations with hazardous waste threshold values - excludes TP08

Category of danger		Irritant	Harmful	Toxic		Carcinogenic		Corrosive		Toxic for reproduction		Mutagenic		Ecotoxic		
														∑N : R50-53/0.25 +∑N : R51-53/2.5 +∑N : R52-53/25	∑N : 50-53 +∑N : R50	∑N : 50-53 +∑N : 51-53 +∑N : 52-53 +∑N : R53
Risk Phrase		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			
Contaminant	Highest concentration	H4 (%)	H5 (%)	H6 (%)	H6 (%)	H7 (%)	H7 (%)	H8 (%)	H8 (%)	H10 (%)	H10 (%)	H11 (%)	H11 (%)	H14	H14	H14
Metals																
Arsenic	43.00			0.0057	0.0066	0.0066								0.4009	0.0066	0.0066
Beryllium	1.60	0.0004		0.0004	0.0004	0.0004										0.0004
Copper	32.00	0.0080	0.0080												0.0080	0.0080
Cadmium	1.10		0.0001		0.0001	0.0001										
Chromium	83.00					0.0134									0.0134	0.0134
Lead	101.00		0.0109							0.0109	0.0109				0.0109	0.0109
Mercury	0.00			0.0000											0.0000	0.0000
Nickel	47.00		0.0060				0.0060				0.0060				0.0060	0.0060
Selenium	0.00				0.0000										0.0000	0.0000
Zinc*	421.00														0.0522	0.0522
Vanadium	148.00	0.0218			0.0218						0.0218		0.0218			0.0218
PAH																
Naphthalene	0.00		0.0000												0.0000	0.0000
Benzo(a)anthracene	2.24				0.0002	0.0002									0.0002	0.0002
Chrysene	2.16				0.0002	0.0002							0.0002		0.0002	0.0002
Benzo(b)fluoranthene	6.29				0.0006	0.0006									0.0006	0.0006
Benzo(k)fluoranthene	1.69				0.0002	0.0002									0.0002	0.0002
Benzo(a)pyrene	5.42					0.0005				0.0005		0.0005			0.0005	0.0005
Dibenzo(a,h)anthracene	0.74				0.0001	0.0001									0.0001	0.0001
TPH																
Benzene	0.00				0.0000	0.0000										
1,2,4-trimethylbenzene	0.00	0.0000	0.0000													0.0000
Hydrocarbon (C6 to C35)	0.00		0.0000			0.0000					0.0000	0.0000				0.0000
Total (or greatest)		0.0302	0.0250	0.0061	0.0302	(0.0134)	(0.006)	0.0000	0.0000	(0.0109)	(0.0218)	(0.0005)	(0.0000)	0.4009	0.0989	0.1211
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	N	N	N

Notes:
*assuming zinc oxide

Title	Table number
Hazard assessment spreadsheet	2

Asset location search

Property Searches

Soiltechnics Limited
Cedar Barn
White Lodge
WALGRAVE
NN6 9PY

Search address supplied Crockwell House Farm
Manor Road
Great Bourton
Banbury
OX17 1QT

Your reference STS5055

Our reference ALS/ALS Standard/2020_4183981

Search date 23 April 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

Asset location search

Property Searches

Search address supplied: Crockwell House Farm, Manor Road, Great Bourton, Banbury, OX17 1QT

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 searchprovides 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

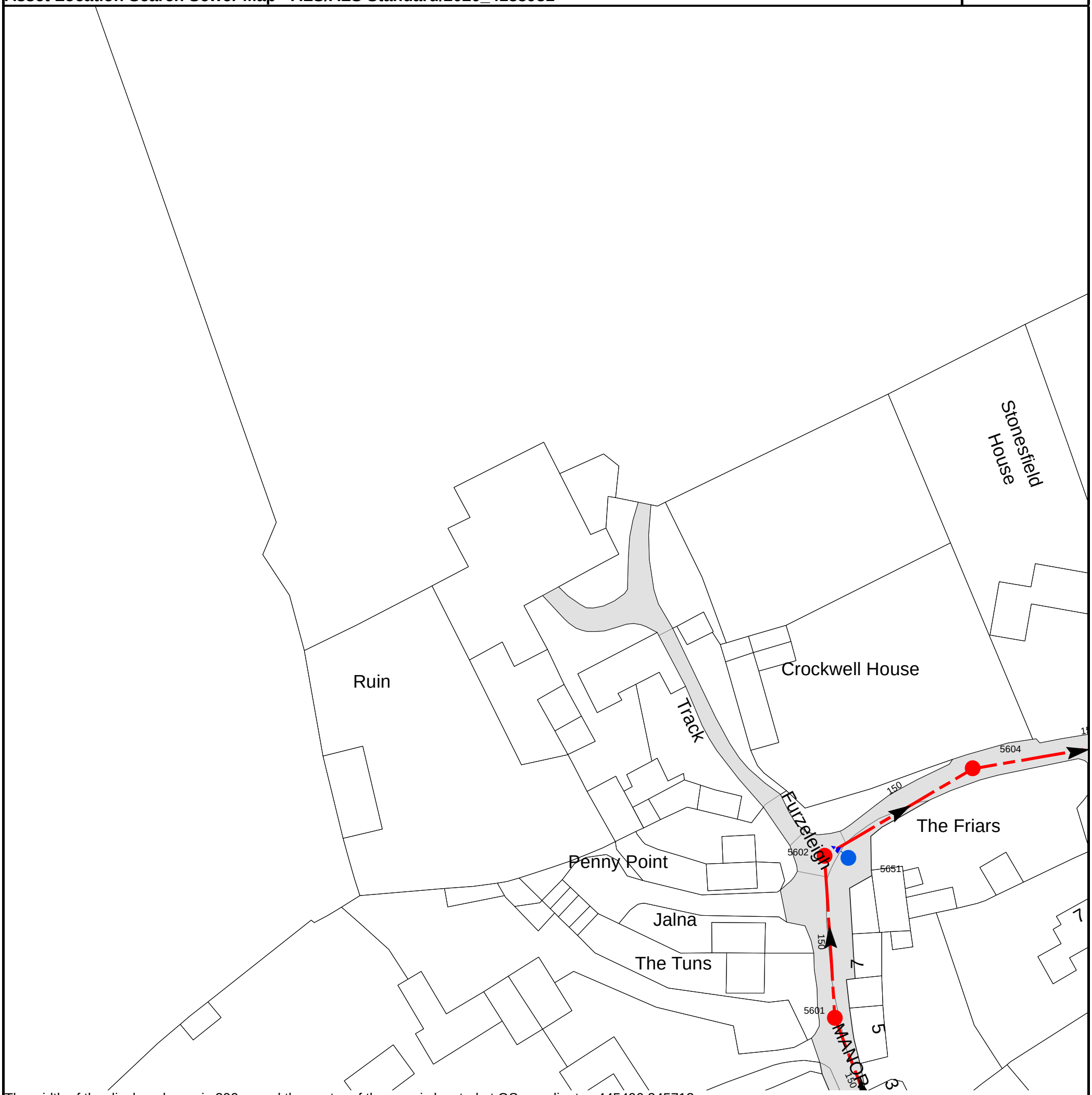
Clean Water queries

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

Asset Location Search Sewer Map - ALS/ALS Standard/2020_4183981



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 445496,245712

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
5602	141.89	139.54
5601	142	140.51
5651	141.77	140.43
5604	139.93	138.36

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 Stationary Office License Number 10019345

ALS/ALS Standard/2020_4183981

0 10 20 40 60 80 Meters

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 before any works are undertaken. Crown copyright Reserved

Scale:	1:1792
Width:	500m
Printed By:	G1KANAGA
Print Date:	23/04/2020
Map Centre:	445496,245711
Grid Reference:	SP4545NW

Comments:

ALS/ALS Standard/2020_4183981

NB: Level quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no Survey information is available.

REFERENCE	COVER LEVEL	INVERT LEVEL
6606	133.23	131.73
5601	142	140.51
6605	135.51	134.18
5501	144.77	143.39
5604	139.93	138.36
6592		
6502	138.8	137.63
6691		
6602	135.44	133.94
5651	141.77	140.43
5454		
7502	137.29	135.82
5502	143.26	141.82
7602	131.5	130.02
7601	132.37	131.04
551A		

REFERENCE	COVER LEVEL	INVERT LEVEL
5602	141.89	139.54
6604	136.61	135.72
5404	145.06	143.62
6501	143.54	142.07
6503	140.77	139.86
6591		
6601	136.54	135.1
6603	135.77	134.27
5402	146.96	145.74
5603	142.46	141.09
5503	142.78	141.47
7605	126.08	123.82
7606	125.15	123.55
7501	137.62	136.92
5504	144.35	143.41
5403	145.32	144.01

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

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

Gulley

Culverted Watercourse

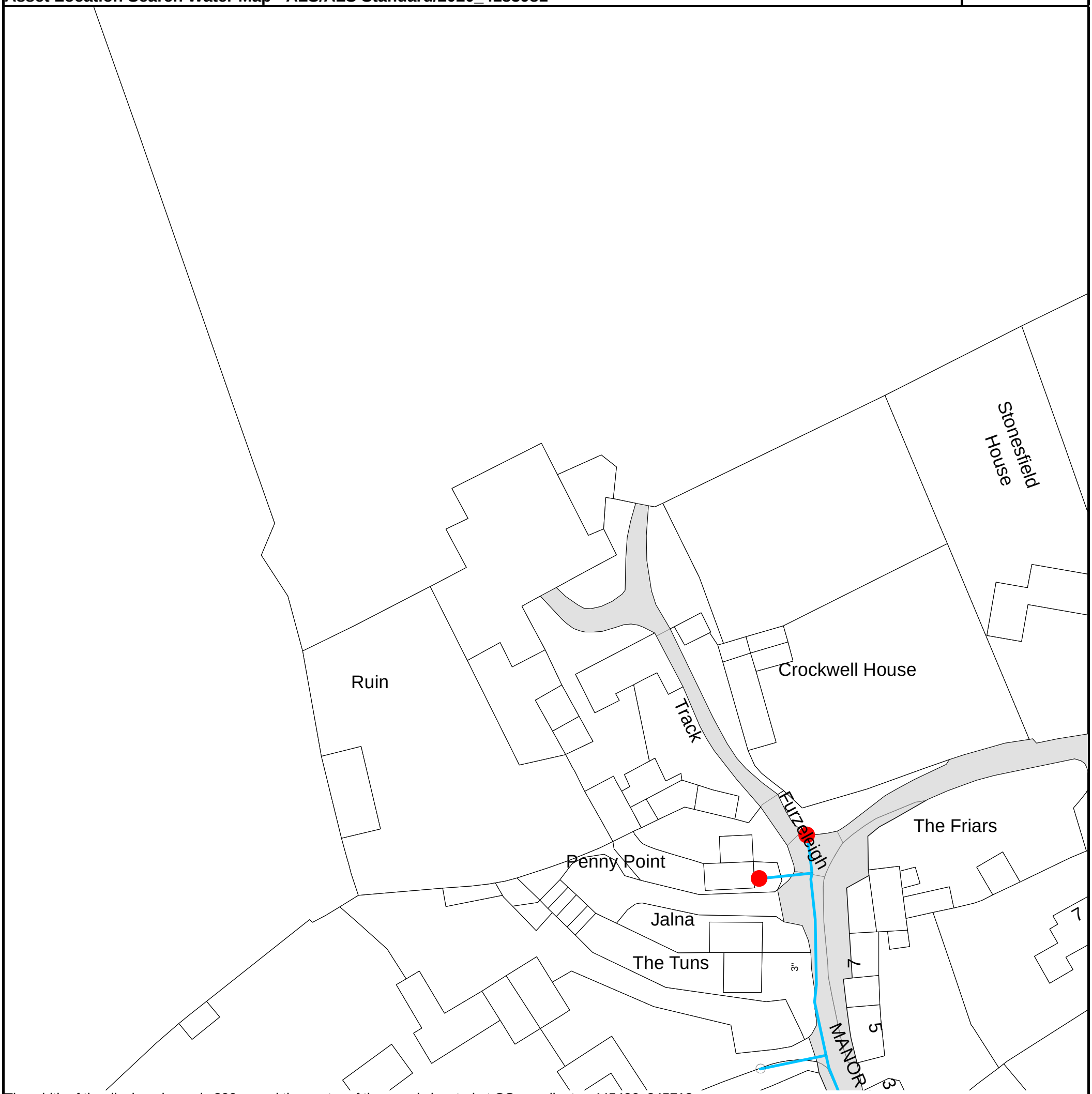
Proposed

Abandoned Sewer

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.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Asset Location Search Water Map - ALS/ALS Standard/2020_4183981



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 445496, 245712.

Based on the Ordnance Survey Map with the sanction of the Controller of H.M Stationary Office License Number 10019345

ALS/ALS Standard/2020_4183981

0 10 20 40 60 80 Meters

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 before any works are undertaken. Crown copyright Reserved

Scale:	1:1792
Width:	500m
Printed By:	G1KANAGA
Print Date:	23/04/2020
Map Centre:	445496,245711
Grid Reference:	SP4545NW

Comments:

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.

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

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')

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: Indiates 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

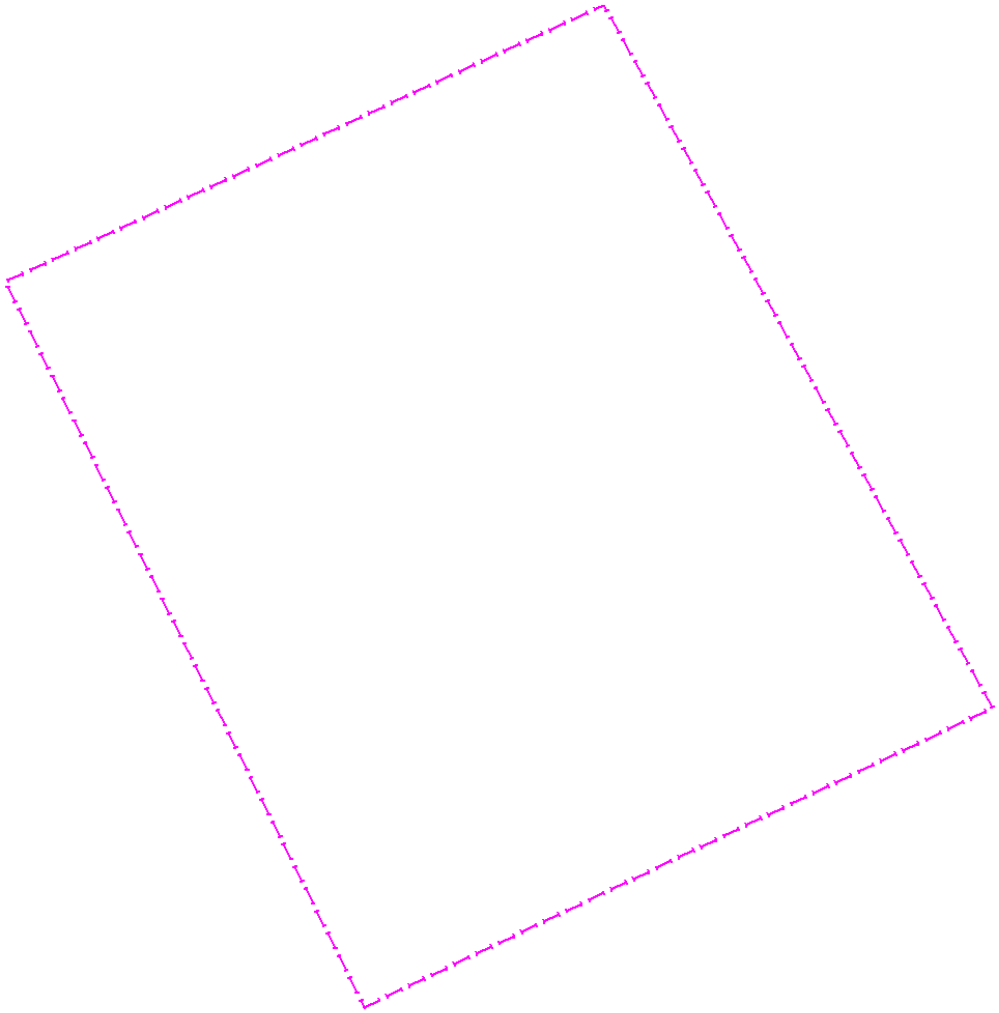
If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

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.



Warning: PDF designed for colour print only with no page scaling.

SGN Your gas. Our network.

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
Digsite:
Line:
Area:
LAs
GTs
SSSIs
Diameter Change
Material Change

N W E S

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

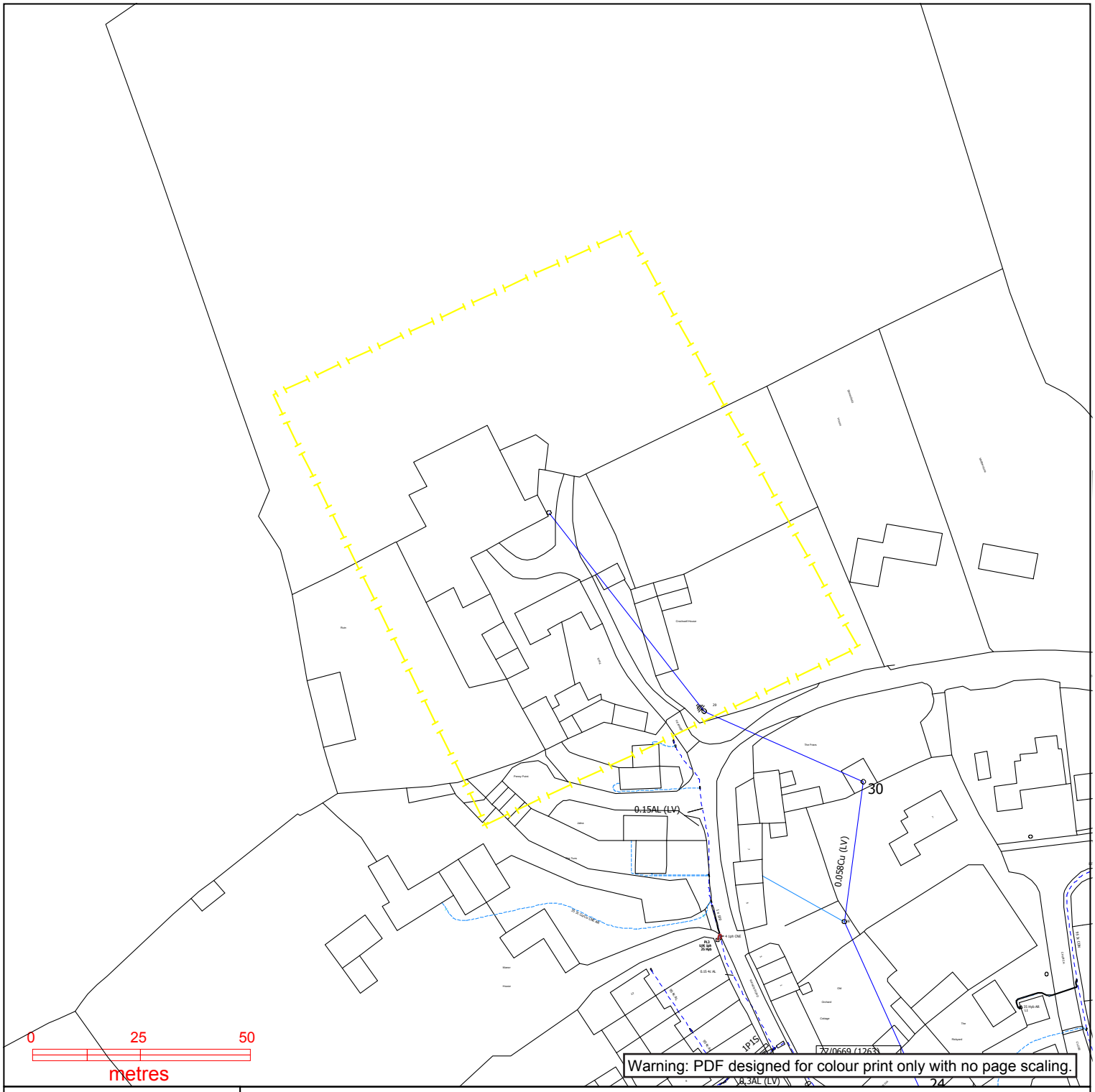
Linesearch before Udig

Date Requested: 23/04/2020
Job Reference: 18226095
Site Location: 445513 245708
Requested by:
Miss Alexa Band
Your Scheme/Reference:
STS5055

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

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, siphons, 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



WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

Contact Us

Mapping Enquiries:

All areas 0121 623 9780

General Enquiries:

All areas 0800 096 3080

Date Requested: 23/04/2020

Job Reference: 18226095

Site Location: 445513 245708

Requested by:

Miss Alexa Band

Your Scheme/Reference:

STS5055

Exact Scales:

1:1250 Area or Circle dig site

1:500 Line dig site

Link Box

Site Location

Line/Area

Overhead Line

- PL
- Service
- LV
- HV (11kV)
- HV (33kV)
- HV (66kV)
- HV (132kV)

Underground Cable

SURF Telecoms

PME Earth

Underground Earth

Pilot Cables

Pole Mounted Transformer

Ground Mounted Transformer

IMPORTANT NOTICES

- This information is given as a guide only and its accuracy cannot be guaranteed. Services or recent additions to the network may not be shown.
- Cables, overhead lines & substations owned by other electricity network owners or private companies may be present and may not be shown.
- You should always verify exact locations of cables using a cable locator and by careful use of hand tools in accordance with HSE guidance note HSG47.
- When working within 10m of any overhead electric line you should follow the requirements of HSE Guidance Note GS6.
- For further advice on working near our electricity cables or lines, call our General Enquiries number.
- Advice should be sought from the Western Power Distribution General Enquiries team for any work that is to take place in proximity to 132kV underground cables and 132kV overhead lines.

Report damage immediately – KEEP EVERYONE AWAY FROM THE AREA

0800 6783 105

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			Change Of State		Hatchings	
	Planned	*Live*	Split Coupling		Built	
PCP			Duct Tee		Planned	
Pole			Building		Inferred	
Box			Kiosk	K	Duct	
Manhole						
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 : HRU02124G
Map Reference : (centre) SP4550645697
Easting/Northing : (centre) 445506,245697
Issued : 23/04/2020 14:12:52

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

Enquiry Confirmation

LSBUD Ref: 18226095

Date of enquiry: 23/04/2020
Time of enquiry: 13:58

Enquirer

Name	Miss Alexa Band	Phone	01604 781877
Company	Soiltechnics	Mobile	Not Supplied
Address	Cedar Barn White Lodge Walgrave Northamptonshire NN6 9PY		
Email	Alexa.Band@soiltechnics.net		

Enquiry Details

Scheme/Reference	STS5055		
Enquiry type	Initial Enquiry	Work category	Development Projects
Start date	24/04/2020	Work type	Commercial/industrial
End date	24/04/2020	Site size	9762 metres square
Searched location	XY= 445506, 245697	Work type buffer*	25 metres
Confirmed location	445512 245709		
Site Contact Name	Not Supplied	Site Phone No	Not Supplied
Description of Works	Not Supplied		

* The WORK TYPE BUFFER is a distance added to your search area based on the Work type you have chosen.

Site Map

Enquiry Confirmation

LSBUD Ref: 18226095

Date of enquiry: 23/04/2020
Time of enquiry: 13:58

Asset Owners

Terms and Conditions. Please note that this enquiry is subject always to our standard terms and conditions available at www.linesearchbeforeudig.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 LinesearchbeforeUdig 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

Enquiry Confirmation

LSBUD Ref: 18226095

Date of enquiry: 23/04/2020
Time of enquiry: 13:58

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**
SGN	08009121722	0800111999	Await response
Western Power Distribution	08000963080	08006783105	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)
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)	Drax Group	E.ON UK CHP Limited
EirGrid	Electricity North West Limited	ENI & Himor c/o Penspen Ltd
EnQuest NNS Limited	EP Langage Limited	ESP Utilities Group
ESSAR	Esso Petroleum Company Limited	Fulcrum Pipelines Limited
Gamma	Gateshead Energy Company	Gigaclear Ltd
Gtt	Heathrow Airport LTD	Humbly Grove Energy
IGas Energy	INEOS FPS Pipelines	INEOS Manufacturing (Scotland and TSEP)
INOVYN Enterprises Limited	Intergen (Coryton Energy or Spalding Energy)	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	Oikos Storage Limited
Ørsted	Perenco UK Limited (Purbeck Southampton Pipeline)	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 and Southern Electricity Networks
Scottish Power Generation	Seabank Power Ltd	SES Water
Shell	Shell NOP	SSE (Peterhead Power Station)
SSE Enterprise Telecoms	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	Vattenfall
Veolia ES SELCHP Limited	Veolia ES Sheffield Ltd	Wales and West Utilities

West of Duddon Sands Transmission Ltd	Westminster City Council	Zayo Group UK Ltd c/o JSM Group Ltd

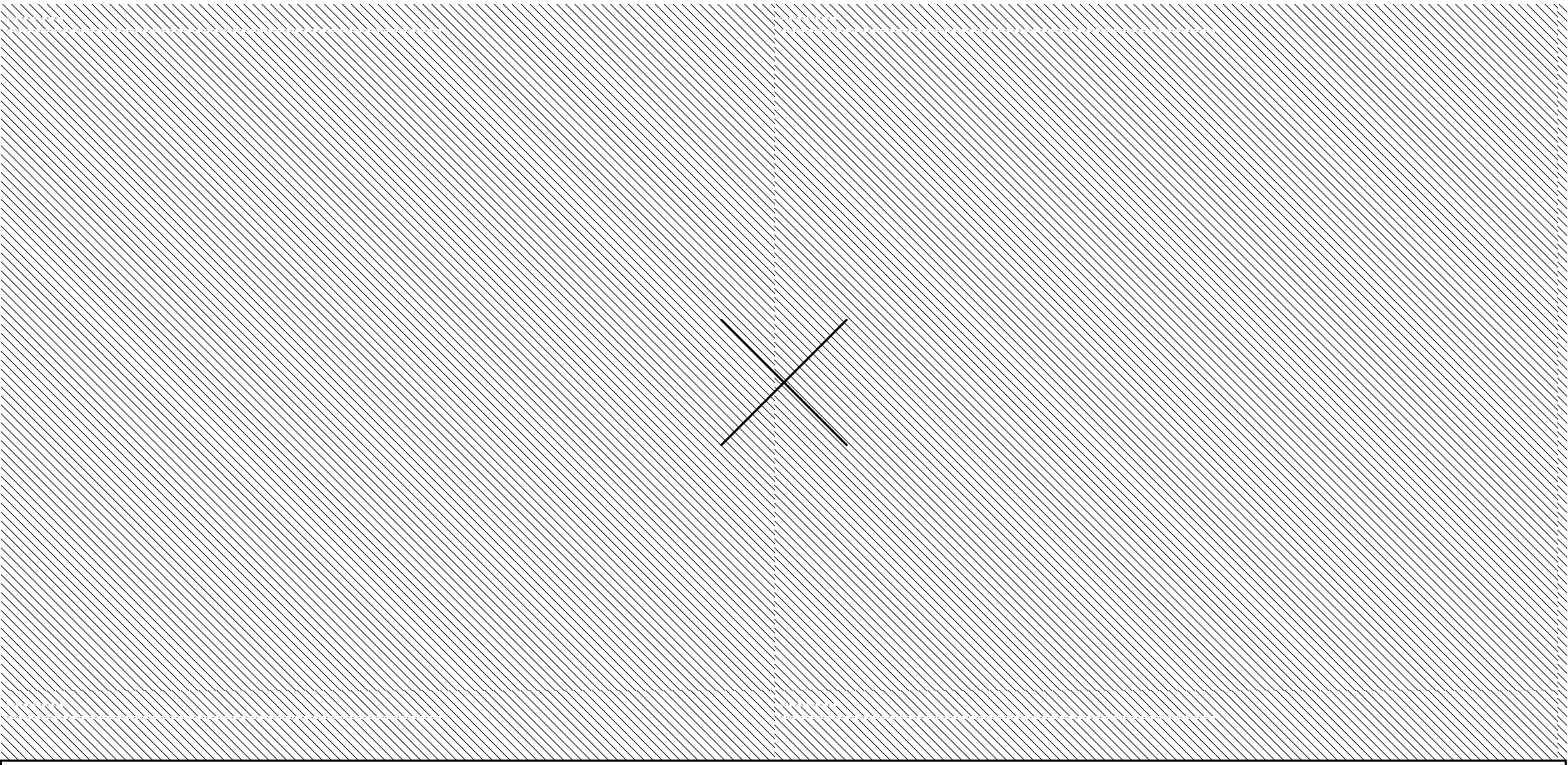
Enquiry Confirmation

LSBUD Ref: 18226095

Date of enquiry: 23/04/2020
Time of enquiry: 13:58

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	08009173993	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@cofely-gdfsuez.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
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



SCALE: Not to scale

USER ID: LaurenW

DATE: 23/04/2020

EXTRACT DATE: 01/01/1970

MAP REF: SP4545

CENTRE: 445506, 245697

LP MAINS

MP MAINS

IP MAINS

LHP MAINS

Some examples of Plant Items:

Valve | Depth of Cover | Syphon | Diameter Change | Material Change | Out of Standard Service

This plan shows those pipes owned by Cadent Gas Ltd in their role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Cadent Gas Ltd or their agents, servants or contractors for any error or omission. 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 this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue. Further information on all DR4s can be determined by calling the DR4 hotline on 01455 892426 (9am-5pm) A DR4 is where a potential error has been identified within the asset record and a process is currently underway to investigate and resolve the error as appropriate.

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Local Machine