



**GEOENVIRONMENTAL SITE INVESTIGATION
REPORT
PHASE II SITE INVESTIGATION
OF LAND AT
7A COLGATE CRESCENT
MANCHESTER**

**Prepared for:-
House Manchester
73 Ladybarn Lane
Fallowfield
Manchester
M14 6YL**

**April 2025
Ref: GSI 2245 DD PII Report**

**GeoCon Site Investigations Ltd
GeoCon Suite, Arden House, Shepley Lane, Industrial Estate, Hawk Green, Marple, Stockport,
Greater Manchester. SK6 7JW**

Quality Assurance	
Project ID	GSI 2245
Project Name	7a Colgate Crescent, Manchester
Report Type	Phase II Site Investigation
Report Reference	GSI 2245 DD PII Report
Appointed by	House Manchester
Version	Version 1
Status	Final
Date of First Issue	April 2025
Revision Date	-
Written by	<i>Dan Dawson</i> For and on behalf of GeoCon Site Investigations Ltd Dan Dawson B.Sc. (Hons) Senior Geo-Environmental Engineer
Reviewed by	<i>Graham Boulton</i> For and on behalf of GeoCon Site Investigations Ltd Graham Boulton B.Sc. (Hons) F.G.S Senior Geo-Environmental Engineer
Authorised by	<i>Ian Walker</i> For and on behalf of GeoCon Site Investigations Ltd Ian Walker B.Sc. (Hons) F.G.S Director / Engineering Geologist

This document has been prepared for the titled project (or named part thereof) and should not be relied upon or used for any other project without an independent check being carried out as to its suitability and prior written authorization being obtained from GeoCon. GeoCon accepts no responsibility or liability for the consequences of the use of this document, wholly or in part, for any other purpose than that for which it was commissioned. Any persons using or relying upon this document for such other purpose do so at their own risk.

This report was prepared for the sole use of the named Client, as defined above, and shall not be relied upon or transferred to any other party without the express written authorisation of GeoCon. It may contain material subject to copyright or obtained subject to license; unauthorised copying of this report will be in breach of copyright/license.

From herein after GeoCon Site Investigations Ltd will be referred to as GeoCon.

Table of Contents

1.0	INTRODUCTION.....	1
1.1	Instruction	1
1.2	Scope of Works	1
1.3	Previous Investigations	1
1.4	Reliance and Limitations.....	1
2.0	SITE LOCATION AND DESCRIPTION	4
2.1	Site Location	4
2.2	Site Description.....	4
2.3	Surrounding Area.....	4
2.4	Future Site Usage.....	4
3.0	GROUND INVESTIGATION.....	5
3.1	General	5
3.2	Dynamic Sample Boreholes	5
3.3	Soakaway Testing	5
3.4	Sampling and Insitu Testing	6
3.5	Backfill	6
3.6	Groundwater	6
3.7	Groundwater Monitoring	6
3.8	Laboratory testing.....	6
3.9	Restrictions	7
4.0	GROUND CONDITIONS	8
4.1	Published Geology	8
4.2	General	8
4.3	Made Ground	9
4.4	Superficial Deposits	9
4.5	Bedrock.....	9
4.6	Groundwater	9
4.7	Groundwater Monitoring	9
4.8	Obstructions	9
4.9	Contamination	9
5.0	CHEMICAL TESTING AND RESULTS	10
5.1	General	10
5.2	Chemical Testing Results.....	10

6.0	GENERIC QUANTITATIVE RISK ASSESSMENT (GQRA)	12
6.1	Criteria for interpretation	12
6.2	Risk to Human Health	12
6.3	Risk to Controlled Waters	14
6.4	Ground Gas Risk Assessment	14
6.5	Plants and Native Grasses	14
6.6	Buried Services and Utilities	14
6.7	Updated Conceptual Site Model (CSM)	15
7.0	GEOTECHNICAL TESTING AND RESULTS	18
7.1	In-situ Testing	18
7.2	Laboratory Testing	18
8.0	GEOTECHNICAL ASSESSMENT	20
8.1	General	20
8.2	Geotechnical Model	20
8.3	Foundations	21
8.4	Floor Slabs	22
8.5	Concrete	22
8.6	Groundwater and Excavations	22
8.7	Road Pavement	22
8.8	Sustainable Drainage	22
8.9	Existing structures	22
9.0	SOAKAWAY TESTING AND RESULTS	23
9.1	General	23
9.2	Soakaway Test Pits	23
9.3	Filling	23
9.4	Soakaway Testing	23
9.5	Backfill	23
9.6	Soakaway Test Results	23
9.7	Soakaway Conclusions and Recommendations	24
10.0	OTHER POTENTIAL DEVELOPMENT CONSIDERATIONS	25
10.1	Waste Soils Characterisation	25
10.2	Imported Fill	25
10.3	Construction Activities	25
10.4	Material Re-Use	25
11.0	REFERENCES	26

List of Tables

Table 2.1: Site Surface Covering.....	4
Table 4.1: Published Geology.....	8
Table 4.2: Summary of Ground Conditions	8
Table 5.1: Summary of Chemical Testing Suite	10
Table 5.2: Summary of Soil Chemical Testing Results	10
Table 6.1: Chemical Determinands Exceeding Screening Criteria	13
Table 7.1: Insitu Geotechnical Testing.....	18
Table 7.2: Geotechnical Laboratory Analysis	18
Table 7.3: Atterberg Limits Testing Results.....	18
Table 7.4: Summary of BRE SD 1 Results.....	19
Table 8.1: Summary of Ground Conditions	20
Table 8.2: Allowable increase in stress.....	21
Table 9.1: Soakaway Pit Dimensions	23
Table 9.2: Soakaway Parameters.....	24

APPENDICES

Appendix	Information
A	Drawings
B	Dynamic Sample Borehole Logs
C	Trial Pit Logs
D	Chemical Testing Results
E	Chemical Screening Criteria
F	Geotechnical Testing Results
G	Soakaway Testing Results

1.0 INTRODUCTION

1.1 Instruction

- 1.1.1 GeoCon Site Investigations Ltd (GeoCon) have been commissioned by House Manchester to undertake a Phase II Geoenvironmental Site Investigation on land at 7a Colgate Crescent, Manchester.
- 1.1.2 It is understood that this is required following the results of a Phase I Preliminary Risk Assessment carried out by GeoCon in November 2024, referenced GSI 2245 DD PI Report V1, which should be referred to in conjunction with this report.
- 1.1.3 This report is therefore provided to establish the potential for contamination at the site as a result of current and historic land uses both on site and within influencing distance, to understand the type, nature and extent of contamination present, and to identify the ground conditions and provide details of the engineering properties of the underlying soils and rocks encountered with subsequent recommendations on suitable foundation solutions for the proposed development.
- 1.1.4 This report is written in accordance with the guidance set out in Land Contamination Risk Management (LCRM), Guiding Principles for Land Contamination (GPLC) 1 – 3, and the National Planning Policy Framework (NPPF).

1.2 Scope of Works

- 1.2.1 Prior to commencing the site works the proposed scope of investigation was as follows, however the proposed scope will be subject to change dependent upon site conditions, access, restrictions and obstructions. The actual works undertaken following the completion of the site works and any on site amendments are detailed in section 3.0.
 - Four dynamic sample boreholes to a nominal depth of up to 5.00mbgl or refusal.
 - One trial pit to facilitate soakaway testing.
 - Insitu environmental and geotechnical sampling, and insitu geotechnical testing.
 - Full supervision of all works by engineering geologist including sampling and detailed geotechnical descriptions to BS5930, EN ISO 14688-1 EN ISO 14688-2 and EN ISO 14689 of all strata types encountered within the exploratory holes.
 - A suite of chemical laboratory analysis.
 - A suite of geotechnical laboratory analysis.
 - Production of an interpretative report.

1.3 Previous Investigations

- 1.3.1 GeoCon have previously undertaken a Phase I Preliminary Risk Assessment for the site, referenced GSI 2245 DD PI Report V1, dated November 2024. The report indicated a potential risk of heavy metals and inorganics, PAH and asbestos contamination at the site and therefore a Phase II Site Investigation is required to assess the risks posed.

1.4 Reliance and Limitations

- 1.4.1 This report has been prepared using published information and information provided by the Client and their professional advisers which has been made available to GeoCon at the time of writing only.

GeoCon accepts no liability for any changes resulting from new information which has become available since this time.

- 1.4.2 This report is provided for the sole use of the client and their professional advisors and is confidential to them unless agreed otherwise in writing. This report may only be used and relied on once the work has been paid for in full.
- 1.4.3 GeoCon owes no duty of care and has no liability to any third party who is not authorised by GeoCon to use this report. Any unauthorised third parties using information contained in this report do so at their own risk.
- 1.4.4 This assessment has been carried out to determine the potential risks posed to future end users, along with other key receptors, resulting from potential contamination at the site, based on the proposed development. Should any revisions in the development proposals result in a change any assessment parameters detailed in this report, a re-assessment of the risk should be carried out.
- 1.4.5 Whilst this report may reference observations made regarding the presence of features/ issues such as invasive species, ACM, site drainage and evidence of structural abnormalities, this report does not constitute specialist surveys on these matters. Should further specialist surveys be carried out in this regard, the findings of these should be reported to GeoCon so that we may determine if this has any impact on the findings of this report.
- 1.4.6 The assessment and interpretation of the factual data obtained as part of this Phase II Site Investigation has been undertaken in accordance with standard consulting practice and with current national and international guidance.
- 1.4.7 This report presents the observations made during the Phase II Site Investigation and the factual data obtained. The conclusions and recommendations in this report are limited to those which can be made based on the findings of the survey and information provided by third parties. GeoCon assumes all third party data to be true and correct. No responsibility can be accepted by GeoCon for inaccuracies in the information provided by any other party.
- 1.4.8 This report is written in the context of an agreed scope of works and should not be used in a different context. Furthermore, new information, improved practices, and changes in legislation may require the reinterpretation of the report in whole or in part after its original issue. GeoCon reserve the right to alter their conclusions and recommendations in the light of further information that may become available. This report is provided for the sole use of the client and their professional advisers and is confidential to them unless agreed otherwise in writing.
- 1.4.9 Ground conditions can be variable and change rapidly, especially in areas of Made Ground, however it is assumed that the ground conditions encountered and observed are typical and representative of the site as a whole. Most specifically with regard to this limited investigation, the ground conditions have been determined from a limited number of exploratory holes formed across the site, therefore only a small percentage of the total area of the site has been investigated. Interpolation between exploratory holes has enabled a general picture of the subsurface conditions to be produced. Conclusions drawn from the ground investigation should be read in this context. GeoCon cannot accept responsibility for any situations resulting from locally unforeseen ground conditions occurring between exploratory holes.

- 1.4.10 In addition, subsurface conditions including contaminant concentrations and groundwater levels may vary spatially with time. This factor should be given due consideration in the event that the information contained within this report is used after any significant period of time has elapsed.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

- 2.1.1 The site is located at 7a Colgate Crescent, Manchester, at approximate National Grid Reference NGR: 384770:393780 (centre of the site).
- 2.1.2 A site location plan is presented as Drawing No. GSI 2245/01 in Appendix A.

2.2 Site Description

- 2.2.1 The site is a roughly rectangular piece of land with an approximate area of 0.03Ha.
- 2.2.2 The topography of the site is undulating.
- 2.2.3 The site is currently a derelict piece of land adjacent to 7 Colgate Crescent. The surfacing of the site is predominantly soft landscaping, overgrown with weeds and shrubs, particularly in the south. Along the eastern boundary, the foundations for a building have been constructed, however the building has not been completed. Across the south and west of the site there is discarded waste and building materials, including bricks, tiles, plastic and timber.
- 2.2.4 An approximate distribution of the surface covering is given below in Table 2.1: Site Surface Covering.

Table 2.1: Site Surface Covering

Type of Surface Cover	Distribution (%)
Soft Ground (grassed and landscaped areas)	95
Hardstanding	-
Roadways	-
Buildings	5
Water (ponds, streams)	-

- 2.2.5 The site is bound by a wood panel and concrete post fence to the east, separating it from 7 Colgate Crescent. A low brick wall and mature hedges separate the site from Colgate Crescent to the north and west. Mature vegetation separates the site from the residential property to the south.
- 2.2.6 Access to the site is via Colgate Crescent to the west.

2.3 Surrounding Area

- 2.3.1 The current surrounding land use to the site is generally residential in all directions.
- 2.3.2 The topography of the surrounding area is generally flat.

2.4 Future Site Usage

- 2.4.1 It is currently proposed to construct a new residential development on the site, comprising a two-storey building with associated garage and recreational outdoor space to include soft and hard landscaping.
- 2.4.2 This assessment has been carried out with reference to this proposed development plan as described by the client, any changes to the proposed development may result in the requirement to update this assessment.

3.0 GROUND INVESTIGATION

3.1 General

- 3.1.1 The intrusive investigation was carried out on 21st February 2025.
- 3.1.2 The specification and scope of works for the ground investigation has been provided by GeoCon, based on information provided by the client.
- 3.1.3 The ground investigation has been carried out in accordance with BS5930 and the UK Specification for Ground Investigation Second Edition 2012.
- 3.1.4 All strata descriptions were undertaken in accordance with BS5930 Amendment 1; EN ISO 14688 -1; EN ISO 14688 -2; and EN ISO 14689.
- 3.1.5 The final scope of the ground investigation was as per the scope of works as defined in section 1.2.
- 3.1.6 The ground investigation was carried out to determine the geotechnical and geoenvironmental properties of the soils and rock beneath the site for a proposed residential development at the site.
- 3.1.7 The locations of the exploratory holes were specified by GeoCon and were positioned to gain key information beneath the site in relation to the proposed development.
- 3.1.8 All locations were checked against buried service location plans and then scanned with a Cable Avoidance Tool (CAT) and Genny prior to excavation, and a permit to dig was then issued. Each location was then continued by hand down to a minimum of 1.20mbgl to clear any buried services or other subsurface obstructions. All locations were then checked again with a Cable Avoidance Tool (CAT) at the base of the hand excavated inspection pit by GeoCon prior to commencement of drilling.
- 3.1.9 All access permissions were arranged by Client prior to the ground investigation commencing.
- 3.1.10 An exploratory hole location plan is presented in Appendix A as drawing number GSI 2245/02.

3.2 Dynamic Sample Boreholes

- 3.2.1 Four dynamic sample boreholes were drilled at the site, referenced DS01 to DS04, to depths of between 3.22 and 3.64mbgl.
- 3.2.2 The Dynamic sample boreholes were drilled using a tracked Dynamic sample rig in order to facilitate geoenvironmental sampling and to gain an understanding of the environmental and geotechnical properties of the soils and rock beneath the site.
- 3.2.3 The dynamic sample boreholes were drilled using 100mm diameter barrel reducing in size with depth. to achieve the target depths.
- 3.2.4 All dynamic sample borehole logs are presented in Appendix B.

3.3 Soakaway Testing

- 3.3.1 One soakaway test pit, referenced SA01, was excavated to a depth of 2.00mbgl.
- 3.3.2 The trial pit was excavated to facilitate soakaway testing to provide infiltration rates for subsequent soakaway design.
- 3.3.3 All soakaway pits were logged and photographed prior to backfilling and reinstating.

3.3.4 The soakaway trial pit log is presented in Appendix C.

3.4 Sampling and Insitu Testing

3.4.1 The environmental and geotechnical sampling regime and insitu testing regime included the following:

- Environmental samples for subsequent chemical analysis were taken from each strata type, with a minimum of three samples taken from the upper 1.00 m, then at 1.00 m intervals in Made Ground with a minimum of one sample from the natural strata.
- Small disturbed samples taken from each strata type and then at 1.00 m intervals thereafter.
- Insitu Standard Penetration Tests (SPTs) were carried out at 1.00 m intervals down to 5.00 mbgl to collate insitu strength information for the soils beneath the site.

3.4.2 Soil samples were collected for environmental and geotechnical analysis by the engineering geologist on site based on physical and visual inspection in addition to standard sampling.

3.4.3 All samples were stored in pre-chilled cool-boxes prior to immediate dispatch to laboratory. Where there has been a delay in transporting the samples to the laboratory, samples have been kept in a cool dark storage unit inside cool boxes packed with ice, which is regularly replaced to maintain sample quality.

3.4.4 The environmental samples were subsequently transported to a chemical laboratory in plastic tubs, glass jars and soils vials. The geotechnical samples were subsequently transported to a geotechnical laboratory in prepared bulk bags and plastic tubs.

3.5 Backfill

3.5.1 All exploratory holes were backfilled with arisings and made level at the surface to a similar condition as prior to the work.

3.6 Groundwater

3.6.1 Where groundwater was encountered a waiting period of 20 minutes was allowed to monitor any change (rise or fall) in the levels of each groundwater strike.

3.7 Groundwater Monitoring

3.7.1 GeoCon have not been commissioned to undertake any groundwater monitoring at this stage.

3.8 Laboratory testing

3.8.1 Chemical laboratory testing was subsequently carried out on selected samples of soil. Further details of the chemical laboratory testing are given within section 5.0 – Chemical Testing and Results.

3.8.2 All chemical laboratory testing has been scheduled by GeoCon.

3.8.3 Geotechnical laboratory testing was subsequently carried out on selected samples of soil. Further details of the geotechnical laboratory testing are given within section 7.0 – Geotechnical Testing and Results.

3.8.4 All geotechnical laboratory testing has been scheduled by GeoCon.

3.9 Restrictions

- 3.9.1 It should be noted that an area in the south of the site could not be accessed during this phase of exploratory works due to the density of overgrown vegetation. The proposed borehole in that area was moved to an accessible location.

4.0 GROUND CONDITIONS

4.1 Published Geology

- 4.1.1 The British Geological Survey shows the site to be underlain by the geological succession outlined below in Table 4.1: Published Geology.

Table 4.1: Published Geology

Geology	Description /strata	BGS General Description (Lexicon)
Artificial	None recorded	-
Superficial	Till	<i>"Till is unsorted and unstratified drift, generally overconsolidated, deposited directly by and underneath a glacier without subsequent reworking by water from the glacier. It consists of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape (diamicton)."</i>
Bedrock	Chester Formation	<i>"The formation shows a progressive change in lithology northwards, from a coarse-grained, typically well-cemented proximal facies to a fine-grained, less well-cemented distal facies."</i>

4.2 General

- 4.2.1 A generalised summary of the proven ground conditions encountered, depths to base, and thickness recorded from the exploratory hole records is presented below in Table 4.2: Summary of Ground Conditions.

Table 4.2: Summary of Ground Conditions

Geology / Strata	Depth (mbgl)				Thickness (m)		Locations encountered
	Top		Base		Min	Max	
	Min	Max	Min	Max			
Made Ground	0.00	-	0.30	1.10	0.30	1.10	All locations
Clay (Till)	0.30	1.10	2.00	3.34	1.50	3.04	All locations
Sand (Chester Formation)	3.00	3.34	3.22	3.64	0.22	0.30	DS01 to DS04
Groundwater	Strike depth (mbgl)		Rest Level (mbgl)		Locations encountered		
	Min	Max	Min	Max			
Seepage	-	-	-	-	Not Encountered		
Strike	-	-	-	-	Not Encountered		
SWL at end of borehole	-	-	-	-	Not Encountered		

- 4.2.2 The general ground conditions encountered have been summarised below.
- 4.2.3 Detailed strata descriptions are presented on the dynamic sample borehole logs and soakaway pit logs presented in Appendix B and C respectively.
- 4.2.4 The actual ground conditions encountered across the site were generally uniform and comprised Made Ground, overlying clay and sand.

4.3 Made Ground

4.3.1 Made Ground was encountered in all exploratory hole locations from ground level to depths of between 0.30 and 1.10mbgl.

4.3.2 The Made Ground generally comprised cohesive soils.

Cohesive Made Ground:

4.3.3 Cohesive Made Ground materials were encountered all exploratory locations from ground level to depths of between 0.30 and 1.10mbgl, generally comprising slightly sandy slightly gravelly clay with fragments of brick.

4.4 Superficial Deposits

4.4.1 Natural clay deposits were encountered in all exploratory locations directly beneath the Made Ground and were proven to depths of between 2.00 and 3.34mbgl, generally comprising firm to stiff slightly sandy slightly gravelly clay.

4.4.2 These soils are considered to represent Till.

4.5 Bedrock

4.5.1 Natural sand deposits were encountered in all dynamic sample boreholes directly beneath the natural clay and were proven to depths of between 3.22 and 3.64mbgl, generally comprising fine to medium sand.

4.5.2 These soils are considered to represent weathered bedrock of the Chester Formation.

4.6 Groundwater

4.6.1 Groundwater was not encountered during the site investigation.

4.7 Groundwater Monitoring

4.7.1 GeoCon have not been commissioned to carry out any groundwater monitoring at the site.

4.8 Obstructions

4.8.1 No obstructions were encountered during this ground investigation.

4.9 Contamination

4.9.1 No visual or olfactory evidence of contamination was encountered or observed during this ground investigation, in particular no obvious visual or olfactory evidence of mobile contamination was observed during the ground investigation.

5.0 CHEMICAL TESTING AND RESULTS

5.1 General

- 5.1.1 All samples were sent to a UKAS accredited chemical testing laboratory, and MCERTS were used where available. The analytical strategy focussed on a general suite of potential contaminants and the analytical suites are summarised in Table 5.1: Summary of Chemical Testing Suite.
- 5.1.2 All chemical testing results are presented in Appendix D.

Table 5.1: Summary of Chemical Testing Suite

Testing	Comment	No. of soil samples analysed
General heavy metals and inorganics suite including: Arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, phenol, selenium, zinc, pH, and water-soluble sulphate	General analysis of soils beneath the site to achieve general site coverage, and targeting former uses on site and off site within influencing distance	4
Speciated PAH	General analysis of soils beneath the site to achieve general site coverage, and targeting former uses on site and off site within influencing distance	4
Asbestos Screen	General analysis of soils beneath the site to achieve general site coverage, and targeting former uses on site and off site within influencing distance	4

5.2 Chemical Testing Results

- 5.2.1 Concentrations of contaminants reported by the laboratory testing are presented in Table 5.2: Summary of Soil Chemical Testing Results.
- 5.2.2 All chemical results have initially been compared against screening criteria for a residential end use with plant uptake.
- 5.2.3 Total Organic Carbon (TOC) was analysed in all three samples from the site. The results of the TOC recorded values between 0.50 and 2.11%. From this, Soil Organic Matter (SOM) has been calculated at values of between 0.86 and 3.64%. Therefore, a worst-case scenario of 1% SOM has been used where appropriate in the chemical assessment.

Table 5.2: Summary of Soil Chemical Testing Results

Determinand	No. Of samples analysed	Screening value (mg/kg) (where applicable)	Determinand concentration range (mg/kg)		No of Samples exceeding screening value
			Min	Max	
Cyanide (total)	4	34	BD	BD	0
Phenols - Total by HPLC	4	280	BD	BD	0
Arsenic	4	37	2.00	10.00	0
Cadmium	4	11	BD	0.60	0
Copper	4	2400	6.00	44.00	0
Chromium	4	910	11.00	21.00	0
Hexavalent Chromium	4	6	BD	BD	0
Lead	4	210	13.00	157.00	0

Mercury	4	1.2	BD	0.24	0
Nickel	4	180	8.00	32.00	0
Selenium	4	250	BD	1.00	0
Zinc	4	3700	12.00	115.00	0
Acenaphthene	4	210	BD	1.91	0
Acenaphthylene	4	170	BD	0.18	0
Anthracene	4	2400	BD	2.78	0
Benzo(a)anthracene	4	7.2	BD	9.46	1
Benzo(a)pyrene	4	2.2	BD	8.33	1
Benzo(b)fluoranthene	4	2.6	BD	8.89	1
Benzo(ghi)perylene	4	320	BD	4.14	0
Benzo(k)fluoranthene	4	77	BD	3.02	0
Chrysene	4	15	BD	9.45	0
Dibenzo(ah)anthracene	4	0.24	BD	0.92	1
Fluoranthene	4	280	BD	21.40	0
Fluorene	4	170	BD	1.18	0
Indeno(123-cd)pyrene	4	27	BD	4.14	0
Naphthalene	4	2.3	BD	0.27	0
Phenanthrene	4	95	BD	14.00	0
Pyrene	4	620	BD	19.80	0

BD = Below Detection

5.2.4 All four samples were analysed for asbestos screen. No fibres were detected in any of the samples.

6.0 GENERIC QUANTITATIVE RISK ASSESSMENT (GQRA)

6.1 Criteria for interpretation

- 6.1.1 The regime for contaminated land was set out in Part IIA of the Environmental Protection Act (EPA) 1990, as inserted by S.57 of The Environment Act 1995 and came into effect in England on 1st April 2000 as The Contaminated Land (England) Regulations 2000 (SI 2000/227). These regulations were subsequently updated with the provision of The Contaminated Land (England) Regulations 2006 (SI 2006/1380), which consolidated the previous regulations and amendments and added in provisions regarding radioactive contaminated land. These regulations came into force on 4th August 2006. This modified the wording for “Contaminated Land” under Part IIA of the EPA. Section 78A (2) defines contaminated land as “land which appears to be in such a condition, by reason of substances in, on or under the land, that:

- significant harm is being caused, or there is a significant possibility of significant harm being caused (SPOSH);

Human Health Receptors

- 6.1.2 An initial Generic Quantitative Risk Assessment (GQRA) for human health has been undertaken by comparison of the soil analytical results with published guidance criteria. These can be classified as Generic Assessment Criteria (GAC) or Soil Screening Values (SSV's) and are widely referred to by consultants, Regulatory Authorities and other professionals within the industry and include the following:

- Land Quality Management (LQM) Chartered Institute of Environmental Health (CIEH) have published a series of GACs / SSV's via the CLEA v1.06 software which are applicable to the UK for common determinands.
- Defra Category 4 Screening Levels 2014 (C4SL's) for assessment of land affected by contamination.
- ATRISK Soil SSV's (Soil Screening Values) at 1% SOM for a sand soil derived by Atkins in line with the Environment Agency 2009 guidance (SR2, SR3, SR4, SR7) using the CLEA v1.04 and CLEA v1.06 software.
- NHBC Technical Extra 15 – 2014.
- Current published Soil Guideline Values (SGVs) published by the Environmental Agency (EA).
- Contaminated Land: Applications in Real Environments (CL:AIRE) 'The Soil Generic Assessment Criteria for Human Health Risk Assessment' GAC's via the CLEA v1.06 software (updated version of the v1.04 update after the release of LQM GAC's).

- 6.1.3 It should be noted that the above guidance criteria are generally restricted with depth i.e. the values quoted with reference to human health are generally only applicable in the top 1.00m of soil and do not (dependant on the conceptual site model and conditions identified on site) necessarily identify significant harm.

- 6.1.4 A list of the screening criteria used for soils is presented in Appendix E.

6.2 Risk to Human Health

- 6.2.1 Chemical results have been screened against current guideline values where applicable for a residential with plant uptake end use.

- 6.2.2 The majority of the chemical determinands analysed recorded levels below the relevant screening criteria for the above end use with the exception of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene and Dibenz(ah)anthracene in the sample tested from DS02 at 0.50mbgl.

- 6.2.3 Elevated concentrations of the above determinands are listed below in Table 6.1: Chemical Determinands Exceeding Screening Criteria.

Table 6.1: Chemical Determinands Exceeding Screening Criteria

Location ID	Depth Range (mbgl)	Determinand Concentration Result (mg/kg)
Benzo(a)anthracene - Screening Criteria = 7.2mg/kg		
DS02	0.50	9.46
Benzo(a)pyrene - Screening Criteria = 2.2mg/kg		
DS02	0.50	8.33
Benzo(b)fluoranthene - Screening Criteria = 2.6mg/kg		
DS02	0.50	8.89
Dibenzo(ah)anthracene - Screening Criteria = 0.24mg/kg		
DS02	0.50	0.92

- 6.2.4 Based on the above, contamination does appear to be present beneath the site within the Made Ground in the area of DS02. The elevated levels of contamination may represent either a localised hotspot of contamination or could be representative of the site as a whole. At this stage it is not possible to determine the full extent of the soil contamination.
- 6.2.5 It is understood that the proposed development comprises a residential property with associated soft and hard landscaping comprising a garden and driveway.
- 6.2.6 Therefore, a pollutant linkage is considered to be present and the risk to human end users are considered to be **high** at this stage.
- 6.2.7 Risks to construction workers are considered to be **high**. All construction workers should wear appropriate Personal Protective Equipment (PPE) including latex gloves and dust masks. Provisions should be made for water on site to 'damp down' any dust in dry conditions.
- 6.2.8 Risks to neighbours / general public are considered to be **high**. Provisions should be made for water on site to 'damp down' any dust in dry conditions.
- 6.2.9 In areas where site soils are to be exposed at the surface such as areas of landscaping then these areas will need remedial action. Alternatively, additional sampling and analysis and further risk assessment could be undertaken to potentially reduce the volumes of soils requiring remedial action / removal from site and potentially delineate and reduce this area.
- 6.2.10 Possible remedial options at this stage would be as follows:
1. Made Ground materials are removed from the site and replaced with clean imported materials to provide a "cover system".
 2. Alternative remediation of the site.
- 6.2.11 Based on the above, it is recommended that a remediation strategy is commissioned for the site and the proposed remedial design is agreed with the Local Planning Authority.
- 6.2.12 A watching brief should be maintained during construction to ensure that any unsuitable materials are removed at the time.
- 6.2.13 Should any erroneous materials or previously unidentified contamination be encountered during construction then further sampling and analysis may be required.
- 6.2.14 The above recommendations should be agreed in principle with the Local Planning Authority prior to development to avoid any delays or complications at a later stage.

6.3 Risk to Controlled Waters

Groundwater

- 6.3.1 The superficial aquifer beneath the site is classified as Secondary Undifferentiated and the bedrock aquifer is classified as Principal. There are no groundwater abstractions within 1000m or drinking water abstractions within 2000m of the site. There is a Zone III SPZ located 433m to the northeast.
- 6.3.2 Based on the above, the environmental information available and the absence of a nearby potable groundwater abstraction point, the probability for contamination at the site to impact the groundwater is unlikely, and therefore the risk to groundwater is considered to be **Very Low** at this stage.

Surface Water

- 6.3.3 The nearest surface water feature to the site is 326m to the east. There are no recorded discharge consents or surface water abstractions within influencing distance of the site.
- 6.3.4 Based on the above, the environmental information available and the proximity of the nearest surface water feature, the probability for contamination at the site to impact the surface water courses is unlikely, and therefore the risk to surface water courses is considered to be **Very Low** at this stage.

6.4 Ground Gas Risk Assessment

- 6.4.1 There are no landfill or other waste management sites recorded within influencing distance of the site. There are five areas within influencing distance with the potential for infilling. Considering the distances between the features and the site and the time that has elapsed since they were potentially infilled, the probability of hazardous gases being present beneath the site is unlikely, and therefore the risk from hazardous ground gases is considered to be **Low**.
- 6.4.2 Landmark indicates that the site is within a lower probability radon area, as less than 1% of homes are above the action level. Therefore, no radon protection measures are necessary in the construction of new dwellings or extensions.

6.5 Plants and Native Grasses

- 6.5.1 Any plants that may be grown at the site in areas of landscaping may potentially be at risk from phytotoxic elements in any artificial soils beneath the site. Guideline screening values are currently available for copper, nickel and zinc which are considered to be the most harmful to plant life.
- 6.5.2 All three chemical determinands recorded levels below the relevant phytotoxic screening criteria. In addition, all plant growth appeared normal during the site walkover. Given the above and the generally low potential for contamination and the results of the wider soil analysis, the risks to plants and native grasses are considered to be **very low**.

6.6 Buried Services and Utilities

- 6.6.1 Any organic contamination present in the soils or groundwater beneath the site would pose a risk of premature failure to below ground services via chemical reaction. Based on the chemical analysis carried out during this ground investigation, the risks to buried services and pipelines are considered to be **low**.
- 6.6.2 It is the responsibility of the utility providers to confirm the risk status and determine what materials should be used in the provision of any newly proposed buried services and utilities based on the results

of the chemical analysis with this report. A copy of this report should therefore be provided to the utility contractors.

- 6.6.3 It is recommended that prior to the placement of any newly proposed buried services, that adequate testing of the soils of which the pipes / cables will be laid in is carried out to determine the suitability of those soils for the utility provider's equipment.

6.7 Updated Conceptual Site Model (CSM)

- 6.7.1 Following the results of the site investigation and above assessment, an updated Conceptual Site Model (CSM) has been produced overleaf as Table 6.1: Updated Conceptual Site Model (CSM).

Table 6.1: Updated Conceptual Site Model (CSM)

Potential Sources	Contaminants of Concern	Potential Pathway	Potential Receptor	Potential Pollutant Linkage	Probability	Consequence	Risk Classification	Action / Mitigation / Justification
Made Ground both on site and within influencing distance of the site Current and former land uses both on site and within influencing distance of the site	Heavy metals, sulphates and inorganics PAH's Asbestos	Ingestion Inhalation Dermal Contact	Human health Including current site users, future site users	Active	High Likelihood	Medium	High	Results of the site investigation confirm that elevated concentrations of contaminants above the relevant assessment criteria have been found within the Made Ground in the area of DS02. Therefore, remedial measures will be required, and it is recommended that Made Ground at the site is removed and replaced with a clean cover or further investigation is undertaken to delineate and remove the contamination hotspot.
			Human health Construction workers	Active	High Likelihood	Medium	High	Results of the site investigation confirm that elevated concentrations of contaminants above the relevant assessment criteria have been found within the Made Ground in the area of DS02. All construction personnel to wear appropriate PPE and adopt good hygienic site practices to control risk.
			Human health Neighbouring residents	Active	High Likelihood	Medium	High	Results of the site investigation confirm that elevated concentrations of contaminants above the relevant assessment criteria have been found within the Made Ground in the area of DS02. Dust control measures and soils / groundwater containment should be used during construction to minimise risk to neighbouring residents / the general public.

Potential Sources	Contaminants of Concern	Potential Pathway	Potential Receptor	Potential Pollutant Linkage	Probability	Consequence	Risk Classification	Action / Mitigation / Justification
Landfill sites Potentially infilled Land (ponds, quarries, reservoirs etc) Made Ground Natural organic soils Coal mining Fuel Stations (on and off-site sources)	Hazardous ground gases including CO ₂ , CH ₄ CO, H ₂ S Vapours	Inhalation Explosion	Human health Including current site users, future site users, neighbouring residents and constructions workers Buildings Confined Spaces	Active	Unlikely	Severe	Very Low	The Phase I assessment of the potential for hazardous ground gases to be present at the site concluded that the risk was very low and ground gas investigation was not required. No further action required.
Made Ground on site Current and former land uses on site	Heavy metals, sulphates and inorganics PAH's	Lateral and vertical migration and leaching of contaminants into local groundwater	Underlying Aquifer (Potable water)	Active	Present	Mild	Very low	The Phase I assessment of the potential for groundwater contamination concluded that the risk was very low and controlled waters investigation was not required. No further action required.
Made Ground on site Current and former land uses on site	Heavy metals, sulphates and inorganics PAH's	Lateral and vertical migration and leaching of contaminants into surface water bodies via permeable strata and features.	Local water courses and associated flora and fauna	Active	Present	Mild	Very low	The Phase I assessment of the potential for surface water contamination concluded that the risk was very low and controlled waters investigation was not required. No further action required.
Made Ground beneath the site Current and former site uses	Phytotoxic elements	Plant uptake	Plants and vegetation	Active	Absent	Mild	Very low	Results of the site investigation confirm that all determinands analysed recorded levels below the relevant phytotoxic screening criteria. No further action required.

7.0 GEOTECHNICAL TESTING AND RESULTS

7.1 In-situ Testing

- 7.1.1 In-situ Standard Penetration Tests (SPTs) were undertaken in accordance with BS1377 (1990) within the window sample boreholes. A summary of the insitu testing is given below in Table 7.1: Insitu Geotechnical Testing:

Table 7.1: Insitu Geotechnical Testing

Strata	Depth Range (mbgl) vs SPT N Value	Locations Encountered
Made Ground	NR	All locations
Clay	N = 12 - 33	All locations
Sand	N = >50	All locations

NR = Not Recorded In This Strata

7.2 Laboratory Testing

- 7.2.1 A programme of geotechnical laboratory testing was undertaken in accordance with BS1377 (1990) 'Methods of tests for soils for civil engineering purposes. All samples were sent to a UKAS accredited geotechnical testing laboratory. The geotechnical testing regime has been summarised below in Table 7.2: Geotechnical Laboratory Analysis.

Table 7.2: Geotechnical Laboratory Analysis

BS 1377 Test Number (or equivalent)	Test Description	Quantity Analysed
BS 1377 1990: Part 2: Clause 3.2	Moisture content	4
BS 1377 1990: Part 2: Clause 4.3, 5.3 & 5.4	Atterberg Limits	4
BS 1377 1990: Part 3: Clause 5.3 & BRE CP2/79	BRE SD 1	4

- 7.2.2 The results of the geotechnical testing are presented in Appendix F.

Plasticity Index

- 7.2.3 Atterberg limit testing was carried out on selected samples of cohesive soils taken from the site to establish the plasticity index of the clay beneath the site. The results of this testing is presented below in Table 7.3: Atterberg Limits Testing Results.

Table 7.3: Atterberg Limits Testing Results

Test	Range
Moisture Content (%)	9.6 – 21.2
Liquid Limit (%)	27 – 44
Plastic Limit (%)	12 – 17
Plasticity Index (%)	15 – 27
Modified plasticity index (%)	14 - 26

- 7.2.4 Based on these results the clay beneath the site can be classed as low to medium plasticity.
- 7.2.5 Chapter 4.2 'Building near Trees' of the NHBC standards indicates that from the testing results, the modified plasticity index is between 14 and 26% and therefore, the clay beneath the site is of low to medium volume change potential.

BRE SD 1

- 7.2.6 Four soil samples were analysed for BRE SD 1 reduced suite to assess the risk to buried concrete at the site, which includes total sulphate, water soluble sulphate, pH and total sulphur. The results of the testing are summarised below in Table 7.4: Summary of BRE SD 1 Results.

Table 7.4: Summary of BRE SD 1 Results

Test	Soil Test - Results Range
Total sulphate (%)	0.01 – 0.03
Water soluble sulphate (mg/l)	28 - 68
Total sulphur (%)	0.02 – 0.10
pH	7.7 – 8.3
Total Potential Sulphate (%)	0.06 – 0.30
Potential Amount of Oxidisable Sulphate Present (%)	0.04 – 0.27

- 7.2.7 Design/mix of buried concrete should be undertaken in accordance with the “Aggressive Chemical Environment for Concrete” (ACEC) classification, of BRE Special Digest 1:2005 (Concrete in Aggressive Ground).
- 7.2.8 The above results indicate that pyrite is unlikely to be present within the soils beneath the site.

8.0 GEOTECHNICAL ASSESSMENT

8.1 General

- 8.1.1 It is understood that the proposed development will comprise the construction of a two-storey residential property with associated soft landscaped garden and hardstanding driveway.
- 8.1.2 At this stage GeoCon have not been provided with any loadings for the proposed development.
- 8.1.3 The recommendations given below assume that ground levels intended for the redevelopment will be similar to those existing at present. If ground levels are subject to significant change as part of the proposed development, then the recommendations in this report may require reinterpretation

8.2 Geotechnical Model

- 8.2.1 Four dynamic sample boreholes were advanced across the site on a basis of targeting proposed structures and as a general coverage assessment of the site as a whole.
- 8.2.2 The ground conditions encountered within the exploratory holes are summarised below in Table 8.1: Summary of Ground Conditions.

Table 8.1: Summary of Ground Conditions

Stratum	Depth Range to Base of Stratum (mbgl) (Thickness Range)	Relative Density / Undrained Shear Strength	Notes
Made Ground and Topsoil			
Made Ground	0.30 to 1.10m (0.30 to 1.10m)	<u>Strength from Field Description</u> Firm	Made Ground was encountered in all exploratory hole locations from ground level to depths of between 0.30 and 1.10mbgl. The Made Ground generally comprised slightly sandy slightly gravelly clay with fragments of brick.
Natural Strata			
Clay (Till)	>2.00 to 3.34m (>1.05 to 3.04m)	<u>Strength from Field Description</u> Firm to stiff <u>Strength from In-situ Field Testing</u> SPT 'N' values recorded: 1.20: N = 12 - 16 2.00: N = 23 - 33	Natural clay deposits were encountered in all exploratory hole locations directly beneath the Made Ground and were proven to depths of between 2.00 and 3.34mbgl. The material generally comprised firm to stiff slightly sandy slightly gravelly clay. Moisture Contents: 9.6 – 21.2% Liquid Limits: 21 – 44% Plastic Limits: 12 – 17% Plasticity Indices*: 14 – 26% Consistency Index: 0.8 – 1.2 The Atterberg Limit tests indicate that the cohesive soil is of low to medium plasticity, of low to medium volume change potential (NHBC classification), and on the basis of the consistency index has a stiff to very stiff consistency.
Sand (Chester Formation)	>3.22 to >3.64m (>0.22 to >0.30m)	<u>Strength from Field Description</u> Very dense <u>Strength from In-situ Field Testing</u>	Natural sand deposits were encountered in all dynamic sample borehole locations directly beneath the natural clay and were proven to depths of between 3.22 and 3.64mbgl, where the boreholes terminated.

		SPT 'N' values recorded: 3.00: N = >50	
* - Corrected for fines content in accordance with NHBC Chapter 4.2.			

NR = Not Recorded In This Strata

8.2.3 Groundwater was not encountered within the exploratory holes advanced across the site.

8.3 Foundations

Shallow Foundations

8.3.1 The Made Ground in its current setting would not be suitable for the construction of shallow foundations due to the risk of unacceptable total and differential settlement occurring. These soils are present in a weak and variable condition such that excessive total and or differential settlement could occur under moderately light surface loading.

8.3.2 Where Made Ground is either not present or present only at shallow depths, it would be possible to adopt strip or spread foundations in the underlying cohesive soils, which generally consists of firm to stiff slightly sandy slightly gravelly clay. It is considered that this material will provide a suitable bearing stratum, provided that the foundations are placed within a single soil type and generally described as being present in a firm (or higher) insitu condition. It is considered that strip or spread foundations constructed within this material at a minimum depth of 1.20mbgl could be designed assuming an allowable increase in load given below in Table 8.2: Allowable Increase in Stress.

Table 8.2: Allowable increase in stress

Foundation Parameter	Strip Footings (m)			Spread Foundation (m)		
Foundation Width (m)	0.60	1.00	1.50	1.00	2.00	3.00
Foundation Depth (m)	1.20			1.20		
Allowable Increase in Stress (kN/m ²)	120	110	100	175	160	150

8.3.3 The allowable increase in stress given above assumes a factor of safety of 3 against general shear failure, with cohesion of 60kN/m² at the foundation depths. Settlements at the above loading intensities should remain within tolerable limits (<25mm) for the type of structure proposed provided that the underlying soils are carefully inspected immediately final trimming has taken place. Should any soft or weak material be encountered they should be locally removed and replaced with lean-mix concrete or compacted granular soil.

8.3.4 Narrower foundations can be used, however the risk of settlement would increase. If narrower foundations are required, then additional site investigation should be carried out to collect undisturbed samples for oedometer testing and the results used to calculate the amount of potential settlement and the number of years it would likely take to settle.

8.3.5 Once excavated, the formation may be subject to heave, which may result in settlement when the new foundation loads are applied. The designer should ensure that any settlement would remain within serviceable limits for the new and existing structures.

8.3.6 It is recommended that foundations are placed in one soil type to avoid any differential settlement.

8.3.7 Foundation depths may need to be increased where they are within influencing distance of trees. Heave precautions may also be required. Advice on these issues is given in NHBC Standards Chapter 4.2.

General Advice

8.3.8 All foundations should be designed by a suitably competent structural engineer in line with current guidance and good practice.

- 8.3.9 Interactions between new and existing foundations would need to be considered, as would the potential for differential settlement between new and existing structures. A construction joint should be incorporated at the interface between any new and existing structures.

8.4 Floor Slabs

- 8.4.1 It is recommended that suspended floor slabs are used at this site due to the presence and thickness of Made Ground immediately beneath the site. Concrete

8.5 Concrete

- 8.5.1 A review of the pH and sulphate concentrations indicates that all concrete used in the foundations at this site should be designed to “Design Sulphate Class” DS-1, and the “Aggressive Chemical Environment for Concrete” (ACEC) class AC-1.

8.6 Groundwater and Excavations

- 8.6.1 Groundwater is unlikely to represent a particular problem to the construction of the proposed development at this site. However, it should be recognized that slight seepages and minor water entries may combine in any long trench excavations to create a significant volume of water which may cause local problems during the construction phase. Any minor groundwater seepages or significant standing water within excavations made upon this site may be removed by using a simple form of de-watering. Such a system could include the excavation of sumps from which the water could be pumped. Advice on Groundwater Control is given in CIRIA Report No 515 – Groundwater Control Design and Practice.
- 8.6.2 Foundation excavations should be feasible using conventional plant.
- 8.6.3 The stability of the excavation faces cannot be guaranteed, thus temporary support to the excavation faces may become necessary. Alternatively, subject to space constraints, excavations could be battered back to a suitable angle of repose. However, if there is a requirement to protect nearby structures or services, appropriate supports may still be required. Advice on excavation support is given in CIRIA Report No 97 – Trenching Practice.

8.7 Road Pavement

- 8.7.1 Any new pavements will require assessment of the existing sub grade in terms of its California Bearing Ratio (CBR) to facilitate the actual pavement design.
- 8.7.2 It is recommended that CBR testing is carried out at the site along any proposed access roads prior to construction to confirm the CBR design value.

8.8 Sustainable Drainage

- 8.8.1 In accordance with National Planning and Policy Framework (NPPF) the Planning Authority are likely to insist that surface water drainage from any new-build or redevelopment complies with current design practices for Sustainable Urban Drainage (SUD's) construction of separate drainage systems for foul and surface water. Surface water shall be required to be attenuated, reducing the discharge of water from the site requiring treatment and disposal. A 20% reduction in surface water discharge rates off the site is to be expected – allowing for the 1 in 100-year storm event and allowing for climate change.
- 8.8.2 Soakaway testing has been carried out as part of this site investigation and is discussed further in section 9.0.

8.9 Existing structures

- 8.9.1 Any existing structures and foundations if found should be grubbed up and replaced with a suitable engineered granular backfill and should be compacted in layers.

9.0 SOAKAWAY TESTING AND RESULTS

9.1 General

- 9.1.1 Soakaway testing was carried out at one location (SA01) to provide infiltration rates where possible and to determine whether a sustainable drainage system is suitable for use at this site to deal with surface water runoff.
- 9.1.2 The soakaway investigation has been carried out in accordance with BRE 365.
- 9.1.3 In accordance with BRE Digest 365 entitled 'Soakaway design', soakaway test pits should be constructed so that they represent a section of the proposed soakaway.
- 9.1.4 As specified within BRE Digest 365, three soakaway tests should be undertaken, however, the water showed no sign of draining to the 25% effective storage level and therefore only one test could be conducted.
- 9.1.5 No natural groundwater was encountered in the soakaway test pits prior to carrying out the test.

9.2 Soakaway Test Pits

- 9.2.1 The soakaway pit dimensions are presented below in Table 9.1: Soakaway Pit Dimensions:

Table 9.1: Soakaway Pit Dimensions

SA ID	Width (m)	Length (m)	Depth (m)
SA01	0.45	2.00	2.00

- 9.2.2 The trial pit logs are presented in Appendix B.
- 9.2.3 The soakaway trial pit remained stable once excavated, therefore was left open following filling to allow the free drainage of water.

9.3 Filling

- 9.3.1 The machine excavated trial pit was filled via a water tanker; water was pumped rapidly into the pit in one continuous motion. The water level monitoring commenced immediately after the pit had been filled.
- 9.3.2 Standard practice as recommended in BRE 365 is to fill each soakaway pit and allow to drain completely three times, however the soakaway pits showed no signs of draining to the 25% effective storage depth after six hours, therefore the test was terminated.

9.4 Soakaway Testing

- 9.4.1 It should be noted that a depth of 1.00mbgl has been taken to be the proposed drain invert level for the purpose of the test as no formal dimensions of depths have been provided at this stage.
- 9.4.2 The soakaway test data obtained (tabulated and graphed) is presented in Appendix G.

9.5 Backfill

- 9.5.1 On completion, the soakaway pits were backfilled with airings to a similar standard as that prior to the works and made safe and level at the surface.

9.6 Soakaway Test Results

- 9.6.1 The results of the soakaway testing have been used to calculate the soakaway parameters and are presented below in Table 9.2: Soakaway Parameters.

- 9.6.2 In accordance with the methodology set out within BRE Digest 365, values of a_{p50} and V_{p75-25} were calculated, and values of t_{p75-25} were estimated where possible from the graphs in Appendix G. It should be noted that the water level recorded at the start of each test has been taken to be the proposed drain invert level.

Table 9.2: Soakaway Parameters

Parameter	Soakaway Test Location SA01		
	Test 1	Test 2	Test 3
Assumed Drain Invert Level (mbgl)	1.00	-	-
Total Effective Storage Depth (m)	1.00	-	-
75% Effective Storage Depth (mbgl)	1.25	-	-
25% Effective Storage Depth (mbgl)	1.75	-	-
Volume (m ³), $V_{p75} - V_{p25}$	0.45	-	-
Area (m ²), a_{p50}	3.35	-	-
Time (minutes), t_{p75-25}	N/A	-	-
Soil infiltration rate (m/s), f	N/A	-	-

9.7 Soakaway Conclusions and Recommendations

Conclusions

- 9.7.1 Based on the results of the soakaway test carried out at the site, the site is therefore considered unsuitable for a Sustainable Drainage System.
- 9.7.2 A soil infiltration rate cannot be determined due to the soakaway test not draining to at least 25% effective storage depth within a 24-hour period.

Recommendations

- 9.7.3 It is therefore recommended that the following options would be available for the site:
- The ground is engineered to accommodate a below ground water storage area. This would need to be designed to accommodate sufficient volumes and account for critical storm duration.
 - Contact the local water provider to discuss connecting to their infrastructure.
 - Consider alternative options.

10.0 OTHER POTENTIAL DEVELOPMENT CONSIDERATIONS

10.1 Waste Soils Characterisation

- 10.1.1 Any excavation works may potentially produce waste soils for which appropriate waste management will be required. Any soils requiring removal and disposal from site would require appropriate classification testing prior to disposal and the results would need to be confirmed with the landfill operator. Isolated hotspots if encountered may need to be taken off as Non-Hazardous or Hazardous waste. Any off-site disposal of soil requires careful management and due consideration of appropriate legislation, guidance and Duty of Care responsibilities.
- 10.1.2 A Hazardous Waste Assessment should be carried out on any materials requiring removal and disposal from site. Waste Acceptance Criteria (WAC) testing may also be required, and the results of the Hazardous Waste Assessment and WAC testing (if appropriate) should be presented to the landfill operator for their confirmation of waste category.

10.2 Imported Fill

- 10.2.1 Any imported fill will be subject to specific quality requirements, particularly in any proposed areas of landscaping. Allowance should be made for the testing of imported fill materials prior to emplacement to ensure suitability should the materials be delivered with no testing certification.

10.3 Construction Activities

- 10.3.1 Due consideration should be given to the suppression of noise, dust and vibration emissions from the site during construction.

10.4 Material Re-Use

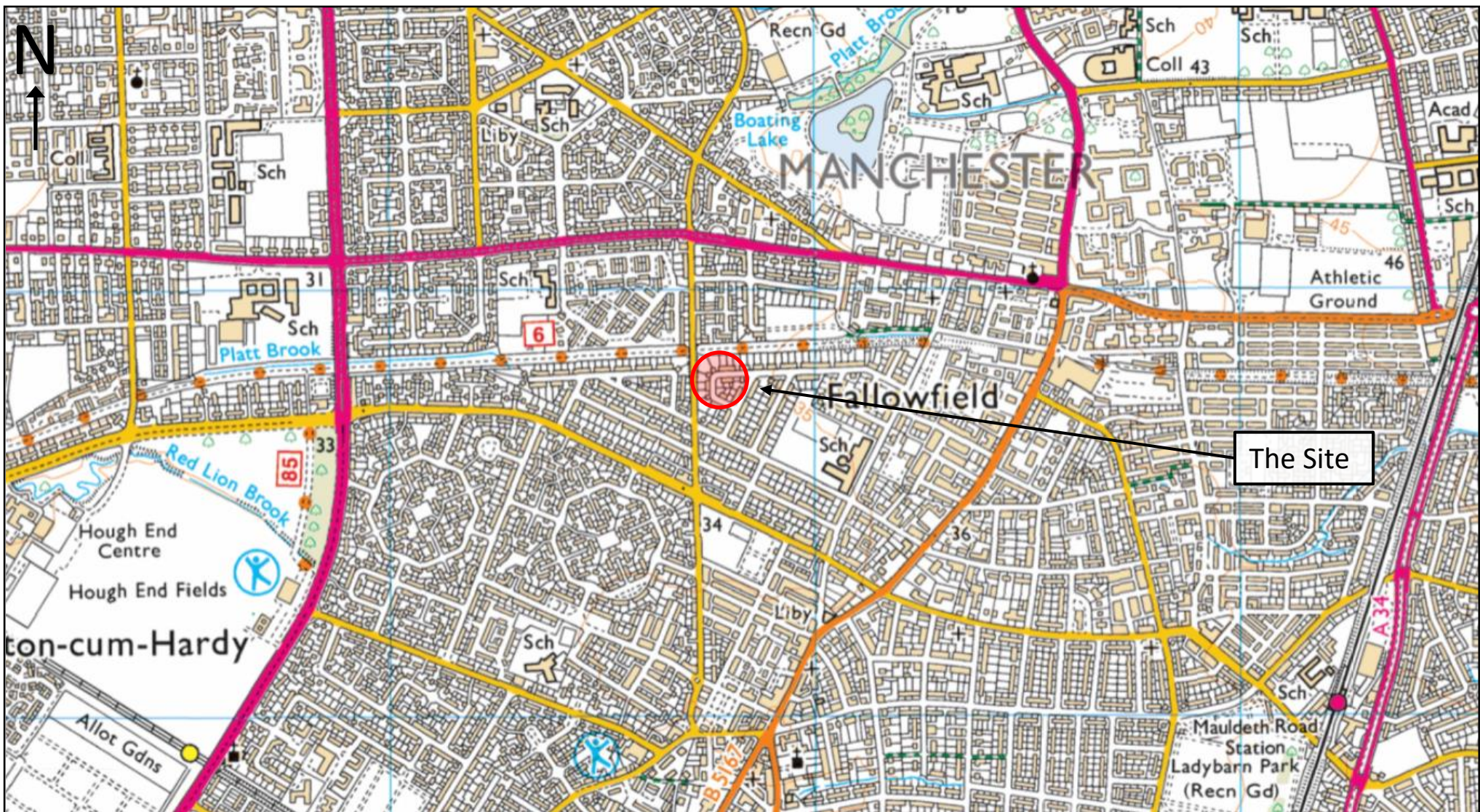
- 10.4.1 Any natural site-won soils may be suitable for reuse across the site subject to the appropriate classification, analysis and engineered solution.
- 10.4.2 Due to the presence of elevated contaminants, the Made Ground is not considered suitable for reuse on the site.

11.0 REFERENCES

- Bowles, J. E. (1996): *Foundation analysis and design*, McGraw-Hill, New York.
- British Geological Survey (BGS): 1:50'000 geological maps of the area.
- British Geological Survey (BGS): *Open geoscience online mapping tool*.
- BS 5930: *Code of Practice for Site Investigation Amendment 2*.
- BS 10175: *Code of Practice for the Investigation of Potentially Contaminated Sites*.
- BRE 211 Radon: *Guidance on protective measures for new buildings*.
- BRE 365: *Soakaway Design*.
- BRE 410 (2004): *Working platforms for tracked plant: Good practice guide to the design, installation, maintenance and repair of ground-supported working platforms*, BRE Press, Garston.
- Cheshire Brine Subsidence Compensation Board: *Cheshire Salt Search*.
- CIRIA 552: *Contaminated Land Risk Assessment; A Guide to Good Practice 2001*.
- CIRIA 665: *Assessing the Risks Posed by Hazardous Ground Gases for Buildings 2007*.
- CIRIA 758D: *Abandoned Mine Workings Manual*.
- Coal Authority: *Coal authority mining report and Cheshire brine subsidence report*.
- *Contaminated Land: Applications in Real Environments (CL:AIRE): 'The Soil Generic Assessment Criteria for Human Health Risk Assessment' GAC's*.
- David Norbury: *Soil and Rock Descriptions in Engineering Practice*.
- Defra C4SL's: *Development of Category 4 Screening Levels for assessment of land affected by contamination Department of the Environment: DOE industry profiles*.
- EN ISO 14688-1: *Geotechnical investigation and testing -- Identification and classification of soil -- Part 1: Identification and description*.
- EN ISO 14688-2: *Geotechnical investigation and testing -- Identification and classification of soil -- Part 2: Principles for a classification*.
- EN ISO 14689: *Geotechnical investigation and testing -- Identification and classification of rock -- Part 1: Identification and description*.
- Environment Agency (EA): *EA Online & What's in my back yard*.
- Environment Agency (EA): *Soil Guideline Values (SGVs)*.
- Environment Agency (EA): *Waste Management Paper WM3.1 June 2018 edition "Guidance on the Classification and Assessment of Waste"*
- HazWasteOnline
- International Society of Rock Mechanics (ISRM): *Commission on Testing Methods (1985) Suggested Method for Determining Point Load Strength*, Int. J. Rock Mech. Min. Sci. and Geomech. Abstr. 22, 1985, pp.51-60.
- *Land Contamination Risk Management (LCRM), Guiding Principles for Land Contamination (GPLC) 1 – 3*.
- *Land Quality Management (LQM): Generic Screening Criteria (GACs)*.
- Landmark: *Envirocheck report and Envirocheck analysis online historical mapping tool*.
- *National Planning Policy Framework (NPPF)*.
- Ordnance survey: *OS Landranger map for the area; OS open data online mapping tool*.
- R&D Publication CLR 8: *Assessment of risks to human health from land contamination*.
- R&D Publication CLR 10: *The Contaminated Land Exposure Model (CLEA)*.
- R&D Publication CLR 11: *Model Procedure for the Management of Contaminated Land DEFRA 2004*.
- Stroud M.A: *The standard penetration test in insensitive clays, Proceedings of the European Symposium on Penetration Testing, Stockholm, 1975, Vol 2, pp 367 – 75*.
- *UK Specification for Ground Investigation Second Edition 2012*.

APPENDIX A

DRAWINGS



GeoCon Site Investigations Ltd
GeoCon Suite, Arden House,
Shepley Lane Industrial Estate,
Hawk Green, Marple,
Stockport. Greater Manchester
SK6 7JW
Tel: 0161 713 0714
Email: info@geoconsiteinvestigations.com
Web: www.geoconsiteinvestigations.com

PROJECT ID
GSI 2245 7a Colgate Crescent, Manchester

TITLE
Site Location Plan

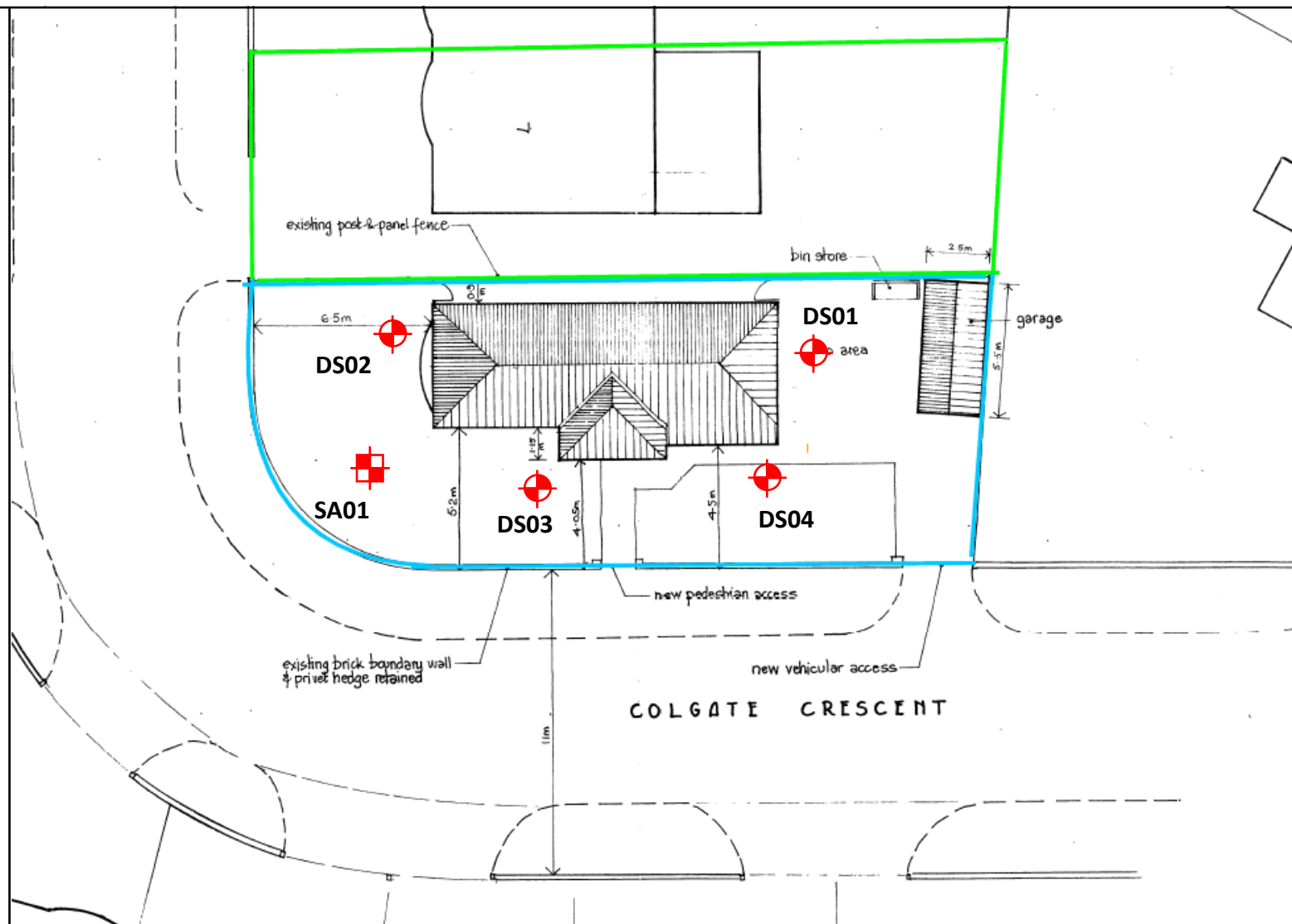
DRAWING NUMBER
GSI 2245/01

DATE
March 2025

SCALE
N.T.S

DRAWN BY
AS

N
↑



Legend:



Dynamic Sample Borehole Location



Trial Pit Location



GeoCon Site Investigations Ltd
GeoCon Suite, Arden House,
Shepley Lane Industrial Estate,
Hawk Green, Marple,
Stockport. Greater Manchester
SK6 7JW
Tel: 0161 713 0714
Email: info@geoconsiteinvestigations.com
Web: www.geoconsiteinvestigations.com

PROJECT ID

GSI 2245 7a Colgate Crescent, Manchester

DRAWING NUMBER

GSI 2245/02

SCALE

N.T.S

TITLE

Exploratory Hole Location Plan

DATE

March 2025

DRAWN BY

AS

APPENDIX B

DYNAMIC SAMPLE BOREHOLE
LOGS

DYNAMIC SAMPLE BOREHOLE LOG



Project 7a Colgate Crescent, Manchester				HAND PIT No DS01	
Project ID GSI 2245	Date 21-02-25 21-02-25	Ground Level (m)	Co-Ordinates		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument & Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.30	ES					(1.10)	MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse mudstone and brick.	MG	
0.60	ES								
0.90	ES					1.10			
1.20	D	N12					Firm to stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse mudstone and sandstone. (TILL)	TILL	
1.20	SPT								
2.00	SPT	N33				(1.90)			
2.20	D								
3.00	SPT	N50/ 75 mm				3.00	Very dense red fine to medium SAND. (CHESTER FORMATION)	CF	
						3.22			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Depth	From	To	Hours	From	To	
All dimensions in metres Scale 1:50			Client House Manchester			Method / Plant Used Competitor Dart					Logged By AS

Location cleared of buried services using CAT & Genny. Service inspection pit excavated to 1.20mbgl. No groundwater encountered.

DYNAMIC SAMPLE BOREHOLE LOG



Project 7a Colgate Crescent, Manchester				HAND PIT No DS02	
Project ID GSI 2245	Date 21-02-25 21-02-25	Ground Level (m)	Co-Ordinates		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument & Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.20	ES					(0.90)	MADE GROUND: Firm dark brown sandy gravelly CLAY with frequent rootlets and cobbles. Gravel is subangular to subrounded fine to coarse mudstone, sandstone, coal and brick. Cobbles are subangular mudstone and brick.	MG	
0.50	ES								
0.80	ES					0.90			
1.00	D						Firm to stiff brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse mudstone and sandstone. (TILL)	TILL	
1.20	SPT	N13							
2.00	D					(2.30)			
2.00	SPT	N27							
3.00	SPT	N50/ 275 mm				3.20	Very dense red fine to medium SAND. (CHESTER FORMATION)	CF	
						3.42			

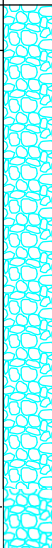
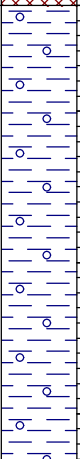
Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Depth	From	To	Hours	From	To	
All dimensions in metres Scale 1:50			Client House Manchester			Method / Plant Used Competitor Dart					Logged By AS

Location cleared of buried services using CAT & Genny. Service inspection pit excavated to 1.20mbgl. No groundwater encountered.

DYNAMIC SAMPLE BOREHOLE LOG

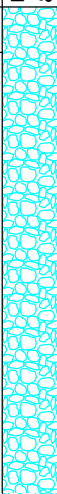
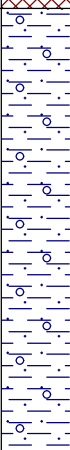


Project 7a Colgate Crescent, Manchester				HAND PIT No DS03	
Project ID GSI 2245	Date 21-02-25 21-02-25	Ground Level (m)	Co-Ordinates		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument & Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.30	ES	N15				0.30	MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse mudstone and brick.	MG	
0.60	ES				(3.02)	Firm to stiff dark brown slightly gravelly CLAY with frequent rootlets. Gravel is subangular to subrounded fine to coarse mudstone and sandstone. (TILL)		TILL	
0.90	ES								
1.20	SPT								
1.50	D	N28							
2.00	SPT								
2.50	D								
3.00	SPT								
		N50/ 175 mm				3.32 3.62	Very dense red fine to medium SAND. (CHESTER FORMATION)	CF	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Depth	From	To	Hours	From	To	
All dimensions in metres Scale 1:50			Client House Manchester			Method / Plant Used Competitor Dart					Logged By AS

Location cleared of buried services using CAT & Genny. Service inspection pit excavated to 1.20mbgl. No groundwater encountered.

SAMPLES & TESTS			STRATA					Geology	Instrument & Backfill	
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION			
0.20	ES	N16				0.30	MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse mudstone and brick.	MG		
0.50	ES				(3.04)		Firm to stiff brown slightly sandy slightly gravelly CLAY. Gravel is subrounded to rounded fine to coarse mudstone and sandstone. (TILL)			TILL
0.80	ES									
1.00	D									
1.20	SPT									
2.00	D	N23								
2.00	SPT									
3.00	SPT	N50/ 115 mm				3.34	Very dense red fine to medium SAND. (CHESTER FORMATION)	CF		

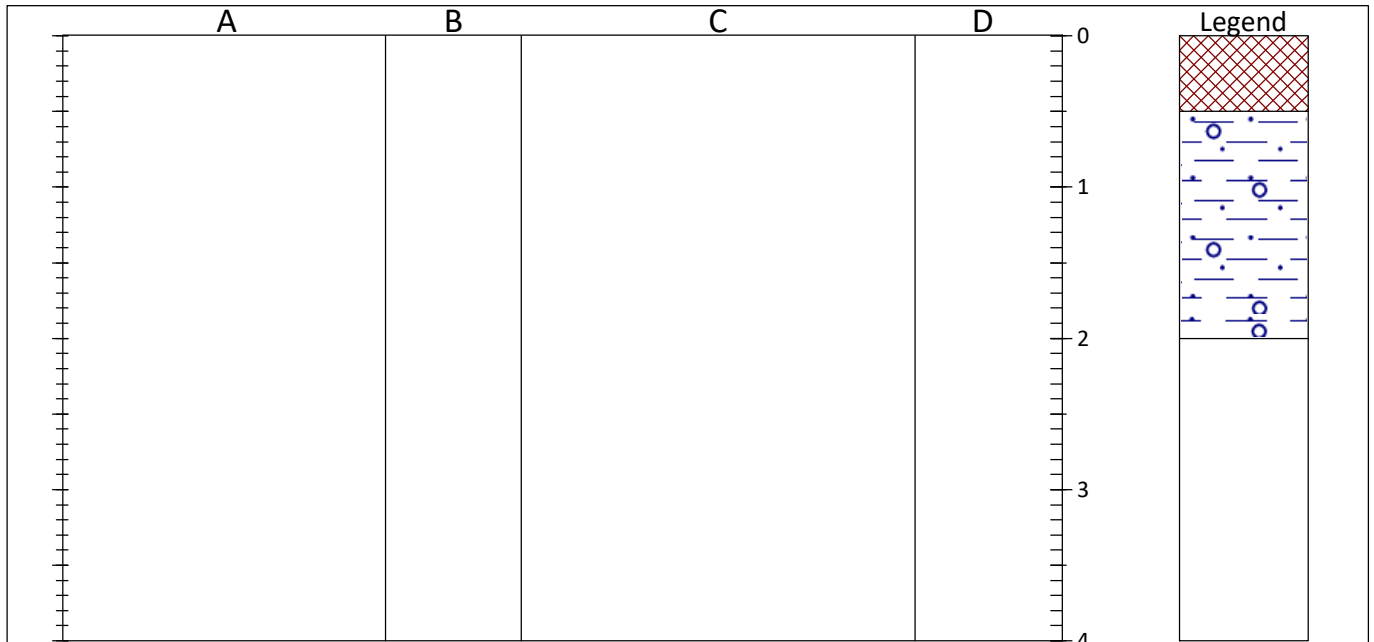
Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Dia. mm	Water Depth	From	To	Hours	From	To	Location cleared of buried services using CAT & Genny. Service inspection pit excavated to 1.20mbgl. No groundwater encountered.
All dimensions in metres Scale 1:50		Client House Manchester				Method / Plant Used Competitor Dart					Logged By AS

APPENDIX C
TRIAL PIT LOGS

TRIAL PIT LOG



Project 7a Colgate Crescent, Manchester				TRIAL PIT No SA01
Project ID GSI 2245	Date 21-02-25 21-02-25	Ground Level (m)	Co-Ordinates	
Contractor				Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	Type	Remarks/Tests
0.00-0.50		MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is subrounded to rounded fine to coarse sandstone and mudstone.			
0.50-2.00		Firm to stiff brown slightly sandy gravelly CLAY. Gravel is subrounded to rounded fine to coarse sandstone and mudstone.			

Shoring/Support: Stability: 			GENERAL REMARKS Location cleared of buried services using CAT & Genny. Trial pit excavated to 2.00mbgl to facilitate soakaway testing. No groundwater encountered.	
--	--	--	--	--

All dimensions in metres Scale 1:50	Client House Manchester	Method / Plant Used 5 tonne excavator	Logged By AS
--	----------------------------	--	-----------------

APPENDIX D
CHEMICAL TESTING RESULTS

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 25/01971
Issue Number: 1
Date: 04 March, 2025

Client: Geocon Site Investigations Ltd
Arden House
Shepley Lane Industrial Estate
Hawk Green, Marple
Stockport
Greater Manchester
UK
SK6 7JW

Project Manager: *Use - Mailing list/*Use - Mailing list 2/*Use - M
Project Name: 7a Colgate Crescent
Project Ref: GSI 2245
Order No: PO 25/0123
Date Samples Received: 26/02/25
Date Instructions Received: 27/02/25
Date Analysis Completed: 04/03/25

Approved by:



Gemma Berrisford
Deputy Client Services Supervisor

Envirolab Job Number: 25/01971

Client Project Name: 7a Colgate Crescent

Client Project Ref: GSI 2245

Lab Sample ID	25/01971/1	25/01971/2	25/01971/3	25/01971/4				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	DS01	DS02	DS03	DS04						
Depth to Top	0.30	0.50	0.30	0.50						
Depth To Bottom										
Date Sampled	21-Feb-25	21-Feb-25	21-Feb-25	21-Feb-25						
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES						
Sample Matrix Code	6A	4AE	6AE	6AE						
% Stones >10mm _A	<0.1	<0.1	4.0	<0.1				% w/w	0.1	A-T-044
pH _D ^{M#}	6.80	5.80	7.37	7.63				pH	0.01	A-T-031s
Cyanide (total) _A ^{M#}	<1	<1	<1	<1				mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2	<0.2				mg/kg	0.2	A-T-050s
Total Organic Carbon _D ^{M#}	1.05	2.11	0.50	0.63				% w/w	0.08	A-T-032s
Arsenic _D ^{M#}	4	10	2	5				mg/kg	1	A-T-024s
Cadmium _D ^{M#}	<0.5	0.6	<0.5	<0.5				mg/kg	0.5	A-T-024s
Copper _D ^{M#}	19	44	6	22				mg/kg	1	A-T-024s
Chromium _D ^{M#}	19	12	11	21				mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1				mg/kg	1	A-T-040s
Lead _D ^{M#}	17	157	17	13				mg/kg	1	A-T-024s
Mercury _D	<0.17	0.24	<0.17	<0.17				mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	26	14	8	32				mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	1				mg/kg	1	A-T-024s
Zinc _D ^{M#}	40	115	12	48				mg/kg	1	A-T-024s

Envirolab Job Number: 25/01971

Client Project Name: 7a Colgate Crescent

Client Project Ref: GSI 2245

Lab Sample ID	25/01971/1	25/01971/2	25/01971/3	25/01971/4				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	DS01	DS02	DS03	DS04						
Depth to Top	0.30	0.50	0.30	0.50						
Depth To Bottom										
Date Sampled	21-Feb-25	21-Feb-25	21-Feb-25	21-Feb-25						
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES						
Sample Matrix Code	6A	4AE	6AE	6AE						
Asbestos in Soil (inc. matrix) ^										
Asbestos in soil _D #	NAD	NAD	NAD	NAD						A-T-045
Asbestos Matrix (visual) _D	-	-	-	-						A-T-045
Asbestos Matrix (microscope) _D	-	-	-	-						A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A	N/A	N/A						A-T-045

Envirolab Job Number: 25/01971

Client Project Name: 7a Colgate Crescent

Client Project Ref: GSI 2245

Lab Sample ID	25/01971/1	25/01971/2	25/01971/3	25/01971/4				Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	DS01	DS02	DS03	DS04						
Depth to Top	0.30	0.50	0.30	0.50						
Depth To Bottom										
Date Sampled	21-Feb-25	21-Feb-25	21-Feb-25	21-Feb-25						
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES						
Sample Matrix Code	6A	4AE	6AE	6AE						
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	1.91	<0.01	<0.01				mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	0.18	<0.01	<0.01				mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	<0.02	2.78	<0.02	<0.02				mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04	9.46	<0.04	<0.04				mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	<0.04	8.33	<0.04	<0.04				mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	<0.05	8.89	<0.05	<0.05				mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	<0.05	4.14	<0.05	<0.05				mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	3.02	<0.07	<0.07				mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	<0.06	9.45	<0.06	<0.06				mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	0.92	<0.04	<0.04				mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	<0.08	21.4	<0.08	<0.08				mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	1.18	<0.01	<0.01				mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	<0.03	4.14	<0.03	<0.03				mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	0.27	<0.03	<0.03				mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	<0.03	14	<0.03	<0.03				mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	<0.07	19.8	<0.07	<0.07				mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	<0.08	110	<0.08	<0.08				mg/kg	0.01	A-T-019s

Report Notes

General

- This report shall not be reproduced, except in full, without written approval from Envirolab.
- The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client and can affect the validity of results.
- The results reported herein relate only to the material supplied to the laboratory.
- The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
- Analytical results reflect the quality of the sample at the time of analysis only.
- Opinions and Interpretations expressed are outside our scope of accreditation.
- A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
- If a sample is outside of the calibration range or affected by interferences then it may need diluting. This will result in the limit of detection (LOD) being raised.
- Subcontracted Analysis: Please see the appended report for any deviations, current LODs and accreditation status of the test.

Key

Superscript “#”	Accredited to ISO 17025
Superscript “M”	Accredited to MCertS
Superscript “U”	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript “A”	Analysis performed on as-received Sample
Subscript “D”	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript “D” on Asbestos	Analysis performed on a dried aliquot of sample provided.
Subscript “A”	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

Asbestos

Identification: Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis

“Trace Asbestos Identified” will be reported if there is not enough present to verify the type.

Quantification: Generally a 2 stage process including visual identification, hand picking and weighing, and fibre counting. Where ACMs are found a percentage asbestos is assigned to each with reference to ‘HSG264, Asbestos: The survey guide’ and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres). “TRACE” will be reported as a quantification result.

PLEASE INFORM THE LABORATORY IF YOU WOULD LIKE THE STAGE 3 SEDIMENTATION PROCESS CARRIED OUT. Note this will be subcontracted.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs

Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.

Soil Chemical Analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as ‘% stones >10mm’.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any “D” subscripts.

TPH by method A-T-007:

For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only. Results “with Clean up” indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:

EPH CWG results have humics mathematically subtracted through instrument calculation.

Where these humic substances have been identified in any IDs from “TPH CWG with clean up” please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	Geocon Site Investigations Ltd, Arden House, Shepley Lane Industrial Estate , Hawk Green, Marple, Stockport, Greater Manchester, UK, SK6 7JW	Project No:	25/01971
Project:	7a Colgate Crescent	Date Received:	27/02/2025 (am)
Clients Project No:	GSI 2245	Cool Box Temperatures (°C):	6.6

NO DEVIATIONS IDENTIFIED

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

Envirolab Analysis Dates

Lab Sample ID	25/01971/1	25/01971/2	25/01971/3	25/01971/4
Client Sample No				
Client Sample ID/Depth	DS01 0.30m	DS02 0.50m	DS03 0.30m	DS04 0.50m
Date Sampled	21/02/25	21/02/25	21/02/25	21/02/25
A-T-019s	04/03/2025	04/03/2025	04/03/2025	04/03/2025
A-T-024s	04/03/2025	04/03/2025	04/03/2025	04/03/2025
A-T-031s	03/03/2025	03/03/2025	03/03/2025	03/03/2025
A-T-032s	04/03/2025	04/03/2025	04/03/2025	04/03/2025
A-T-040s	04/03/2025	04/03/2025	04/03/2025	04/03/2025
A-T-042sTCN	03/03/2025	04/03/2025	04/03/2025	04/03/2025
A-T-044	03/03/2025	03/03/2025	03/03/2025	03/03/2025
A-T-045	28/02/2025	28/02/2025	28/02/2025	28/02/2025
A-T-050s	03/03/2025	03/03/2025	03/03/2025	03/03/2025

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

End of Report

APPENDIX E

CHEMICAL SCREENING

CRITERIA

GeoCon Site Investigations Ltd
GENERIC SCREENING CRITERIA
FOR
GENERIC QUANTITATIVE RISK ASSESSMENT

January 2023

Compound / Determinands	Source / Reference	Residential WITH consumption of home-grown vegetables			Residential WITHOUT consumption of home-grown vegetables			Commercial			Allotments			Public Open Space - Residential			Public Open Space - Parks		
		1 % SOM	2.5% SOM	6 % SOM	1 % SOM	2.5% SOM	6 % SOM	1 % SOM	2.5% SOM	6 % SOM	1 % SOM	2.5% SOM	6 % SOM	1 % SOM	2.5% SOM	6 % SOM	1 % SOM	2.5% SOM	6 % SOM
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Metals																			
Antimony	C	141	-	222	437	-	437	4650	-	4650	-	-	58.3	749	-	749	3090	-	3090
Arsenic	A	37	37	37	40	40	40	640	640	640	43	43	43	79	79	79	170	170	170
Barium	C	56.8	-	110	1340	-	1340	22000	-	22000	-	-	18.1	2680	-	2680	5770	-	63
Beryllium	A	1.7	1.7	1.7	1.7	1.7	1.7	12	12	12	35	35	35	2.2	2.2	2.2	532	532	532
Boron	A	290	290	290	11000	11000	11000	240000	240000	240000	45	45	45	21000	21000	21000	46000	46000	46000
Cadmium (pH 6, 7, 8)	A	11	11	11	85	85	85	190	190	190	1.9	1.9	1.9	120	120	120	532	532	532
Chromium III	A	910	910	910	910	910	910	8600	8600	8600	18000	18000	18000	1500	1500	1500	33000	33000	33000
Chromium VI	A	6	6	6	6	6	6	33	33	33	1.8	1.8	1.8	7.7	7.7	7.7	220	220	220
Copper	A	2400	2400	2400	7100	7100	7100	68000	68000	68000	520	520	520	12000	12000	12000	44000	44000	44000
Lead	B	210	210	210	330	330	330	6000	6000	6000	84	84	84	760	760	760	1400	1400	1400
Mercury (elemental)	A	1.2	1.2	1.2	1.2	1.2	1.2	58	58	58	21	21	21	16	16	16	30	30	30
Mercury (Inorganic)	A	40	40	40	56	56	56	1100	1100	1100	19	19	19	120	120	120	240	240	240
Mercury (methyl)	A	11	11	11	15	15	15	320	320	320	6	6	6	40	40	40	68	68	68
Molybdenum	C	95.2	-	97.4	673	673	673	17600	17600	17600	17	17	17	1360	1360	1360	2880	2880	2880
Nickel	A	180	180	180	180	180	180	980	980	980	230	230	230	230	230	230	3400	3400	3400
Selenium	A	250	250	250	430	430	430	12000	12000	12000	88	88	88	1100	1100	1100	1800	1800	1800
Vanadium	A	410	410	410	1200	1200	1200	9000	9000	9000	91	91	91	2000	2000	2000	5000	5000	5000
Zinc	A	3700	3700	3700	40000	40000	40000	730000	730000	730000	620	620	620	81000	81000	81000	170000	170000	170000
Non-Metals / Inorganics																			
Free-Cyanide (Total)	C	34	34	34	34	34	34	373	373	373	34	34	34	34	34	34	34	34	34
Phenol and Chlorophenols																			
Phenol	A	280	550	1100	750	1300	2300	760	1500	3200	66	140	280	760	1500	3200	760	1500	3200
Chlorophenols	A	0.87	2	4.5	94	150	210	3500	4000	4300	0.13	0.3	0.7	620	620	620	1100	1100	1100
Pentachlorophenol	A	0.22	0.52	1.2	27	29	31	400	400	400	0.03	0.08	0.19	60	60	60	110	120	120
Poly Aromatic Hydrocarbons (PAH)																			
Acenaphthene	A	210	510	1100	3000	4700	6000	84000	97000	100000	34	85	200	15000	15000	15000	29000	30000	30000
Acenaphthylene	A	170	420	920	2900	4600	6000	83000	97000	100000	28	69	160	15000	15000	15000	29000	30000	30000
Anthracene	A	2400	5400	11000	31000	35000	37000	520000	540000	540000	380	950	2200	74000	74000	74000	150000	150000	150000
Benzo(a)anthracene	A	7.2	11	13	11	14	15	170	170	180	2.9	6.5	13	29	29	29	49	56	62
Benzo(a)pyrene	A	2.2	2.7	3	3.2	3.2	3.2	35	35	36	0.97	2	3.5	5.7	5.7	5.7	11	12	13
Benzo(b)fluoranthene	A	2.6	3.3	3.7	3.9	4	4	44	44	45	0.99	2.1	3.9	7.1	7.2	7.2	13	15	16
Benzo(ghi)perylene	A	320	340	350	360	360	360	3900	4000	4000	290	470	640	640	640	640	1400	1500	1600
Benzo(k)fluoranthene	A	77	93	100	110	110	110	1200	1200	1200	37	75	130	190	190	190	370	410	440
Chrysene	A	15	22	27	30	31	32	350	350	350	4.1	9.4	19	57	57	57	93	110	120
Dibenzo(ah)anthracene	A	0.24	0.28	0.3	0.31	0.32	0.32	3.5	3.6	3.6	0.14	0.27	0.43	0.57	0.57	0.58	1.1	1.3	1.4
Fluoranthene	A	280	560	890	1500	1600	1600	23000	23000	23000	52	130	290	3100	3100	3100	6300	6300	6400
Fluorene	A	170	400	860	2800	3800	4500	63000	68000	71000	27	67	160	9900	9900	9900	20000	20000	20000
Indeno(123-cd)pyrene	A	27	36	41	45	46	46	500	510	510	9.5	21	39	82	82	82	150	170	180
Naphthalene	A	2.3	5.6	13	2.3	5.6	13	190	460	1100	4.1	10	24	4900	4900	4900	1200	1900	3000
Phenanthrene	A	95	220	440	1300	1500	1500	2200	22000	23000	15	38	90	3100	3100	3100	6200	6200	6300
Pyrene	A	620	1200	2000	3700	3800	3800	54000	54000	54000	110	270	620	7400	7400	7400	15000	15000	15000
PAH (Total 16)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Petroleum Hydrocarbons (TPH CWG)																			
MTBE	C	27.6	-	220	33.3	-	318	3140	-	22400	-	-	108	73600	-	75000	70800	-	117000
Benzene	A	0.087	0.17	0.37	0.38	0.7	1.4	27	47	90	0.017	0.034	0.075	72	72	73	90	100	110
Toluene	A	130	290	660	880	1900	3900	56000	110000	180000	22	51	120	56000	56000	56000	87000	95000	100000
Ethylbenzene	A	47	110	260	83	190	440	5700	13000	27000	16	39	91	24000	24000	25000	17000	22000	27000
o-Xylene	A	60	140	330	88	210	480	6600	15000	33000	28	67	160	41000	42000	43000	17000	24000	33000
m-Xylene	A	59	140	320	82	190	450	6200	14000	31000	31	74	170	41000	42000	43000	17000	24000	32000
p-Xylene	A	56	130	310	79	180	430	5900	14000	30000	29	69	160	41000	42000	43000	17000	24000	31000
TPH Aliphatic EC5-6	A	42	78	160	42	78	160	3200	5900	12000	730	1700	3900	570000	590000	600000	95000	130000	180000
TPH Aliphatic EC6-8	A	100	230	530	100	230	530	7800	17000	40000	2300	5600	13000	600000	610000	620000	150000	220000	320000
TPH Aliphatic EC8-10	A	27	65	150	27	65	150	2000	4800	11000	320	770	1700	13000	13000	13000	14000	18000	21000
TPH Aliphatic EC10-12	A	130	330	760	130	330	770	9700	23000	47000	2200	4400	7300	13000	13000	13000	21000	23000	24000
TPH Aliphatic EC12-16	A	1100	2400	4300	1100	2400	4400	59000	82000	90000	11000	13000	13000	13000	13000	13000	25000	25000	26000
TPH Aliphatic EC16-35	A	65000	92000	110000	65000	92000	110000	1600000	1700000	1800000	260000	270000	270000	250000	250000	250000	450000	480000	490000
TPH Aliphatic EC35-44	A	65000	92000	110000	65000	92000	110000	1600000	1700000	1800000	260000	270000	270000	250000	250000	250000	450000	480000	490000
TPH Aromatic EC5-7	A	70	140	300	370	690	1400	26000	46000	86000	13	27	57	56000	56000	56000	76000	84000	92000
TPH Aromatic EC7-8	A	130	290	660	860	1800	3900	56000	110000	180000	22	51	120	56000	56000	56000	87000	95000	100000
TPH Aromatic EC8-10	A	34	83	190	47	110	270	3500	8100	17000	8.6	21	51	5000	5000	5000	7200	8500	9300
TPH Aromatic EC10-12	A	74	180	380	250	590	1200	16000	28000	34000	13	31	74	5000	5000	5000	9200	9700	10000
TPH Aromatic EC12-16	A	140	330	660	1800	2300	2500	36000	37000	38000	23	57	130	5100	5100	5000	10000	10000	10000
TPH Aromatic EC16-21	A	260	540	930	1900	1900	1900	28000	28000	28000	46	110	260	3800	3800	3800	7600	7700	7800
TPH Aromatic EC21-35	A	1100	1500	1700	1900	1900	1900	28000	28000	28000	370	820	1600	3800	3800	3800	7800	7800	7900
TPH Aromatic EC35-44	A	1100	1500	1700	1900	1900	1900	28000	28000	28000	370	820	1600	3800	3800	3800	7800	7800	7900
TPH Aliphatic + Aromatic EC44-70	A	1600	1800	1900	1900	1900	1900	28000	2										



GeoCon Site Investigations Ltd

GENERIC SCREENING CRITERIA

FOR

GENERIC QUANTITATIVE RISK ASSESSMENT

January 2023

Generic Screening Criteria Reference Guide:	
Soils - Generic Screening Criteria Source Reference	
A	LQM/CIEH S4ULs for Human Health Risk Assessment Values 2015
B	Defra C4SL's 2014
C	AtRisk Soil Screening Values and Water Screening Values Produced by Atkins 2017
D	NHBC Technical Extra 15 - 2014
E	UK (CLEA) Soil Guideline Value 2009
F	CL:AIRE GAC Values December 2009
Waters - Generic Screening Criteria Source Reference	
1	Environmental Quality Standard from List 2 EC Dangerous Substances Directive (76/464/EEC) - Freshwater
2	Environmental Quality Standard from EC Surface Water Abstraction Directive (75/440/EEC) - Imperative (A1)
3	Drinking Water Standard from World Health Organisation (WHO) Guidelines for Drinking Water Quality, 1984 - health value
4	Environmental Quality Standard from List 2 EC Dangerous Substances Directive (76/464/EEC) - Freshwater (hardness related)
5	Environmental Quality Standard from EC Surface Water Abstraction Directive (75/440/EEC) - Imperative (A2)
6	Drinking Water Standard from World Health Organisation (WHO) Guidelines for Drinking Water Quality, 1984 - ATO
7	Ayscough <i>et al.</i> (2002) Proposed Environmental Quality Standards for Ethylbenzene in Water (EA R&D Technical Report P2-115/TR4).
8	UK Drinking Water Inspectorate - threshold for objectionable odour/taste of 5µg/l to 10µg/l
9	US EPA advisory limits (1997). As published in Environment Agency "The fuel additive MTBE a groundwater protection issue?" booklet.
10	Ahlberg <i>et al.</i> (2001) An Environmental Risk Assessment of MTBE use in Europe. ECETOC/EFOA Task Force on ERA of MTBE.
11	Environmental Quality Standard from List 1 EC Dangerous Substances Directive (76/464/EEC) - Freshwater
12	As Presented in Appendix 8 "Selected Water Quality Standards" in Hydrogeological Risk Assessments for Landfills (LFTGN01 - Environment Agency, March 2003).
13	UK Drinking Water Standards (DWS)
14	Environment Agency, Environmental Quality Standards (EQS) 2015
Abbreviations	
SOM	Soil Organic Matter

CONFIDENTIAL

Not to be copied or distributed to third parties without written consent from GeoCon.

APPENDIX F

GEOTECHNICAL TESTING

RESULTS



LABORATORY REPORT



Contract Number: PSL25/1388

Report Date: 13 March 2025
Client's Reference: GSI 2245 PO25/0124
Client Name: Geocon Site Investigations Ltd
Geocon Suite, Arden House
Shipley Lane Industrial Estate
Hawk Green
Marple
SK6 7JW

For the attention of: George Pool/Graham Boulton

Contract Title: 7a Colgate Crescent

Date Received: 25/02/2025
Date Commenced: 25/02/2025
Date Completed: 13/03/2025

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. 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 other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins
(Managing Director)

R Berriman
(Associate Director)

S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)


D Nicholson
(Senior Technician)

T Watkins
(Senior Technician)

5 – 7 Hexthorpe Road,
Hexthorpe,
Doncaster,
DN4 0AR
Tel: 01302 768098
Email: rberriman@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043



7a Colgate Crescent

Contract No:

PSL25/1388

Client Ref:**GSI 2245**

SUMMARY OF SOIL CLASSIFICATION TESTS

BS 1377 - Part 2 : 2022 in accordance with BS EN ISO 17892 (as below)

[illegible]

Water Content - BS 1377 - Part 2 : 2022 : Clause 4 in accordance with BS EN ISO 17892 - 1 : 2014 + A1 : 2022

Linear Shrinkage - BS 1377 - Part 2 : 2022 : Clause 7

Particle Density (Gas Jar method) - BS 1377 - Part 2 : 2022 : Clause 9

Liquid, Plastic Limit & Plasticity Index - BS 1377 - Part 2 : 2022 : Clause 5 & 6 in accordance with BS EN ISO 17892 - 12 : 2018 + A2 : 2022

SYMBOLS : NP = Non Plastic



7a Colgate Crescent

Contract No:

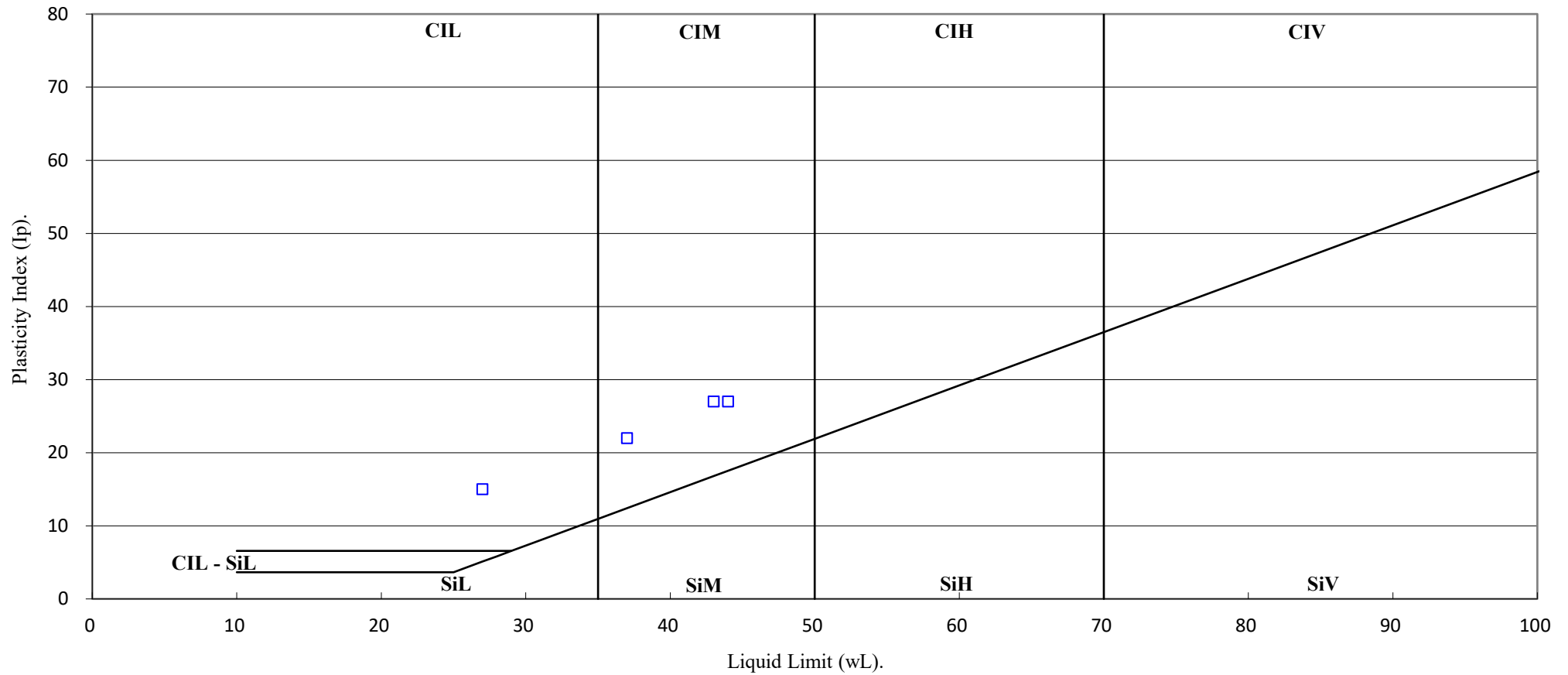
PSL25/1388

Client Ref:

GSI 2245

PLASTICITY CHART

BS EN ISO 14688-2:2017 Clause 4.4



4043



7a Colgate Crescent

Contract No:

PSL25/1388

Client Ref:

GSI 2245



4161



Professional Soils Laboratory
 5/7 Hexthorpe Road
 Hexthorpe
 Doncaster
 DN4 0AR

Analytical Test Report: L25/02651/PSL - 25-59542

Your Project Reference:	PSL25/1388 7a Colgate Crescent		
Your Order Number:	PSL25/1388	Samples Received / Instructed:	10/03/2025 / 10/03/2025
Report Issue Number:	1	Sample Tested:	10/03 to 17/03/2025
Samples Analysed:	4 sample(s)	Report issued:	17/03/2025

Signed



James Gane
 Analytical Services Manager
 CTS

Notes:**General**

Please refer to Methodologies page for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report unless otherwise requested.

Moisture Content was determined in accordance with CTS method statement MS - CL - Sample Prep, oven dried at <30°C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.**Uncertainty of measurement values are available on request.**

Samples were supplied by customer, results apply to the samples as received.

Deviating Samples

On receipt samples are compared against our sample holding and handling protocols, where any deviations have been noted these are reported on our deviating sample page (if present)

Accreditation Key

This report shall not be reproduce except in full

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited, subUKAS - Subcontracted to a laboratory UKAS accredited for this test, subMCERTS - Subcontracted to a laboratory MCERTS accredited for this test

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

UKAS accreditation on waters only covers the Ground water and Surface water matrices

Date of Issue: 12.03.25

Issued by: J. Gane

Issue No: 4

Rev No: 26



L25/02651/PSL - 25-59542

Project Reference - PSL25/1388 7a Colgate
Crescent

Analytical Test Results - Chemical Analysis

Lab Reference			468137	468138	468139	468140
Client Sample ID			-	-	-	-
Client Sample Location			DS01	DS02	DS03	DS04
Client Sample Type			D	D	D	D
Client Sample Number			-	-	-	-
Depth - Top (m)			1.20	1.00	2.50	2.00
Depth - Bottom (m)			1.20	1.00	2.50	2.00
Date of Sampling			21/02/2025	21/02/2025	21/02/2025	21/02/2025
Time of Sampling			-	-	-	-
Sample Matrix			Clay	Clay	Clay	Clay
Determinant	Units	Accreditation				
Water soluble sulphate (as SO ₄)	(mg/l)	u	37	67	68	28
Acid Soluble Sulphate	(%)	u	0.01	0.02	0.03	0.02
Total Sulphur	(%)	UKAS	0.02	0.02	0.10	0.04
pH Value	pH Units	MCERTS	7.7	8.1	8.2	8.3



L25/02651/PSL - 25-59542

Project Reference - PSL25/1388 7a Colgate Crescent

Sample Descriptions

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)	Passing 2mm test sieve (%)
468137	-	DS01	D	-	Brown silty clay	-	-	100
468138	-	DS02	D	-	Brown silty clay	-	-	100
468139	-	DS03	D	-	Brown silty clay	-	-	82
468140	-	DS04	D	-	Brown silty clay	-	-	92



L25/02651/PSL - 25-59542

Project Reference - PSL25/1388 7a Colgate Crescent

Sample Comments

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
468137	-	DS01	D	-	
468138	-	DS02	D	-	
468139	-	DS03	D	-	
468140	-	DS04	D	-	



L25/02651/PSL - 25-59542

Project Reference - PSL25/1388 7a Colgate Crescent

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
ANIONSS	MS - CL - Anions by Aquakem (2:1Extract)	Oven dried	Passing 2mm test sieve	Determination of Anions (inc Sulphate, chloride etc.) in soils by Aquakem. Analysis is based on a 2:1 water to soil extraction ratio
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
ASSO4S	MS - CL - Acid Soluble Sulphate	Oven Dried	Passing 2mm test sieve	Determination of total sulphate in soils by acid extraction followed by ICP analysis
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis
1377TS-ELT	BS1377 Total Sulphur Content by HTC	Oven dried	BS1377 : Part 1 : 2016	Total Sulphur Content testing of Soil in accordance with BS 1377 : Part 3 : 2018 + A1 : 2021 Clause 7.10 (using Eltra CS-800 Analyser)



L25/02651/PSL - 25-59542

Project Reference - PSL25/1388 7a Colgate Crescent

Sample Deviations

Deviations are listed below against each sample and associated test method, where deviation(s) are noted it means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

Observations on receipt

A - No date of sampling provided

W - No time of sampling provided for water sample

C - Received in inappropriate container

H - Contains headspace

T - Temperature on receipt exceeds storage temperature

R - Sample(s) received with less than 96 hours for testing to commence/complete, any result formally classed as deviating will be marked with an X against the applicable test (i.e. RX)

Observations whilst in laboratory

X - Exceeds sampling to extraction or analysis timescales

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
468137	-	DS01	D	-	MS - CL - pH in Soils	RX
468138	-	DS02	D	-	MS - CL - pH in Soils	RX
468139	-	DS03	D	-	MS - CL - pH in Soils	RX
468140	-	DS04	D	-	MS - CL - pH in Soils	RX

APPENDIX G

SOAKAWAY TESTING RESULTS

Soakaway Infiltration Test Record

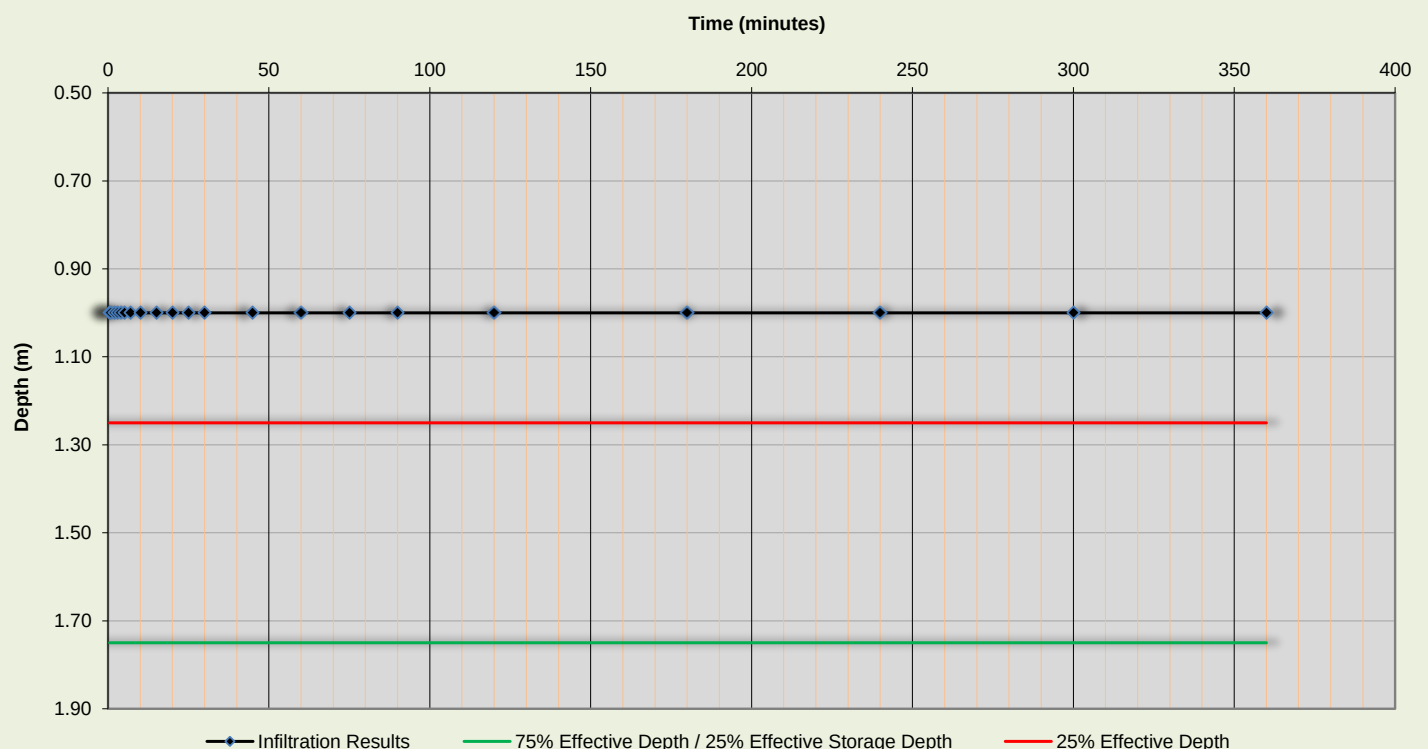


Method	Date	Recorded By	Checked By	Datum (mAGL)	Trial pit dimensions:		National Grid Reference	
BRE Digest DG 365: 2016	21 Feb 25	AS	DD	0.00	Length (m):	2.00	Easting (m)	-
Granular Infill Used	Depth to Granular Infill (mBGL)		Porosity of Granular Infill		Width (m):	0.45	Northing (m)	-
No	N/A		1.0		Depth (m):	2.00	Ground Level (mAOD)	-

Elapsed time (mins):	Water depth (m below datum):	Elapsed time (mins):	Water depth (m below datum):
0.5	1.00		
1.0	1.00		
2.0	1.00		
3.0	1.00		
4.0	1.00		
5	1.00		
7	1.00		
10	1.00		
15	1.00		
20	1.00		
25	1.00		
30	1.00		
45	1.00		
60	1.00		
75	1.00		
90	1.00		
120	1.00		
180	1.00		
240	1.00		
300	1.00		
360	1.00		

Parameter	Value
Is Natural Groundwater Present	No
Depth to Natural Groundwater if Present (mBGL)	N/A
Invert Level (mBGL)	1.00
Total Soakaway Trial Pit Depth (mBGL)	2.00
Total Effective Depth (mBGL)	1.00
50% Effective Depth (m)	0.50
75% Effective Depth (m)	1.75
25% Effective Depth (m)	1.25
Mean Surface area Through Which Outflow Occurs (m ²): a_{p50}	3.35
Volume Outflow Between 75% and 25% Effective Depth: V_{p75-25}	0.45
From the Graph	Value
Time Taken to Drain to 75% Effective Depth (mins): t_{p75}	N/A
Time Taken to Drain to 25% Effective Depth (mins): t_{p25}	N/A
Time for Water Level to Fall 75% to 25% Effective Depth t_{p75-25}	N/A
Soil Infiltration Rate	Value
Soil Infiltration Rate (m/s): f	Unsuitable

Test incomplete as 25% effective storage depth not achieved. Unable to reliably determine soil infiltration rate



Remarks	Location cleared of buried services using CAT and Genny. No groundwater encountered.	Project No:	GSI 2245	Test ID:	
Status:	FINAL	Project:	7a Colgate Crescent, Manchester	TP/SA ID:	SA01
		Client:	House Manchester	Cycle No:	1