

Phase 2: Site Investigation

Wignall Gate, Holbeach

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PHASE 2 SITE INVESTIGATION REPORT

Wignall Gate, Holbeach

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Revision	Date	Prepared By	Signed
Final	December 2025	R Fletcher Engineering Geologist	
		Checked By	
		A Lowry Consultant	
		Approved By	
		R Woods Managing Director	

1 EXECUTIVE SUMMARY

Site Address	South of Wignals Gate Street, Holbeach, Spalding, PE12 7HR.
Proposed Development	The site is outlined for a residential development, with associated access roads and parking.
Fieldwork	• 12no small percussive boreholes (BH01 to BH12) drilled to a maximum of 5.00mbgl with 4no. monitoring pipes in BH04, BH05, BH08 and BH12. • 6no machine excavated trial pits (TP01 to TP06) to a maximum depth of 3.00mbgl. • 2no soakaway tests within TP01 and TP03.
Ground Conditions	• Topsoil was encountered to a depth of 0.40mbgl in all positions. • Loose to medium dense, slightly clayey sand was encountered to depths of between 2.30mbgl (TP06) and 3.60mbgl (BH02-12) underlain by generally medium dense silty sand to depths of >5.45mbgl. • Groundwater was noted between 2.00m and 2.90m.
Contamination Analysis	• Given the site's proposed residential land use, the levels of contamination recorded on site do not pose a significant risk to the current and future users of the site. • If any zones of odorous, brightly coloured or suspected contaminated ground or groundwater are encountered then work should cease in that area until the material has been investigated. The results of the investigation will therefore determine whether or not remediation will be required. • Made ground classed as posing a low risk with respect to construction workers. PPE for workers. Damping down of site during dry windy conditions. • Controlled waters unlikely to be at significant risk. • With respect to utilities, pH was elevated; as a minimum all services should be laid in clean trenches. • Sub surface concrete should be designed to DS-1 ACEC (Class AC-1s). This assumes static groundwater conditions.
Geotechnical Analysis & Foundation Recommendations	• Mini piled foundations recommended. • Client could also consider shallow ground improvement techniques, contact specialist for advice. • Normal earthworks plant for excavations.
Further Works Recommendation	• A series of cable percussive boreholes to confirm the above ground conditions and provide additional information for pile design. Alternatively, CPT testing may prove the relative density of the soils being acceptable for shallow foundations.

2 INTRODUCTION

2.1 Authorisation

The site investigation described in this report was carried out by Solmek to the instructions of Brown Builders, on land located south of Wignals Gate Street, Holbeach, Spalding, PE12 7HR. (Figure 1).

Sources of information, including previous work undertaken at the site, are detailed below:

- *Solmek Phase 1 Desk Study (S250326) April 2025.*
- *Solmek Soakaway Letter Report (S250326) April 2025.*

Reference should be made to the above reports for details of the site's history and environmental setting, the ground conditions encountered, and the results of historical contamination analysis.

2.2 Scope of Works

The site is expected to be developed with new residential housing with associated parking and soft landscaping. The proposed layout is shown as Figure 3.

The following steps may be required in the investigation and remediation of potentially contaminated land:

- Phase 1: Desk Study
- Phase 2: Intrusive Investigation
- Phase 3: Remediation Statement
- Phase 4: Validation Reports

Phases 1 and 2 are generally required in the redevelopment of most sites. Phases 3 and 4 are subject to the findings of the initial stages.

A geotechnical and environmental (Phase 2) investigation including a ground gas risk assessment was requested. The fieldwork and testing was generally carried out according to;

- BS 5930:2015+A1:2020 Code of Practice for Ground Investigations
- BS 10175:2011+A1:2013 Investigation of Potentially Contaminated Sites – Code of Practice.
- CIRIA C665:2007 Assessing Risks Posed by Hazardous Ground Gas to Buildings
- BS 8485:2015+A1:2019 Code of Practice for the Characterization and Remediation from Ground Gas in Affected Developments
- Rock and soil descriptions shall be in accordance with BS EN ISO 14689-1:2003, BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2004

This report forms part of a Stage 1 Risk Assessment (Generic Quantitative Risk Assessment) with respect to the Environment Agency's guidance document Environment Agency *Land Contamination Risk Management*, which replaced the now-withdrawn *Contaminated Land Report 11 – Model Procedures for the Management of Land Contamination (2004)*.

The information provided in this report is based on the investigation fieldwork and is subject to the comments and approval of the various regulatory authorities. There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report. Solmek reserve the right to alter conclusions and recommendations should further information be available or provided. Any schematic representation or opinion of the possible configuration of ground conditions between exploratory holes is conjectural and given for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

3 SITE DESCRIPTION

A site inspection, as recommended in BS 5930 and BS 10175, was undertaken on Tuesday 6th September 2025. The site is centred at Ordnance Survey Co-ordinates 534410, 324490 and covers approximately 1.85Ha.

The site is located on a parcel of land south of Wignals Gate Road, Holbeach, PE12 7HR. Land on site is noted to be agricultural in nature and the topography is noted to be flat and even.

Access to the site is via an opening between two houses along Wignals Gate, there is no perimeter fencing or gate into the site. An overhead telecommunications wire is noted above the entrance point in the north.

Residential housing is noted immediately to the north of the site. The land to the south and west is identified as agricultural in nature with several pylons noted to the southwest of the site. Residential housing is located to the east.

4 FIELDWORK

The fieldwork was carried out on 13th October 2025. The extent of the investigation was:

- 12no small percussive boreholes (BH01 to BH012 inclusive) to a maximum depth of 5.45m below ground level (bgl).
 - The boreholes were evenly spread around the site to achieve maximum site coverage.
- Gas monitoring wells were installed in BH's 04, 05, 08 & 12.
 - The wells were spaced evenly around the site.
 - BH12 in particular targeting an infilled pond.
- 6no machine excavated trial pits (TP01 to TP06) were dug to a maximum depth of 3.00mbgl.
- In-situ soakaway testing carried out in TP01 and TP03.
- Insitu testing in the exploratory positions as Standard Penetration Tests (SPTs) and hand shear vanes.
- Retrieval of samples for geotechnical and chemical testing.

The trial pits and boreholes were backfilled with clean arisings and bentonite/installations, respectively upon completion. Selected plates of the trial pits are presented in Appendix A.

Descriptions of the strata encountered in the boreholes and trial pits together with details of sampling and groundwater are presented in Appendix B of this report. A plan showing the location of the boreholes and trial pits can be found in Appendix A (Figure 2).

5 GROUND CONDITIONS

A summary of the ground conditions encountered is given below. The exploratory hole logs are presented in Appendix B.

5.1 Topsoil

A slightly clayey, sandy topsoil was proven to a depth of 0.40mbgl in all excavated positions across the site.

5.2 Natural Deposits

Proven to underlie the topsoil across the site, natural ground generally comprised medium dense and loose, slightly clayey sand to depths of between 2.30mbgl (TP06) and 3.60mbgl (BH02-12) underlain generally by medium dense silty sand.

To the west of the site (BH01-03), a loose, silty sand was present to a maximum depth of 5.45mbgl.

5.3 Groundwater

Groundwater strikes, where encountered, are presented on the exploratory logs (Appendix B) and are summarised below in Table 1:

TABLE 1: SUMMARY OF GROUNDWATER STRIKES

Exploratory Position	Depth Encountered (mbgl)	Strata
BH01	2.00	Sand
	2.90	Sand
BH02	2.00	Sand
	2.90	Sand
BH03	2.00	Sand
	2.90	Sand
BH04	2.00	Sand
	2.90	Sand
BH05	2.00	Sand
	2.90	Sand
BH06	2.00	Sand
	2.90	Sand
BH07	2.00	Sand
	2.90	Sand
BH08	2.00	Sand
	2.90	Sand
BH09	2.00	Sand
	2.90	Sand
BH10	2.00	Sand
	2.90	Sand
BH11	2.00	Sand
	2.90	Sand
BH12	2.00	Sand
	2.90	Sand
TP01	2.90	Sand
TP02	2.90	Sand
TP03	2.90	Sand
TP04	2.90	Sand
TP05	2.90	Sand
TP06	2.90	Sand

It should be noted the rapid rate of advancement of the exploratory holes may mask minor seepages and it should be borne in mind that water levels fluctuate with a number of influences including season, rainfall, dewatering and pumping activities. Therefore, water levels significantly higher than those found during this investigation may be encountered.

6 CONTAMINATION TESTING RESULTS

The proposed development of the site is to involve the construction of residential homes with associated gardens, parking and access roads. The chemical samples were generally retrieved in line with BS ISO 18400-105:2017 *Soil Quality. Sampling*. The chemical results are presented in Appendix C.

6.1 Site Characterisation

Within the Solmek Phase 1 Desk Study, a preliminary conceptual model was formed based on the information obtained. The initial risk was based on the site history which recorded generally open agricultural land throughout the site's history.

An overall low to moderate risk was provided for various receptors:

- Human Health – Moderate
- Controlled Water – Very Low
- Current Site Users (on-site workers/visitors) – Moderate/Low
- Vegetation – Low
- Construction Materials – Moderate/Low

6.2 Contamination Testing and Rationale

To provide information upon the possibility of ground contamination five samples of topsoil and two samples of natural sand were selected for shallow contamination testing. A Moderate/Low overall contamination risk was highlighted in the Phase 1 Desk Study due to previous land uses. This coupled with the end use being Residential with Home Grown Produce means that seven samples are considered appropriate for testing. The samples selected are detailed below:

- TP01 – 0.20-0.40m (topsoil)
- TP02 – 0.60-0.80m (Natural granular)
- TP03 – 0.20-0.40m (topsoil)
- TP04 – 0.20-0.40m (topsoil)
- TP05 – 0.20-0.40m (topsoil)
- TP06 – 0.20-0.40m (topsoil)
- TP06 – 0.60-0.80m (Natural granular)

The samples selected are considered to provide coverage of both the made ground and shallow natural strata from across the site that would be most likely to be exposed during future site works. The samples were tested for the following contaminant suites:

- 7no Metals, semi-metals, non-metals, inorganic determinants
- 7no Asbestos identification screenings
- 7no Speciated Polyaromatic Hydrocarbons (PAHs)
- 2no Total Petroleum Hydrocarbon Criteria Working Group fractions (TPHCWG)

Leachate analysis was also undertaken on the below samples:

- TP02 – 0.60-0.80m (Natural granular)
- TP05 – 0.20-0.40m (topsoil)
- TP06 – 0.20-0.40m (topsoil)

6.3 Test Results

Based on the proposed development at the site, the test results have been compared to a series of Land Quality Management (LQM) Suitable for Use Levels (S4UL) based on a residential with home grown produce land use. These are the most up to date thresholds published in 2015.

The value for lead has been compared with the Category 4 Screening Level (March 2014) developed by

Contaminated Land: Applications In Real Environments (CL:AIRE).

The test results are presented in Appendix C, and a summary is provided below in Tables 2 & 3.

TABLE 2: SUMMARY OF INORGANIC CONTAMINATION TESTING RESULTS

Determinand	Units	Number of Samples above Level of Detection	Minimum Recorded Level	Maximum Recorded Level	Residential with HGP Threshold Value	Number of Results Exceeding Threshold Value
Metals						
Cadmium	mg/kg	0	<0.1	0.1	11	0
Chromium	mg/kg	7	15	28	910	0
Copper	mg/kg	7	15	22	2400	0
Lead	mg/kg	7	17	28	200*	0
Mercury	mg/kg	1	<0.1	0.12	40	0
Nickel	mg/kg	7	13	24	180	0
Zinc	mg/kg	7	45	60	3700	0
Semi metals and non metals						
Arsenic	mg/kg	7	9.7	12	37**	0
Boron	mg/kg	7	0.5	1.2	290	0
Selenium	mg/kg	0	<0.2	-	250	0
Inorganic chemicals						
Cyanide (Total)	mg/kg	0	<0.5	-	1.49**	0
Sulphate (2:1 Water Soluble)	mg/l	7	22	51	2000^	0
Other						
pH	pH	-	7.6	8.5	5.5^	0
* Category 4 Screening Levels, March 2014 ** CLEA Software Version 1.06 (pH7 and 1%SOM) ^ EA Threshold Values HGP Home Grown Produce						

6.4 Metals, Semi Metals and Non Metals

No samples indicated significantly raised levels of contamination above the S4UL threshold values, based on the seven samples tested.

6.5 Inorganic Chemicals

Soluble sulphates (potentially aggressive to foundation concrete) were recorded between 22 and 51mg/l. None of the samples were elevated above levels affecting human health or the BRE Special Digest 1 500mg/l limit for the sulphate classification of concrete.

The results of the pH testing were between 7.6 and 8.5. These pH levels are consistent with slightly alkaline conditions.

6.6 Organic Chemicals

The organic thresholds vary depending on the levels of soil organic matter (SOM).

The average SOM recorded across the site was 1.59% therefore a SOM of 1.00% has been used to determine the S4UL thresholds. Table 3, below, summarises the results.

TABLE 3: SUMMARY OF ORGANIC CONTAMINATION TESTING RESULTS

Determinand	Units	Number of Samples above Level of Detection	Minimum Recorded Level	Maximum Recorded Level	Residential with HGP Threshold Value at 1% SOM	Number of Results Exceeding Threshold Value
TPH Aliphatic Fractions						
Aliphatic (C5-C6)	mg/kg	0	<0.01	-	160	0
Aliphatic (C6-C8)	mg/kg	0	<0.01	-	530	0
Aliphatic (C8-C10)	mg/kg	0	<0.01	-	150	0
Aliphatic (C10-C12)	mg/kg	2	1.78	1.99	760	0
Aliphatic (C12-C16)	mg/kg	0	<1.2	-	4300	0
Aliphatic (C16-C21)	mg/kg	0	<1.5	-	110000	0
Aliphatic (C21-C35)	mg/kg	0	<3.4	-	110000	0
TPH Aromatic Fractions						
Aromatic (C5-C7)	mg/kg	0	<0.01	-	300	0
Aromatic (C7-C8)	mg/kg	0	<0.01	-	660	0
Aromatic (C8-C10)	mg/kg	0	<0.01	-	190	0
Aromatic (C10-C12)	mg/kg	0	<0.9	-	380	0
Aromatic (C12-C16)	mg/kg	0	<0.5	-	660	0
Aromatic (C16-C21)	mg/kg	0	<0.6	-	930	0
Aromatic (C21-C35)	mg/kg	0	<1.4	-	1700	0
Speciated PAH						
Naphthalene	mg/kg	0	<0.1	-	13	0
Acenaphthylene	mg/kg	0	<0.1	-	920	0
Acenaphthene	mg/kg	0	<0.1	-	1100	0
Fluorene	mg/kg	0	<0.1	-	860	0
Phenanthrene	mg/kg	0	<0.1	-	440	0
Anthracene	mg/kg	0	<0.1	-	11000	0
Fluoranthene	mg/kg	4	<0.1	0.31	890	0
Pyrene	mg/kg	3	<0.1	0.34	2000	0
Benzo[a]anthracene	mg/kg	3	<0.1	0.36	13	0
Chrysene	mg/kg	3	<0.1	0.29	27	0
Benzo[b]fluoranthene	mg/kg	3	<0.1	0.25	3.7	0
Benzo[k]fluoranthene	mg/kg	2	<0.1	0.16	100	0
Benzo[a]pyrene	mg/kg	3	<0.1	0.25	3	0
Benzo[g,h,i]perylene	mg/kg	2	<0.1	0.19	41	0
Dibenz(a,h)Anthracene	mg/kg	1	<0.1	0.16	0.3	0
Indeno(1,2,3-c,d)Pyrene	mg/kg	1	<0.1	0.32	350	0
Total PAH	mg/kg	1	<2	2.6	50*	0
Total Phenol	mg/kg	0	<0.3	0.3	1100	0
* EA Threshold Values						

No samples indicated significantly raised levels of contamination above the S4UL threshold values, based on the four samples tested.

6.7 Asbestos

From the seven samples subject to asbestos screening, no asbestos fibres were recorded.

6.8 Leachates

The results of the three leachate tests are presented in Table 4. The results have been compared, where available, to UK Drinking Water Standards (DWS), otherwise EA Leachate Quality Thresholds, EQS Freshwater and WHO Guidelines (2005) have been used.

TABLE 4: LEACHATE TESTING

Determinant	Units	Number of Samples above Level of Detection	Minimum Recorded Level	Maximum Recorded Level	UK DWS	Number of Results Exceeding Threshold Value
Inorganic Contaminants						
Cadmium	µg/l	0	<0.03	-	5	0
Chromium (Total)	µg/l	1	<0.25	3.4	50	0
Copper	µg/l	3	1.1	3.1	2000	0
Lead	µg/l	3	0.16	2.7	25	0
Mercury	µg/l	1	<0.01	0.01	1	0
Nickel	µg/l	1	<0.5	1.7	20	0
Zinc	µg/l	2	3.4	9.6	5000	0
Arsenic	µg/l	3	2.0	2.6	10	0
Selenium	µg/l	1	<0.25	0.25	10	0
Cyanide (Total)	µg/l	0	<20	-	50	0
Sulphate	mg/l	2	3.4	5.8	250	0
Boron	µg/l	3	13.4	17.3	2000	0
pH	-	3	8.0	9.6	>5.5**	
PAH						
Naphthalene	µg/l	3	0.05	0.07	PAH DWS is 0.1 µg/l	0
Acenaphthylene	µg/l	1	<0.01	0.02		0
Acenaphthene	µg/l	1	<0.01	0.02		0
Fluorene	µg/l	1	<0.01	0.02		0
Phenanthrene	µg/l	3	0.01	0.09		0
Anthracene	µg/l	1	<0.01	0.02		0
Fluoranthene	µg/l	2	<0.01	0.10		1
Pyrene	µg/l	3	0.01	0.10		1
Benzo(a)anthracene	µg/l	1	<0.01	0.04		0
Chrysene	µg/l	0	<0.01	0.04		0
Benzo(b)fluoranthene	µg/l	1	<0.01	0.04		0
Benzo(k)fluoranthene	µg/l	1	<0.01	0.02		0
Benzo(a)pyrene	µg/l	1	<0.01	0.04		0
Benzo(ghi)perylene	µg/l	1	<0.01	0.06		0
Dibenzo(ah)anthracene	µg/l	0	<0.01	-		0
Ideno(123cd)pyrene	µg/l	2	<0.01	0.08		0
PAH Total	µg/l	1	<0.20	0.71	0.2**	1
Phenol	µg/l	0	<1.5	-	0.5	0
TPH Aliphatic Fractions						
C5-6	µg/l	0	<0.1	-	15000*	0
C6-8	µg/l	0	<0.1	-	15000*	0
C8-10	µg/l	0	<0.1	-	300*	0
C10-12	µg/l	0	<1.0	-	300*	0
C12-16	µg/l	0	<1.0	-	300*	0
C16-21	µg/l	0	<1.0	-	300*	0
C21-35	µg/l	0	<1.0	-	300*	0
TPH Aromatic Fractions						
C5-7	µg/l	0	<0.1	-	10*	0
C7-8	µg/l	0	<0.1	-	10*	0
C8-10	µg/l	0	<0.1	-	100*	0
C10-12	µg/l	0	<1.0	-	100*	0
C12-16	µg/l	0	<1.0	-	100*	0
C16-21	µg/l	0	<1.0	-	90*	0
C21-35	µg/l	0	<1.0	-	90*	0
* WHO Guidelines 2005						
** EA leachate quality thresholds						
*** EQS Freshwater						

Following comparison of the leachate results to date, generally, the contaminants were recorded below relevant threshold values, with the exception of slightly leachable PAH compounds within the topsoil deposits of TP05. As the underlying drift and solid aquifer designations are unproductive and there are no nearby abstractions or surface water features as well as the PAH in this sample not been elevated in total soil concentrations, this localised leachable contamination is not considered a significant risk.

6.9 Environmental Protection Act 1990: Part 2A Revised Statutory Guidance (April 2012)

This revised document explains how the Local Authority should decide if land, based on a legal interpretation,

is contaminated. The document replaces the previous guidance given in Annex 3 of DEFRA Circular 01/2006, issued in accordance with section 78YA of the 1990 Environmental Protection Act.

The main objectives of the Part 2A regime are to “identify and remove unacceptable risks to human health and the environment” and to “seek to ensure that contaminated land is made suitable for its current use”. Part 2A uses a risk based approach to defining contaminated land whereby the “risk” is interpreted as “the likelihood that harm, or pollution of water, will occur as a result of contaminants in, on or under the land” and by “the scale and seriousness of such harm or pollution if it did occur”.

For a relevant risk to exist a contaminant, pathway and receptor linkage must be present before the land can be considered to be contaminated. The document explains that *“for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or property; or significantly pollute controlled waters.”*

A conceptual model is used to develop and communicate the risks associated with a particular site.

To determine if land is contaminated the local authority use various categories from 1 to 4. Categories 1 and 2 include “land which is capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health.” Categories 3 and 4 “encompass land which is not capable of being determined on such grounds”.

See Appendix E for additional notes on contamination guidelines.

7 CONCEPTUAL MODEL AND CONTAMINATION ANALYSIS

The contamination conceptual model in Table 5 identifies the potential pollution linkages present on site based on source – pathway – receptor relationships.

TABLE 5: CONCEPTUAL MODEL

Source	Pathway	Receptor	Risk Rating	Comments
Asphyxiating or explosive ground gases • 2no Landfills within 250m • Infilled pond with the site	Ground gas migration • Migration through permeable soils • Inhalation	Future site users • Adult & infant residents	Moderate /Low	Gas monitoring in progress.
		Users during development • Construction workers	Low	
Areas of contamination hazardous to human health (Residential Thresholds) • No significantly elevated organic determinants • No significantly elevated inorganic determinants • No asbestos	• Inhalation • Dust ingestion • Dermal contact	Future site users • Adult & infant residents	Low	No significant contamination identified.
		Users during development • Construction workers	Low	No significant contamination identified. Consideration to be given to Health and Safety Executive: <i>Protection of Workers and the General Public During the Development of Contaminated Land</i> .
	• Inhalation • Dust ingestion	Users of surrounding sites • Adult & infant residents	Low	Consideration to be given to dust suppression, in line with BRE: <i>The Control of Dust and Emissions from Construction and Demolition, Best Practice Guidance</i> .
Areas of elevated Leachate contamination • Localised Elevated fluoranthene, pyrene and total PAH in TP05	• Leaching mobilised contaminants of	Drift geology • Unproductive Strata	Very Low	The underlying drift and solid aquifer designations are unproductive and there are no nearby abstractions or surface water features as well as the PAH in this sample not been elevated in total soil concentrations, this localised leachable contamination is not considered a significant risk.
		Solid geology • Unproductive Strata	Low	
	• Drainage • Lateral migration of • Accumulation of contaminated sediment	Surface water features • Land drain 4m to the east.	Low	Generally low contamination levels highly unlikely to impact nearby surface water feature.
Areas of phytotoxic contamination • No significantly elevated contamination	• Uptake via roots and leaf surfaces	Vegetation • Gardens proposed	Low	No elevated phytotoxic contamination.
Areas of contamination above service fabric or BRE Special Digest 1	• Direct contact	Construction Materials • Concrete	Low	DS-1 ACEC (Class AC-1s) requirements for concrete protection.

thresholds • No elevated determinants		Construction Materials • Service Fabric	Moderate/ Low	Copper piping may require to be avoided given the elevated pH levels identified. Prudent to lay any service within a clean bedding.
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7.1 Hazard Assessment for Human Health and the Environment

No sources of contamination have been encountered during this investigation, and consequently no unacceptable risks have been identified.

Although asbestos and other forms of contamination were not detected from the soil samples subjected to testing within this investigation, the possibility still exists that such contamination may still be present on site and currently lie undetected. It is therefore advised that a 'watching brief' is undertaken during the initial site strip and any excavation works and advice sought if contamination is found or suspected.

It is considered that the levels of contamination present on site do not pose a risk to construction workers and users of surrounding sites, however S4ULs assume long term exposure to contamination and therefore relate primarily to chronic health risks. The risk of short-term acute exposure (e.g. to construction workers) falls under the *Health and Safety at Work Act: 1974* and underlying regulations, such as the *Control of Substances Hazardous to Health (COSHH, 2002)* Regulations. The levels of contamination and the associated risks to site workers should be considered under the *Construction Design and Management (CDM, 2015)* regulations during the planning of works and the preparation of the designers and contractors Health and Safety Plans and Method Statements.

As good practice, full PPE must be employed in accordance with Health and Safety Executive: *Protection of Workers and the General Public During the Development of Contaminated Land* and safeguards should be taken to limit dust during ground works, and access to the public should be restricted. Construction workers should use gloves as a precaution when handling any fill materials. Provision of suitable hygiene facilities are needed for site workers. Wheel washers should be provided and used for any vehicle entering or leaving site to prevent cross contamination.

During dry weather, any excavations may require clean water to be sprinkled at shallow depth to prevent excess dust escaping to off-site receptors. Monitoring of dust concentrations during construction should be given careful consideration to ensure occupational exposure levels are not exceeded. Works should be undertaken in line with BRE: *The Control of Dust and Emissions from Construction and Demolition, Best Practice Guidance*.

7.2 Construction Materials

Materials at risk from potential soil contamination include inorganic matrices such as cement and concrete and also organic material; e.g. plastics and rubbers. Acid ground conditions and elevated levels of sulphates can accelerate the corrosion of building materials. Plastics and rubbers are generally used for piping and service ducts and are potentially attacked by a range of chemicals, most of which are organic, particularly petroleum-based substances. Drinking water supplies can be tainted by substances that can penetrate piping and water companies enforce stringent threshold values.

7.2.1 Concrete Classification

BRE Special Digest One: *Concrete in Aggressive Ground: 2005 3rd Edition* has been used to assess the risks posed to underground concrete and to establish the design measures required to mitigate the risks. The results of the pH and water-soluble sulphate tests (when converted to total potential sulphate) fall into Class DS-1 ACEC (Class AC-1s) requirements for concrete protection. This assumes static groundwater conditions.

7.2.2 Water Supply Pipes Material Selection

The levels of potential contaminants should be compared to thresholds supplied in the UK Water Industry Research (UKWIR) publication *Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites* (January 2011). A Brownfield Site is defined in the document as "Land or premises that have previously been used or developed that may be vacant or derelict". It should be noted that Brownfield sites may not be contaminated. The guidance does not apply to Greenfield Sites however water companies may have their own assessment criteria which should be checked by the developer.

Based on the samples tested during the site investigation, levels of acidic to alkaline pH (7.6 to 8.5) were

recorded across the site at depths of between 0.20mbgl and 0.80mbgl within the made ground and natural samples.

The concentrations of the selected determinants should be compared to the pipe material selection table in Appendix E, and consultation with the appropriate utility supply company is required to identify the most suitable service fabric. However, the pH levels may preclude the use of copper pipes depending on the depth of proposed service corridors.

7.3 Unexpected Contamination

No evidence of the infilled pond was detected on site. However, made ground may be encountered within his area during construction works. If during the initial site strip or subsequent ongoing construction activities, any zones of odorous, brightly coloured or suspected contaminated ground, or suspected Asbestos Containing Materials (ACMs) are encountered, then the following procedure should be followed:

- Stop work in the affected area
- Contact Solmek and provide pictures of the affected area
- Solmek can visit site to investigate the material and provide guidance
- If required – Solmek can sample and test the material
- Once test results are returned, this will determine whether or not remediation will be required

7.4 Waste Classification

During the site strip and construction activities, material may be required to be removed from site. Any such material would require classification, in line with Environment Agency Technical Guidance *Waste Classification: Guidance on the classification and assessment of waste* (2015). This would classify the material as either Non-Hazardous or Hazardous Waste.

Once the material has been classified, determining the suitable landfill for disposal is governed by landfill directive Waste Acceptance Criteria (WAC) testing, with landfills categorized as Inert Waste, Stable Non-Reactive Hazardous Waste and Hazardous Waste.

If waste classification and/or WAC testing are not undertaken, material taken off site may be subject to WAC testing by the appropriate waste disposal company. The decision on whether or not to accept waste, or whether further testing is required, is at the discretion of the waste disposal company.

For this project, Waste Classification has not been requested by the client. Waste classification, in line with the aforementioned EA guidance, would be needed to classify the material as Hazardous or Non-Hazardous Waste. WAC testing would then be required to determine the suitability of the material for the relevant landfill.

8 GROUND GAS ASSESSMENT

The proposed development includes the construction of residential housing with associated parking and access roads.

Ground gases such as carbon dioxide (CO₂), methane (CH₄), carbon monoxide (CO) and volatile organic compounds (VOCs) can be classed as a form of contamination where there is a potential risk to human health.

For this report, gas monitoring is via measuring emissions from four standpipes (BH04, BH05, BH08 & BH12) that were installed during the sitework. The gas monitoring will consist of six visits over a period of three months. The gas monitoring results will be presented as an addendum to this report.

The rationale of the ground gas installations was to capture ground gas emissions from across the site, with BH12 in particular targeting an infilled pond, and BH04, BH05 and BH08 providing additional spatial coverage.

9 GEOTECHNICAL TESTING AND ANALYSIS

Samples taken from the boreholes and trial pits underwent a series of geotechnical tests at a UKAS accredited laboratory to aid foundation design and soil description. In addition, in-situ Standard Penetration Tests (SPTs) were undertaken at regular intervals during drilling/excavation. The geotechnical results are presented in Appendix D.

9.1 Strength and Density

9.1.1 SPT N Values

Standard Penetration Tests undertaken within the natural granular deposits of slightly clayey sand down to a maximum depth of 3.60mbgl yielded N values of between 4 and 13, indicative of loose to medium dense deposits.

Within the natural granular deposits of silty sand down to a maximum depth of 5.45mbgl, along the western boundary of the site (BH01-03), the SPTs yielded N values of between 4 and 7, indicative of loose deposits.

However, for the silty sand across the rest of the site (BH04-12), the SPTs yielded values of between 10 and 18, indicative of medium dense deposits.

9.2 Particle Size Distribution and Sedimentation Testing

Four samples from the boreholes at varying depths were subject to Particle Size Distribution (PSD) tests in accordance with BS1377 Part 2 to aid soil descriptions. In addition to the PSD tests, two of the samples were then subjected to sedimentation analysis using a hydrometer to further classify the fine grained soils (i.e. the quantities of clay and silt). The results have been used to prepare precise soil descriptions in accordance with BS5930:2015 Section 6 and are presented in Appendix D.

9.3 pH and Sulphate Results

Ten samples of natural soil from the boreholes and trial pits were tested for acidity and soluble sulphate content to assess whether the material may be potentially aggressive to building fabric. The results of the testing for pH ranged from 8.4 to 10.7 indicating slightly alkaline to alkaline conditions. Soluble sulphates were recorded at levels ranging from 13mg/l to 68mg/l.

9.4 Percolation Tests

Two percolation tests were carried out within TP01 and TP03. The returned results showed soakaway drainage may be unsuitable for the proposed development as both of the tests failed to soakaway sufficiently.

Given the results encountered, soakaway drainage may not be suitable for the proposed development. Soakaway drainage, if incorporated, should be designed in accordance with BRE *Special Digest 365 – Soakaway Design*. The results are attached in Appendix D.

9.5 Foundations

9.5.1 Piled Foundations

Based on the information from this investigation, due to the depth of loose natural granular deposits, the use of shallow foundations are not considered appropriate and deeper mini piled foundations are recommended. Information provided in this report should be made available to a competent piling contractor who can design appropriate foundations in accordance with Section 7: Pile foundations of BS EN 1997 – 1:2004 which applies to end-bearing piles, friction piles, tension piles and transversely loaded piles installed by driving, by jacking, and by screwing or boring. The piling contractor will need to take into consideration the possible effects of negative skin friction from loose riverbed deposits of clayey sand. Allowance should be made for breaking through known and unknown buried obstructions.

The precise method of pile installation and the applicability of proprietary systems, diameters and depths required would need to be determined by a specialist piling contractor.

Further drilling works would be required to provide information for pile design. Such work would require a series of cable percussive boreholes, especially along the western boundary of the site, extending to a depth sufficient to encounter competent strata.

It is possible that the SPT'N' values have been affected by the groundwater and as such, should a shallow foundation solution be preferred further ground investigation via cable percussive or CPT testing may prove higher SPT'N' values and better relative densities and the possibility of shallow foundations being acceptable.

9.5.2 Ground Improvement

It may be possible to use ground improvement techniques such as vibro-replacement (i.e. stone columns). A specialist ground improvement contractor is recommended who can advise on the suitability of possible techniques.

9.6 Excavation

Based on the nature of the ground conditions encountered, excavations should be within the capacity of normal earthworks plant although breaking out of relict foundations and other obstructions should be anticipated. Stability of excavations will be poor in the made ground but should improve in the natural clay. Excavation sides should be designed, constructed and supported in accordance with the recommendations given in CIRIA Report No. 97: "Trenching Practice".

9.7 Groundwater

Groundwater was encountered between 2.00mbgl and 2.90mbgl, as referenced in Table 1.

It should be noted the rapid rate of advancement of the exploratory holes may mask minor seepages and it should be borne in mind that water levels fluctuate with a number of influences including season, rainfall, dewatering and pumping activities. Therefore, water levels significantly higher than those found during this investigation may be encountered.

SOLMEK

APPENDIX A



12-16 Yarm Road, Stockton on Tees, TS18 3NA
Tel: 01642 607083 Email: info@solmek.com

Figure Title

Site Location Plan

Project Number

S250326

Project Name

Wignals Gate, Holbeach

Client

D. Brown Building Contractors Ltd

Date

December 2025

DRG Number

Figure 1

Scale

1:3500 @ A4 [DO NOT SCALE]

Legend Key

Project Bounds - Project Bounds



12-16 Yarm Road, Stockton on Tees, TS18 3NA
Tel: 01642 607083 Email: info@solmek.com

Figure Title

Location Plan

Project Number

S250326

Project Name

Wignalls Gate, Holbeach

Client

D. Brown Building Contractors Ltd

Date

December 2025

DRG Number

Figure

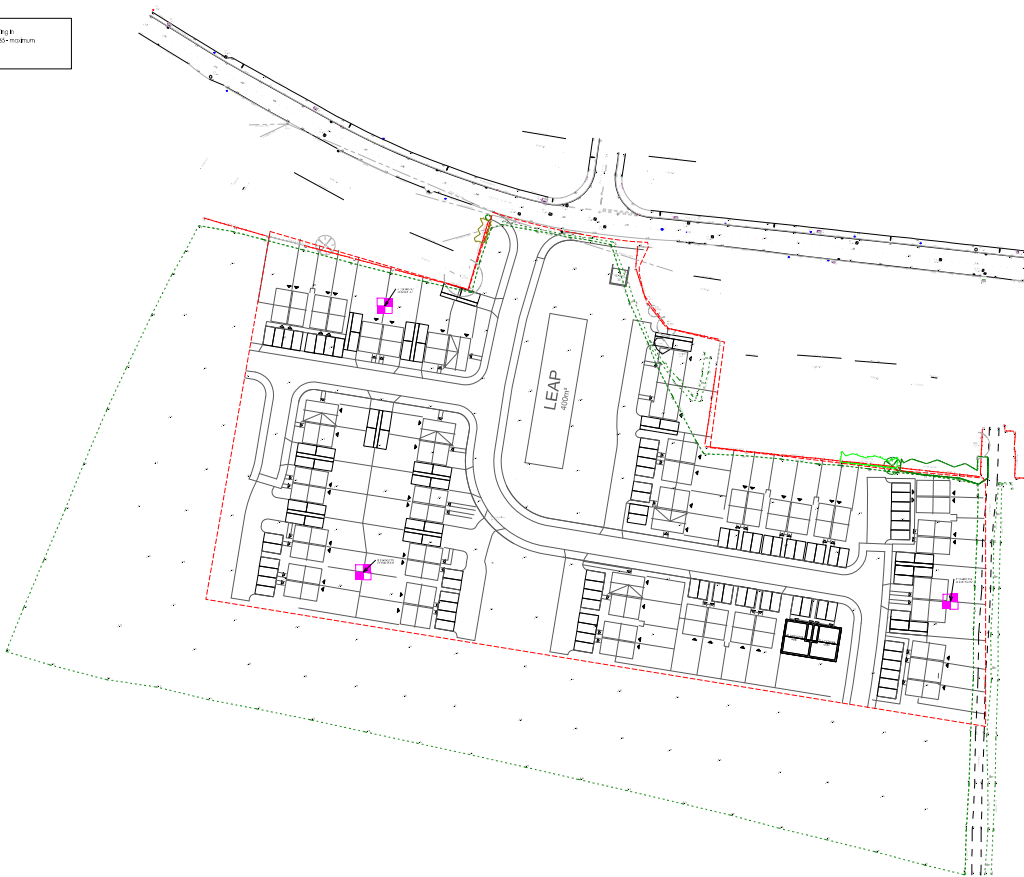
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1:1500 @ A4 [DO NOT SCALE]

Legend Key

-  Locations By Type - BH
-  Locations By Type - TP
-  Project Bounds - Project Bounds

Soakaway Trenches: Trenches at 250mm maximum depth 1.5m from G.L.



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Williams Saunders is not responsible for the accuracy of the information provided in this drawing. It is the responsibility of the client to ensure that the information provided is accurate and complete.

- Notes:
- 1- Do not scale the drawing. If any doubt exists.
 - 2- The drawing is to be read in conjunction with all relevant drawings and specifications.
 - 3- All drawings are to be checked on site prior to any work commencing. Any discrepancies are to be reported to the Engineer immediately.
 - 4- All dimensions are given in millimetres unless otherwise stated. All dimensions are to be rounded up to the nearest millimetre.
 - 5- All works to be carried out in accordance with the current British Standards, Codes of Practice and Building Regulations.

Rev	Description	Rev	Date
1	Issue for Design	1	13/03/25
2	Issue for Construction	2	13/03/25

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Information

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Email: info@williamsaunders.co.uk

Project:
Signals Gate,
Holebeach,
PE12 7HR

Client:
D Brown Building Contractors Ltd

Title:
Soakaway Test Locations

Version:
12773 - CM - 13/03/25 - 1:500 - 4-A1

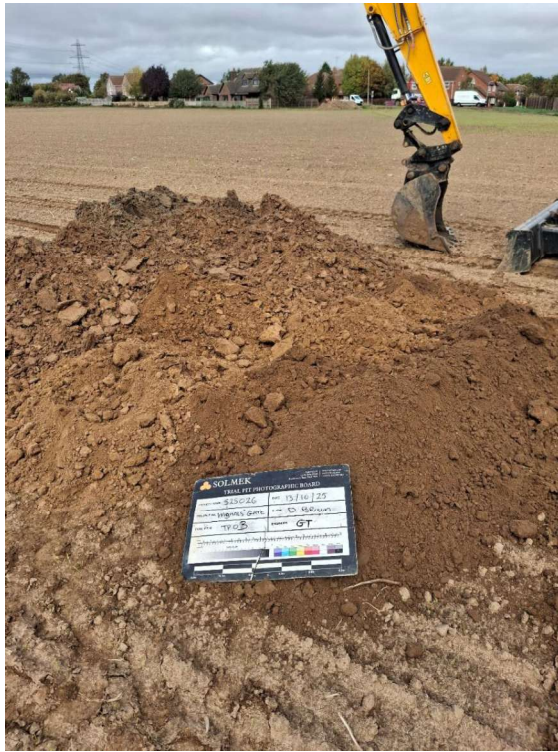
Project:
12773 - WMS - 22 - XX - D - C - 39001 - S2 - P1



Title
Trial Pit 01 Photos
Project
Wignals Gate, Holbeach
Client
Brown Builders
Date
November 2025
Fig No.
Figure 4
Scale
Do Not Scale
Key
Solmek Ltd. 12 Yarm Road Stockton-on-Tees TS18 3NA Tel: +44 (0) 1642 607083 Fax: +44 (0) 1642 612355 e-mail: south@solmek.com www.solmek.com
 SOLMEK



Title
Trial Pit 02 Photos
Project
Wignals Gate, Holbeach
Client
Brown Builders
Date
November 2025
Fig No.
Figure 5
Scale
Do Not Scale
Key
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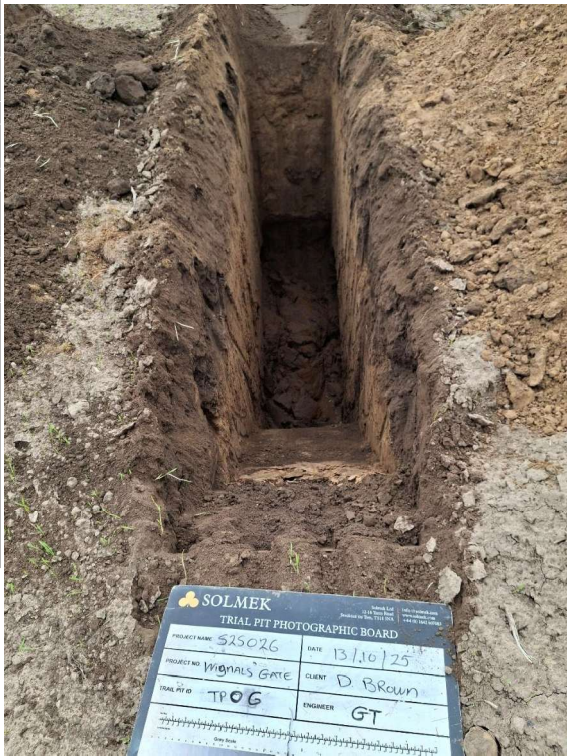
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Trial Pit 03 Photos
Project
Wignals Gate, Holbeach
Client
Brown Builders
Date
November 2025
Fig No.
Figure 6
Scale
Do Not Scale
Key
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Title
Trial Pit 04 Photos
Project
Wignals Gate, Holbeach
Client
Brown Builders
Date
November 2025
Fig No.
Figure 7
Scale
Do Not Scale
Key
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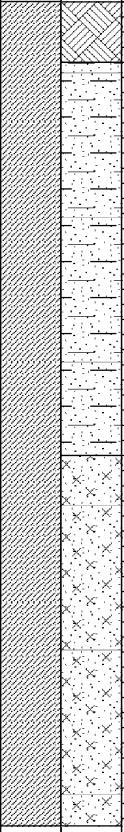


Title
Trial Pit 05 Photos
Project
Wignals Gate, Holbeach
Client
Brown Builders
Date
November 2025
Fig No.
Figure 8
Scale
Do Not Scale
Key
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Title
Trial Pit 06 Photos
Project
Wignals Gate, Holbeach
Client
Brown Builders
Date
November 2025
Fig No.
Figure 9
Scale
Do Not Scale
Key
Solmek Ltd. 12 Yarm Road Stockton-on-Tees TS18 3NA Tel: +44 (0) 1642 607083 Fax: +44 (0) 1642 612355 e-mail: south@solmek.com www.solmek.com
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APPENDIX B

 SOLMEK 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com		Borehole Log						Scale 1:50 Sheet 1 of 1 BH01						
Contract no: S250326		Site: Wignals Gate, Holbeach			Driller: L&A Drilling Ltd Plant used: Mini Rig Started: 13/10/2025		GL (AOD): Easting: 534329 Northing: 324540							
Client: D. Brown Building Contractors Ltd					Ended: 13/10/2025		Logged: GT							
Method: Small Percussive					Backfilled: 13/10/2025		Status: FINAL							
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing									
					Depth (m)	Type	Results							
		0.40		Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.	0.20 - 0.40	B+ES								
				Loose to medium dense, Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.	0.60 - 0.80	B+ES								
					1.20 - 1.65 1.20 - 1.40	SPT (S) B	N=10 (3,3/3,3,2,2)							
					2.00 - 2.45 2.00 - 2.20	SPT (S) B	N=7 (1,1/1,2,2,2)							
					3.00 - 3.45 3.00 - 3.20	SPT (S) B	N=6 (1,1/1,1,2,2)							
					4.00 - 4.45 4.00 - 4.20	SPT (S) B	N=7 (1,2/2,1,2,2)							
					5.00 - 5.45	SPT (S)	N=6 (1,1/1,1,2,2)							
					End of Borehole at 5.450m									
Hole Diameter		Casing Depths		General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	1.2m Hand excavated inspection pit dug. Groundwater encountered at 2.00m & 2.90m.			From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
										2.00 2.90				

Contract no:	S250326	Site:	Wignals Gate, Holbeach	Driller:	L&A Drilling Ltd	GL (AOD):	
				Plant used:	Mini Rig	Easting:	534330
				Started:	13/10/2025	Northing:	324511
Client:	D. Brown Building Contractors Ltd			Ended:	13/10/2025	Logged:	GT
Method:	Small Percussive			Backfilled:	13/10/2025	Status:	FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		0.40		Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.	0.20 - 0.40	B+ES	
				Loose to medium dense, Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.	0.60 - 0.80	B+ES	
				1.20 - 1.65 1.20 - 1.40	SPT (S) B	N=12 (3,3/3,3,3,3)	
				2.00 - 2.45 2.00 - 2.20	SPT (S) B	N=6 (2,1/2,1,1,2)	
				3.00 - 3.45 3.00 - 3.20	SPT (S) B	N=5 (2,1/1,1,1,2)	
		3.60					

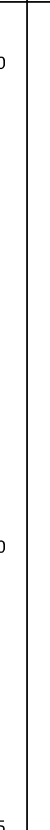
Hole Diameter		Casing Depths		General Remarks	Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)		From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
				1.2m Hand excavated inspection pit dug. Groundwater encountered at 2.00m & 2.90m.				2.00 2.90				
S250326 Geotech Report 30 of 81												

 SOLMEK 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com		Borehole Log					Scale 1:50 Sheet 1 of 1 BH03						
Contract no: S250326		Site: Wignals Gate, Holbeach		Driller: L&A Drilling Ltd Plant used: Mini Rig Started: 13/10/2025 Ended: 13/10/2025 Backfilled: 13/10/2025		GL (AOD): Easting: 534331 Northing: 324478 Logged: GT Status: FINAL							
Client: D. Brown Building Contractors Ltd													
Method: Small Percussive													
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing								
					Depth (m)	Type	Results						
		0.40	 	Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.	0.20 - 0.40	B+ES							
				Loose to medium dense, Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.	0.60 - 0.80	B+ES							
					1.20 - 1.65 1.20 - 1.40	SPT (S) B	N=12 (3,3/3,3,3,3)						
					2.00 - 2.45 2.00 - 2.20	SPT (S) B	N=6 (2,2/1,2,2,1)						
		3.60			3.00 - 3.45 3.00 - 3.20	SPT (S) B	N=8 (1,1/2,2,2,2)						
				Greyish brown, silty, loose SAND. Sand is fine to coarse.	4.00 - 4.45 4.00 - 4.20	SPT (S) B	N=4 (2,2/1,1,1,1)						
		5.45			5.00 - 5.45	SPT (S)	N=4 (1,1/1,1,1,1)						
				End of Borehole at 5.450m									
Hole Diameter		Casing Depths		General Remarks		Chiselling		Ground Water					
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	1.2m Hand excavated inspection pit dug. Groundwater encountered at 2.00m & 2.90m.		From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
									2.00 2.90				
S250326 Geotech Report 31 of 81													

 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com		Borehole Log					Scale 1:50 Sheet 1 of 1						
Contract no: S250326		Site: Wignals Gate, Holbeach		Driller: L&A Drilling Ltd Plant used: Mini Rig Started: 13/10/2025 Ended: 13/10/2025 Backfilled: 13/10/2025		GL (AOD): Easting: 534358 Northing: 324531 Logged: GT Status: FINAL							
Client: D. Brown Building Contractors Ltd													
Method: Small Percussive													
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing								
					Depth (m)	Type	Results						
		0.40		Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.	0.20 - 0.40	B+ES							
				Loose to medium dense, Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.	0.60 - 0.80	B+ES							
			▼		1.20 - 1.65	SPT (S)	N=12 (3,3/3,3,3,3)						
					1.20 - 1.40	B							
			▼		2.00 - 2.45	SPT (S)	N=4 (1,1/1,1,1,1)						
					2.00 - 2.20	B							
		3.60			3.00 - 3.45	SPT (S)	N=5 (2,2/1,1,2,1)						
					3.00 - 3.20	B							
				Medium dense, greyish brown, silty, SAND. Sand is fine to coarse.	4.00 - 4.45	SPT (S)	N=14 (3,3/3,4,4,3)						
				4.00 - 4.20	B								
					5.00 - 5.45	SPT (S)	N=18 (3,4/4,4,5,5)						
		5.45		End of Borehole at 5.450m									
Hole Diameter		Casing Depths		General Remarks		Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	1.2m Hand excavated inspection pit dug. Groundwater encountered at 2.00m & 2.90m.		From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
									2.00				
									2.90				

S250326 Geotech Report 32 of 81

 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com		Borehole Log					Scale 1:50 Sheet 1 of 1	
Contract no: S250326		Site: Wignals Gate, Holbeach		Driller: L&A Drilling Ltd		GL (AOD):		
Client: D. Brown Building Contractors Ltd		Plant used: Mini Rig		Easting: 534362		Northing: 324472		
Method: Small Percussive		Started: 13/10/2025		Logged: GT		Status: FINAL		
Backfill / Installation		Legend		Depth (m)		Level (m AOD)		
				Stratum Description		Samples and Insitu Testing		
						Depth (m)	Type	Results
				Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.		0.20 - 0.40	B+ES	
				Loose to medium dense, Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.		0.60 - 0.80	B+ES	
						1.20 - 1.65 1.20 - 1.40	SPT (S) B	N=12 (3,3/3,3,3,3)
						2.00 - 2.45 2.00 - 2.20	SPT (S) B	N=4 (1,1/1,1,1,1)
						3.00 - 3.45 3.00 - 3.20	SPT (S) B	N=6 (1,1/2,2,1,1)
				Medium dense, greyish brown, silty, SAND. Sand is fine to coarse.		4.00 - 4.45 4.00 - 4.20	SPT (S) B	N=10 (2,3/2,3,3,2)
						5.00 - 5.45	SPT (S)	N=12 (2,2/3,3,3,3)
				End of Borehole at 5.450m				

 SOLMEK 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com		Borehole Log					Scale 1:50 Sheet 1 of 1 BH06							
Contract no: S250326		Site: Wignals Gate, Holbeach		Driller: L&A Drilling Ltd Plant used: Mini Rig Started: 13/10/2025 Ended: 13/10/2025 Backfilled: 13/10/2025			GL (AOD): Easting: 534409 Northing: 324476 Logged: GT Status: FINAL							
Client: D. Brown Building Contractors Ltd														
Method: Small Percussive														
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing									
					Depth (m)	Type	Results							
 	 	0.40		Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.	0.20 - 0.40	B+ES								
				Loose to medium dense, Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.	0.60 - 0.80	B+ES								
		3.60			1.20 - 1.65	SPT (S) B	N=12 (2,2/3,3,3,3)							
					1.20 - 1.40									
					2.00 - 2.45	SPT (S) B	N=7 (2,1/2,1,2,2)							
					2.00 - 2.20									
		5.45		Medium dense, greyish brown, silty, SAND. Sand is fine to coarse.	3.00 - 3.45	SPT (S) B	N=8 (2,2/2,2,2,2)							
					3.00 - 3.20									
					4.00 - 4.45	SPT (S) B	N=11 (2,2/3,3,2,3)							
					4.00 - 4.20									
End of Borehole at 5.450m					5.00 - 5.45	SPT (S)	N=17 (3,2/4,4,4,5)							
					</									

BH07

Contract no: S250326

Site: Wignals Gate, Holbeach

Driller:	L&A Drilling Ltd
Plant used:	Mini Rig
Started:	13/10/2025
Ended:	13/10/2025
Backfilled:	13/10/2025

GL (AOD):	
Easting:	534452
Northing:	324470
Logged:	GT
Status:	FINAL

Client:	D. Brown Building Contractors Ltd
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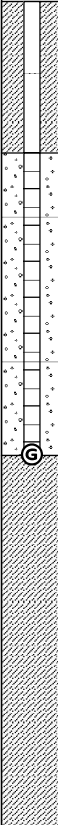
Method:	Small Percussive
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Backfill / Installation		Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing								
						Depth (m)	Type	Results						
		0.40		Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.	0.20 - 0.40	B+ES	N=11 (3,3/3,3,2,3)							
				Loose to medium dense, Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.	0.60 - 0.80	B+ES								
					1.20 - 1.65 1.20 - 1.40	SPT (S) B								
					2.00 - 2.45 2.00 - 2.20	SPT (S) B								
					3.00 - 3.45 3.00 - 3.20	SPT (S) B								
		3.60		Medium dense, greyish brown, silty, SAND. Sand is fine to coarse.	4.00 - 4.45 4.00 - 4.20	SPT (S) B	N=10 (2,2/2,3,2,3)							
					5.00 - 5.45	SPT (S)	N=16 (2,2/4,3,4,5)							
				End of Borehole at 5.450m										
Hole Diameter		Casing Depths		General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	1.2m Hand excavated inspection pit dug. Groundwater encountered at 2.00m & 2.90m.			From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
										2.00 2.90				

S250326 Geotech Report 25 of 81

 SOLMEK 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com				Borehole Log				Scale 1:50 Sheet 1 of 1 BH08	
Contract no: S250326		Site: Wignals Gate, Holbeach		Driller: L&A Drilling Ltd Plant used: Mini Rig Started: 13/10/2025 Ended: 13/10/2025 Backfilled: 13/10/2025		GL (AOD): Easting: 534490 Northing: 324467 Logged: GT Status: FINAL			
Client: D. Brown Building Contractors Ltd									
Method: Small Percussive									
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing				
					Depth (m)	Type	Results		
		0.40		Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.	0.20 - 0.40	B+ES			
				Loose to medium dense, Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.	0.60 - 0.80	B+ES			
					1.20 - 1.65 1.20 - 1.40	SPT (S) B	N=12 (2,3/3,3,4,2)		
					2.00 - 2.45 2.00 - 2.20	SPT (S) B	N=6 (2,2/1,1,2,2)		
					3.00 - 3.45 3.00 - 3.20	SPT (S) B	N=4 (1,1/1,1,1,1)		
					4.00 - 4.45 4.00 - 4.20	SPT (S) B	N=10 (3,3/2,3,3,2)		
				Medium dense, greyish brown, silty, SAND. Sand is fine to coarse.	5.00 - 5.45	SPT (S)	N=14 (3,2/2,4,4,4)		
					End of Borehole at 5.450m				

 SOLMEK 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com		Borehole Log						Scale 1:50 Sheet 1 of 1 BH11	
Contract no: S250326		Site: Wignals Gate, Holbeach				Driller: L&A Drilling Ltd		GL (AOD):	
						Plant used: Mini Rig		Easting: 534424	
Client: D. Brown Building Contractors Ltd						Started: 13/10/2025		Northing: 324502	
Method: Small Percussive						Ended: 13/10/2025		Logged: GT	
						Backfilled: 13/10/2025		Status: FINAL	
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing				
					Depth (m)	Type	Results		
                          									

 SOLMEK 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 607083 info@solmek.com		Borehole Log				Scale 1:50 Sheet 1 of 1 BH12								
Contract no: S250326		Site: Wignals Gate, Holbeach		Driller: L&A Drilling Ltd		GL (AOD):								
				Plant used: Mini Rig		Easting: 534397								
Client: D. Brown Building Contractors Ltd				Started: 13/10/2025		Northing: 324500								
Method: Small Percussive				Ended: 13/10/2025		Logged: GT								
				Backfilled: 13/10/2025		Status: FINAL								
Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing									
					Depth (m)	Type	Results							
		0.40		Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.	0.20 - 0.40	B+ES								
				Loose to medium dense, Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.	0.60 - 0.80	B+ES								
					1.20 - 1.65 1.20 - 1.40	SPT (S) B	N=12 (3,3/3,3,3,3)							
					2.00 - 2.45 2.00 - 2.20	SPT (S) B	N=4 (1,1/1,1,1,1)							
					3.00 - 3.45 3.00 - 3.20	SPT (S) B	N=5 (2,2/1,1,2,1)							
		3.60		Medium dense, greyish brown, silty, SAND. Sand is fine to coarse.	4.00 - 4.45 4.00 - 4.20	SPT (S) B	N=14 (3,3/3,4,4,3)							
					5.00 - 5.45	SPT (S)	N=18 (3,4/4,4,5,5)							
		5.45		End of Borehole at 5.450m										
Hole Diameter		Casing Depths		General Remarks			Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	1.2m Hand excavated inspection pit dug. Groundwater encountered at 2.00m & 2.90m.			From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
										2.00 2.90				
S250326 Geotech Report 40 of 81														

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP01 Sheet 1 of 1	
Project Name: Wignals Gate, Holbeach				Project No. S250326		Co-ords: 534338E - 324550N Level:		Date 13/10/2025	
Plant Used: JCB				Dimensions (m): 0.60		Scale 1:26		Logged GT	
Client: D. Brown Building Contractors Ltd				Depth 3.00					
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
▼	0.20 - 0.40	B+ES		0.40			Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.		
	0.60 - 0.80	B+ES					Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.		
	1.20 - 1.40	B							
	2.00 - 2.20	B							
							2.90 3.00	Greyish brown, silty, SAND. Sand is fine to coarse. End of Pit at 3.000m	
Remarks: Groundwater encountered at 2.90m.									
Stability: Pit wall unstable- Wall collapse below 2m.									

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP02 Sheet 1 of 1	
Project Name: Wignals Gate, Holbeach				Project No. S250326		Co-ords: 534341E - 324493N Level:		Date 13/10/2025	
Plant Used: JCB				Dimensions (m): 0.60 2.00		Scale 1:26			
Client: D. Brown Building Contractors Ltd				Depth 3.00		Logged GT			
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
▼	0.20 - 0.40	B+ES		0.40			Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.	1	
	0.60 - 0.80	B+ES					Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.		
	1.20 - 1.40	B							
	2.00 - 2.20	B							
				2.90 3.00			Greyish brown, silty, SAND. Sand is fine to coarse.	3	
							End of Pit at 3.000m	4	
								5	

Remarks: Groundwater encountered at 2.90m.

Stability: Pit wall unstable- Wall collapse below 2m.

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP03 Sheet 1 of 1	
Project Name: Wignals Gate, Holbeach				Project No. S250326		Co-ords: 534444E - 324465N Level:		Date 13/10/2025	
Plant Used: JCB				Dimensions (m): 0.60		Scale 1:26		Logged GT	
Client: D. Brown Building Contractors Ltd				Depth 3.00					
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
▼	0.20 - 0.40	B+ES		0.40	3.00		Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.		
	0.60 - 0.80	B+ES					Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.		
	1.20 - 1.40	B							
	2.00 - 2.20	B							
							End of Pit at 3.000m		
Remarks: Groundwater encountered at 2.90m.									
Stability: Pit wall unstable- Wall collapse below 2m.									

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP04 Sheet 1 of 1	
Project Name: Wignals Gate, Holbeach				Project No. S250326		Co-ords: 534501E - 324469N Level:		Date 13/10/2025	
Plant Used: JCB				Dimensions (m): 0.60		Scale 1:26		Logged GT	
Client: D. Brown Building Contractors Ltd				Depth 3.00					
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
▼	0.20 - 0.40	B+ES		0.40			Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.		
	0.60 - 0.80	B+ES					Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.		
	1.20 - 1.40	B							
	2.00 - 2.20	B		3.00					
End of Pit at 3.000m									
Remarks: Groundwater encountered at 2.90m.									
Stability: Pit wall unstable- Wall collapse below 2m.									

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP05 Sheet 1 of 1	
Project Name: Wignals Gate, Holbeach				Project No. S250326		Co-ords: 534435E - 324499N Level:		Date 13/10/2025	
Plant Used: JCB				Dimensions (m): 0.60		Scale 1:26			
Client: D. Brown Building Contractors Ltd				Depth 3.00		Logged GT			
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
▼	0.20 - 0.40	B+ES		0.40			Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.		
	0.60 - 0.80	B+ES					Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.		
	1.20 - 1.40	B							
	2.00 - 2.20	B		3.00			End of Pit at 3.000m		
Remarks: Groundwater encountered at 2.90m.									
Stability: Pit wall unstable- Wall collapse below 2m.									

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP06 Sheet 1 of 1	
Project Name: Wignals Gate, Holbeach				Project No. S250326		Co-ords: 534400E - 324529N Level:		Date 13/10/2025	
Plant Used: JCB				Dimensions (m): 0.60		Scale 1:26			
Client: D. Brown Building Contractors Ltd				Depth 3.00		Logged GT			
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
▼	0.20 - 0.40	B+ES		0.40			Dark brown to dark grey, slightly clayey, sand TOPSOIL. Sand is fine to coarse.	1	
	0.60 - 0.80	B+ES					Light brown to yellowish brown, slightly clayey, SAND. Sand is fine to coarse.		
	1.20 - 1.40	B					2		
	2.00 - 2.20	B							
								3	
				Greyish brown, silty, SAND. Sand is fine to coarse.					
				3.00			End of Pit at 3.000m	4	
								5	

Remarks: Groundwater encountered at 2.90m.

Stability: Pit wall unstable- Wall collapse below 2m.

APPENDIX C

Certificate of Analysis

Certificate Number 25-24218

Issued: 29-Oct-25

Client SOLMEK
12 Yarm Road
Stockton On Tees
Cleveland
TS18 3NA

Our Reference 25-24218

Client Reference ~ S250326

Order No ~ SOL-10241/RF/S250326

Contract Title ~ Wignall Gate, Holbeach

Description 7 Soil samples, 3 Leachate prepared by DETS samples.

Date Received 21-Oct-25

Date Started 21-Oct-25

Date Completed 29-Oct-25

Test Procedures Identified by prefix DETSn (details on request).

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

Approved By




Louise Cook
Contracts Manager



Sample Deviations present. See Deviation Table Section for details.

Normec DETS Limited

Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY
Tel: 01207 582333 • email: info@normecdets.com • normecdets.com

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 25-24218

Client Ref ~ S250326

Contract Title ~ Wignall Gate, Holbeach

Sample ID	Depth	Lab No	Completed	Matrix Description
TP01	0.20-0.40	2585536	29/10/2025	Dark brown gravelly, sandy CLAY including odd rootlets
TP02	0.60-0.80	2585537	29/10/2025	Brown gravelly, sandy CLAY including odd rootlets
TP03	0.20-0.40	2585538	29/10/2025	Dark brown gravelly, sandy CLAY including odd rootlets
TP04	0.20-0.40	2585539	29/10/2025	Dark brown gravelly, sandy CLAY including odd rootlets
TP05	0.20-0.40	2585540	29/10/2025	Dark brown gravelly, sandy CLAY including odd rootlets
TP06	0.20-0.40	2585541	29/10/2025	Dark brown gravelly, sandy CLAY including odd rootlets
TP06	0.60-0.80	2585542	29/10/2025	Dark brown gravelly, sandy CLAY including odd rootlets

Summary of Chemical Analysis

Soil Samples

Our Ref 25-24218

Client Ref ~ S250326

Contract Title ~ Wignall Gate, Holbeach

Lab No	2585536	2585537	2585538	2585539	2585540	2585541	2585542
Sample ID ~	TP01	TP02	TP03	TP04	TP05	TP06	TP06
Depth ~	0.20-0.40	0.60-0.80	0.20-0.40	0.20-0.40	0.20-0.40	0.20-0.40	0.60-0.80
Other ID ~							
Sample Type ~	ES	ES	ES	ES	ES	ES	ES
Sampling Date ~	13/10/2025	13/10/2025	13/10/2025	13/10/2025	13/10/2025	13/10/2025	13/10/2025
Sampling Time ~	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	10	10	11	12	12	10	9.7
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	1.1	0.8	1.0	0.5	0.9	1.2	0.8
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1
Chromium	DETSC 2301#	0.15	mg/kg	28	25	19	16	17	16	15
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	21	20	19	20	19	22	15
Lead	DETSC 2301#	0.3	mg/kg	28	17	19	18	23	24	17
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	0.06	0.12	0.08
Nickel	DETSC 2301#	1	mg/kg	24	24	18	14	16	14	13
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	58	57	52	48	60	52	45
Inorganics										
pH	DETSC 2008#		pH	8.4	8.5	8.1	7.6	8.2	8.1	8.4
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	1.0	1.3	1.8	1.8	1.9	2.0	1.3
Sulphate Aqueous Extract as SO ₄ (2:1)	DETSC 2076#	10	mg/l	51	29	32	24	22	29	50
Petroleum Hydrocarbons										
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg		< 0.01				< 0.01	
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg		< 0.01				< 0.01	
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg		< 0.01				< 0.01	
Aliphatic >EC10-EC12: EH_2D_AL	DETSC 3521#	1.5	mg/kg		1.78				1.99	
Aliphatic >EC12-EC16: EH_2D_AL	DETSC 3521#	1.2	mg/kg		< 1.20				< 1.20	
Aliphatic >EC16-EC21: EH_2D_AL	DETSC 3521#	1.5	mg/kg		< 1.50				< 1.50	
Aliphatic >EC21-EC35: EH_2D_AL	DETSC 3521#	3.4	mg/kg		< 3.40				< 3.40	
Aliphatic >EC35-EC40: EH_2D_AL	DETSC 3521*	3.4	mg/kg		< 3.40				< 3.40	
Aliphatic C5-C40: EH_2D+HS_1D_AL	DETSC 3521*	10	mg/kg		< 10.00				< 10.00	
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg		< 0.01				< 0.01	
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg		< 0.01				< 0.01	
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg		< 0.01				< 0.01	
Aromatic >EC10-EC12: EH_2D_AR	DETSC 3521#	0.9	mg/kg		< 0.90				< 0.90	
Aromatic >EC12-EC16: EH_2D_AR	DETSC 3521#	0.5	mg/kg		< 0.50				< 0.50	
Aromatic >EC16-EC21: EH_2D_AR	DETSC 3521#	0.6	mg/kg		< 0.60				< 0.60	
Aromatic >EC21-EC35: EH_2D_AR	DETSC 3521#	1.4	mg/kg		< 1.40				< 1.40	
Aromatic >EC35-EC40: EH_2D_AR	DETSC 3521*	1.4	mg/kg		< 1.40				< 1.40	
Aromatic C5-C40: EH_2D+HS_1D_AR	DETSC 3521*	10	mg/kg		< 10.00				< 10.00	
TPH Ali/Aro C5-C40: EH_2D+HS_1D_Total	DETSC 3521*	10	mg/kg		< 10.00				< 10.00	
PAHs										
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Summary of Chemical Analysis Soil Samples

Our Ref 25-24218

Client Ref ~ S250326

Contract Title ~ Wignal Gate, Holbeach

Lab No	2585536	2585537	2585538	2585539	2585540	2585541	2585542
Sample ID ~	TP01	TP02	TP03	TP04	TP05	TP06	TP06
Depth ~	0.20-0.40	0.60-0.80	0.20-0.40	0.20-0.40	0.20-0.40	0.20-0.40	0.60-0.80
Other ID ~							
Sample Type ~	ES	ES	ES	ES	ES	ES	ES
Sampling Date ~	13/10/2025	13/10/2025	13/10/2025	13/10/2025	13/10/2025	13/10/2025	13/10/2025
Sampling Time ~	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	DETSC 3301	0.1	mg/kg	0.31	< 0.10	< 0.10	< 0.10	0.17	0.22	0.16
Pyrene	DETSC 3301	0.1	mg/kg	0.34	< 0.10	< 0.10	< 0.10	0.24	0.22	0.10
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	0.36	< 0.10	< 0.10	< 0.10	0.22	0.18	< 0.10
Chrysene	DETSC 3301	0.1	mg/kg	0.29	< 0.10	< 0.10	< 0.10	0.15	0.22	< 0.10
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	0.25	< 0.10	< 0.10	< 0.10	0.16	0.21	< 0.10
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.16	< 0.10	< 0.10	< 0.10	0.15	< 0.10	< 0.10
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	0.25	< 0.10	< 0.10	< 0.10	0.16	0.16	< 0.10
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	0.32	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	0.16	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	0.14	< 0.10	< 0.10	< 0.10	< 0.10	0.19	< 0.10
PAH 16 Total	DETSC 3301	1.6	mg/kg	2.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Phenols										
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	0.3	< 0.3	0.3

Summary of Chemical Analysis

Leachate Samples

Our Ref 25-24218

Client Ref ~ S250326

Contract Title ~ Wignall Gate, Holbeach

Lab No	2585543	2585544	2585545
Sample ID ~	TP02	TP06	TP05
Depth ~	0.60-0.80	0.20-0.40	0.20-0.40
Other ID ~			
Sample Type ~	ES	ES	ES
Sampling Date ~	13/10/2025	13/10/2025	13/10/2025
Sampling Time ~	n/s	n/s	n/s

Test	Method	LOD	Units			
Preparation						
NRA Leachate Preparation	DETSC 1009*			Y	Y	Y
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.1	2.6	2.0
Boron, Dissolved	DETSC 2306*	12	ug/l	16.5	17.3	13.4
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	3.4	< 0.25
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.4	3.1	1.1
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.33	2.7	0.16
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	1.7	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	3.4	9.6	< 1.3
Inorganics						
pH	DETSC 2008		pH	9.1	8.0	8.2
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20
Phenol - Monohydric Low Level	DETSC 2131	1.5	ug/l	< 1.5	< 1.5	< 1.5
Sulphate as SO4	DETSC 2055	0.1	mg/l	4.4	5.8	3.4
Petroleum Hydrocarbons						
Aliphatic C5-C6: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	
Aliphatic C6-C8: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	
Aliphatic C8-C10: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aliphatic C35-C40: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aliphatic C5-C40: EH_CU+HS_1D_AL	DETSC 3072*	10	ug/l	< 10	< 10	
Aromatic C5-C7: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	
Aromatic C7-C8: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	
Aromatic C8-C10: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aromatic C35-C40: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	< 1.0	
Aromatic C5-C40: EH_CU+HS_1D_AR	DETSC 3072*	10	ug/l	< 10	< 10	
TPH Ali/Aro C5-C40: EH_CU+HS_1D_Total	DETSC 3072*	10	ug/l	< 10	< 10	
PAHs						
Naphthalene	DETSC 3304	0.05	ug/l	0.07	0.05	0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01

Summary of Chemical Analysis

Leachate Samples

Our Ref 25-24218

Client Ref ~ S250326

Contract Title ~ Wignall Gate, Holbeach

Lab No	2585543	2585544	2585545
Sample ID ~	TP02	TP06	TP05
Depth ~	0.60-0.80	0.20-0.40	0.20-0.40
Other ID ~			
Sample Type ~	ES	ES	ES
Sampling Date ~	13/10/2025	13/10/2025	13/10/2025
Sampling Time ~	n/s	n/s	n/s

Test	Method	LOD	Units			
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02
Phenanthrene	DETSC 3304	0.01	ug/l	0.01	0.01	0.09
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.01	0.10
Pyrene	DETSC 3304	0.01	ug/l	0.01	0.02	0.10
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.04
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.04
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.04
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.04
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.06
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	0.01	0.08
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	< 0.20	0.71

Summary of Asbestos Analysis Soil Samples

Our Ref 25-24218

Client Ref ~ S250326

Contract Title ~ Wignall Gate, Holbeach

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2585536	TP01 0.20-0.40	SOIL	NAD	none	James Heath
2585537	TP02 0.60-0.80	SOIL	NAD	none	James Heath
2585538	TP03 0.20-0.40	SOIL	NAD	none	James Heath
2585539	TP04 0.20-0.40	SOIL	NAD	none	James Heath
2585540	TP05 0.20-0.40	SOIL	NAD	none	James Heath
2585541	TP06 0.20-0.40	SOIL	NAD	none	James Heath
2585542	TP06 0.60-0.80	SOIL	NAD	none	James Heath

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 25-24218
 Client Ref ~ S250326
 Contract ~ Wignal Gate, Holbeach

Containers Received & Deviating Samples

Lab No	Sample ID ~	Date	Containers Received	Holding time exceeded for tests	Incorrect container for tests
		Sampled ~			
2585536	TP01 0.20-0.40 SOIL	13/10/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	temperature
2585537	TP02 0.60-0.80 SOIL	13/10/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	temperature
2585538	TP03 0.20-0.40 SOIL	13/10/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	temperature
2585539	TP04 0.20-0.40 SOIL	13/10/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	temperature
2585540	TP05 0.20-0.40 SOIL	13/10/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	temperature
2585541	TP06 0.20-0.40 SOIL	13/10/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	temperature
2585542	TP06 0.60-0.80 SOIL	13/10/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	temperature
2585543	TP02 0.60-0.80 LEACHATE	13/10/25	GJ 250ml, GJ 60ml, PT 1L x2	Aliphatics/Aromatics (5 days), Chromium, Hexavalent (4 days), Kone (4 days), pH/Cond (1 days), PAH MS (4 days)	Containers OK, temperature
2585544	TP06 0.20-0.40 LEACHATE	13/10/25	GJ 250ml, GJ 60ml, PT 1L x2	Aliphatics/Aromatics (5 days), Chromium, Hexavalent (4 days), Kone (4 days), pH/Cond (1 days), PAH MS (4 days)	Containers OK, temperature
2585545	TP05 0.20-0.40 LEACHATE	13/10/25	GJ 250ml, GJ 60ml, PT 1L x2	Chromium, Hexavalent (4 days), Kone (4 days), pH/Cond (1 days), PAH MS (4 days)	Containers OK, temperature

Key: G-Glass P-Plastic J-Jar T-Tub

Normec DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 250µm sieve

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det

Aliphatic C5-C6

Acronym

HS_1D_AL

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETS 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETS 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETS 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETS 2076	Sulphate Aqueous Extract as SO ₄	mg/l	10	Air Dried	No	Yes	Yes
DETS 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETS 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETS 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETS 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETS 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETS 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETS 2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETS 2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETS 2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETS 2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETS 2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETS 2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETS 2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETS 2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETS 2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETS 2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETS 2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETS 2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETS 2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETS 2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETS 2311	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETS 2321	Total Sulphate as SO ₄	%	0.01	Air Dried	No	Yes	Yes
DETS 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETS 3049	Sulphur (free)	mg/kg	0.75	As Received	No	Yes	Yes
DETS 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETS 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETS 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETS 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETS 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETS 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETS 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETS 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETS 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETS 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETS 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3321	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3521	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3521	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3521	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3521	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3521	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
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Key:

~ Sample details are provided by the client and can affect the validity of the results

* -not accredited.

-MCERTS (accreditation only applies if report carries the MCERTS logo).

\$ -subcontracted.

n/s -not supplied.

I/S -insufficient sample.

U/S -unsuitable sample.

t/f -to follow.

nd -not detected.

End of Report

Certificate of Analysis

Certificate Number 25-24221

Issued: 28-Oct-25

Client SOLMEK
12 Yarm Road
Stockton On Tees
Cleveland
TS18 3NA

Our Reference 25-24221

Client Reference ~ S250326

Order No ~ SOL-10241/RF/S250326

Contract Title ~ Wignall Gate, Holbeach

Description 10 Soil samples.

Date Received 21-Oct-25

Date Started 21-Oct-25

Date Completed 28-Oct-25

Test Procedures Identified by prefix DETSn (details on request).

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

Approved By




Louise Cook
Contracts Manager



Sample Deviations present. See Deviation Table Section for details.

Normec DETS Limited

Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY
Tel: 01207 582333 • email: info-dets@normecgroup.com • normecdets.com

Summary of Chemical Analysis

Matrix Descriptions

Our Ref 25-24221

Client Ref ~ S250326

Contract Title ~ Wignal Gate, Holbeach

Sample ID	Depth	Lab No	Completed	Matrix Description
BH01	1.2	2585550	28/10/2025	Brown slightly gravelly, sandy CLAY
BH03	2	2585551	28/10/2025	Brown slightly gravelly, sandy CLAY
BH05	4	2585552	28/10/2025	Brown slightly gravelly, sandy CLAY
BH06	0.6	2585553	28/10/2025	Brown slightly gravelly, sandy CLAY
BH08	2	2585554	28/10/2025	Brown slightly gravelly, sandy CLAY
BH10	1.2	2585555	28/10/2025	Brown slightly gravelly, sandy CLAY
BH11	4	2585556	28/10/2025	Brown slightly gravelly, sandy CLAY
BH12	3	2585557	28/10/2025	Brown slightly gravelly, sandy CLAY
TP02	1.2	2585558	28/10/2025	Brown slightly gravelly, sandy CLAY
TP04	2	2585559	28/10/2025	Brown slightly gravelly, sandy CLAY

Summary of Chemical Analysis Soil Samples

Our Ref 25-24221
 Client Ref ~ S250326
 Contract Title ~ Wignall Gate, Holbeach

Lab No	2585550	2585551	2585552	2585553	2585554	2585555	2585556	2585557	2585558	2585559
Sample ID ~	BH01	BH03	BH05	BH06	BH08	BH10	BH11	BH12	TP02	TP04
Depth ~	1.20	2.00	4.00	0.60	2.00	1.20	4.00	3.00	1.20	2.00
Other ID ~										
Sample Type ~	B	B	B	B	B	B	B	B	B	B
Sampling Date ~	13/10/2025	13/10/2025	13/10/2025	13/10/2025	13/10/2025	13/10/2025	13/10/2025	13/10/2025	13/10/2025	13/10/2025
Sampling Time ~	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units										
Inorganics													
pH	DETSC 2008#		pH	8.7	10.7	8.6	8.9	8.6	8.6	9.4	8.8	8.4	8.8
Sulphate Aqueous Extract as SO ₄ (2:1)	DETSC 2076#	10	mg/l	17	26	68	24	24	17	46	25	13	41

Information in Support of the Analytical Results

Our Ref 25-24221
 Client Ref ~ S250326
 Contract ~ Wignall Gate, Holbeach

Containers Received & Deviating Samples

Lab No	Sample ID ~	Date Sampled ~	Containers Received	Holding time exceeded for tests	Incorrect container for tests
2585550	BH01 1.20 SOIL	13/10/25	PT 500ml	pH + Conductivity (7 days)	
2585551	BH03 2.00 SOIL	13/10/25	PT 500ml	pH + Conductivity (7 days)	
2585552	BH05 4.00 SOIL	13/10/25	PT 500ml	pH + Conductivity (7 days)	
2585553	BH06 0.60 SOIL	13/10/25	PT 500ml	pH + Conductivity (7 days)	
2585554	BH08 2.00 SOIL	13/10/25	PT 500ml	pH + Conductivity (7 days)	
2585555	BH10 1.20 SOIL	13/10/25	PT 500ml	pH + Conductivity (7 days)	
2585556	BH11 4.00 SOIL	13/10/25	PT 500ml	pH + Conductivity (7 days)	
2585557	BH12 3.00 SOIL	13/10/25	PT 500ml	pH + Conductivity (7 days)	
2585558	TP02 1.20 SOIL	13/10/25	PT 500ml	pH + Conductivity (7 days)	
2585559	TP04 2.00 SOIL	13/10/25	PT 500ml	pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

Normec DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 250µm sieve

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO ₄	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC 2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC 2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC 2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC 2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC 2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC 2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC 2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC 2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 2311	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO ₄	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	As Received	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3321	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3521	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3521	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3521	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3521	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3521	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
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Key:

~ Sample details are provided by the client and can affect the validity of the results

* -not accredited.

-MCERTS (accreditation only applies if report carries the MCERTS logo).

\$ -subcontracted.

n/s -not supplied.

I/S -insufficient sample.

U/S -unsuitable sample.

t/f -to follow.

nd -not detected.

End of Report

APPENDIX D

Laboratory Report Front Sheet		G2M Testing (Stockton) 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 033318 info@g2mtesting.co.uk	 10258
Site name	Job number		
Wignal Gate, Holbaech	S250326		

Client details:

Reference: S250326
 Name: Solmek
 Address: 12 Yarm Road,
 Stockton-on-tees,
 TS18 3NA

Telephone: 01642 607083
 Email: rfletcher@solmek.com

FAO: Rory Fletcher

Samples received: 20/10/2025

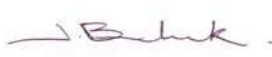
Date commenced: 28/10/2025

Date reported: 19/11/2025

Observations and interpretations are outside of 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 in full, without the prior written approval of the laboratory.

Samples will be held at the laboratory for a period of 4 weeks after the report date. After the above reporting date the samples will be disposed of. Should further testing be required then the office should be informed before the above date.

Signature: 	Approved Signatories: ☐ D.Anderson (Managing Director) ☒ J. Brischuk (Laboratory Manager) ☐
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Summary of Classification Tests

G2M Testing (Stockton)

12-16 Yarm Road
Stockton on Tees
TS18 3NA

01642 033318

info@g2mtesting.co.uk



10258

Site name	Job number
Wignal Gate, Holbaech	S250326

Hole	Depth		Type	w %	Oven temp. oc	wa %	Pa %	Pr %	wL %	wP %	IP %	IL	Plasticity class	Preparation method
	Top m	Base m												
BH01	1.20		B	26	105									
BH03	2.00		B	25	105									
BH05	4.00		B	32	105									
BH06	0.60		B	20	105									
BH08	2.00		B	25	105									
BH10	1.20		B	18	105									
BH11	4.00		B	27	105									
BH12	3.00		B	27	105									
TP02	1.20		B	14	105									
TP04	2.00		B	30	105									

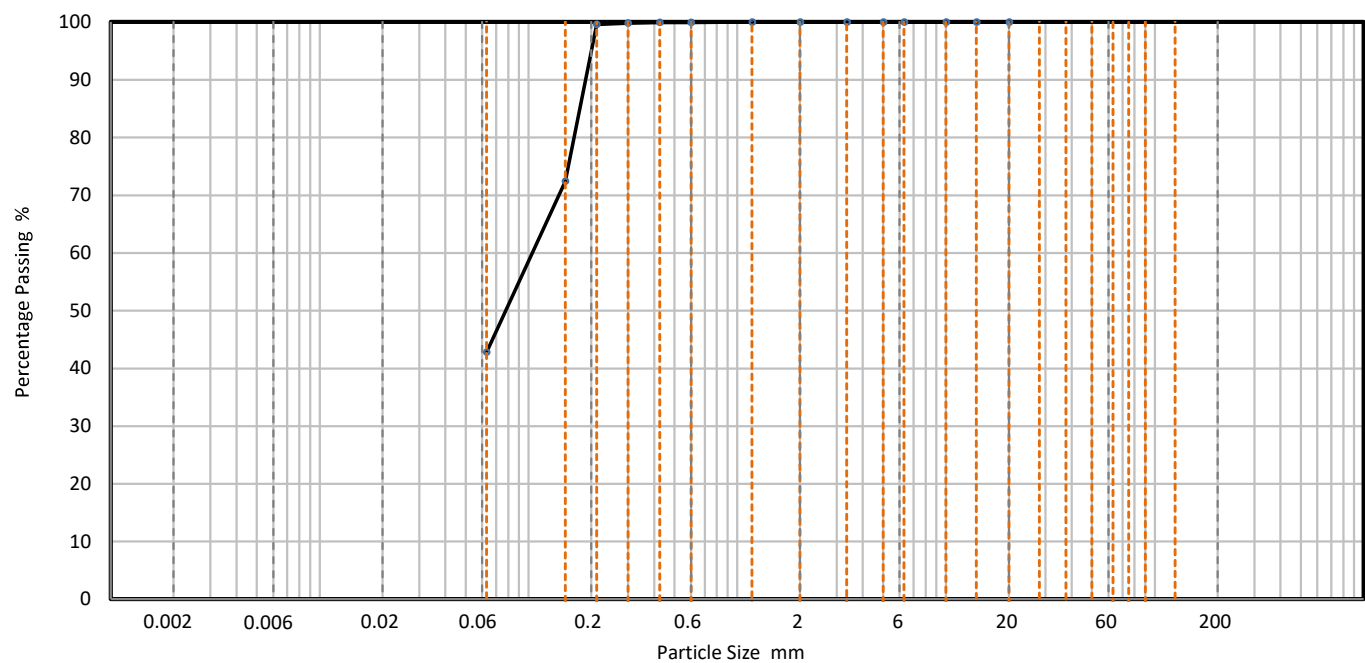
All tests found in G2M Testing UKAS Schedule of Accreditation are tested to standard unless otherwise indicated

Key	Description	Category	BS Test Code
w	Moisture content		BS 1377:1990 Part 2 Clause 3.2
wa	Equivalent moisture content passing 425µm sieve		BS 1377:1990 Part 2 Clause 3.2
wL	Liquid limit Single point Four point	-s	BS 1377:1990 Part 2 Clause 4.4
		-f	BS 1377:1990 Part 2 Clause 4.3
wP	Plastic limit		BS 1377:1990 Part 2 Clause 5.2
Pa	Percentage passing 425um sieve		
Pr	Percentage retained 425um sieve		
IP	Plasticity index		BS 1377:1990 Part 2 Clause 5.4
IL	Liquidity index		BS 1377:1990 Part 2 Clause 5.4
	Suffix indicating test is "Not UKAS Accredited"	*	

Approved by	D Anderson
Approval date	14/11/2025 11:17
Date report generated	
Report Number	

PARTICLE SIZE DISTRIBUTION		G2M Testing (Stockton) 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 033318 info@g2mtesting.co.uk	 10258
Site name	Job number		
Wignal Gate, Holbaech	S250326		

Hole		BH01	Lab sample ID	G2MT202510280
Depth (Top)	m	1.20	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m		Soil Description	Very Silty/Clayey, SAND
Sample type		B		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	100		
0.3	100		
0.212	100		
0.15	72		
0.063	43		

Dry Mass of sample, g	771
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Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.0
Sand	57.2
Fines <0.063mm	43.0

Grading Analysis	
D100 mm	
D60 mm	0.104
D30 mm	
D10 mm	
Uniformity Coefficient	
Curvature Coefficient	

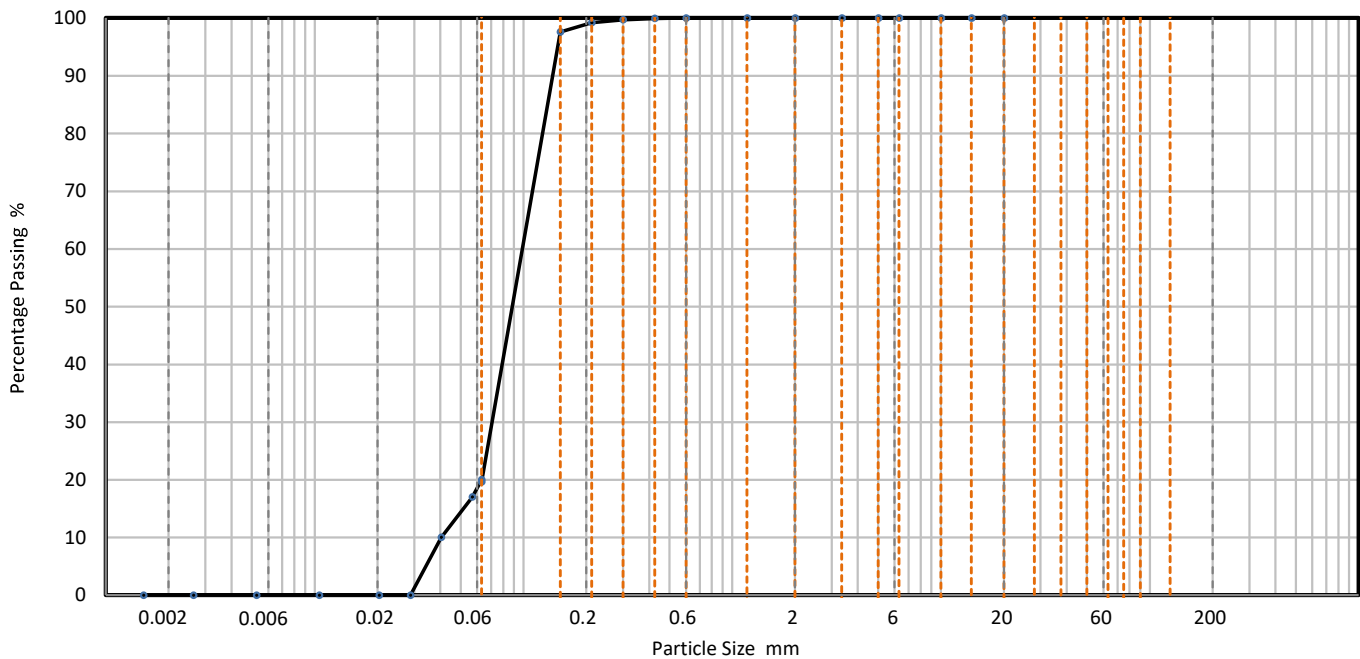
Remarks
 Preparation and testing in accordance with test method unless noted below

Accreditation status
 Hydrometer is the usual Sedimentation method carried out by G2M Testing and is part of the G2M Testing UKAS accreditation schedule.

Approved by	D Anderson
Approval date	14/11/2025 11:25

PARTICLE SIZE DISTRIBUTION		G2M Testing (Stockton) 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 033318 info@g2mtesting.co.uk	
Site name	Job number		
Wignal Gate, Holbaech	S250326		

Hole		BH05	Lab sample ID	G2MT202510282
Depth (Top)	m	4.00	Test Method	BS 1377 - 2 : 1990 Clauses 9.2 and 9.5
Depth (Base)	m		Soil Description	Silty, SAND
Sample type		B		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0630	20
		0.0568	17
		0.0404	10
		0.0288	0
		0.0204	0
		0.0105	0
		0.0053	0
20	100	0.0026	0
14	100	0.0015	0
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density (assumed) 2.65 Mg/m3	
0.425	100		
0.3	100		
0.212	99		
0.15	98		
0.063	20		

Dry Mass of sample, g	812
-----------------------	-----

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.0
Sand	80.4
Silt	19.6
Clay	0.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	2.4
Curvature Coefficient	1.2

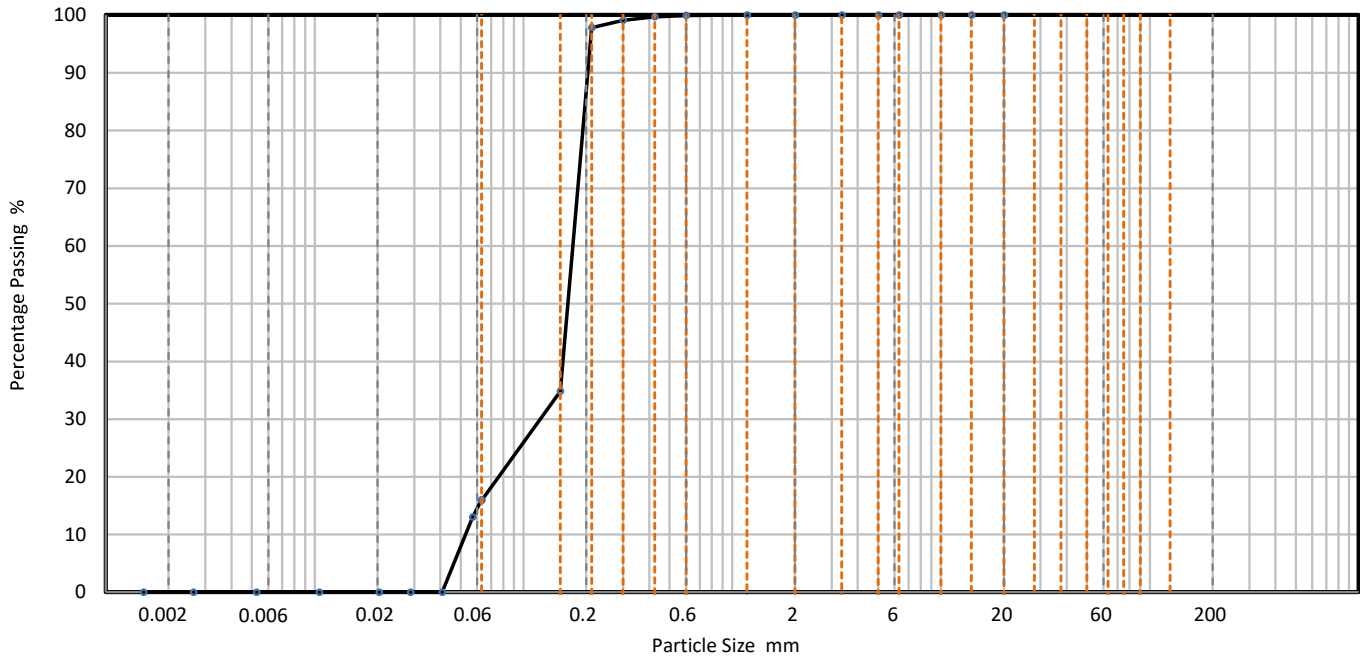
Remarks
 Preparation and testing in accordance with test method unless noted below

Accreditation status
 Hydrometer is the usual Sedimentation method carried out by G2M Testing and is part of the G2M Testing UKAS accreditation schedule.

Approved by	D Anderson
Approval date	14/11/2025 11:29

PARTICLE SIZE DISTRIBUTION		G2M Testing (Stockton) 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 033318 info@g2mtesting.co.uk	 10258
Site name		Job number	
Wignal Gate, Holbaech		S250326	

Hole		BH08	Lab sample ID	G2MT202510284
Depth (Top)	m	2.00	Test Method	BS 1377 - 2 : 1990 Clauses 9.2 and 9.5
Depth (Base)	m		Soil Description	Silty, SAND
Sample type		B		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0630	16
		0.0571	13
		0.0407	0
		0.0288	0
		0.0204	0
		0.0105	0
		0.0053	0
20	100	0.0026	0
14	100	0.0015	0
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density (assumed) 2.65 Mg/m3	
0.425	100		
0.3	99		
0.212	98		
0.15	35		
0.063	16		

Dry Mass of sample, g	809
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Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.0
Sand	84.1
Silt	15.9
Clay	0.0

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	3.2
Curvature Coefficient	1.6

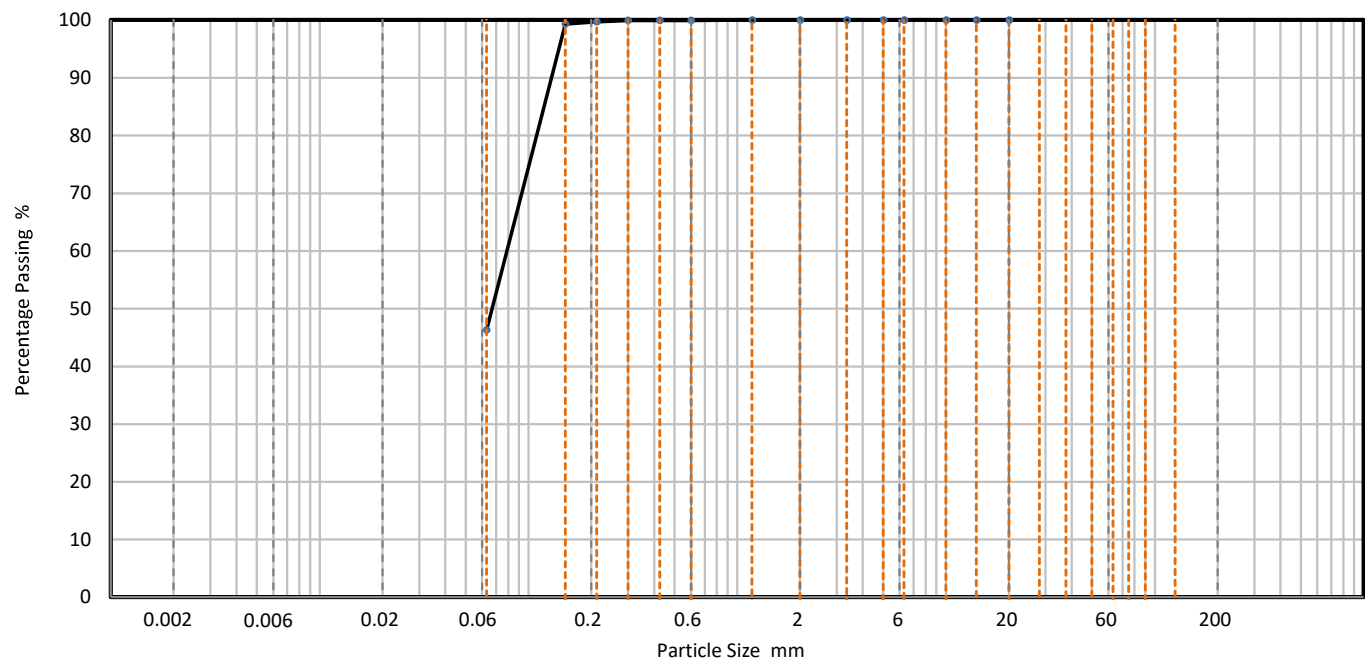
Remarks
Preparation and testing in accordance with test method unless noted below

Accreditation status
Hydrometer is the usual Sedimentation method carried out by G2M Testing and is part of the G2M Testing UKAS accreditation schedule.

Approved by	D Anderson
Approval date	14/11/2025 11:35

PARTICLE SIZE DISTRIBUTION		G2M Testing (Stockton) 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 033318 info@g2mtesting.co.uk	 10258
Site name	Job number		
Wignal Gate, Holbaech	S250326		

Hole	BH12	Lab sample ID	G2MT202510287
Depth (Top)	m 3.00	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m	Soil Description	Very Silty/Clayey, SAND
Sample type	B		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	100		
0.3	100		
0.212	100		
0.15	99		
0.063	46		

Dry Mass of sample, g	1160
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Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.0
Sand	53.7
Fines <0.063mm	46.0

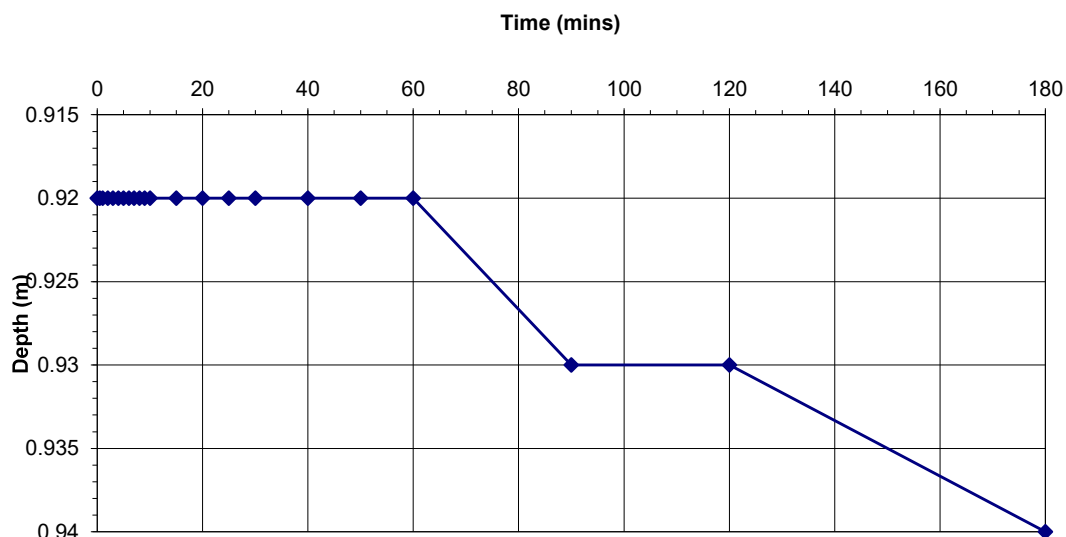
Grading Analysis	
D100 mm	
D60 mm	0.0788
D30 mm	
D10 mm	
Uniformity Coefficient	
Curvature Coefficient	

Remarks
 Preparation and testing in accordance with test method unless noted below

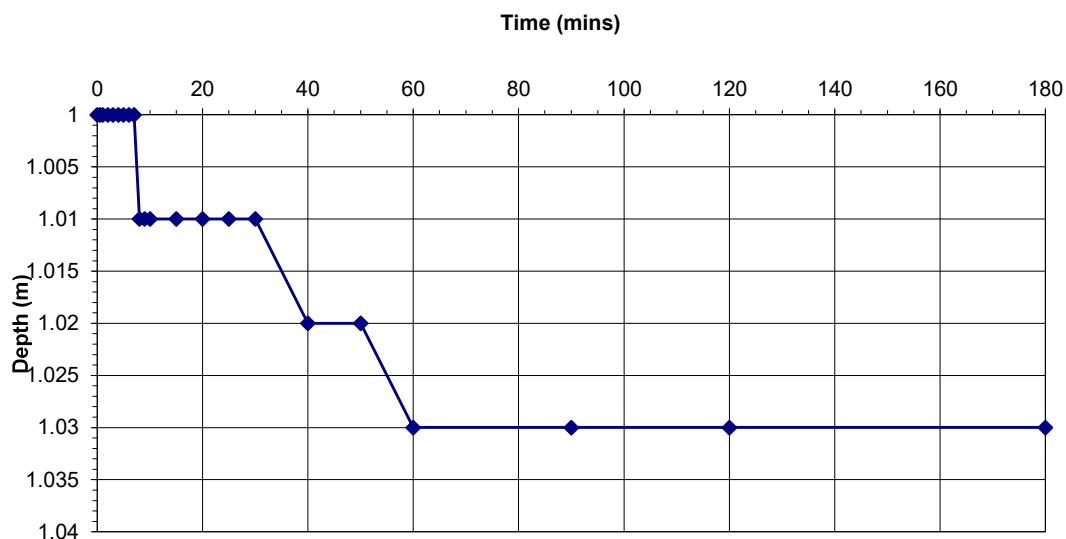
Accreditation status
 Hydrometer is the usual Sedimentation method carried out by G2M Testing and is part of the G2M Testing UKAS accreditation schedule.

Approved by	D Anderson
Approval date	14/11/2025 11:38

SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991 BRE Digest 365, Figure 2, Page 5					
Client: Brown Builders					
Site: Wignals Gate, Holbeach			Notes: Loose, clayey SAND.		
Job No: S250326					
Pit No: TP01		Test No:		1	
CALCULATION OF SOIL INFILTRATION RATE					
Time (min)	Depth (m)	Pit Dimensions		Length (m) =	1.40
0	0.92			Width (m) =	0.60
0.5	0.92			Depth (m) =	1.50
1	0.92				
2	0.92	Depth at start of test (m) = 0.920			
3	0.92	Depth at end of test (m) = 0.940			
4	0.92	75% level (m) = 0.925			
5	0.92	50% Effective Depth = 0.570			
6	0.92	25% level (m) = 0.935			
7	0.92				
8	0.92	Base area of pit (m ²) = 0.840			
9	0.92	V _{p75-25} (m ³) = 0.008			
10	0.92	a _{n50} (m ²) = 3.120			
15	0.92				
20	0.92	From the graph:			
25	0.92	tp 75 (min) = 75			
30	0.92	tp 25 (min) = 150			
40	0.92				
50	0.92	Soil infiltration rate, f, (m/s) =		5.98E-07	normal test
60	0.92				
90	0.93				
120	0.93	Input by:	GT	Date:	13.10.2025
180	0.94	Checked by:	RF	Date:	13.10.2025



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991 BRE Digest 365, Figure 2, Page 5					
Client: William Saunders					
Site: Wignals Gate, Holbeach			Notes: Loose, clayey, SAND.		
Job No: S250326					
Pit No: TP03		Test No:		1	
CALCULATION OF SOIL INFILTRATION RATE					
Time (min)	Depth (m)	Pit Dimensions		Length (m) =	1.40
0	1			Width (m) =	0.60
0.5	1			Depth (m) =	1.50
1	1				
2	1	Depth at start of test (m) = 1.000			
3	1	Depth at end of test (m) = 1.030			
4	1	75% level (m) = 1.008			
5	1	50% Effective Depth = 0.485			
6	1	25% level (m) = 1.023			
7	1				
8	1.01	Base area of pit (m ²) = 0.840			
9	1.01	V _{p75-25} (m ³) = 0.013			
10	1.01	a _{n50} (m ²) = 2.780			
15	1.01				
20	1.01	From the graph:			
25	1.01	tp 75 (min) = 7.75			
30	1.01	tp 25 (min) = 52.5			
40	1.02				
50	1.02	Soil infiltration rate, f, (m/s) =		1.69E-06 normal test	
60	1.03				
90	1.03				
120	1.03	Input by:	GT	Date:	13.10.2025
180	1.03	Checked by:	RF	Date:	13.10.2025



APPENDIX E

♣Solmek conditions of offer, notes on limitations & basis for contract (ref: version1/2025)

These conditions accompany our tender and supercede any previous conditions issued. Solmek will prepare a report solely for the use of the Client (the party invoiced) and its agent(s). No reliance should be placed on the contents of this report, in whole or in part by 3rd parties. The report, its content and format and associated data are copyright, and the property of Solmek. Photocopying of part or all of the contents, transfer or reproduction of any kind is forbidden without written permission from Solmek. A charge may be levied against such approval, the same to be made at the discretion of Solmek.

Solmek cannot be held liable and do not warrant, or otherwise guarantee the validity of information provided by third parties and subsequently used in our reports. Solmek are not responsible for the action negligent of otherwise of subcontractors or third parties.

Site investigation is a process of sampling. The scope and size of an investigation may be considered proportional to levels of confidence regarding the ground and groundwater conditions. The exploratory holes undertaken investigate only a small volume of the ground in relation to the overall size of the site, and can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions as encountered within each of the exploratory holes. There may be different ground conditions elsewhere on the site which have not been identified by this investigation and which therefore have not been taken into account in this report. Reports are generally subject to the comments of the local authority and Environment Agency. The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that mobile contamination, ground gas levels and groundwater levels may vary owing to seasonal, tidal and/or weather related effects. Solmek cannot be held liable for any unrecorded or unforeseen obstructions between exploratory boreholes and trial pits. This includes instances where previous structures on the site (buried man made structures) or the presence of boulder clay (cobbles and/or boulder obstructions) have been anticipated. All types of piling operations should make allowance for obstructions within the construction budget to accommodate this. Unrecorded ancient mining may occur anywhere where seams that have been worked and influence the rock and soil above. Dissolution cavities can occur where gypsum or chalk is present. Rotary drilling is the recommended technique to prove the integrity of the rock.

Where the scope of the investigation is limited via access to information, time constraints, equipment limitations, testing, interpretation or by the client or his agents budgetary constraints, elements not set out in the proposal and excluded from the report are deemed to be omitted from the scope of the investigation.

Desk studies are generally prepared in accordance with RICS guidelines. Environmental site investigations are generally undertaken as 'exploratory investigations' in accordance with the definitions provided in paragraph 5.4 of BS 10175:2011 in order to confirm the conceptual assumptions. You are advised to familiarize yourself with the typical scope of such an investigation. No pumping of water will be undertaken unless a licence or facilities/equipment have been arranged by others.

Where the type, number or/and depth of exploratory hole is specified by others, Solmek cannot and will not be responsible for any subsequent shortfall or inadequacy in data, and any consequent shortfall in interpretation of environmental and geotechnical aspects which may be required at a later date in order to facilitate the design of permanent or temporary works.

All information acquired by Solmek in the course of investigation is the property of Solmek, and, only also becomes the joint property of the Client only on the complete settlement of all invoices relating to the project. Solmek reserve the right to use the information in commercial tendering and marketing, unless the Client expressly wishes otherwise in writing. The quoted rates do not include VAT, and payment terms are 30 days from dispatch of invoice from our offices. Quotes are subject to a site visit.

We have allowed for 1 mobilisation and normal working hours unless otherwise stated. The scope of the investigation may be reviewed following the desk study and/or fieldwork. The presence or otherwise of Japanese Knotweed or other invasive plants can be difficult to identify especially during winter months. If Japanese Knotweed or other invasive species are suspect, it should be confirmed by an ecologist. We have not allowed for acquiring services information, and cannot be responsible for damage to underground services or pipes not shown to us or not clearly shown on plans. Costs incurred will be passed on to you, and in commissioning Solmek you understand and accept that you/your agent have a contractual relationship with Solmek & you accept this. Our rates assume unobstructed, reasonably level and firm access to the exploratory positions and adequate clear working areas and headroom. We have priced on the basis that you or your client have the necessary permissions, wayleaves and approvals to access land. All boreholes and pits are backfilled with arisings except where gas monitoring pipes are installed with stopcock covers. Solmek are not responsible for any uneven surfaces as a result of siteworks and rutting and backfilled excavations may require re-levelling and/or making good by others after fieldwork is complete, and Solmek has not allowed for this. No price has been provided or requested for a return visit to remove pipework and covers. Hourly rates apply to consultancy only and do not include expenses unless otherwise shown. If warranties are required, legal costs incurred will be passed on to you assuming Solmek agree to complete such warranties, modified or otherwise and you understand and agree to pay all costs.

We reserve the right to pursue full payment of the invoice prior to release of any information including reports. We advise you/your client that we may elect to pursue our statutory rights under late payment legislation, and will apply 8% to the base rate for unreasonably late payments. Solmek are exempt from the CIS Scheme. Solmek offer to undertake work only in strict accordance with conditions covered by our current insurances, which are available for inspection. Solmek are not responsible for acts, negligent or otherwise of subcontractors and as a matter of policy cannot indemnify any other parties. Professional indemnity Insurance is limited to ten times the invoice net total except where stated otherwise by Solmek. Solmek give notice that consequential loss as a direct or indirect result of Solmek's activities or omission of the same are excluded.

UK BACKGROUND

Environmental Protection Act 1990: Part 2A Revised Statutory Guidance (April 2012)

This revised document explains how the Local Authority should decide if land, based on a legal interpretation, is contaminated. The document replaces the previous guidance given in Annex 3 of DEFRA Circular 01/2006, issued in accordance with section 78YA of the 1990 Environmental Protection Act.

The main objectives of the Part 2A regime are to “*identify and remove unacceptable risks to human health and the environment*” and to “*seek to ensure that contaminated land is made suitable for its current use*”.

Part 2A uses a risk based approach to defining contaminated land whereby the “risk” is interpreted as “*the likelihood that harm, or pollution of water, will occur as a result of contaminants in, on or under the land*” and by “*the scale and seriousness of such harm or pollution if it did occur*”.

For a relevant risk to exist a contaminant, pathway and receptor linkage must be present before the land can be considered to be contaminated. The document explains that “*for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or property; or significantly pollute controlled waters.*”

A conceptual model is used to develop and communicate the risks associated with a particular site.

To determine if land is contaminated the local authority use various categories from 1 to 4. Categories 1 and 2 include “*land which is capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health.*”

Categories 3 and 4 “*encompass land which is not capable of being determined on such grounds*”.

PRELIMINARY CONCEPTUAL MODEL

Preliminary Conceptual Models are undertaken in accordance with CIRIA C552. The Preliminary Conceptual Model assesses the consequence and the likelihood of a risk being realised to provide a risk classification, using the tables detailed below.

CONSEQUENCE OF RISK BEING REALISED (Based on C552 CIRIA, 2001)

Classification	Definition	Example
Severe	Short-term (acute) risk to human health, the environment, an element of the development or other aspect with is likely to result in <i>significant harm</i> , damage or both.	High concentrations of cyanide on the surface of an informal recreational area. Major spills of contaminants from site into controlled water. High concentrations of explosive gas in the subsurface environment that have a clear unobstructed pathway into buildings.
Moderate	Chronic damage to human health, a plausible chance that an event will occur, although the timeline is not immediate to be in the short-term.	Appreciable concentration of contamination that over the longer-term will cause significant harm i.e. high lead concentration in topsoil. Shallow mine workings that are potentially unstable but may remain in a satisfactory or stable conditions for a number of years.
Mild	Low level pollution of non-sensitive water, a feasible hazardous scenario although the timeline of such occurring can probably be considered in 10's of years.	The effect of high sulphate concentrations on structural concrete. Pollution of non-classified groundwater.
Minor	Harm, although not necessarily significant to human health, or with respect to other aspects of the development, which are considered implausible in terms of occurrence, or will have little consequential impact.	The presence of contaminants at such low concentrations that protective equipment is required during site works. Any damage to structures is minimal and will not be structural in characteristics.

PROBABILITY OF RISK BEING REALISED (C552 CIRIA, 2001)

Classification	Definition
High Likelihood	There is a viable pollutant linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence that the receptor has been harmed or polluted.
Likely	There is a viable pollutant linkage and all elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a viable pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a viable pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

RISK CLASSIFICATION MATRIX (C552 CIRIA, 2001)

Risk = Probability x Consequence		Consequence			
		Severe	Moderate	Mild	Minor
Probability	High likelihood	Very high risk	High risk	Moderate risk	Moderate/low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

HUMAN RECEPTORS

Human exposure to contaminants present in soils can occur via several pathways. Direct exposure pathways include dermal absorption after contact with contaminated ground, inhalation of soil or dust, inhalation of volatilised compounds, and inadvertent soil ingestion (or deliberate soil ingestion in the case of some children). Other indirect pathways include human ingestion of plants grown in contaminated soil or contaminated ground or surface water. Contaminants associated with wind blown dust can affect humans on surrounding sites.

VEGETATION

Plants can be affected by soil contamination in a number of ways resulting in growth inhibition, nutrient deficiencies and yellowing of leaves. Contaminants are taken up by plants through the roots and through foliage. Contaminants identified as being highly phytotoxic include boron, cadmium, copper, lead, nickel, and zinc.

To establish if the levels of contaminants present on a site may pose a risk to vegetation the results of the contamination testing are compared to a series of threshold values published in 'Code of Good Agricultural Practice for the Protection of Soil'.

GROUNDWATER AND SURFACE WATER RECEPTORS

The principal pathway by which soil contamination may reach the water environment is through a slow seepage or leaching to groundwater or surface water. The potential for contaminants to migrate along such pathways is dependent on the chemical and physical characteristics of the contaminants and the local hydrogeology. Surface watercourses may also accumulate contamination as contaminated sediments are deposited within the water body.

Where the site investigated overlies major/principal aquifers (and in some cases minor/secondary aquifers depending on certain conditions), groundwater Source Protection Zones and areas in close proximity to groundwater abstractions, contamination test results have been compared with the Water Supply (Water Quality) Regulations 1989 and The Water Supply (Water Quality) Regulations 2000.

Should a surface water receptor, such as a fresh water environment (river, canal, stream, lake etc), or marine environment be considered sensitive in relation to a site, then test results are compared with DEFRA & SEPA Environmental Quality Standards (2004). Many of the Environmental Quality Standards are hardness (CaCO_3) depended. Where no hardness values are available, Solmek assume conservative values (of between 0 and 50mg/l).

In the absence of vulnerable ground and surface water environments, Solmek may compare any test results with the Environment Agency Leachate Quality Threshold Values.

DETAILED QUANTITATIVE RISK ASSESSMENT (DQRA)

In line with Environment Agency's guidance document Environment Agency *Land Contamination Risk Management*, which replaced the now-withdrawn *Contaminated Land Report 11 – Model Procedures for the Management of Land Contamination (2004)*, a DQRA for groundwater/human health may be required following a Phase 2 investigation and before the preparation of a Phase 3 Remediation Strategy. For human health DQRA, a site specific assessment criteria is undertaken using CLEA Software Version 1.06. For groundwater DQRA, the Environment Agency Remedial Targets Worksheet Version 3.1 is used.

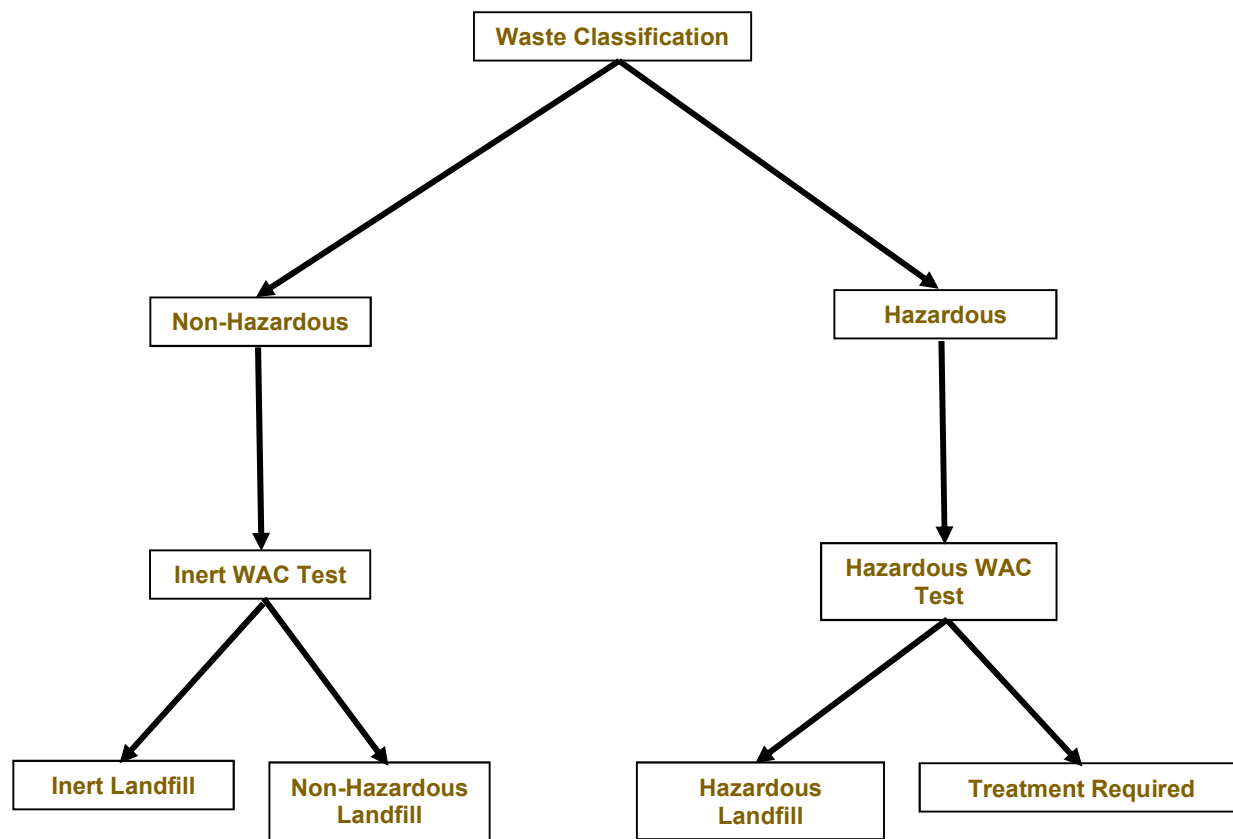
WASTE CLASSIFICATION AND WASTE ACCEPTANCE CRITERIA

During the site strip and construction activities, material may be required to be removed from site. Any such material would require classification, in line with Environment Agency Technical Guidance *Waste Classification: Guidance on the classification and assessment of waste (2015)*. This would classify the material as either Non-Hazardous or Hazardous Waste.

Once the material has been classified, determining the suitable landfill for disposal is governed by landfill directive Waste Acceptance Criteria (WAC) testing, with landfills categorized as Inert Waste, Stable Non-Reactive Hazardous Waste and Hazardous Waste. The WAC testing relates to materials that are to be exported from a site/development to landfill, and do not directly relate to human health specifically. The testing results are generally presented as certificates which can be used by site owners/contractors etc, which should be presented to the accepting waste facility or waste contractor.

If waste classification and/or WAC testing are not undertaken, material taken off site may be subject to WAC testing by the appropriate waste disposal company. The decision on whether or not to accept waste, or whether further testing is required, is at the discretion of the waste disposal company.

The below flow chart provides further information on the waste classification process.



CONSTRUCTION MATERIALS

Materials at risk from possible soil contaminants include inorganic matrices such as cement and concrete and also organic material such as plastics and rubbers. Acid ground conditions and high levels of sulphates can accelerate the corrosion of building materials. Where pH and soluble sulphate analysis has been undertaken, Solmek compare the test results with the guidelines presented within BRE Special Digest 1, 2005 (3rd Edition) 'Concrete in Aggressive Ground'. Plastics and rubbers are generally used for piping and service ducts and are potentially attacked by a range of chemicals, most of which are organic, particularly petroleum based substances. Drinking water supplies can be tainted by substances that can penetrate piping and water companies enforce stringent threshold values.

The levels of potential contaminants should be compared to thresholds supplied in the UK Water Industry Research (UKWIR) publication "Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites" (January 2011). A Brownfield Site is defined in the document as "Land or premises that have not previously been used or developed that may be vacant or derelict". It should be noted that Brownfield sites may not be contaminated. The guidance does not apply to Greenfield Sites however water companies may have their own assessment criteria which should be checked by the developer. The table below outlines the pipe material selection threshold concentrations.

Parameter group	Pipe Material (Threshold concentrations in mg/kg)					
	PE	PVC	Barrier pipe (PE-AL-PE)	Wrapped Steel	Wrapped Ductile Iron	Copper
Extended VOC suite by purge and trap or head space and GC-MS with TIC	0.5	0.125	Pass	Pass	Pass	Pass
+ BTEX + MTBE	0.1	0.03	Pass	Pass	Pass	Pass
SVOCs TIC by purge and trap or head space and GC-MS with TIC (aliphatic and aromatic C5-C10)	2	1.4	Pass	Pass	Pass	Pass
+ Phenols	2	0.4	Pass	Pass	Pass	Pass
+ Cresols and chlorinated phenols	2	0.04	Pass	Pass	Pass	Pass
Mineral oil C11-C20	10	Pass	Pass	Pass	Pass	Pass
Mineral oil C21-C40	500	Pass	Pass	Pass	Pass	Pass
Corrosive (Conductivity, Redox and pH)	Pass	Pass	Pass	Corrosive if pH <7 and conductivity >400µS/cm	Corrosive if pH <5, Eh not neutral and conductivity >400µS/cm	Corrosive if pH <5 or >8 and Eh positive
Specific suite identified as relevant following site investigation						
Ethers	0.5	1	Pass	Pass	Pass	Pass
Nitrobenzene	0.5	0.4	Pass	Pass	Pass	Pass
Ketones	0.5	0.02	Pass	Pass	Pass	Pass
Aldehydes	0.5	0.02	Pass	Pass	Pass	Pass
Amines	Fail	Pass	Pass	Pass	Pass	Pass

REQUIREMENTS OF PARTIES WITHIN THE DEVELOPMENT PROCESS

Interested parties involved in the development process may use the data in different ways and there may be varying views and interpretation of the factual data. Local Authority staff may have a view on contamination and human health and the wider environment. The Environment Agency are concerned principally with the protection of Controlled waters. Building insurers, funders and purchasers may be primarily concerned with issues of potential commercial blight. Purchasers are also not always fully informed, and perceptions on issues associated with risk can affect the decision to purchase. Developers and construction organisations will focus on financial aspects of dealing with the contamination in the context of the development and construction programme.

RISKS & LIABILITIES FROM CONTAMINATION

In simple terms, risks associated with contamination may be considered in terms of 1) statutory risks and 2) development related risks. If contamination is severe or forms a potential hazard based on its potential to affect groundwater, surface water or human health, a statutory risk may be present, and as such, if the risk is not reduced, criminal proceedings may be instigated by a government body or local authority.

If the contamination is less severe or not considered to be mobile, it may be considered a commercial liability which could, in theory remain untreated, but which may at a later date affect the value of the property, or, with changing legislation, become a statutory risk. Commercial liabilities could give rise to civil proceedings by third parties if there are grounds for action.