SP ASSOCIATES

GEO-ENVIRONMENTAL ASSESSMENT
PROPOSED INDUSTRIAL DEVELOPMENT
OAK ROAD
WREXHAM INDUSTRIAL ESTATE

Client: FI Real Estate Management Ltd

Report Number: S1916-2

September 2025

GEO-ENVIRONMENTAL ASSESSMENT
PROPOSED INDUSTRIAL DEVELOPMENT
OAK ROAD
WREXHAM INDUSTRIAL ESTATE

Prepared for : **FI Real Estate Management Ltd**

S P Associates
1 Market Place
Warwick
CV34 4SA

Tel : 07831 389024
E-Mail: spassociates@hotmail.co.uk

REPORT No S1916-2

GEO-ENVIRONMENTAL ASSESSMENT
PROPOSED INDUSTRIAL DEVELOPMENT
OAK ROAD
WREXHAM INDUSTRIAL ESTATE

CONTENTS

1. INTRODUCTION **6**

2. THE SITE **7**

2.1 LOCATION AND SURFACE CONDITIONS 7

2.2 HISTORY 7

2.3 GEOLOGY 7

2.4 UNEXPLODED ORDNANCE 7

2.4 HYDROGEOLOGY AND HYDROLOGY 7

3 CONCEPTUAL MODEL **8**

3.1 ENVIRONMENTAL SETTING 8

5.2 RISK ASSESSMENT METHODLOGY 8

4 GROUND INVESTIGATION **10**

4.1 GENERAL 10
4.1.1 ON-SITE POTENTIAL CONTAMINANT SOURCES - SOILS 10
4.1.2 ON-SITE CONTAMINANT SOURCES – GROUND GAS 10
4.1.3 CONTROLLED WATERS ASSESSMENT 11
4.1.4 GEOTECHNICAL ASSESSMENT 11

4.2 WINDOW SAMPLER BOREHOLES 11

4.3 TRIAL PITS 12

4.4 SOAKAWAY TESTING 12

4.5 LABORATORY TESTING 12

4.6 MONITORING 12

5. GROUND CONDITIONS **13**

5.1 MADE GROUND 13

5.2 GLACIAL TILL 13

5.3 GEOTECHNICAL PROPERTIES 13

5.4 GROUNDWATER 13

6 GEOTECHNICAL ASSESSMENT **14**

6.1 GENERAL 14

6.2 FOUNDATIONS 14

6.3 GROUND FLOOR SLABS 14

6.4 BURIED CONCRETE 14

6.5 SOAKAWAY DRAINAGE 15

7 ENVIRONMENTAL CONSIDERATIONS **16**

7.1 SOIL CONTAMINATION 16
7.1.1 GENERAL APPROACH 16
7.1.2 RISK SCREENING 16
7.1.2.1 HUMAN SITE OCCUPIERS AND CONSTRUCTION WORKERS 16
7.1.2.2 WATER SUPPLY PIPES 16
7.1.3 PROPOSED REMEDIAL MEASURES 16

7.2 CONTROLLED WATERS 17

7.3 GROUND GAS 17

8 ADDITIONAL INVESTIGATIVE WORK **18**

TABLES
1.Gas and Groundwater Readings
2.Human Health Screening Values for an Industrial/Commercial Land Use versus Measured Values - Soils

FIGURES
1 Site Location Plan
2 Borehole and Trial Pit Location Plan

APPENDICES
A Initial CSM and Risk Assessment
B Borehole and Trial Pit Logs
C Laboratory Test Results
D Soakaway Test Results
E Updated CSM and Risk Assessment

EXECUTIVE SUMMARY

The Site	The site is located about 6Km to the east of Wrexham town centre in the south-eastern quadrant of Wrexham Industrial Estate at approximate National Grid Reference 338590 349380 (Figure 1). The redevelopment site is essentially flat, approximately 2.8Ha in area and approximates to a rectangle in shape (Figure 2). The site comprises an area of undeveloped open scrub and woodland which is accessed from the north off Oak Road via a concrete surfaced pathway which traverses the northern part of the site in a south-easterly direction.
History	The site comprised agricultural land before being incorporated into ROF Wrexham.
Geology	The site is underlain by Kinnerton Sandstone of Triassic age. Superficial deposits comprise Glacial Till.
Radon Gas	The site is in a Lower Probability radon area where less than 1% of properties are above the Radon action level. However, the environmental database recommends that basic radon protection measures are installed within the proposed industrial unit.
Ground Investigation	**Window Sampler Boreholes:** A total of 5No. boreholes were sunk at the site on the 13th August 2025 using a window sampler drilling rig. **Trial Pits**: A total of 3No. trial pits were excavated across the site on the 20th August 2025 using a tracked excavator. **In Situ Soakaway Tests**: 3No.Soakaway tests were carried out within the trial pits on the 20th August 2025. The tests were carried out in accordance with the recommendations contained within BRE 365, 'Soakaway design'. **Laboratory Testing**: 10No. samples of the near surface formation have been tested for the following list of potential contaminants of concern: pH, SO4, asbestos, phenols, metals, 16 US EPA PAHs, TPH (aromatic/aliphatic), BTEX. 5No. soil samples have been subject to Index tests. **Standpipe Monitoring**: Concentrations of methane, carbon dioxide, oxygen, hydrogen sulphide and carbon monoxide gas have been measured within the Borehole 1 and 3 standpipes on three occasions within the period 20th August 2025 to the 8th September 2025. Total gas concentrations were measured using a GA 2000 meter w S/N 7871 with atmospheric pressure meter. Depth to groundwater was measured at each monitoring visit.
Ground Conditions	**Made Ground:** The boreholes and trial pits have identified the presence of between 0.70m (TP1) and 1.5m (BH5) of superficial Made Ground deposits. The formation is a mixture of cohesive and granular deposits consisting of firm, clay with angular gravel of shale, concrete and brick, and, loose sand with gravel of concrete, brick, shale and mudstone. In Borehole 5, a dense layer of sandstone gravel was encountered from 1.0m to 1.5m depth.

	Glacial Till: Natural deposits of Glacial Till were encountered beneath the superficial Made Ground formation to the termination depths of each of the boreholes and trial pits. The formation predominantly comprised firm, becoming stiff, brown and grey, occasionally gravelly clay. **Groundwater**: Groundwater was not encountered within the boreholes, trial pits or borehole standpipes.
Foundations	Conventional strip or pad foundations should be suitable for the proposed industrial unit and such foundations taken through the Made Ground horizon into the natural cohesive formation may be designed using an allowable bearing capacity of 150kPa. This design value should provide a factor of safety of 3 against bearing capacity failure and limit total and differential settlements to a maximum of 25mm. Footings should be taken to a minimum depth of 900mm below finished grade so that they lie below the zone of seasonal moisture content variation. However, the cohesive formation is of intermediate plasticity and where footings lie within influencing distance of existing, recently planted or recently felled trees the recommendations of NHBC Standards Chapter 4.2 should be followed which may result in some footings having to be taken deeper than the minimum depth recommended above. Index test data have demonstrated that the cohesive soils at the approximate foundation horizon display signs of desiccation and consequently precautions against heave will be required. These precautions are likely to comprise the application of expansion board to footings and below ground structural elements.
Ground Floor Slabs	Slab on grade construction techniques could be adopted where the exposed sub-formation is firstly proof rolled. Any loose zones or pockets of deleterious material should be excavated and the slab formation level restored using well compacted granular engineering fill.
Surface Water Drainage	The 3No. soakaway tests failed to drain successfully and it is unlikely that soakaway drains could be adopted for the disposal of surface water. An alternative drainage strategy will therefore be required and this is likely to comprise a nearby permanently flowing surface water body or the mains drainage system.
Below Ground Concrete	Test results conform to Design Sulphate Class DS-1 with an ACEC Class of AC-1 as defined within BRE Special Digest 1:2005 'Concrete in aggressive ground'.
Soil Remedial Measures	The site is considered to represent a low risk to human health and there are consequently no proposals to implement remedial measures at the site as part of the development process. Construction workers to wear appropriate PPE and an unexpected contamination protocol to be put in place.
Gas Membranes	Basic radon protection measures are likely to be required for the proposed development.

REPORT No S1916-2

GEO-ENVIRONMENTAL ASSESSMENT
PROPOSED INDUSTRIAL DEVELOPMENT
OAK ROAD
WREXHAM INDUSTRIAL ESTATE

1. INTRODUCTION

SP Associates (SPA) have been appointed by FI Real Estate Management Ltd to carry out a Geo-Environmental Assessment for a site located at Oak Road, Wrexham Industrial Estate, LL13 9RG. We understand that the assessment is required to provide geo-environmental design data for the development of the site with an industrial unit and associated infrastructure.

The scope of the investigation on which this Phase II assessment is based is as follows:

- Boreholes sunk using a windowless sampler drilling rig;
- Borehole instrumentation comprising gas and groundwater monitoring standpipe;
- Standpipe monitoring for ground gas concentrations and groundwater levels;
- Excavation of trial pits using a tracked machine;
- Soakaway test carried out in trial pits to BRE 365 Standards;
- Testing of selected soil samples in the laboratory for chemical characteristics and geotechnical design parameters;
- Analysis of data and reporting.

The investigation was implemented in order to assess the geotechnical and geo-environmental conditions at the site and to identify potential geotechnical and geo-environmental issues related to the construction of the proposed new unit. This report presents the factual data from the investigation and makes recommendations on foundation, ground floor slab and surface water drainage design along with issues associated with soil and ground gas contamination.

This study is supplemental to a Phase I Assessment of the site carried out by SP Associates in March 2024 (Report S1916) and reference to that report should be made for historical land use and environmental data. Elements of that study have, however, been included within this report for completeness.

2. THE SITE

2.1 LOCATION AND SURFACE CONDITIONS

The site is located about 6Km to the east of Wrexham town centre in the south-eastern quadrant of Wrexham Industrial Estate at approximate National Grid Reference 338590 349380 (Figure 1).

The redevelopment site is essentially flat, approximately 2.8Ha in area and approximates to a rectangle in shape (Figure 2).

The site comprises an area of undeveloped open scrub and woodland which is accessed from the north off Oak Road via a concrete surfaced pathway which traverses the northern part of the site in a south-easterly direction.

The site lies in the south-eastern quadrant of Wrexham Industrial Estate and is bounded to the east by open woodland and scrub along with structures remnant from the Wrexham Royal Ordnance Factory (ROF Wrexham) which manufactured Cordite during World War II. The south-easterly flowing Redwither Brook lis to the south with an Engineering Works to the west. Oak Road lies to the north with a range of industrial, commercial and office developments beyond that.

Upon inspection, the site appeared to be free from external signs of olfactory or visual contamination.

2.2 HISTORY

Copies of historical Ordnance Survey maps for the site and its immediate surrounds are included within the Phase I Assessment. In summary, the site comprised agricultural land that was incorporated into ROF Wrexham during WWII. On maps dating from the 1950s the site is shown as being occupied by a number of structures, bunkers, access roads and hydrants most of which had been removed by the late 1970s.

2.3 GEOLOGY

The site is shown on British Geological Survey (BGS) maps to be underlain by Kinneton Sandstone of Triassic age.

The Kinneton Sandstone is overlain with superficial deposits of Glacial Till.

2.4 UNEXPLODED ORDNANCE

A preliminary Unexploded Ordnance Threat Assessment has been obtained for the site a copy of which is enclosed within the Phase I study. That report states that the site comprised part of ROF Wrexham and that it was utilised mostly as an ammunition dump. The factory itself manufactured cordite which was used as an ammunition shell propellant. Given the site's usage the UXO report considers that a UXO threat may exist at the site and it has recommended that a Detailed UXO Threat and Risk Assessment is carried out prior to the commencement of development works.

2.4 HYDROGEOLOGY AND HYDROLOGY

The Kinneton Sandstone is classified by the Environment Agency (EA) as a Principal Aquifer. These are formations that have high intergranular and/or fracture permeability meaning they usually provide a high level of water storage and transmission. They may supply potable water and/or river base flow on a strategic scale.

The overlying Glacial Deposits are classified as a Secondary Aquifer - Undifferentiated.

3 CONCEPTUAL MODEL

The development of a Conceptual Model for the site involves the determination of potential pollutant linkages through the identification of likely sources of contamination from previous and current site uses and the identification of potential targets such as site users and controlled waters.

3.1 ENVIRONMENTAL SETTING

The historical and land use database for the site indicates that its environmental setting can be summarised as follows:

- The site was agricultural land prior to being developed as part of ROF Wrexham.
- The site solid geology comprises Kinnerton Sandstone which is a Principal Aquifer.
- There are 2No. licensed water abstractions within 250m of the site.
- The site lies within Zone II and Zone III of a groundwater source protection zone;
- The nearest significant natural water body is the Redwither Brook that lies about 50m to the south-west.
- According to the Envirocheck database the site does not lie within an area that could be affected by groundwater flooding at surface.
- Basic Radon protection measures will be required for the proposed development.

5.2 RISK ASSESSMENT METHODLOGY

The initial conceptual model and preliminary risk assessment are based upon the available archive data for the site and provide an initial qualitative assessment of risk posed to human health and environmental receptors from potential on and off-site sources of contamination as defined within Part IIa of the Environmental Protection Act (1990). For a significant risk to exist, it must be established that contamination has the potential to cause harm to susceptible targets through a pollutant linkage and requires three criteria to be identified at a significant level:

- The presence of substances that may cause harm (Source);
- The presence of a receptor which may be harmed (Target);
- The existence of a plausible pollutant linkage between the source and the target (Pathway).

EA R&D (2008) provides a risk classification system based on consequence and probability. The table below shows a risk matrix in which the likelihood of probability of each pollutant linkage being realised is ranked against the severity of the consequences. The result is the risk classification based upon which risk management actions can be implemented. The individual sources, pathways and receptors identified are assessed against this risk matrix; potential pollutant linkages and associated risks are recorded.

	Severity of Consequence

		severe	**medium**	**mild**	**minor**
Probability of pollutant linkage	**High likelihood**	Very high risk	High risk	Moderate risk	Moderate to Low risk
	Likely	High risk	Moderate risk	Moderate to Low risk	Low risk
	Low Likelihood	Moderate risk	Moderate to Low risk	Low risk	Very Low risk
	Unlikely	Moderate to Low risk	Low Risk	Very Low risk	Very Low risk

The categories of risk are defined as follows:

Very High Risk: there is a probability that severe harm could arise to a designated receptor from an identified source, or there is evidence that severe harm to a designated receptor is currently occurring;

High Risk: harm is likely to arise to a designated receptor from an identified source;

Low Risk: it is possible that harm could arise to a designated receptor from an identified source, but it is likely that this harm, if realised, would at worst normally be mild;

Very Low Risk: there is a low possibility that harm could arise to the receptor. In the event of such harm being realised it is not likely to be severe.

The following documents provide guidance on the procedures to be adopted for the assessment of contaminated land:

- DEFRA, Model Procedures for the Management of Land Contamination, Contamination Land Report 11.
- DEFRA, The Contaminated Land Exposure Model (CLEA): Technical Basis and Algorithms, R & D Publication CLR 10
- EA, Land Contamination and Risk Management LCRM).

Based upon the above guides and the hazards identified by the geo-environmental database, an initial Conceptual Site Model (CSM) has been compiled a copy of which is enclosed in tabulated form in Appendix A. A post-investigation updated CSM and Risk Assessment is enclosed within Appendix E.

4 GROUND INVESTIGATION

4.1 GENERAL

The fieldwork was carried out generally where relevant in accordance with BS5930 2015 + A1:2020 and Investigation of Potentially Contaminated Sites – CoP (BS10175):2011 + A2 2017, and LCRM, EA:2020.

The Phase I database for the site has identified the following potential sources of contamination.

4.1.1 ON-SITE POTENTIAL CONTAMINANT SOURCES - SOILS

The initial CSM suggests that there are likely to be Made Ground deposits at the site that could be somewhat contaminated depending upon their source. It is also possible that some explosive residues could be present.

The proposed scope of works to investigate potential issues of soil contamination include:

- The sinking of window sampler boreholes to retrieve continuous liner soil samples. Each liner will be logged and representative samples retained for laboratory testing.

- Representative soil samples will be tested for a range of contaminants of concern. The analytical suite will include where appropriate the following determinants: heavy metals, speciated Total Petroleum Hydrocarbons, PAHs, selected inorganics and phenols.

- Selected samples to be subject to testing for explosives and PCBs when the site has been fully cleared and prior to development works being undertaken.

- Testing to be carried out in a UKAS/MCERTS accredited laboratory.

4.1.2 ON-SITE CONTAMINANT SOURCES – GROUND GAS

The initial CSM suggests that there may be Made Ground deposits on site that could be generating ground gases and the proposed scope of works to assess the gas regime is as follows:

- The installation of gas monitoring standpipe within selected window sampler boreholes.

- Completion of a minimum of 3 no. monitoring rounds to measure the following parameters: Concentrations of methane, carbon dioxide, oxygen, hydrogen sulphide and carbon monoxide along with borehole gas pressures, borehole flow rates and atmospheric pressure.

- Ground gas data to be assessed using the recommendations of CIRIA 365. And a Characteristic situation to be defined for the site.

-

4.1.3 CONTROLLED WATERS ASSESSMENT

The CSM has identified that the on-site risks associated with potentially contaminated groundwater originating off-site are low and consequently there are no proposals to carry out a specific controlled waters risk assessment with respect to the groundwater system. However, where the water table is intercepted by intrusive boreholes representative samples will be taken and tested in the laboratory for a range of UK Drinking Water parameters. The results will be assessed qualitatively against GAC parameters and a further judgement made as to the requirement for a quantitative analysis.

4.1.4 GEOTECHNICAL ASSESSMENT

Previously identified geotechnical development constraints include the possible presence of Made Ground overlying Glacial Superficial Deposits and possible below ground structures.

The proposed scope of geotechnical assessment works is as follows:

- Utilisation of window sampler boreholes for in-situ SPT testing and bulk/disturbed soil sample recovery for laboratory testing;
- Trial pitting to expose near surface soils and to facilitate bulk soil sampling.
- Testing in the laboratory for index properties and gradings.
- Soakaway testing to BRE 365 standards to provide surface water drainage design parameters.

It is recommended that when the site has been cleared that in-situ CBR tests are carried out to facilitate pavement design and that searches are carried out for potential underground structures using physical exploration methods in association with ground probing radar.

4.2 WINDOW SAMPLER BOREHOLES

A total of 5No. boreholes were sunk across the site on the 13th August 2025. They were sunk in those areas of the site that had been made accessible by clearing the vegetation and scrub at the locations shown on Figure 2. The boreholes were sunk using a window sampler drilling rig and were taken to depths of 3.45m and 4.45m below ground surface where they were terminated in stiff formation. Standard Penetration Tests were carried out at 1m intervals within each borehole with full depth liner soil samples being recovered for soil description and testing requirements.

Borehole logs are enclosed within Appendix B with their locations shown on Figure 2.

Upon the completion of drilling, ground gas and groundwater monitoring standpipe was installed within the following boreholes:

Borehole	Depth to Base (m)	Response Zone (m bgl)	Pipe Diameter (mm)	Gas Valve/Lockable Cover
1	3	1.0 – 3.0 (firm and stiff clay)	50	Yes
3	3	1.0 – 3.0 (firm and stiff clay)	50	Yes

4.3 TRIAL PITS

A total of 3No. trial pits were excavated across the site on the 20th August 2025 in the locations shown on Figure 2. They were taken to depths of 1.8m and 1.9m below ground surface using a tracked excavator and were sunk so as to facilitate soakaway testing. The work was supervised by a qualified Geotechnical Engineer who also logged soil arisings at the pit side.

4.4 SOAKAWAY TESTING

Soakaway tests were carried out within Trial Pits 1, 2 and 3 on the20th August 2025. The tests were carried out to accord with the requirements of BRE 365, 'Soakaway design' and comprised the following elements.

The dimensions of the test pits were measured before water was introduced from a bowser. The depth of the water below ground level was measured and this was used as the datum for all other measurements. The fall in water level from datum was then measured in accordance with the time increments shown on the test data sheets enclosed within Appendix D. The protocol demands that the pit is allowed to fully drain before the process is repeated for a second and then third time with the data from the third drainage event being used for the infiltration rate calculations.

4.5 LABORATORY TESTING

The Initial CSM and Preliminary Risk Assessment has identified that the site's development and land use history could potentially have resulted in some contaminant impact to soil and/or controlled waters. Consequently, a soil testing programme predicated upon the following test suite has been implemented:

Asbestos, phenols, heavy metals, inorganic chemicals, Speciated Petroleum Hydrocarbons, PAHs, BTEX.

Selected soil samples from the borehole investigation have been tested in the laboratories of Eurofins Chemtest for the above range of chemical determinants.

In addition to the chemical testing program, a total of 5No. cohesive soil samples taken from the approximate foundation horizon have been tested in the laboratories of Socotec for Index properties.

Laboratory test results are enclosed within Appendix C.

4.6 MONITORING

Concentrations of methane, carbon dioxide, oxygen, hydrogen sulphide and carbon monoxide gas have been measured within the Borehole 1 and 3 standpipes on three occasions within the period 20th August 2025 to the 8th September 2025. Total gas concentrations were measured using a GA 2000 meter w S/N 7871 with atmospheric pressure meter. The rate of gas flow from the standpipes was measured using a flow meter.

Groundwater levels were also measured at each monitoring visit.

The results obtained from the monitoring exercise are summarised on Table 1.

.

5. GROUND CONDITIONS

The boreholes and trial pits each encountered Made Ground deposits overlying natural Glacial Till formation.

5.1 MADE GROUND

The boreholes and trial pits have identified the presence of between 0.70m (TP1) and 1.5m (BH5) of superficial Made Ground deposits. The formation is a mixture of cohesive and granular deposits consisting of firm, clay with angular gravel of shale, concrete and brick, and, loose sand with gravel of concrete, brick, shale and mudstone. In Borehole 5, a dense layer of sandstone gravel was encountered from 1.0m to 1.5m depth.

5.2 GLACIAL TILL

Natural deposits of Glacial Till were encountered beneath the superficial Made Ground formation to the termination depths of each of the boreholes and trial pits. The formation predominantly comprised firm, becoming stiff, brown and grey, occasionally gravelly clay.

5.3 GEOTECHNICAL PROPERTIES

Index tests carried out in the laboratory on samples of the natural cohesive formation have resulted in the following properties:

Liquid Limit Range (%): 34 - 61
Adjusted Plasticity Index Range (%): 10 - 35

The highest adjusted value of Plasticity Index places the near surface cohesive formation within the intermediate plasticity category.

A preliminary assessment of the cohesive soil's state of desiccation has been arrived at using the conservative empirical relationship between Natural Moisture Content (NMC) and Liquid Limit (LL) derived by Driscoll which considers that if the NMC is less than 40% the LL then the soil may be desiccated. Results can be summarised as follows:

BH1: Ratio NMC/LL: 18.6/51 = 36%
BH2: Ratio NMC/LL: 17.5/47 = 37%
BH3: Ratio NMC/LL: 15.6/51 = 31%
BH4: Ratio NMC/LL: 9.3/52 = 18%
BH5: Ratio NMC/LL: 10.4/34 = 31%

Each of the NMC/LL ratios are less than 40% and the tested cohesive soil samples can therefore be considered to be displaying signs of desiccation.

5.4 GROUNDWATER

The boreholes, trial pits and borehole standpipes remained dry.

6 GEOTECHNICAL ASSESSMENT

6.1 GENERAL

It is understood that the proposed development will comprise a new industrial unit in the configuration shown on Figure 2.

6.2 FOUNDATIONS

The site is characterised by the presence of firm and stiff clay beneath a superficial layer of Made Ground. All of the boreholes, trial pits and borehole standpipes remained dry.

The natural firm and stiff clay that lies at shallow depth beneath the Made Ground horizon should be capable of supporting light to medium structural loads whilst maintaining total and differential settlements within accepted tolerances. Consequently, conventional strip or pad foundations should be suitable for the proposed industrial unit and such foundations taken through the Made Ground horizon into the natural cohesive formation may be designed using an allowable bearing capacity of 150kPa. This design value should provide a factor of safety of 3 against bearing capacity failure and limit total and differential settlements to a maximum of 25mm.

Footings should be taken to a minimum depth of 900mm below finished grade so that they lie below the zone of seasonal moisture content variation. However, the cohesive formation is of intermediate plasticity and where footings lie within influencing distance of existing, recently planted or recently felled trees the recommendations of NHBC Standards Chapter 4.2 should be followed which may result in some footings having to be taken deeper than the minimum depth recommended above.

Index test data have demonstrated that the cohesive soils at the approximate foundation horizon display signs of desiccation and consequently precautions against heave will be required. These precautions are likely to comprise the application of expansion board to footings and below ground structural elements.

Temporary foundation and service trench excavations should remain dry although some minor trench instability could be expected within the near surface Made Ground formation if left unsupported.

6.3 GROUND FLOOR SLABS

Slab on grade construction techniques could be adopted where the following precautions are taken. All Made Ground deposits beneath the proposed slab should be excavated and removed and the sub-formation further excavated to at least 1m below slab formation level. The exposed sub-formation level should be proof rolled and any pockets of soft soil or deleterious material excavated and replaced with well compacted engineering fill. The slab formation level should then be restored using granular engineering fill compacted to an appropriate Series 600 Specification.

As an alternative to a slab on grade a suspended ground floor slab could be adopted; however, this would likely require the construction of internal support walls and foundations.

6.4 BURIED CONCRETE

The results of Soluble Sulphate and pH tests carried out on samples of the formation are summarised below:

No. of Tested Samples	Range of Water Soluble Sulphate Values (g/l)	Range of pH Values
10	<0.010 – 0.039	7.5 – 8.4

The results fall within concrete Class DS-1 with a corresponding ACEC class of AC-1.

6.5 SOAKAWAY DRAINAGE

The soakaway tests carried out in Trial Pits 1 , 2 and 3 failed to drain successfully due to the cohesive nature of the natural Glacial Till formation. It is therefore unlikely that soakaway drainage could be adopted at the site for the disposal of surface water and an alternative disposal method will need to be found. This is likely to comprise a nearby permanently flowing surface watercourse or, as a last resort, the mains drainage system.

7 ENVIRONMENTAL CONSIDERATIONS

7.1 SOIL CONTAMINATION

7.1.1 GENERAL APPROACH

The UK approach to the assessment of contaminated land is based upon the principles of risk assessment. This is founded upon the 'source – pathway – target' model to establish the presence or potential presence of a pollutant linkage. The overall methodology is based upon a tiered approach to determine risk based remedial targets for soil involving site specific data collection.

Should the adopted criteria be exceeded, then two courses of action are available. Firstly, the pollutant link could be broken by undertaking remedial work such as providing clean soil cover. Alternatively, a more detailed risk assessment can be carried out to determine whether a statistically relevant pollutant link actually exists.

We understand that the proposal is to construct a new industrial unit and for the purpose of risk assessment a commercial/industrial use has been adopted as the default land use category.

7.1.2 RISK SCREENING

7.1.2.1 HUMAN SITE OCCUPIERS AND CONSTRUCTION WORKERS

In terms of risk to human health, the chemical test data enclosed within Appendix C have been compared to the Tier 1 chemical screening criteria for an industrial/commercial land use on Table 2. Reference to that table shows that none of the analytes within the test suite are present at concentrations that exceed their Tier 1 screening chemical acceptance criteria values. The risk to human health from contaminants of concern within the near surface site soil can be considered therefore to be low.

7.1.2.2 WATER SUPPLY PIPES

Plastics and rubber, which are often used in piping and services ducts, can be attacked by a range of substances, most of which are organic, and drinking water supplies can be tainted by substances, particularly phenols, that are capable of penetrating piping.

The potential effect of soil contaminants on plastic and rubber service pipes and ducts is conventionally assessed using the threshold values defined within the Water Regulations Advisory Scheme Guidance Note 9-04-03 '*The selection of materials for Water Supply Pipes to be laid in Contaminated Land*'. Testing carried out on the near surface natural soils at the site indicates that there are few if any potential contaminants of concern present that could negatively influence the choice of pipework material within that formation. Consequently, there should be no requirement to adopt barrier pipework for the proposed development; however, the chosen water supply company should be consulted to determine specific pipe specification requirements prior to pipework being laid.

7.1.3 PROPOSED REMEDIAL MEASURES

The risk screening exercise has shown that there is a low risk to human health from potential contaminants of concern within the near surface formation and consequently there are no proposals to implement soil remedial measures at the development stage.

However, groundworkers are likely to come into contact with the near surface formation during the preliminary stages of the development process and it is recommended that they are all furnished with appropriate PPE to mitigate any potential short term risks from any as yet unidentified soil or air borne contaminants. In addition, an unexpected contaminant protocol should be put in place whereby any soils or materials that could be considered to be contaminated through visual or olfactory evidence are brought to the attention of the Engineer for further consideration.

7.2 CONTROLLED WATERS

The Conceptual Site Model indicated that there was a potential link between potential contaminants of concern leaching out of the site soils and their impact upon the Principal Aquifer. However, laboratory testing for a range of potential contaminants of concern on samples of the Made Ground formation has failed to identify any significantly elevated concentrations of analytes and although leaching tests have not been carried out it is considered that the low concentrations of potential contaminants of concern measured in the soil will reduce the risk of leachate being generated to acceptably low levels.

In addition, the standpipes installed within Boreholes 1 and 3 have remained dry indicating that the unsaturated zone above the permanent groundwater table, which is likely to lie at depth within the Kinnerton Sandstone, is relatively large. As such, any leachate generated within the Made Ground formation will likely to be reduced in concentration through the natural processes of advection, dispersal and dilution.

I is considered based upon the above evidence that the risks to controlled waters from contaminant impact is low and no remedial measures are considered to be necessary.

7.3 GROUND GAS

Table 1 shows that carbon dioxide was measured within the borehole standpipes at a maximum concentration of 1.6% whilst methane was effectively absent.

The ground gas situation has been assessed using the methodology outlined in CIRIA Publication C665 'Assessing risks posed by hazardous ground gases to buildings'. Under that methodology a gas screening value (GSV) has been calculated carbon dioxide by factoring the maximum measured gas concentration with the maximum measured gas flow rate. The results of that exercise are as follows:

Carbon Dioxide GSV 0.0016l/hr.

Comparing this GSV with screening values in Table 8.5 of C665 a Characteristic Situation of 1 is obtained for the site which classifies it as very low risk whereby no special precautions are required with respect to methane and carbon dioxide. Table 8.5 does state that irrespective of GSV value if methane gas is present at concentrations in excess of 1% then consideration should be given to raising the Characteristic Situation to 2. However, in this particular case no such elevated methane concentrations have been encountered.

The Envirocheck Data report for the site contained within the Phase I study states that part of the site lies in an area where basic radon protection measures are required for new structures.

8 ADDITIONAL INVESTIGATIVE WORK

The current investigation was carried out before the site had been fully cleared of vegetation and scrub and consequently there are areas that have not been subject to drilling or trial pitting. It is recommended therefore that when the site has been cleared that these areas are appropriately investigated to complete the site geo-environmental database. Soil testing should include for an explosives suite and PCB testing as a precaution. In addition, the potential presence of buried structures and obstructions should be investigated initially by a GPR survey with follow up trial pitting.

The additional investigative work should be preceded by the purchase of a detailed UXO report.

TABLES

Table 1
Proposed Industrial Development, Oak Road, Wrexham Industrial Estate

Gas and Groundwater Readings

Gas Readings

Date: 20/08/2025 Atmospheric Pressure: 1003mb (Falling)

BH	Gas Flow (l/hr)	Borehole Pressure (mb)	Methane (%vol)		Methane (%LEL)		Carbon Dioxide (%vol)		Oxygen (%vol)		Other Gases (ppm)	
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	H2s	CO
1	<0.1	1	<0.1	<0.1	<2	<2	1.3	1.3	19.0	19.0	<1	<1
3	<0.1	2	<0.1	<0.1	<2	<2	1.5	1.5	18.7	18.7	<1	<1

Date: 29/08/2025 Atmospheric Pressure: 1008mb (Falling)

BH	Gas Flow (l/hr)	Borehole Pressure (mb)	Methane (%vol)		Methane (%LEL)		Carbon Dioxide (%vol)		Oxygen (%vol)		Other Gases (ppm)	
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	H2s	CO
1	<0.1	1	<0.1	<0.1	<2	<2	1.4	1.4	18.4	18.4	<1	<1
3	<0.1	2	<0.1	<0.1	<2	<2	1.6	1.6	18.3	18.3	<1	<1

Date: 08/09/2025 Atmospheric Pressure: 1009mb (Rising)

BH	Gas Flow (l/hr)	Borehole Pressure (mb)	Methane (%vol)		Methane (%LEL)		Carbon Dioxide (%vol)		Oxygen (%vol)		Other Gases (ppm)	
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	H2s	CO
1	<0.1	2	<0.1	<0.1	<2	<2	1.6	1.6	18.4	18.4	<1	<1
3	<0.1	2	<0.1	<0.1	<2	<2	1.5	1.5	18.6	18.6	<1	<1

Groundwater Readings (mbgl)

BH	20/08/2025	29/08/2025	08/09/2025
1	dry	dry	dry
3	dry	dry	dry

Gas and groundwater monitoring undertaken by: P. Cosgrove
Equipment used: GA2000 Plus, Flow pod S/N 419
Steady concentrations are measured for up to 5 minutes.

Table 2
Proposed Industrial Development. Oak Road, Wrexham Industrial Estate

Human Health Screening Values for a Commercial/Industrial Land Use versus Measured Values - Soils

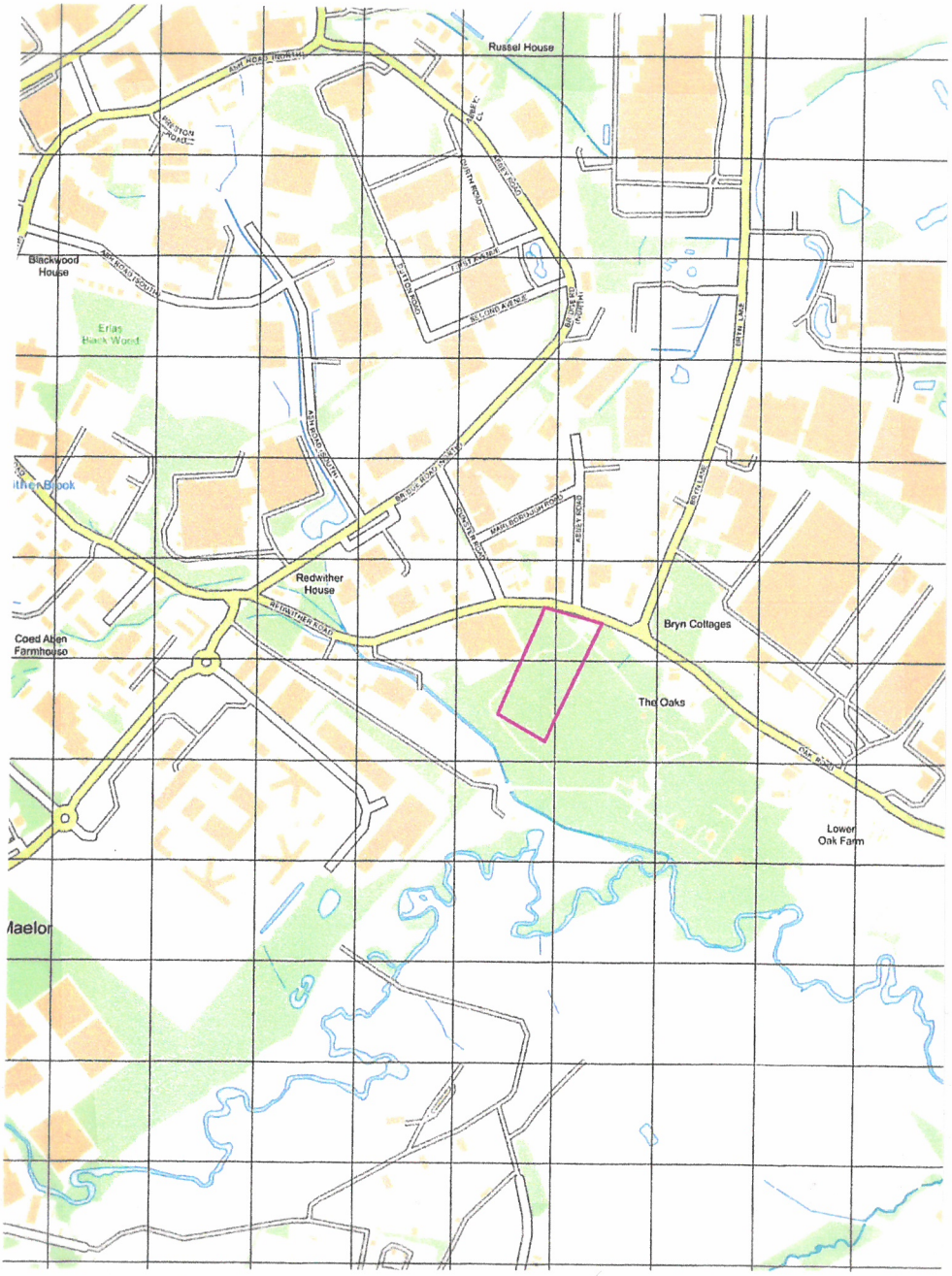
Determinant	Final screening chemical acceptance criteria mg/kg	Derivation Tool	Range of Measured Values	No. of Values > acceptance criteria (location)
Asbestos	Presence		None	0
Phenols	1500	LQM/CIEH:S4UL	<0.1	0
US EPA Priority PAHs				
Acenapthene	97000	LQM/CIEH:S4UL	<0.1 – 1.9	0
Acenapthylene	97000	LQM/CIEH:S4UL	<0.1	0
Anthracene	54000	LQM/CIEH:S4UL	<0.1 – 4.3	0
Benzo(a)Anthracene	170	LQM/CIEH:S4UL	<0.1 – 5.5	0
Benzo (a)pyrene	77	DEFRA:C4SL	<0.1 – 4.2	0
Benzo (b)flouranthene	44	LQM/CIEH:S4UL	<0.1 – 5.2	0
Benzo(k)flouranthene	1200	LQM/CIEH:S4UL	<0.1 – 1.9	0
Benzo(g,h,i) perylene	4000	LQM/CIEH:S4UL	<0.1 – 1.9	0
Chrysene	350	LQM/CIEH:S4UL	<0.1 – 4.7	0
Di-benzo(a,h)anthracene	3.6	LQM/CIEH:S4UL	<0.1- 0.32	0
Indeno)1,2,3-cd)pyrene	510	LQM/CIEH:S4UL	<0.1 – 2.3	0
Flouranthene	23000	LQM/CIEH:S4UL	<0.1 - 16	0
Flourene	68000	LQM/CIEH:S4UL	<0.1 – 1.8	0
Napthalene	400	LQM/CIEH:S4UL	<0.1 – 0.19	0
Phenanthrene	22000	LQM/CIEH:S4UL	<0.1 - 17	0
Pyrene	64000	LQM/CIEH:S4UL	<0.1 - 11	0
Heavy Metals/ Metalloids				
Arsenic	640	DEFRA C4SL	3.2 - 11	0
Cadmium	420	DEFRA C4SL	<0.10– 0.43	0
Chromium	86000	LQM/CIEH:S4UL	19 - 41	0
Copper	68000	LQM/CIEH:S4UL	9.2 - 22	0
Lead	1100	DEFRA C4SL	14 - 37	0
Mercury	1100	LQM/CIEH:S4UL	<0.05	0
Nickel	980	LQM/CIEH:S4UL	16 - 43	0
Selenium	12000	LQM/CIEH:S4UL	<0.25 – 1.1	0
Vanadium	9000	LQM/CIEH:S4UL	15 – 40	0
Zinc	730000	LQM/CIEH:S4UL	`17 - 86	0

Petroleum Hydrocarbons				
TPH Aliphatic C5-6	5900	LQM/CIEH:S4UL	<0.05	0
C6-8	7800	LQM/CIEH:S4UL	<0.05	0
C8-10	4800	LQM/CIEH:S4UL	<0.05	0
C10-12	23000	LQM/CIEH:S4UL	<2 – 4.5	0
C12-16	82000	LQM/CIEH:S4UL	<1 – 2.5	0
C16-21	1700000	LQM/CIEH:S4UL	<2	0
C21-35	170000	LQM/CIEH:S4UL	<3 - 19	0
C35-44	1700000	LQM/CIEH:S4UL	<10	0
TPH Aromatic C5-7	46000	LQM/CIEH:S4UL	<0.05	0
C7-8	110000	LQM/CIEH:S4UL	<0.05	0
C8-10	8100	LQM/CIEH:S4UL	<0.05	0
C10-12	28000	LQM/CIEH:S4UL	7.3 – 9.1	0
C12-16	37000	LQM/CIEH:S4UL	<1	0
C16-21	28000	LQM/CIEH:S4UL	2.3 – 5.0	0
C21-35	28000	LQM/CIEH:S4UL	5.6 - 27	0
C35-44	28000	LQM/CIEH:S4UL	<1 – 9.5	0
BTEX			*	

1% SOM adopted for SGV calculation
Copyright Land Quality Management Ltd., Publication Number S4U:L 3458

*Below Detection Limit

FIGURES



Site Location Plan

SP ASSOCIATES	Report: S1916	Site: Oak Road, Wrexham Industrial Estate	Figure: 1



Borehole and Trial Pit Location Plan

SP ASSOCIATES	Report: S1916-2	Site: Oak Road, Wrexham Industrial Estate	Figure: 2

APPENDIX A

Initial CSM and Preliminary Risk Assessment

Oak Road, Wrexham Industrial Estate

Initial Conceptual Site Model and Preliminary Risk assessment

Source	Pathway	Receptor	Risk Matrix Assessment	Assessment of Linkage Significance/Potential Mitigation Measures
Contaminated Soils and Groundwater from historical and current on-site sources.	Direct Ingestion, direct contact and inhalation of dust, vapours and liquids	Future site users	Moderate to High	Post-war Ordnance Survey records indicate that the site was occupied by a number of structures, bunkers and hydrants linked by footways which the Preliminary UXO Threat report has identified as being an ammunition dump. By 1982 the bunkers and structures associated with ROF Wrexham had been removed from the map record and it is likely that any below ground structures such as bunkers were infilled with imported material. There are no available records to indicate the nature of the infill material and given its age it is possible that the environmental controls in place at the time were limited in extent and scope. In the circumstances potential on-site contaminant sources comprise explosives, such as cordite remnant from the ammunition manufacturing process, and imported Made Ground used to infill and bunkers and other underground structures.
		Construction workers	Moderate to High	Site workers may be exposed to Made Ground materials during the site enabling works and earthworks stage of the project. All site workers to wear appropriate PPE and adopt appropriate hygiene and safe working practices.
	Leaching and vertical and lateral migration	Controlled waters	Low to Moderate	There is no archive evidence to suggest that widespread contamination is present on site and the superficial Glacial soils are of low permeability.
	Direct infiltration in water supply pipes	Service Conduits	Low to Moderate	Water supply pipes may need to barrier grade if significant deposits of contaminant impacted Made Ground are encountered.

	Plant uptake	Vegetation within soft landscape areas	Low	Phytotoxic contamination in near surface soils unlikely to be significant.
	Lateral migration through groundwater	Off-site neighbouring properties	Low	Off-site groundwater migration risks to nearby properties are considered to be low due to the low potential for significant on-site leaching to be taking place and the low permeability nature of the near surface natural formation. Also, groundwater flow direction is to the south towards a stream and there no properties located between the site and the stream where groundwater is likely to discharge.
Potentially contaminated groundwater: migration from off-site sources onto site	Direct contact or ingestion and inhalation of dust and vapours	Future site users	Low	The potential for contaminant impacted groundwater to migrate onto the site is considered to be low due to the absence of a significant upstream contaminant source.
	Vertical and lateral migration	Controlled waters	Low	As above.
Ground gases generated on-site	Vertical and lateral migration	Buildings and human occupiers	Moderate	Made Ground deposits may be present that could have the potential to generate ground gases. Characteristic Situation category to be determined at site investigation stage.
Ground gas migration onto site from off-site sources	Lateral migration	Buildings and human occupiers	Low to Moderate	Some infilled ground associated with former below ground structures is likely to be present immediately to the east and west of the site and these materials may be generating ground gases principally carbon dioxide.
High sulphate and low p in site soils	Direct contact and within shallow groundwater	Below ground concrete	Low	No apparent source.

APPENDIX B

Borehole and Trial Pit Logs

SP ASSOCIATES Geoenvironmental & Geotechnical Servies
1 Market Place, Warwick, CV34 4SA
tel: 01926 494271
email: spassociates@hotmail.co.uk

Site
Oak Road, Wtexham Industrial Estate

Number
BH1

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			FI Construction	S1916-1
	Location	**Dates** 13/08/2025	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	UD1				0.10	Tarmacadam fragments		
					(0.40)	Firm, brown CLAY with occasional fine, angular gravel of shale (Made Ground)		
					0.50			
					(0.30)	Firm, brown CLAY with occasional fine to medium, angular gravel of concrete (Made Ground)		
					0.80			
1.00-1.45 1.00-2.00	SPT N=8 UD2		3,3/2,1,2,3			Firm to stiff, brown CLAY (Glacial Till)		
					(1.20)			
2.00-2.45 2.00-3.00	SPT N=29 UD3		2,3/6,6,7,10		2.00	Stiff, brown CLAY with occasional pockets of grey clay (Glacial Till)		
					(1.45)			
3.00-3.45	SPT N=35		2,4/6,8,10,11					
					3.45	Complete at 3.45m		

Remarks

Scale (approx)	Logged By
1:50	PVC

Figure No.
S1916-1.BH1

Produced by the GEOtechnical DAtabase SYstem (GEODASY) © all rights reserved

SP ASSOCIATES Geoenvironmental & Geotechnical Servies
1 Market Place, Warwick, CV34 4SA
tel: 01926 494271
email: spassociates@hotmail.co.uk

Site
Oak Road, Wtexham Industrial Estate

Number
BH2

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			FI Construction	S1916-1
	Location	**Dates** 13/08/2025	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	UD1				(0.20) 0.20	Loose, brown, clayey SAND with some fine to medium, angular to sub-rounded gravel and fine roots (Made Ground)		
					(0.30) 0.50	Firm, brown CLAY with some fine, angular gravel of shale and concrete (Made Ground)		
					(0.50) 1.00	Loose, brown SAND with abundant fine to medium, angular gravel of shale and mudstone (Made Groind)		
1.00-1.45 1.00-2.00	SPT N=13 UD2		2,3/3,3,3,4			Firm to stiff, brown CLAY (Glacial Till)		
					(1.00) 2.00			
2.00-2.45 2.00-3.00	SPT N=32 UD3		3,5/6,8,8,10			Stiff brown CLAY with occasional pockets of grey clay (Glacial Till)		
					(1.45) 3.45			
3.00-3.45	SPT N=38		3,6/9,9,9,11			Complete at 3.45m		

Remarks

Scale (approx)	Logged By
1:50	PVC

Figure No.
S1916-1.BH2

Produced by the GEOtechnical DAtabase SYstem (GEODASY) © all rights reserved

SP ASSOCIATES Geoenvironmental & Geotechnical Servies
1 Market Place, Warwick, CV34 4SA
tel: 01926 494271
email: spassociates@hotmail.co.uk

Site
Oak Road, Wtexham Industrial Estate

Number
BH3

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			FI Construction	S1916-1
	Location	**Dates** 13/08/2025	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	UD1				(0.20) 0.20	Loose, dark brown, silty SAND with occasional fine to medium, angular gravel of brick (Made Ground)		
					(0.60)	Firm to stiff, friable, brown, slightly sandy CLAY with some fine to medium, angular gravel of brick and concrete (Made Ground)		
					0.80 (0.20) 1.00	Loose, red brown, fine to coarse, angular GRAVEL of sandstone (Made Ground)		
1.00-1.45 1.00-2.00	SPT N=11 UD2		2,2/2,2,3,4			Firm to stiff, brown CLAY (Glacial Till)		
					(1.00)			
2.00-2.45 2.00-3.00	SPT N=31 UD3		3,5/5,7,8,11		2.00	Stiff, brown mottled grey CLAY (Glacial Till)		
					(1.45)			
3.00-3.45	SPT N=37		3,4/7,8,10,12					
					3.45	Complete at 3.45m		

Remarks

Scale (approx)	Logged By
1:50	PVC

Figure No.
S1916-1.BH3

Produced by the GEOtechnical DAtabase SYstem (GEODASY) © all rights reserved

SP ASSOCIATES Geoenvironmental & Geotechnical Servies
1 Market Place, Warwick, CV34 4SA
tel: 01926 494271
email: spassociates@hotmail.co.uk

Site
Oak Road, Wtexham Industrial Estate

Number
BH4

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Windowless Sampler			FI Construction	S1916-1
	Location	**Dates** 13/08/2025	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	UD1				(0.20) 0.20	Loose, brown clayey SAND with occasional fine to medium, angular to sub-rounded gravel (Made Ground)		
					(0.50) 0.70	Firm to stiff, brown, slightly sandy CLAY with occasional fine to medium, angular gravel of shale and concrete (Made Ground)		
1.00-1.45 1.00-2.00	SPT N=8 UD2		2,2/2,2,2,2		(1.30) 2.00	Firm to stiff, brown CLAY (Glacial Till)		
2.00-2.45 2.00-3.00	SPT N=21 UD3		2,3/4,5,6,6		(1.00) 3.00	Stiff, brown CLAY with a grey mottle (Glacial Till)		
3.00-3.45 3.00-4.00	SPT N=25 UD4		3,3/4,7,7,7		(1.45) 4.45	Stiff, brown CLAY (Glacial Till)		
4.00-4.45	SPT N=36		5,6/7,9,10,10			Complete at 4.45m		

Remarks

Scale (approx)	Logged By
1:50	PVC

Figure No.
S1916-1.BH4

Produced by the GEOtechnical DAtabase SYstem (GEODASY) © all rights reserved

SP ASSOCIATES Geoenvironmental & Geotechnical Servies
1 Market Place, Warwick, CV34 4SA
tel: 01926 494271
email: spassociates@hotmail.co.uk

Site
Oak Road, Wtexham Industrial Estate

Number
BH5

Excavation Method
Drive-in Windowless Sampler

Dimensions

Ground Level (mOD)

Client
FI Construction

Job Number
S1916-1

Location

Dates
13/08/2025

Engineer

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	UD1				(0.30) 0.30	Firm to stiff, friable, beige brown CLAY with occasional fine to medium, angular to sub-rounded gravel and roots (Made Ground)		
					(0.70) 1.00	Firm to stiff, friable, brown CLAY with occasional fine to coarse, angular to sub-rounded gravel of quartz and brick (Made Ground)		
1.00-1.45 1.00-2.00	SPT N=31 UD2		2,6/6,7,7,11		(0.50) 1.50	Dense, beige, fine to coarse, clayey, angular GRAVEL of sandstone (Made Ground)		
					(0.50) 2.00	Firm, fruable, brown CLAY with some fine to coarse, sub-angulat gravel of sandstone (Glacial Till)		
2.00-2.45 2.00-3.00	SPT N=7 UD3		2,2/1,2,2,2		(1.00) 3.00	Firm, brown, sandy CLAY (Glacial Till)		
3.00-3.45 3.00-4.00	SPT N=14 UD4		2,2/2,3,4,5		(1.45) 4.45	Stiff, brown mottled grey CLAY (Glacial Till)		
4.00-4.45	SPT N=36		2,3/7,9,10,10			Complete at 4.45m		

Remarks

Scale (approx)
1:50

Logged By
PVC

Figure No.
S1916-1.BH5

Produced by the GEOtechnical DAtabase SYstem (GEODASY) © all rights reserved

SP ASSOCIATES Geoenvironmental & Geotechnical Servies
1 Market Place, Warwick, CV34 4SA
tel: 01926 494271
email: spassociates@hotmail.co.uk

Site	Trial Pit Number
Oak Road, Wtexham Industrial Estate	TP1

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			FI Construction	S1916-1
	Location	**Dates** 20/08/2025	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.60)	Firm, brown CLAY with occasional angular gravel of shale and concrete (Made Ground)		
					0.60			
					(1.30)	Firm to stiff, brown CLAY with occasional pockets of grey clay (Glacial Till)		
					1.90			
						Complete at 1.90m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:50	SMP	S1916-1.TP1

Produced by the GEOtechnical DAtabase SYstem (GEODASY) © all rights reserved

SP ASSOCIATES Geoenvironmental & Geotechnical Servies
1 Market Place, Warwick, CV34 4SA
tel: 01926 494271
email: spassociates@hotmail.co.uk

Site
Oak Road, Wtexham Industrial Estate

Trial Pit Number
TP2

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			FI Construction	S1916-1
	Location	**Dates** 20/08/2025	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.80)	Firm to stiff, friable, brown, slightly sandy CLAY with some medium to coarse, angular gravel of brick and concrete (Made Ground)		
					0.80	*Firm to stiff, brown CLAY (Glacial Till)*		
					(1.00)			
					1.80	Complete at 1.80m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:50	SMP	S1916-1.TP2

Produced by the GEOtechnical DAtabase SYstem (GEODASY) © all rights reserved

SP ASSOCIATES Geoenvironmental & Geotechnical Servies
1 Market Place, Warwick, CV34 4SA
tel: 01926 494271
email: spassociates@hotmail.co.uk

Site	Trial Pit Number
Oak Road, Wtexham Industrial Estate	TP3

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit			FI Construction	S1916-1
	Location	**Dates** 20/08/2025	**Engineer**	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(1.00)	Firm to stiff, friable, brown CLAY with occasional fine to coarse, angular to sub-rounded gravel of quartz and brick (Made Ground)		
					1.00			
					(0.90)	Firm, brown, sandy CLAY (Glacial Till)		
					1.90			
						Complete at 1.90m		

Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:50	SMP	S1916-1.TP3

Produced by the GEOtechnical DAtabase SYstem (GEODASY) © all rights reserved

APPENDIX C

Laboratory Test Results

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: cs@etuki.eurofins.com

UKAS TESTING 2183

MCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Final Report

Report No.:	25-28273-1
Initial Date of Issue:	11-Sep-2025
Re-Issue Details:	
Client	*SP Associates Ltd*
Client Address:	*1 Market Place* *Warwick* *Warwickshire* *CV34 4SA*
Contact(s):	*Steven Peters*
Project	*51916 OAK ROAD, WREXHAM IND EST*
Quotation No.:	*Q24-35284*
Date Received:	29-Aug-2025
Order No.:	51916-1
Date Instructed:	29-Aug-2025
No. of Samples:	*10*
Turnaround (Wkdays):	10
Results Due:	11-Sep-2025
Date Approved:	11-Sep-2025
Approved By:	[redacted]
Details:	David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Soil

Project: 51916 OAK ROAD, WREXHAM IND EST

Client: SP Associates Ltd						**Chemtest Job No.:**	25-28273	25-28273	25-28273	25-28273	25-28273	25-28273	25-28273	25-28273	25-28273
Quotation No.: Q24-35284						**Chemtest Sample ID.:**	2021166	2021167	2021168	2021169	2021170	2021171	2021172	2021173	2021174
						Client Reference:	*BH1*	*BH1*	*BH2*	*BH2*	*BH3*	*BH3*	*BH4*	*BH4*	*BH5*
						Sample Type:	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
						Top Depth (m):	*0.10*	*0.50*	*0.00*	*0.20*	*0.00*	*0.20*	*0.00*	*0.20*	*0.00*
						Bottom Depth (m):	*0.50*	*0.80*	*0.20*	*0.50*	*0.20*	*0.80*	*0.20*	*0.70*	*0.30*
						Date Sampled:	*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*
						Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**										
ACM Type		N	2192		N/A		-	-	-	-	-	-	-	-	-
Asbestos Identification		U	2192		N/A		No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020		14	14	7.1	6.2	5.5	5.9	7.5	9.4	9.2
Soil Colour		N	2030		N/A		Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material		N	2030		N/A		Stones and Roots	Stones	Stones, Roots and Wood	Stones	Stones, Roots and brick	Stones and Roots	Stones and Roots	Roots, Stones and Wood	Stones and Roots
Soil Texture		N	2030		N/A		Loam	Clay	Loam	Clay	Loam	Clay	Loam	Loam	Loam
pH at 20C		M	2010		4.0		8.1	8.6	7.6	8.4	8.1	8.3	7.6	8.0	7.5
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010		0.016	0.021	< 0.010	< 0.010	0.034	0.011	0.039	0.023	0.012
Arsenic		M	2455	mg/kg	0.5		11	7.5	4.4	7.8	4.9	7.9	3.2	5.8	6.9
Cadmium		M	2455	mg/kg	0.10		0.43	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chromium		M	2455	mg/kg	0.5		40	32	19	31	19	41	15	24	25
Copper		M	2455	mg/kg	0.50		22	17	14	17	12	22	9.2	14	17
Mercury		M	2455	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel		M	2455	mg/kg	0.50		41	33	20	35	20	43	16	28	38
Lead		M	2455	mg/kg	0.50		33	21	28	14	15	20	34	23	20
Selenium		M	2455	mg/kg	0.25		1.1	0.69	0.37	0.45	< 0.25	0.50	< 0.25	0.29	0.40
Vanadium		U	2455	mg/kg	0.5		40	34	19	31	19	39	15	23	24
Zinc		M	2455	mg/kg	0.50		86	58	67	53	42	72	53	59	50
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25		< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00		< 2.0	< 2.0	3.3	3.4	4.5	2.8	4.1	3.2	4.1
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.5	< 1.0	< 1.0
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00		< 3.0	3.3	7.2	< 3.0	19	5.6	5.6	5.7	9.3
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00		< 5.0	< 5.0	11	< 5.0	25	10	13	10	14
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00		< 10	< 10	11	< 10	26	11	13	11	15
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25		< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00		8.9	8.2	9.1	8.0	8.1	7.3	7.5	7.5	8.1
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00		5.0	3.9	8.1	2.8	6.4	3.3	4.1	4.0	3.0

Results - Soil

Project: 51916 OAK ROAD, WREXHAM IND EST

Client: SP Associates Ltd			**Chemtest Job No.:**			25-28273	25-28273	25-28273	25-28273	25-28273	25-28273	25-28273	25-28273	25-28273
Quotation No.: Q24-35284			**Chemtest Sample ID.:**			2021166	2021167	2021168	2021169	2021170	2021171	2021172	2021173	2021174
			Client Reference:			*BH1*	*BH1*	*BH2*	*BH2*	*BH3*	*BH3*	*BH4*	*BH4*	*BH5*
			Sample Type:			*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
			Top Depth (m):			*0.10*	*0.50*	*0.00*	*0.20*	*0.00*	*0.20*	*0.00*	*0.20*	*0.00*
			Bottom Depth (m):			*0.50*	*0.80*	*0.20*	*0.50*	*0.20*	*0.80*	*0.20*	*0.70*	*0.30*
			Date Sampled:			*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*	*22-Aug-2025*
			Asbestos Lab:			DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**									
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	8.4	10	27	5.6	56	9.3	31	19	33
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00	< 1.0	1.5	4.0	< 1.0	9.5	2.2	2.7	1.2	2.8
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00	22	22	44	16	71	20	43	31	44
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00	23	24	48	17	81	22	46	32	47
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00	26	26	55	21	97	30	56	41	59
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00	27	28	60	21	110	33	58	43	62
Organic Matter		M	2625	%	0.40	1.8	0.95	7.4	0.55	4.5	0.80	7.0	1.3	3.2
Total Organic Carbon		M	2625	%	0.20	1.1	0.55	4.3	0.32	2.6	0.46	4.0	0.73	1.8
Benzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.19	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.9	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.8	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene		M	2800	mg/kg	0.10	0.27	0.66	0.16	17	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene		M	2800	mg/kg	0.10	0.10	0.19	< 0.10	4.3	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene		M	2800	mg/kg	0.10	0.51	1.7	0.43	16	< 0.10	0.13	0.14	< 0.10	< 0.10
Pyrene		M	2800	mg/kg	0.10	0.46	1.7	0.37	11	< 0.10	0.16	0.15	< 0.10	< 0.10
Benzo[a]anthracene		M	2800	mg/kg	0.10	0.31	0.87	0.28	5.5	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene		M	2800	mg/kg	0.10	0.30	1.1	0.26	4.7	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	0.35	1.9	0.38	5.2	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	< 0.10	0.53	0.18	1.9	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene		M	2800	mg/kg	0.10	0.29	1.4	0.26	4.2	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	0.18	0.95	0.23	2.3	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.32	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	0.17	0.95	0.20	1.9	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's		N	2800	mg/kg	2.0	2.9	12	2.8	78	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Total Phenols		M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.16

Results - Soil

Project: 51916 OAK ROAD, WREXHAM IND EST

Client: SP Associates Ltd		**Chemtest Job No.:**				25-28273
Quotation No.: Q24-35284		**Chemtest Sample ID.:**				2021175
		Client Reference:				*BH5*
		Sample Type:				*SOIL*
		Top Depth (m):				*0.30*
		Bottom Depth (m):				*1.00*
		Date Sampled:				*22-Aug-2025*
		Asbestos Lab:				DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type		N	2192		N/A	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected
Moisture		N	2030	%	0.020	4.9
Soil Colour		N	2030		N/A	Brown
Other Material		N	2030		N/A	Stones
Soil Texture		N	2030		N/A	Loam
pH at 20C		M	2010		4.0	8.2
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	< 0.010
Arsenic		M	2455	mg/kg	0.5	7.8
Cadmium		M	2455	mg/kg	0.10	< 0.10
Chromium		M	2455	mg/kg	0.5	26
Copper		M	2455	mg/kg	0.50	17
Mercury		M	2455	mg/kg	0.05	0.05
Nickel		M	2455	mg/kg	0.50	31
Lead		M	2455	mg/kg	0.50	37
Selenium		M	2455	mg/kg	0.25	0.46
Vanadium		U	2455	mg/kg	0.5	26
Zinc		M	2455	mg/kg	0.50	77
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10	< 0.10
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25	< 0.25
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	2.5
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00	< 1.0
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00	< 3.0
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00	5.5
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25	< 0.25
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	7.4
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	2.3

Results - Soil

Project: 51916 OAK ROAD, WREXHAM IND EST

Client: SP Associates Ltd			**Chemtest Job No.:**			25-28273
Quotation No.: Q24-35284			**Chemtest Sample ID.:**			2021175
			Client Reference:			*BH5*
			Sample Type:			*SOIL*
			Top Depth (m):			*0.30*
			Bottom Depth (m):			*1.00*
			Date Sampled:			*22-Aug-2025*
			Asbestos Lab:			DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**	
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	15
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00	< 1.0
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00	25
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00	25
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50	< 0.50
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00	30
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00	31
Organic Matter		M	2625	%	0.40	0.97
Total Organic Carbon		M	2625	%	0.20	0.56
Benzene		M	2760	µg/kg	1.0	< 1.0
Toluene		M	2760	µg/kg	1.0	< 1.0
Ethylbenzene		M	2760	µg/kg	1.0	< 1.0
m & p-Xylene		M	2760	µg/kg	1.0	< 1.0
o-Xylene		M	2760	µg/kg	1.0	< 1.0
Naphthalene		M	2800	mg/kg	0.10	< 0.10
Acenaphthylene		N	2800	mg/kg	0.10	< 0.10
Acenaphthene		M	2800	mg/kg	0.10	< 0.10
Fluorene		M	2800	mg/kg	0.10	< 0.10
Phenanthrene		M	2800	mg/kg	0.10	< 0.10
Anthracene		M	2800	mg/kg	0.10	< 0.10
Fluoranthene		M	2800	mg/kg	0.10	0.12
Pyrene		M	2800	mg/kg	0.10	0.17
Benzo[a]anthracene		M	2800	mg/kg	0.10	< 0.10
Chrysene		M	2800	mg/kg	0.10	< 0.10
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	< 0.10
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	< 0.10
Benzo[a]pyrene		M	2800	mg/kg	0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	< 0.10
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	< 0.10
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	< 0.10
Total Of 16 PAH's		N	2800	mg/kg	2.0	< 2.0
Total Phenols		M	2920	mg/kg	0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
2010	pH Value of Soils	pH at 20°C	pH Meter	
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C.	
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES	
2192	Asbestos Quantification in Soils Sediments Ballast & Aggregate Crushed Concrete & Demolition Rubble	Asbestos	Polarised light microscopy / Gravimetry	
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.	
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40	Acetone/Heptane extraction / GCxGC FID detection	
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.	
2780	VPH A/A Split	Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8–C10 Aromatics: >C5–C7,>C7-C8,>C8–C10	Water extraction / Headspace GCxGC FID detection	
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS	
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.	

Report Information

Key	
U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection
Text example	All items indicated in italic font represent customer-supplied information that may not be independently verified by the laboratory

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.

Any comments or interpretations are outside the scope of UKAS accreditation.

The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.

Uncertainty of measurement for the determinands tested are available upon request .

None of the results in this report have been recovery corrected.

All results are expressed on a dry weight basis.

The following tests were analysed on samples 'as received' and the results subsequently corrected to a dry weight basis EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at ≤ 30°C prior to analysis.

All Asbestos testing is performed at the indicated laboratory .

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

NEW_ASB	Eurofins Chemtest Limited, 11 Depot Road, Newmarket, CB8 0AL
DURHAM	Eurofins Chemtest Limited, Unit A North Wing, Prospect Business Park, Crookhall Lane, Consett, Co Durham, DH8 7PW

Sample Deviation Codes

As a result of any of the below deviations applying, the test results may be unreliable

A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - The required amount of sample for analysis was not received

H - Appropriate cooling measures were not taken for sample transportation

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.

All water samples will be retained for 14 days from the date of receipt.

Charges may apply to extended sample storage.

Report Information

Water Sample Category Key for Accreditation

DW - Drinking Water (Non-Regulatory)
GW - Ground Water
LE - Land Leachate
NA - Not Applicable
PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

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
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

Asbestos Tests LOD = LOQ

Limit of Detection = Limit of Quantification for asbestos results only

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

SOCOTEC UK Limited
Leofric Business Park
Progress Close, Coventry
England
CV3 2TF, United Kingdom
Telephone: 02475 310700

Water Content

TEST REPORT

UKAS TESTING 0001

Project Details

Client:	SP ASSOCIATES LTD
Client Address:	1 MARKET PLACE WARWICK WARWICKSHIRE CV34 4SA
Project:	P254313 - Oak Road, Wrexham

Report Details

Report No.:	WC:CEN25-04742-S001
Report Date:	10/09/2025
Issue No.:	1
Recipients:	

Sample Details

SOCOTEC Sample Ref:	CEN25-04742-S001	Material Description:	Brown CLAY
Client Sample Ref:	BH1	Specification:	–
Date Sampled:	01/09/2025	Supplier:	–
Date Received:	01/09/2025	Source:	–
Sample Type:	Bulk Disturbed Sample	General Location:	BH1 @ 1.1-2.0m
Sample Location:	–	Sampled By:	Client
Sampling Cert Received?:	No		

Test Results

BS EN ISO 17892-1 - 2014 + A1 2022

Sample Preparation Procedure:	5.1		
Visual Description:	Dark brown/grey mottled CLAY		
Water Content (%):	18.6	Date Tested:	02/09/2025

Signed: [redacted] **Luke Harfield - Technical Supervisor**

for and on behalf of SOCOTEC UK Limited

Certified that testing was carried out in accordance with the test methods identified herein. This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Signed Date: 10/09/2025

The results relate to the item(s) tested only. Opinions and interpretations expressed herein are outside of the scope of our UKAS accreditation.
SOCOTEC UK Limited. Registered in England No. 2880501. Registered Office: SOCOTEC House, Bretby Business Park, Ashby Road, Burton Upon Trent, DE15 0YZ

© 2000-2025 QEST Platform by SpectraQEST.com

SOCOTEC UK Limited
Leofric Business Park
Progress Close, Coventry
England
CV3 2TF, United Kingdom
Telephone: 02475 310700

Water Content

TEST REPORT

UKAS TESTING 0001

Project Details

Client:	SP ASSOCIATES LTD
Client Address:	1 MARKET PLACE WARWICK WARWICKSHIRE CV34 4SA
Project:	P254313 - Oak Road, Wrexham

Report Details

Report No.:	WC:CEN25-04742-S002
Report Date:	10/09/2025
Issue No.:	1
Recipients:	

Sample Details

SOCOTEC Sample Ref:	CEN25-04742-S002	Material Description:	Brown CLAY
Client Sample Ref:	BH2	Specification:	—
Date Sampled:	—	Supplier:	—
Date Received:	01/09/2025	Source:	—
Sample Type:	Bulk Disturbed Sample	General Location:	BH2 @ 1.0-2.0m
Sample Location:	—	Sampled By:	Client
Sampling Cert Received?:	No		

Test Results

BS EN ISO 17892-1 - 2014 + A1 2022

Sample Preparation Procedure:	5.1		
Visual Description:	Dark brown/grey mottled CLAY		
Water Content (%):	17.5	Date Tested:	02/09/2025

Signed: [redacted]

Luke Harfield - Technical Supervisor

For and on behalf of SOCOTEC UK Limited
Certified that testing was carried out in accordance with the test methods identified herein. This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Signed Date: 10/09/2025

The results relate to the item(s) tested only. Opinions and interpretations expressed herein are outside of the scope of our UKAS accreditation.
SOCOTEC UK Limited. Registered in England No. 2880501. Registered Office: SOCOTEC House, Bretby Business Park, Ashby Road, Burton Upon Trent, DE15 0YZ

© 2000-2025 QEST Platform by SpectraQEST.com

SOCOTEC UK Limited
Leofric Business Park
Progress Close, Coventry
England
CV3 2TF, United Kingdom
Telephone: 02475 310700

Water Content

TEST REPORT

UKAS TESTING 0001

Project Details

Client:	SP ASSOCIATES LTD
Client Address:	1 MARKET PLACE WARWICK WARWICKSHIRE CV34 4SA
Project:	P254313 - Oak Road, Wrexham

Report Details

Report No.:	WC:CEN25-04742-S003
Report Date:	10/09/2025
Issue No.:	1
Recipients:	

Sample Details

SOCOTEC Sample Ref:	CEN25-04742-S003	Material Description:	Brown CLAY
Client Sample Ref:	BH3	Specification:	–
Date Sampled:	–	Supplier:	–
Date Received:	01/09/2025	Source:	–
Sample Type:	Bulk Disturbed Sample	General Location:	BH3 @ 1.0-2.0m
Sample Location:	–	Sampled By:	Client
Sampling Cert Received?:	No		

Test Results

BS EN ISO 17892-1 - 2014 + A1 2022

Sample Preparation Procedure:	5.1		
Visual Description:	Dark brown slightly gravelly CLAY with crushed brick fragments		
Water Content (%):	21.8	Date Tested:	02/09/2025

Signed: [redacted]

Luke Harfield - Technical Supervisor

For and on behalf of SOCOTEC UK Limited
Certified that testing was carried out in accordance with the test methods identified herein. This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Signed Date: 10/09/2025

The results relate to the item(s) tested only. Opinions and interpretations expressed herein are outside of the scope of our UKAS accreditation.
SOCOTEC UK Limited. Registered in England No. 2880501. Registered Office: SOCOTEC House, Bretby Business Park, Ashby Road, Burton Upon Trent, DE15 0YZ

© 2000-2025 QEST Platform by SpectraQEST.com

SOCOTEC UK Limited
Leofric Business Park
Progress Close, Coventry
England
CV3 2TF, United Kingdom
Telephone: 02475 310700

Water Content

TEST REPORT

UKAS TESTING 0001

Project Details

Client:	SP ASSOCIATES LTD
Client Address:	1 MARKET PLACE WARWICK WARWICKSHIRE CV34 4SA
Project:	P254313 - Oak Road, Wrexham

Report Details

Report No.:	WC:CEN25-04742-S004
Report Date:	10/09/2025
Issue No.:	1
Recipients:	

Sample Details

SOCOTEC Sample Ref:	CEN25-04742-S004	Material Description:	Brown CLAY
Client Sample Ref:	BH4	Specification:	—
Date Sampled:	—	Supplier:	—
Date Received:	01/09/2025	Source:	—
Sample Type:	Bulk Disturbed Sample	General Location:	BH4 @ 0.7-1.0m
Sample Location:	—	Sampled By:	Client
Sampling Cert Received?:	No		

Test Results

BS EN ISO 17892-1 - 2014 + A1 2022

Sample Preparation Procedure: 5.1

Visual Description: Dark brown slightly gravelly CLAY with occasional plant roots

Water Content (%): 13.4 Date Tested: 02/09/2025

Remarks: All material used 20mm max particle size.

Signed: [redacted]

Luke Harfield - Technical Supervisor

For and on behalf of SOCOTEC UK Limited

Certified that testing was carried out in accordance with the test methods identified herein. This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Signed Date: 10/09/2025

The results relate to the item(s) tested only. Opinions and interpretations expressed herein are outside of the scope of our UKAS accreditation.
SOCOTEC UK Limited. Registered in England No. 2880501. Registered Office: SOCOTEC House, Bretby Business Park, Ashby Road, Burton Upon Trent, DE15 0YZ

© 2000-2025 QEST Platform by SpectraQEST.com

SOCOTEC UK Limited
Leofric Business Park
Progress Close, Coventry
England
CV3 2TF, United Kingdom
Telephone: 02475 310700

Water Content

TEST REPORT

UKAS TESTING 0001

Project Details

Client:	SP ASSOCIATES LTD
Client Address:	1 MARKET PLACE WARWICK WARWICKSHIRE CV34 4SA
Project:	P254313 - Oak Road, Wrexham

Report Details

Report No.:	WC:CEN25-04742-S005
Report Date:	10/09/2025
Issue No.:	1
Recipients:	

Sample Details

SOCOTEC Sample Ref:	CEN25-04742-S005	Material Description:	Brown CLAY
Client Sample Ref:	BH5	Specification:	—
Date Sampled:	—	Supplier:	—
Date Received:	01/09/2025	Source:	—
Sample Type:	Bulk Disturbed Sample	General Location:	BH5 @ 1.5-2.0m
Sample Location:	—	Sampled By:	Client
Sampling Cert Received?:	No		

Test Results

BS EN ISO 17892-1 - 2014 + A1 2022

Sample Preparation Procedure:	5.1		
Visual Description:	Brown slightly gravelly SILT		
Water Content (%):	10.4	Date Tested:	02/09/2025

Signed: [redacted]

Luke Harfield - Technical Supervisor

For and on behalf of SOCOTEC UK Limited

Certified that testing was carried out in accordance with the test methods identified herein. This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Signed Date: 10/09/2025

The results relate to the item(s) tested only. Opinions and interpretations expressed herein are outside of the scope of our UKAS accreditation.
SOCOTEC UK Limited. Registered in England No. 2880501. Registered Office: SOCOTEC House, Bretby Business Park, Ashby Road, Burton Upon Trent, DE15 0YZ

© 2000-2025 QEST Platform by SpectraQEST.com

SOCOTEC UK Limited
Leofric Business Park
Progress Close, Coventry
England
CV3 2TF, United Kingdom
Telephone: 02475 310700

Plasticity Index

TEST REPORT

UKAS TESTING 0001

Project Details

Client:	SP ASSOCIATES LTD
Client Address:	1 MARKET PLACE WARWICK WARWICKSHIRE CV34 4SA
Project:	P254313 - Oak Road, Wrexham

Report Details

Report No.:	PI:CEN25-04742-S001
Report Date:	10/09/2025
Issue No.:	1
Recipients:	

Sample Details

SOCOTEC Sample Ref:	CEN25-04742-S001	Material Description:	Brown CLAY
Client Sample Ref:	BH1	Specification:	—
Date Sampled:	01/09/2025	Supplier:	—
Date Received:	01/09/2025	Source:	—
Sample Type:	Bulk Disturbed Sample	General Location:	BH1 @ 1.1-2.0m
Sample Location:	—	Sampled By:	Client
Sampling Cert Received?:	No		

Test Results

BS EN ISO 17892-12 - 2018

Sample Preparation Procedure:	BS EN ISO 17892-12 Cl. 5.2	Test Type:	Fallcone (one-point)
Cone Type:	80g/30°	Trial 1 Average Penetration (mm):	17.6
Trial 1 Water Content (%):	48.6	Trial 2 Average Penetration (mm):	17.6
Trial 2 Water Content (%):	48.6	Correlation Factor:	1.046
Visual Description:	Medium coloured brown, CLAY	Material History:	Not previously dried
Oversize Material Removed By:	Hand	Material < 0.4mm (%):	—
As Received Water Content (%):	18.6	Liquid Limit (%):	51
Plastic Limit (%):	23	Plasticity Index (%):	28
Date Tested:	05/09/2025		

Signed: [redacted]

Luke Harfield - Technical Supervisor

For and on behalf of SOCOTEC UK Limited

Certified that testing was carried out in accordance with the test methods identified herein. This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Signed Date: 10/09/2025

The results relate to the item(s) tested only. Opinions and interpretations expressed herein are outside of the scope of our UKAS accreditation.
SOCOTEC UK Limited. Registered in England No. 2880501. Registered Office: SOCOTEC House, Bretby Business Park, Ashby Road, Burton Upon Trent, DE15 0YZ

© 2000-2025 QEST Platform by SpectraQEST.com

SOCOTEC UK Limited
Leofric Business Park
Progress Close, Coventry
England
CV3 2TF, United Kingdom
Telephone: 02475 310700

Plasticity Index

TEST REPORT

UKAS TESTING 0001

Project Details

Client:	SP ASSOCIATES LTD
Client Address:	1 MARKET PLACE WARWICK WARWICKSHIRE CV34 4SA
Project:	P254313 - Oak Road, Wrexham

Report Details

Report No.:	PI:CEN25-04742-S002
Report Date:	10/09/2025
Issue No.:	1
Recipients:	

Sample Details

SOCOTEC Sample Ref:	CEN25-04742-S002	Material Description:	Brown CLAY
Client Sample Ref:	BH2	Specification:	—
Date Sampled:	—	Supplier:	—
Date Received:	01/09/2025	Source:	—
Sample Type:	Bulk Disturbed Sample	General Location:	BH2 @ 1.0-2.0m
Sample Location:	—	Sampled By:	Client
Sampling Cert Received?:	No		

Test Results

BS EN ISO 17892-12 - 2018

Sample Preparation Procedure:	BS EN ISO 17892-12 Cl. 5.2	Test Type:	Fallcone (one-point)
Cone Type:	80g/30°	Trial 1 Average Penetration (mm):	18.4
Trial 1 Water Content (%):	45.6	Trial 2 Average Penetration (mm):	18.4
Trial 2 Water Content (%):	45.5	Correlation Factor:	1.031
Visual Description:	Medium coloured brown , CLAY	Material History:	Not previously dried
Oversize Material Removed By:	Hand	Material < 0.4mm (%):	100
As Received Water Content (%):	17.5	Liquid Limit (%):	47
Plastic Limit (%):	22	Plasticity Index (%):	25
Date Tested:	05/09/2025		

Signed: [redacted] **Luke Harfield - Technical Supervisor**

For and on behalf of SOCOTEC UK Limited

Certified that testing was carried out in accordance with the test methods identified herein. This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Signed Date: 10/09/2025

The results relate to the item(s) tested only. Opinions and interpretations expressed herein are outside of the scope of our UKAS accreditation.
SOCOTEC UK Limited. Registered in England No. 2880501. Registered Office: SOCOTEC House, Bretby Business Park, Ashby Road, Burton Upon Trent, DE15 0YZ

© 2000-2025 QEST Platform by SpectraQEST.com

SOCOTEC UK Limited
Leofric Business Park
Progress Close, Coventry
England
CV3 2TF, United Kingdom
Telephone: 02475 310700

Plasticity Index

TEST REPORT

UKAS TESTING 0001

Project Details

Client:	SP ASSOCIATES LTD
Client Address:	1 MARKET PLACE WARWICK WARWICKSHIRE CV34 4SA
Project:	P254313 - Oak Road, Wrexham

Report Details

Report No.:	PI:CEN25-04742-S003
Report Date:	10/09/2025
Issue No.:	1
Recipients:	

Sample Details

SOCOTEC Sample Ref:	CEN25-04742-S003	Material Description:	Brown CLAY
Client Sample Ref:	BH3	Specification:	—
Date Sampled:	—	Supplier:	—
Date Received:	01/09/2025	Source:	—
Sample Type:	Bulk Disturbed Sample	General Location:	BH3 @ 1.0-2.0m
Sample Location:	—	Sampled By:	Client
Sampling Cert Received?:	No		

Test Results

BS EN ISO 17892-12 - 2018

Sample Preparation Procedure:	BS EN ISO 17892-12 Cl. 5.2	Test Type:	Fallcone (one-point)
Cone Type:	80g/30°	Trial 1 Average Penetration (mm):	17.4
Trial 1 Water Content (%):	58.1	Trial 2 Average Penetration (mm):	17.2
Trial 2 Water Content (%):	58.2	Correlation Factor:	1.049
Visual Description:	Medium coloured brown CLAY	Material History:	Not previously dried
Oversize Material Removed By:	Hand	Material < 0.4mm (%):	100
As Received Water Content (%):	15.6	Liquid Limit (%):	61
Plastic Limit (%):	26	Plasticity Index (%):	35
Date Tested:	05/09/2025		

Signed: [redacted] **ke Harfield - Technical Supervisor**

r and on behalf of SOCOTEC UK Limited
rtified that testing was carried out in accordance with the test methods identified herein. This st report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Signed Date: 10/09/2025

The results relate to the item(s) tested only. Opinions and interpretations expressed herein are outside of the scope of our UKAS accreditation.
SOCOTEC UK Limited. Registered in England No. 2880501. Registered Office: SOCOTEC House, Bretby Business Park, Ashby Road, Burton Upon Trent, DE15 0YZ

© 2000-2025 QEST Platform by SpectraQEST.com

SOCOTEC UK Limited
Leofric Business Park
Progress Close, Coventry
England
CV3 2TF, United Kingdom
Telephone: 02475 310700

Plasticity Index

TEST REPORT

UKAS TESTING 0001

Project Details

Client:	SP ASSOCIATES LTD
Client Address:	1 MARKET PLACE WARWICK WARWICKSHIRE CV34 4SA
Project:	P254313 - Oak Road, Wrexham

Report Details

Report No.:	PI:CEN25-04742-S004
Report Date:	10/09/2025
Issue No.:	1
Recipients:	

Sample Details

SOCOTEC Sample Ref:	CEN25-04742-S004	Material Description:	Brown CLAY
Client Sample Ref:	BH4	Specification:	—
Date Sampled:	—	Supplier:	—
Date Received:	01/09/2025	Source:	—
Sample Type:	Bulk Disturbed Sample	General Location:	BH4 @ 0.7-1.0m
Sample Location:	—	Sampled By:	Client
Sampling Cert Received?:	No		

Test Results

BS EN ISO 17892-12 - 2018

Sample Preparation Procedure:	BS EN ISO 17892-12 Cl. 5.2	Test Type:	Fallcone (one-point)
Cone Type:	80g/30°	Trial 1 Average Penetration (mm):	18.2
Trial 1 Water Content (%):	50.5	Trial 2 Average Penetration (mm):	18.3
Trial 2 Water Content (%):	50.5	Correlation Factor:	1.032
Visual Description:	Very hard Brownish bluesh CLAY	Material History:	Not previously dried
Oversize Material Removed By:	Hand	Material < 0.4mm (%):	100
As Received Water Content (%):	9.3	Liquid Limit (%):	52
Plastic Limit (%):	24	Plasticity Index (%):	28
Date Tested:	08/09/2025		

Signed: [redacted] **Luke Harfield - Technical Supervisor**

For and on behalf of SOCOTEC UK Limited
Certified that testing was carried out in accordance with the test methods identified herein. This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Signed Date: 10/09/2025

The results relate to the item(s) tested only. Opinions and interpretations expressed herein are outside of the scope of our UKAS accreditation.
SOCOTEC UK Limited. Registered in England No. 2880501. Registered Office: SOCOTEC House, Bretby Business Park, Ashby Road, Burton Upon Trent, DE15 0YZ

© 2000-2025 QEST Platform by SpectraQEST.com

SOCOTEC UK Limited
Leofric Business Park
Progress Close, Coventry
England
CV3 2TF, United Kingdom
Telephone: 02475 310700

Plasticity Index

TEST REPORT

UKAS TESTING 0001

Project Details

Client:	SP ASSOCIATES LTD
Client Address:	1 MARKET PLACE WARWICK WARWICKSHIRE CV34 4SA
Project:	P254313 - Oak Road, Wrexham

Report Details

Report No.:	PI:CEN25-04742-S005
Report Date:	10/09/2025
Issue No.:	1
Recipients:	

Sample Details

SOCOTEC Sample Ref:	CEN25-04742-S005	Material Description:	Brown CLAY
Client Sample Ref:	BH5	Specification:	—
Date Sampled:	—	Supplier:	—
Date Received:	01/09/2025	Source:	—
Sample Type:	Bulk Disturbed Sample	General Location:	BH5 @ 1.5-2.0m
Sample Location:	—	Sampled By:	Client
Sampling Cert Received?:	No		

Test Results

BS EN ISO 17892-12 - 2018

Sample Preparation Procedure:	BS EN ISO 17892-12 Cl. 5.2	Test Type:	Fallcone (one-point)
Cone Type:	80g/30°	Trial 1 Average Penetration (mm):	21.2
Trial 1 Water Content (%):	35.0	Trial 2 Average Penetration (mm):	21.4
Trial 2 Water Content (%):	34.9	Correlation Factor:	0.980
Visual Description:	Light brown gravelly top soil with CLAY	Material History:	Not previously dried
Oversize Material Removed By:	Hand	Material < 0.4mm (%):	73
As Received Water Content (%):	10.4	Liquid Limit (%):	34
Plastic Limit (%):	20	Plasticity Index (%):	14
Date Tested:	08/09/2025		

Signed: [redacted]

Luke Harfield - Technical Supervisor

For and on behalf of SOCOTEC UK Limited
Certified that testing was carried out in accordance with the test methods identified herein. This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Signed Date: 10/09/2025

The results relate to the item(s) tested only. Opinions and interpretations expressed herein are outside of the scope of our UKAS accreditation.
SOCOTEC UK Limited. Registered in England No. 2880501. Registered Office: SOCOTEC House, Bretby Business Park, Ashby Road, Burton Upon Trent, DE15 0YZ

© 2000-2025 QEST Platform by SpectraQEST.com

APPENDIX D

Soakaway Test Results

SP ASSOCIATES
SOAKAWAY TEST

1 Market Place, Warwick, CV34 4SA
Tel: 01926 494271

Site: Oak Road, Wrexham Industrial Estate
Job No: S1916-1
Test Date: 20/08/2025 Report date: 01/09/2025
Test Method: BRE 365 (2015)

Trial Pit Number: ST1 – TP1
Depth: 1.9m, Length 1.3m, Width 0.4m

Start Water Depth for Analysis – Datum (mbgl): **1.02**
75% Effective Depth (mbgl): - Elapsed Time (Mins):
50% Effective Depth (mbgl): -
25% Effective Depth (mbgl): - Elapsed Time (Mins):
Base of Soakage Zone (mbgl): **1.9**

Volume outflow between 75% and 25% effective depth (m3):
Mean surface area of outflow (m 2):
Time for outflow between 75% and 25% effective depth (mins):

Elapsed Time (minutes)	Water Depth (m below datum)	Elapsed Time (minutes)	Water Depth (m below datum)
0	1.02	**90**	1.03
1	1.02	**100**	1.03
2	1.02	**110**	1.04
3	1.02	**120**	1.04
4	1.02	**130**	1.04
5	1.02	**140**	1.04
6	1.02	**150**	1.04
7	1.02	**160**	1.04
8	1.02	**170**	1.04
9	1.02	**180**	1.04
10	1.02	**190**	1.05
15	1.02	**200**	1.05
20	1.02	**210**	1.05
25	1.03	**220**	1.05
30	1.03	**230**	1.05
40	1.03	**240**	1.05
50	1.03	-	-
60	1.03	-	-
70	1.03	-	-
80	1.03	-	-

Soil Infiltration Rate (m/s): Test abandoned due very slow rate of infiltration in stiff clay.

SP ASSOCIATES
SOAKAWAY TEST

1 Market Place, Warwick, CV34 4SA
Tel: 01926 494271

Site: Oak Road, Wrexham Industrial Estate
Job No: S1916-1
Test Date: 20/08/2025 Report date: 01/09/2025
Test Method: BRE 365 (2015)

Trial Pit Number: ST2 – TP2
Depth: 1.8m, Length 1.4m, Width 0.4m

Start Water Depth for Analysis – Datum (mbgl): **0.98**
75% Effective Depth (mbgl): - Elapsed Time (Mins):
50% Effective Depth (mbgl): -
25% Effective Depth (mbgl): - Elapsed Time (Mins):
Base of Soakage Zone (mbgl): **1.8**

Volume outflow between 75% and 25% effective depth (m3):
Mean surface area of outflow (m 2):
Time for outflow between 75% and 25% effective depth (mins):

Elapsed Time (minutes)	Water Depth (m below datum)	Elapsed Time (minutes)	Water Depth (m below datum)
0	0.98	**90**	0.99
1	0.98	**100**	0.99
2	0.98	**110**	0.99
3	0.98	**120**	0.99
4	0.98	**130**	0.99
5	0.98	**140**	0.99
6	0.98	**150**	0.99
7	0.98	**160**	0.99
8	0.98	**170**	0.99
9	0.98	**180**	0.99
10	0.98	**190**	0.99
15	0.98	**200**	0.99
20	0.98	**210**	1.00
25	0.98	**220**	1.00
30	0.98	**230**	1.00
40	0.98	**240**	1.00
50	0.99	-	-
60	0.99	-	-
70	0.99	-	-
80	0.99	-	-

Soil Infiltration Rate (m/s): Test abandoned due very slow rate of infiltration in stiff clay.

SP ASSOCIATES
SOAKAWAY TEST

1 Market Place, Warwick, CV34 4SA
Tel: 01926 494271

Site: Oak Road, Wrexham Industrial Estate
Job No: S1916-1
Test Date: 20/08/2025 Report date: 01/09/2025
Test Method: BRE 365 (2015)

Trial Pit Number: ST3 – TP3
Depth: 1.9m, Length 1.4m, Width 0.4m

Start Water Depth for Analysis – Datum (mbgl): **1.03**
75% Effective Depth (mbgl): - Elapsed Time (Mins):
50% Effective Depth (mbgl): -
25% Effective Depth (mbgl): - Elapsed Time (Mins):
Base of Soakage Zone (mbgl): **1.9**

Volume outflow between 75% and 25% effective depth (m3):
Mean surface area of outflow (m 2):
Time for outflow between 75% and 25% effective depth (mins):

Elapsed Time (minutes)	Water Depth (m below datum)	Elapsed Time (minutes)	Water Depth (m below datum)
0	1.03	**90**	1.04
1	1.03	**100**	1.04
2	1.03	**110**	1.04
3	1.03	**120**	1.04
4	1.03	**130**	1.04
5	1.03	**140**	1.04
6	1.03	**150**	1.04
7	1.03	**160**	1.04
8	1.03	**170**	1.04
9	1.03	**180**	1.04
10	1.03	**190**	1.05
15	1.03	**200**	1.05
20	1.03	**210**	1.05
25	1.03	**220**	1.05
30	1.03	**230**	1.05
40	1.03	**240**	1.05
50	1.03	-	-
60	1.03	-	-
70	1.04	-	-
80	1.04	-	-

Soil Infiltration Rate (m/s): Test abandoned due very slow rate of infiltration in stiff clay.

APPENDIX E

Updated CSM and Risk Assessment

Proposed Industrial Development, Oak Road, Wrexham Industrial Estate

Adjusted Conceptual Site Model and Risk assessment

Source	Pathway	Receptor	Risk Matrix Assessment	Assessment of Linkage Significance/Potential Mitigation Measures
Contaminated Soils and Groundwater from historical and current on-site sources.	Direct Ingestion, direct contact and inhalation of dust, vapours and liquids	Future site users	Low	Site investigation and testing of near soil soils for a range of potential contaminants of concern have failed to result in any analytes being present at concentrations that exceed Tier 1 screening levels for the proposed site use.
		Construction workers	Low	Site workers to wear appropriate PPE and adopt appropriate hygiene and safe working practices.
	Leaching and vertical and lateral migration	Controlled waters	Low	There is no widespread contamination present and the unsaturated zone is in excess of 3m deep.
	Direct infiltration in water supply pipes	Service Conduits	Low to Moderate	Water supply pipes may not need to be barrier grade based upon the results of laboratory testing on near surface soil samples. Water supplier to be consulted.
	Plant uptake	Vegetation within soft landscape areas	Low	Phytotoxic contamination in near surface soils unlikely to be significant as there are no indications of widespread contamination.
	Lateral migration through groundwater	Off-site neighbouring properties	Low	Off-site groundwater migration risks to nearby properties are considered to be low due to the low potential for significant on-site leaching to be taking place.

Source	Pathway	Receptor	Risk Matrix Assessment	Assessment of Linkage Significance/Potential Mitigation Measures
Potentially contaminated groundwater: migration from off-site sources onto site	Direct contact or ingestion and inhalation of dust and vapours	Future site users	Low	The potential for contaminant impacted groundwater to migrate onto the site is considered to be low due to the absence of a significant upstream contaminant source.
	Vertical and lateral migration	Controlled waters	Very Low	As above.
Ground gases generated on-site	Vertical and lateral migration	Buildings and human occupiers	Low	Ground gas conditions comply with CS-1 category.
Ground gas migration onto site from off-site sources	Lateral migration	Buildings and human occupiers	Low	Ground gas conditions comply with CS-1 category.
High sulphate and low pH in site soils	Direct contact and within shallow groundwater	Below ground concrete	Low	Buried concrete may be designed using concrete class DS-1 and ACEC class AC-1.