

**Phase 1 Geoenvironmental Risk Assessment and
Phase 2 Ground Investigation**

**LAND TO REAR OF 365 DUNFORD ROAD
HADE EDGE
HOLMFIRTH**

for

Jones Homes (Yorkshire) Limited

Report Number 4431

January 2025



Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Registered Office: 531 Denby Dale Road West, Calder Grove, Wakefield, WF4 3ND UK
T +44(0)1924 360458 **E** mdja@geoenvironmental.co.uk **W** www.geoenvironmental.co.uk

LAND TO REAR OF 365 DUNFORD ROAD, HADE EDGE, HOLMFIRTH

Contents

1.	Introduction
2.	The Site
3.	Site History
4.	Geology and Mining
5.	Hydrogeology and Flooding
6.	GroundSure Enviro-Insight and Geo-Insight Reports
7.	Contaminated Land
8.	Radon
9.	The Investigation
10.	Strata Profile
11.	In-Situ and Laboratory Testing
12.	Geoenvironmental Risk Assessment
13.	Recommendations
	Procedure Notes

Figures

Figure 1	Site Plan with Exploratory Borehole and Trial Pit Positions
Figure 2	Development Proposals
Figure 3	Conceptual Site Model
Figure 4	Topsoil Areas

Appendices

Appendix 1	Window Sampling Records
Appendix 2	Trial Pit Records
Appendix 3	Laboratory Test Results
Appendix 4	GroundSure Enviro-Insight and Geo-Insight Reports
Appendix 5	Historical Mapping
Appendix 6	Coal Authority Mining Report
	Standard Appendices A and B

1 INTRODUCTION

- 1.1 At the request of Jones Homes (Yorkshire) Limited, a Phase I Geoenvironmental and Geotechnical Assessment (Desk Study) and a Phase II Intrusive Investigation have been carried out at Dunford Road in Hade Edge. It is proposed to develop the site with residential properties.
- 1.2 The purpose of the desk study was to review and assess published information on the site including geological, mining and hydrogeological data. It was also to review the past history of the site and its environmental setting.
- 1.3 The intrusive investigation has comprised trial pitting and window sampling with associated in-situ and laboratory testing. Recommendations are made for the safe and economic development of the site.
- 1.4 The study has not included checks on services on or adjacent to the site, and no structural or asbestos surveys have been carried out.

2 THE SITE

- 2.1 The site covers an area of approximately 2.9 hectares and is located to the east side of Dunford Road, approximately 3 km south of the centre of Holmfirth. The Ordnance Survey National Grid Reference is 414680, 405230, and it lies at approximately 330 m AOD. Figure 1 shows the general site location, whilst figure 2 shows the site in more detail. It consists of a grassland/pasture, which is enclosed by dry stone walling.
- 2.2 The site lies to the east of Dunford Road, and is currently accessed via a driveway to the north of No. 365 Dunford Road.
- 2.3 The majority of the site comprises grassland bounded by a dry stone wall, and which slopes gently down in an easterly direction. A dry stone wall also separates the site into two parts, referenced to as the eastern and western halves in this report.



View of eastern half, looking to the northeast



View of eastern half, looking to the east



View of eastern half, looking to the west from the eastern boundary



View of western half, looking to the northeast



View of western half, looking to the northwest



View of western half, looking to the northeast



View of western half, looking to the southeast

- 2.4 The southwestern part of the site is presently occupied by a stable block and a barn used for storage, together with associated hardstanding. It is understood that both buildings have asbestos cement sheet roofs.



View of stable and barn, looking to the west

- 2.5 To the north of the site are houses recently constructed by Jones Homes, and to the west are older residential properties. Open grassland lies to the south and east, and there is a turkey farm a short distance to the southeast.

3 SITE HISTORY

3.1 The following archival Ordnance Survey maps have been examined to trace the past development of the site. These are reproduced in Appendix 5 with the current site boundary superimposed on them. The apparent displacement on the older maps is due to a change in Ordnance Survey co-ordinates.

Scale and Year of Publication			
6" to 1 mile	1854	1:2500	1892
	1888		1906
	1906		1964
	1919		1975
	1948		
	1951		
	1955		
	1970		
1:10,000	1980	1:1250	2003
	2001		
	2010		
	2024		

3.2 The maps show that the site has always been undeveloped agricultural land to the east side of Dunford Road.

3.3 The earliest map to show the site in detail dates from 1892. It shows the site as undeveloped land, with the Sportman’s Inn (now No. 363/365), located adjacent to the southwestern corner of the site.

- 3.4 There are a number of quarries shown in the area, particularly just to the west, which at their nearest they are approximately 100m from the site. A shaft is also recorded approximately 95m to the west. However, there is no recorded quarrying on the site itself, although small unrecorded quarries cannot be entirely precluded.
- 3.5 Over the subsequent years, the quarries were backfilled. The map of 1964 records two small “refuse tips” to the southwest of the site, the nearest being approximately 110m away.
- 3.6 Due to time and cost constraints, it has not been possible to consult with local history journals and newspapers. This can be carried out if requested at additional cost, but is unlikely to provide any significant additional information.
- 3.7 It is not believed that the study site is of archaeological interest, but it would be prudent to make enquiries with West Yorkshire Archaeology Service.

4 GEOLOGY AND MINING

4.1 Geology

4.1.1 Maps of the British Geological Survey (BGS), show the site to be underlain by Rough Rock, a prominent medium and coarse grained sandstone of the Carboniferous Millstone Grit Series.

4.1.2 The sandstone can be expected to have weathered to sandy gravelly and gravelly sand in the near surface. There are no drift deposits shown on the geological maps, which also show the site to be free of faulting.

4.2 Mining

4.2.1 The site lies outside a Coal Authority defined "High Risk Development Area". A mining report has been obtained from the Coal Authority, and is reproduced in full in Appendix 6. It states that there has been no recorded mining beneath the site.

4.2.2 The report makes no mention of shallow workings being present or that shallow unrecorded workings might be present. This has been confirmed in subsequent correspondence which is also attached in Appendix 6. The Coal Authority holds no record of any notice or subsidence claim having been made.

4.2.3 No shaft or adits are reported on, or within 20m of the site boundary. Although old unrecorded mine entries might be present on the site, these are considered very unlikely. No past, present or future opencasts are reported within the vicinity of the site.

4.2.4 No mine gas emissions have been recorded within the boundary of the property.

Further, none of the following are recorded;

- Emergency Surface Hazard Call Out Incidents
- Withdrawal of Support
- Working Facilities Order
- Payments to owner of former copyhold land

4.3 GroundSure Geo-Insight

4.3.1 A GroundSure Geo-Insight Report has been obtained for the site and is reproduced in Appendix 4. The report is based on the British Geological Survey (BGS) geological maps, GroundSure data and miscellaneous other geological sources.

4.3.2 None of the following are recorded beneath the site.

Geology 1:10,000 Scale
Artificial and Made Ground (10k) Superficial geology (10k) Landslip (10k)

Boreholes
BGS Boreholes

Mining, Ground Workings and Natural Cavities
Natural Cavities BritPits Surface ground workings Underground workings Historical Mineral Planning Areas Non-coal mining Mining cavities Brine areas Gypsum areas Tin mining Clay mining

In respect of natural ground subsidence, the BGS reports the following risk ratings.

Natural Ground Subsidence	Risk
Shrink-Swell Clay	Negligible
Running Sand	Negligible
Compressible Deposits	Negligible
Collapsible Deposits	Very Low
Landslide	Very Low
Ground Dissolution of Soluble Rocks	Negligible

5 HYDROGEOLOGY AND FLOODING

Hydrogeology

- 5.1 Since April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive.
- 5.2 The aquifer within the bedrock deposits is designated as Secondary A. This is described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
- 5.3 Details provided by the Environment Agency in the GroundSure Enviro-Insight report, indicate there to be no licensed surface water abstraction points within at least ½km of the site.
- 5.4 The nearest groundwater abstraction point is located approximately 64m to the northwest. It is described as 'historical' and comprises the abstraction from both a spring and a well for "*General Farming and Domestic*" purposes. The area has subsequently been developed and is unlikely to be applicable now.

Flooding

- 5.5 There are no open watercourses in the immediate vicinity of the site, and according to data supplied by the Environment Agency in the GroundSure Enviro-Insight report, the site is not at risk from flooding.

- 5.6 The risk from surface water flooding and groundwater flooding are both recorded as negligible.

6 GROUNDSURE ENVIRO-INSIGHT REPORT

- 6.1 A GroundSure Enviro-Insight Report has also been commissioned for this site. None of the following features are recorded within 250m of the site. Full details are given in Appendix 4.

Past Land Use
Historical tanks Historical energy features Historical petrol stations Historical garages Historical military land

Waste and Landfill
Active or recent landfill Historical landfill (BGS records) Historical landfill (LA/mapping records) Historical landfill (EA/NRW records) Historical waste sites Licensed waste sites Waste Exemptions

Current Industrial Land Use

Recent industrial land uses
Current or recent petrol stations
Electricity cables
Gas pipelines
Sites determined as Contaminated Land
Control of Major Accident Hazards (COMAH)
Regulated explosive sites
Hazardous substance storage/usage
Historical licensed industrial activities (IPC)
Licensed industrial activities (Part A(1))
Licensed pollutant release (Part A(2)/B)
Radioactive Substance Authorisations
Licensed Discharges to controlled waters
Pollutant release to surface waters (Red List)
Pollutant release to public sewer
List 1 Dangerous Substances
List 2 Dangerous Substances
Pollution Incidents (EA/NRW)
Pollution inventory substances
Pollution inventory waste transfers
Pollution inventory radioactive waste

Environmental Designations

Site of Special Scientific Interest (SSSI)
Conserved wetland sites (Ramsar sites)
Special Areas of Conservation (SAC)
Special Protection Areas (SPA)
National Nature Reserves (NNR)
Local Nature Reserves (LNR)
Designated Ancient Woodland
Biosphere Reserves
Forest Parks
Marine Conservation Zones
Proposed Ramsar sites
Possible Special Areas of Conservation (pSAC)
Potential Special Protection Areas (pSPA)
Nitrate Sensitive Areas
Nitrate Vulnerable Zones
SSSI Units

Visual and Cultural Designations
World Heritage Sites Areas of Outstanding Natural Beauty National Parks Conservation Areas Scheduled Ancient Monuments Registered Parks and Gardens

Agricultural Designations
Open Access Land Tree Felling Licences Environmental Stewardship Schemes Countryside Stewardship Schemes

Habitat Designations
Priority Habitat Inventory Habitat Networks Limestone Pavement Orders

Railway Infrastructure and Projects
Underground railways (London) Underground railways (Non-London) Railway tunnels Historical railway and tunnel features Royal Mail tunnels Historical railways Railways Crossrail 1 Crossrail 2 HS2

- 6.2 The GroundSure Enviro-Insight Report is based upon known, published information and may not comprise a complete record of all features of relevance. An explanation of the datasets is provided in the report in Appendix 4.

- 6.3 It should be noted that due to time constraints the Local Authority has not been contacted, nor has the Petroleum Licensing Officer, as former fuel tanks are not suspected.

7 CONTAMINATED LAND

- 7.1 There is no visibly contaminated material on the surface of the site, nor is there any distressed vegetation suggestive of significant or serious contamination.
- 7.2 The inspection of the site did not indicate any obvious invasive plants. However, the identification of such is outside the expertise of this consultancy and appropriate advice should be sought if considered necessary.

8 RADON

- 8.1 According to the GroundSure Geo-Insight report the site lies in an area where between 3% and 5% of homes are above the action level recommended by UK Health Security Agency (UKHSA). **Basic radon protective measures are therefore necessary** according to the data provided in the GroundSure report and UKHSA.

9 THE INVESTIGATION

- 9.1 The investigation was designed to provide preliminary information on ground and groundwater conditions on the site, together with identifying potential areas of contamination. The investigation was undertaken in accordance with the principles of BS EN 1997-1: 2004 "Eurocode 7 - Geotechnical Design - Part 1: General Rules", BS EN 1997-2: 2007 "Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing", BS5930: 1999 and BS10175: 2001 and under the full-time supervision of a Chartered Engineer from Michael D Joyce Associates LLP.
- 9.2 The ground investigation was carried out on 29th November 2024 and comprised trial pitting and window sampling. The exploratory positions are shown on figure 1. At the request of the landowner, investigation was not possible around the existing buildings.
- 9.3 The trial pitting consisted of excavating a number of trial holes using a mechanical excavator provided by the landowner. On completion, soakaway tests were carried out in some of the trial pits, and all the excavations were subsequently backfilled with the arisings.
- 9.4 The window sampling consisted of driving a series of 1m and 2m long tubes into the ground using a dropping weight. On completion of each run, the tube was withdrawn. The next tube was then inserted and the process repeated to provide a continuous profile of the ground. On each run the tube diameter was reduced in order to assist in its recovery.

- 9.5 It was also possible to carry out Standard Penetration Tests using the window sampling equipment, which has the same specification as a conventional cable percussive SPT. On completion the boreholes were either backfilled with the arisings or gas monitoring standpipes were installed.

10 STRATA PROFILE

- 10.1 The full exploratory borehole and trial pit records are presented in Appendices 1 and 2 respectively. These give full strata descriptions based on visual examination and are in accordance with the requirements of BS EN ISO 14688-1:2002 "Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 1", BS EN ISO 14688-2:2004 "Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 2", and BS EN ISO 14689-1:2003 "Geotechnical Investigation and Testing - Identification and Classification of Rock - Part 1".
- 10.2 The majority of the site is underlain by between 150mm and 400mm of topsoil. This includes all of the eastern half of the site and also around trial pits TP10, TP11, TP13 and TP17.
- 10.3 In the western half of the site Made Ground was also encountered, particularly around the existing buildings (WS7, TP14, TP15 and TP16). The Made Ground comprises topsoil and sandy gravel, but also contained ash, burnt wood, concrete, tarmac, stone and plastic netting/geogrid-type material. The Made Ground was found to between 0.5m and 0.9m depth, and in lieu of the topsoil.



Trial Pit TP14

- 10.4 A similar Made Ground was found in the northwestern corner of the site (TP12 and WS6). This comprised topsoil, together with ash, burnt wood, plastics, metal and broken pieces of asbestos cement sheeting.



Close up of Made Ground in TP12, including the Asbestos Cement Sheetting

- 10.5 The topsoil and/or Made Ground was underlain by weathered sandstone. This generally comprised orangish-brown and yellow-brown slightly silty gravelly sand. This was underlain by a yellow-brown, moderately and slightly weathered, coarse-grained sandstone, recovered as gravel and cobbles in a sand matrix.
- 10.6 The trial pits terminated on competent flaggy sandstone bedrock at between 0.8m and 1.8m when progress became impractical. The window sampling boreholes generally terminated at a similar depth.



Typical trial pit



Typical arisings from trial pits

- 10.7 All the window sample borehole and trial pits were dry on completion.
- 10.8 Excluding the areas of Made Ground, there was no unusual colouration or odours to any of the soils encountered elsewhere, and no obvious visual evidence of contamination, such as asbestos, was found during the investigation. This does not mean that asbestos containing materials or asbestos fibres are not present in other areas.
- 10.9 It should also be noted that lateral and vertical changes can occur between exploratory points and care is needed when extrapolation is used. The relative close spacing of the exploratory points means that large-scale quarrying can be excluded. Small borrow pits between exploratory points cannot be excluded, but are considered unlikely. It is also possible that other areas of Made Ground may be present, although the eastern half of the site appears to have been undisturbed.

11 IN-SITU AND LABORATORY TESTING

11.1 In-Situ Gas Monitoring

- 11.1.1 Methane is the dominant constituent of landfill gas, and can form an explosive mixture in air at concentrations of between 5% and 15%. Thus 5% methane in air is known as the Lower Explosive Limit (LEL). Concentrations less than this do not normally ignite. Carbon dioxide can also be a potential problem, especially where it occurs in concentrations greater than 1.5%.
- 11.1.2 In-situ gas tests were carried out in the boreholes on completion and in probe holes made in the sides of the trial pits. Testing was with a portable meter, which measures the methane content as its percentage volume in air. The corresponding oxygen and carbon dioxide concentrations are also measured.
- 11.1.3 No methane, carbon monoxide or hydrogen sulphide gases were detected in any of the boreholes. Carbon dioxide ranged from 0% to 0.3% by volume.
- 11.1.4 In order to monitor over the longer term, gas monitoring standpipes were installed in window sample boreholes WS1, WS2, WS3, WS4, WS6 and WS7. These comprise slotted uPVC pipework surrounded by single sized gravel to the base of the boreholes. The top 0.5m of pipework was not slotted and was surrounded by bentonite pellets to seal the boreholes. Valves were also fitted.
- 11.1.5 The risks associated with the gases have been considered in accordance with British Standard BS 8485:2015 "Code of Practice for the design and protective measures from methane and carbon dioxide ground gases for new buildings" and CIRIA report C665,

“Assessing Risks Posed by Hazardous Ground Gases to Buildings” and NHBC Report No. 4 “Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present”. Gas monitoring is currently on-going and the results will be reported separately. However, to date no elevated levels of methane or carbon dioxide have been detected.

11.2 Soakaway Testing

11.2.1 Soakaway tests were carried out in trial pits TP1, TP4, TP7 and TP9 in accordance with BRE Digest 365: Soakaway Design. This involved filling the trial pits with water from a water tanker and recording the fall in water level over a period of time. From this it is possible to calculate the Soil Infiltration Rate (SIR) based on the trial pit dimensions and the rate of dissipation.

11.2.2 The tests in trial pit TP1, TP4 and TP9 recorded falls of only 0.15cm, 0.27cm and 0.28cm respectively after 5 hours, and should be considered to be unsuccessful.

11.2.3 However, the test in trial pit TP7 was successful, recording a Soil Infiltration Rate of 1.55×10^{-5} m/s.

11.2.4 The results of the testing have been compared to soakaway testing carried out on the Jones Homes site immediately to the north, and where the same geology/ground conditions are present.

11.2.5 The following results were recorded, and are presented in Michael D Joyce Associates LLP Report No. 3967 “Additional Soakaway Testing - Dunford Road, Hade Edge”, and dated September 2018.

Trial Pit No.	Soil Infiltration Rate (m/s)
TP1	1.39×10^{-4}
TP3	1.41×10^{-5}
TP6	1.93×10^{-5}
SA1	2.78×10^{-5}
SA2	3.53×10^{-5}
SA3	2.58×10^{-5}
SA4	2.57×10^{-5}
SA5B	1.35×10^{-5}
SA6	2.96×10^{-5}
SA7	1.62×10^{-5}
SA8	7.72×10^{-6}
SA9	1.82×10^{-5}
SA10	2.78×10^{-5}
SA11	2.23×10^{-5}
SA12	3.63×10^{-5}
SA13	3.26×10^{-5}
SA14	2.83×10^{-5}
SA15	2.61×10^{-5}
SA16	1.09×10^{-4}
SA17	2.96×10^{-5}
SA18	1.33×10^{-4}
SA19	3.00×10^{-5}
SA20	3.75×10^{-5}
SA21	2.58×10^{-5}
SA22	3.59×10^{-5}
SA23	5.53×10^{-5}
SA24	4.75×10^{-5}
SA25	4.22×10^{-5}
SA26	6.55×10^{-5}
SA27	5.97×10^{-5}
SA28	1.84×10^{-4}
SA29	1.44×10^{-5}

- 11.2.6 It can be seen that the results from TP7 was very similar to the SIR recorded in TP1, TP3 and TP6 of the previous site.
- 11.2.7 The reason for the three “failures” recorded on this site is believed to be due to the excavations. The landowner requested to excavate the trial pits, but only had a smooth edged backacter bucket. Consequently, the depths of excavations were restricted and it was not possible to “rip” the base of the pits down to unweathered bedrock. As the drainage is via fissures in the rock, the smooth bucket was less suitable for exposing such fissures.
- 11.2.8 To the north of the site, additional soakaway testing was carried out (reference SA1 to SA29). These recorded higher SIRs. The reason for this is that a larger 360° excavator was used. This had the advantage of achieving greater depths which exposed cleaner fissures in the less weathered rock.
- 11.2.9 It is therefore concluded that soakaways will be suitable for road and roof drainage on this site, providing a larger excavator is used to provide greater depths, which intercept fissured sandstone bedrock.

11.3 Sulphate and Acidity Tests

Chemical tests were carried out on representative samples of the sub-soils in order to determine their water soluble content and acidity.

Borehole No.	Depth (m)	Water Soluble Sulphate Content (g/l)	pH
Natural Ground	Formation Level	0.01 - 0.02	5.8 - 6.7

The testing recorded negligible water soluble sulphate contents and slightly acidic pH values.

11.4 Contamination Testing

Rationale

11.4.1 The investigation and sampling was under the full time direction of a Chartered Engineer. All the recovered soil samples were screened on site for any visual or olfactory evidence of contamination including the presence of VOCs. Samples were selected from the trial pits and window sample boreholes on the basis of those which were most likely to be contaminated and those which gave the most appropriate indication of the spread of any contaminants. The samples were stored in both glass and plastic containers and kept in cooled conditions. Testing was carried out by i2 Analytical Limited to UKAS accredited procedures in accordance with MCERTS performance standards.

11.4.2 The aim of this was to make a preliminary assessment of the level of any contamination on the site in order to determine if there was any significant risk associated with contaminants in respect of both human health and the environment, including controlled waters.

-
- 11.4.3 Standard Appendix B attached to this report discusses the methodology for the assessment of contamination and should be read in conjunction with the comments overleaf.
- 11.4.4 The Land Contamination Risk Management (LCRM) series of documents have been produced by the Environment Agency. It is to provide guidance to identify and assess if there is an unacceptable risk, assess suitable remediation options, and carry out and verify the remediation.
- 11.4.5 DEFRA previously issued "Outcome of the Way Forward Exercise on Soil Guideline Values". This document was intended to provide guidance to determine if there is a Significant Possibility of Significant Harm (SPOSH) i.e. whether land meets the legal trigger of being contaminated land.
- 11.4.6 In the context of Part 2A, a risk assessor using an SGV would conclude the following (DEFRA, 2008).
- At a representative average soil concentration at or below an SGV, it is very unlikely that there will be a *significant possibility of significant harm (SPOSH)*.
 - At a representative average soil concentration above an SGV, there *might* be a *significant possibility of significant harm* with the significance linked to the margin of exceedance, the duration and frequency of exposure, and other site-specific factors that the enforcing authority may wish to take into account. Further investigation and/or detailed evaluation will usually be required.
- 11.4.7 It should be stressed that where there is any uncertainty as to whether or not there is a SPOSH, it was the policy of this practice to adopt a conservative approach,

particularly in the adoption of clean cover systems.

11.4.8 In April 2012, Defra published new Statutory Guidance which forms a major part of their contaminated land regimes under Part 2A of the Environment Protection Act 1990. The regime provides a means of dealing with contaminated land which poses a significant risk to human health or the environment where there is no alternative solution. It also works alongside planning rules and building regulations to help ensure that affected land is made suitable for use when it is redeveloped.

11.4.9 Since the regime was first introduced in 2000 there has been considerable uncertainty over how to decide when land is, and is not, contaminated land on grounds of the legal test of *significant possibility of significant harm to human health or the environment*.

11.4.10 To help address this, one of the main changes set out in the new Statutory Guidance, is the introduction of a new four category test to help decide when land is, and is not, contaminated land on grounds of *significant possibility of significant harm to human health*. Under the new four category test:

- Category 1 describes land that is clearly contaminated land, for example because similar land is known to have caused significant harm in the past.
- Categories 2 and 3 cover less straightforward land where more detailed consideration is needed before the regulator can decide either: (a) that there is a strong case for regulatory action, in which case the land would be in Category 2 and be classified as contaminated land under Part 2A; or (b) that such a case does not exist, in which case the land would be in Category 3 and not be classified as contaminated land under Part 2A.

- Category 4 describes land that is clearly not contaminated land, as discussed below.

11.4.11 One of the main purposes of including the Categories in the Statutory Guidance is to provide a legal framework against which new technical tools can be developed by the land contamination sector to describe the Categories in more detail with regard to specific substances and/or situations.

11.4.12 The new Category 4 test is particularly important in terms of reducing uncertainty over when land is definitely not caught by the regime.

11.4.13 The new Statutory Guidance makes clear what land should be placed into Category 4, for example:

- (a) Land where no relevant contaminant linkage has been established.
- (b) Land where there are only normal levels of contaminants in soil (as explained in Section 3 of the guidance), unless there is a particular reason to consider otherwise. In other words land with normal background concentrations in the soil.
- (c) Land that has been excluded from the need for further inspection and assessment under Part 2A because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of the guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of the guidance, e.g. Category 4 Screening Levels.
- (d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the

environment, to which receptors are likely to be exposed to in the normal course of their lives).

11.4.14 The guidance clarifies how generic assessment criteria should and should not be used.

It states that:

3.27 *It is common practice in contaminated land risk assessment to use “generic assessment criteria” (GACs) as screening tools in generic quantitative human health risk assessment to help assessors decide when land can be excluded from the need for further inspection and assessment, or when further work may be warranted.*

3.28 *Local authorities may use GACs and other technical tools to inform certain decisions under the Part 2A regime, provided: (i) they understand how they were derived and how they can be used appropriately; (ii) they have been produced in an objective, scientifically robust and expert manner by reputable organisations; and (iii) they are only used in a manner that is in accordance with Part 2A and this Guidance.*

3.29 *GACs relating to human health risk assessment represent cautious estimates of levels of contaminants in soil at which there is considered to be no risk to health or, at most, a minimal risk to health. With regard to such GACs:*

- (a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.
- (b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which GACs are exceeded (in itself) as being particularly

relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.

- (c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risks to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.
 - (d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.
 - (e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.
- 11.4.15 The way in which the new four category system is intended to operate and the place of the C4SLs within that system, was explained in detail in the Impact Assessment which accompanied the Statutory Guidance. Please note that although the detail of the Impact Assessment is included here to provide clarity on the job expected of C4SLs, the Statutory Guidance, itself, sets out the regime that needs to be delivered under Part 2A.

11.4.16 The C4SLs are intended as “*relevant technical tools*” provides to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

11.4.17 The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

“The new statutory guidance will bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land”.

11.4.18 C4SLs, therefore, should not be viewed as “SPOSH levels” and they should not be used as a legal trigger for the determination of land under Part 2A.

11.4.19 In 2014 CL:AIRE (Contaminated Land: Application in Real Environments) published “*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*”. In it a series of C4SLs were proposed as follows. Where C4SLs are not available, the LQM/CIEH “Generic Assessment Criteria for Human Health Risk” have been used.

Analyte	Residential (with home grown produce) (mg/kg)	Residential (without home grown produce) (mg/kg)	Allotments (mg/kg)	Commercial (mg/kg)	POS (mg/kg)
Arsenic	37	40	49	640	79
Benzene	0.87	3.3	0.18	98	140
Benzo(a)Pyrene	5.0	5.3	5.7	77	10
Cadmium	22	150	3.9	410	220
Chromium (vi)	21	21	170	49	21
Lead	200	310	80	2300	630

Results

11.4.20 The following range of results was obtained and the full results are presented in Appendix 3.

Table 1: Chemical testing thresholds and results for topsoil

	Contaminant	Threshold (mg/kg)			Range of Results
Metals	Arsenic	37			12 - 17
	Cadmium	11			<0.2 - 1.1
	Chromium (total)	910			13 - 24
	Chromium VI	6			<1.8 - 2.5
	Copper	2,400			17 - 87
	Lead	200			74 - 270
	Mercury	1.2			<0.3
	Nickel	130			8 - 18
	Selenium	250			<1.0 - 1.2
	Zinc	3,700			42 - 300
	Soil Organic Matter (SOM)	1%	2.5%	6%	
PAH USEPA 16	Naphthalene	2.3	5.6	13	<0.05 - 0.19
	Acenaphthylene	170	420	920	<0.05 - 0.36
	Acenaphthene	210	510	1,100	<0.05 - 0.30
	Fluorene	170	400	860	<0.05 - 0.27
	Phenanthrene	95	220	440	0.26 - 1.90
	Anthracene	2,400	5,400	11,000	<0.05 - 0.65
	Fluoranthene	280	560	890	0.44 - 3.70
	Pyrene	620	1,200	2,000	0.40 - 3.90
	Benzo(a) anthracene	7.2	11	13	0.19 - 1.80
	Chrysene	15	22	27	0.24 - 1.80
	Benzo(b) fluoranthene	2.6	3.3	3.7	<0.05 - 2.40
	Benzo(k) fluoranthene	77	93	100	<0.05 - 0.82
	Benzo(a) pyrene	2.2	2.7	3.0	0.25 - 2.00
	Indeno (123-cd) pyrene	27	36	41	0.15 - 0.93
	Dibenzo(a,h) anthracene	0.24	0.28	0.30	<0.05 - 0.24
	Benzo(g,h,i) perylene	320	340	350	0.14 - 1.10
	Asbestos	None			None

(1) Category 4 Screening Levels (C4SL)

(2) Suitable for Use Values (S4UL) derived by LQM/CIEH "S4ULS for Human Health Risk Assessment" 2015. For organics a SOM of 1.0% assumed.

11.4.21 Eight samples of the topsoil were tested. Virtually all the results for the topsoil fell within their respective threshold concentrations and can be considered uncontaminated. The exception was from trial pit TP4 which contained slightly elevated levels of lead.

11.4.22 All eight samples were screened for asbestos. No asbestos containing materials or fibres were detected. However, as discussed previously, pieces of probable asbestos cement sheeting were observed in trial pit TP12. This was confirmed in testing to comprise Chrysotile asbestos.

BS3882: 2015 Specification for Topsoil

11.4.23 Two samples of topsoil were tested to determine their compliance with BS3882: 2015 Specification for Topsoil.

11.4.24 The sample from trial pit TP4 complied with the specification of a Multi-purpose topsoil, with the exception that the Extractable Potassium Concentration of 20.1 mg/l, which was below the required 121 mg/l. It did however constitute a low fertility topsoil.

11.4.25 The sample from trial pit TP6 was also low in respect of Extractable Potassium (recording 47 mg/l), but also Extractable Magnesium. In respect of Extractable Magnesium, the recorded concentration was 46 mg/l, as opposed to the minimum of 51 mg/l. Once again, these concentrations are acceptable for a low fertility topsoil.

11.4.26 In general, both samples were largely in accordance with a Multi-purpose topsoil, and entirely in accordance with a low fertility topsoil. The deviations from the multi-purpose specification were relatively minor.

11.4.27 In the interests of sustainability, it is therefore recommended that the topsoil is reused, subject to the agreement of Kirklees Council and the NHBC.

Herbicides

11.4.28 Given the site is predominantly grassland, two samples of the topsoil were analysed for commonly used herbicides.

11.4.29 All the results fell below the limit of detection indicating their absence. It is nevertheless recommended that confirmation is obtained from the landowner that herbicides and pesticides have not been used on the land. No animal carcasses have been encountered. However, it is also recommended that assurances are sought that livestock have not been buried on the site.

12 GEOENVIRONMENTAL RISK ASSESSMENT

Conceptual Site Model

- 12.1 A quantitative health and environmental risk assessment has been carried out as part of this assessment. The process of risk assessment is set out in Part IIA of the Environment Protection Act 1990 and amended in part by The Water Act 2003. This defines contaminated land as *"any land which appears to the local authority in whose area it is situated to be in such a condition by reason of substances in, on or under the land, that there is a significant possibility of significant harm being caused, or that significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused"*.
- 12.2 The Act introduces the concept of a pollution linkage. This linkage consists of a pollution (contaminative) source or hazard and a receptor, together with an established pathway between the two. For land to be contaminated, a pollution linkage (hazard-pathway-receptor) must exist. This forms a so-called 'conceptual model' of the site.
- 12.3 Examples of pathways and effects from land contamination (after PPS 23) are given below, and these are illustrated on figure 3.

12.4 **Human Health (Pathways 1-5, Receptors A – C)**

Uptake of contaminants by food plants grown in contaminated soil - Uptake will depend on the concentration of a contaminant in soil, its chemical form, soil pH, plant species and prominence in diet.

Ingestion and inhalation - Substances may be ingested directly by young children playing on contaminated soil, or by eating plants which have absorbed metals or are contaminated with soil or dust. Ingestion may also occur via contaminated water supplies. Metals and some organic material substances may be inhaled from dusts and soils. Land gas, radon and volatile organic compounds can be inhaled directly.

Skin contact - Soil containing tars, oils and corrosive substances may cause irritation to the skin through direct contact. Some substances (e.g. phenols) may be absorbed into the body through the skin or through cuts and abrasions.

Irradiation - As well as being inhaled and absorbed through the skin, radioactive materials emitting gamma rays can cause a radiation response.

Fire and explosion - Materials such as coal, coke particles, oil, tar, pitch, rubber, plastic and domestic waste are all combustible. Both underground fires and biodegradation of organic materials may produce toxic or flammable gases. Methane and other gases may explode if allowed to accumulate in confined spaces.

12.5 **Buildings (Pathways 7 and 8)**

Fire and explosion - Underground fires may cause ground subsidence and cause structural damage. Accumulations of flammable gases in confined space leads to a risk of explosion. Underground fires may damage services.

Chemical attack on building materials and services - Sulphates may attack concrete structures. Acids, oils and tarry substances may accelerate corrosion of metals or attack plastics, rubber and other polymeric materials used in pipework and service conduits or as jointing seals and protective coatings to concrete and metals.

Physical - Blast-furnace and steel-making slag (and some natural materials) may expand. Degradation of fills may cause settlement and voids in buried tanks and drums may collapse as corrosion occurs or under loading.

12.6 **Natural Environment (Pathway 6, Receptors D - E)**

Phytotoxicity (prevention/inhibition of plant growth) - Some metals essential for plant growth at low levels are phytotoxic at higher concentrations. Methane and other gases may give rise to phytotoxic effects.

Contamination of water resources - Soil has a limited capacity to absorb, degrade or attenuate the effects of pollutants. When this is exceeded, polluting substances may enter into surface and groundwaters.

Ecotoxological effects - Contaminants in soil may affect microbial, animal and plant populations. Ecosystems or individual species on the site, in surface waters or areas affected by migration from the site may be affected.

- 12.7 For any contaminant source identified, judgement is used regarding the probability of a pollution linkage occurring and the potential consequences of that linkage. Based on the probability and likely consequences, the overall risk (significance) can be established. The definitions that have been used for this purpose are given in Standard Appendix B. The probability of a hazard, combined with its consequences, can be used to assess risk. This forms the so-called Conceptual Site Model.

Sources

- 12.8 The majority of the site has had no previously recorded commercial or industrial use recorded on the historical maps having always been agricultural land. As such no specific potential contaminants have been identified and no contaminants have been found during the investigation and subsequent laboratory testing.
- 12.9 The southwestern part of the site was mainly used as farm buildings. Given the age of the previous buildings, asbestos containing materials may have been used in their construction. In particular, probable asbestos cement sheeting has been extensively used in the stable blocks. Should asbestos containing materials be identified, these should be safely removed prior to demolition. Nevertheless, waste cement sheeting materials may have found their way into the near surface either during construction, or more likely after the farm was abandoned. This is demonstrated by the presence of asbestos cement sheeting in trial pit TP12.

- 12.10 As with all agricultural land, there is the possible burial of livestock, as well as the use of herbicides and pesticides. However, no evidence of these have been encountered to date.
- 12.11 Reference has been made primarily to DEFRA publication CLR8 'Potential Contaminants for the Assessment of Land' and the relevant DOE Industry Profiles to identify the typical contaminants associated with the past industrial use.

Risk Assessment based on Conceptual Site Model

Summary of Hazards, Pathways and Receptors

Source	Potential Pollutant	Pathways	Receptor	Risk
Potential contaminated Made Ground. Possible past minor fuel spillages and metals. Possible Asbestos Containing Materials.	No specific contaminative sources identified. Oils, fuels, grease, hydraulic fluid, metals, asbestos (sheeting).	1 - 5	A. Present Occupants.	Low Risk.
			B. Groundworkers.	Low Risk involved with excavation work, providing personnel adopt suitable precautions, together with washing facilities.
			C. Future Occupants.	Low Risk for residential use, providing Made Ground is removed or capped by clean sub-soil and topsoil.
		6	D. Controlled Waters.	Low Risk.
			E. Ecosystems.	Low Risk as leaching is not considered likely.
		7	F. Building Materials and Services.	Low Risk. Install pipes in clean bedding materials. Adequate precautions to be taken in respect of buried concrete.
Organic Material.	Landfill Gases, Radon, VOCs, SVOCs.	8	A - F	Medium Risk. Low values of ground gases present during initial monitoring. Basic radon protection measures are required.

Pathways and Receptors

- 12.12 The principal receptors are groundworkers, future residents and controlled waters (Receptors B, C and D). However based on the past history of the site and the laboratory testing to date, the probability of contamination being present sufficient to affect the identified receptors is considered to be a low risk with respect to the majority of the site. The area around the buildings and the westernmost part of the site have been found to comprise Made Ground which contained elevated levels of heavy metals, polyaromatic hydrocarbons and asbestos cement sheeting.
- 12.13 The overall risk for the agricultural land is assessed to be low, with a low to medium risk for the area around the existing buildings and the westernmost part of the site. Section 13 of this report provides recommendations in this regard.
- 12.14 With any site, the possibility of contaminants being present, sufficient to cause significant harm cannot be entirely precluded without extensive intrusive investigation, sampling and testing since it is not always possible to determine if contaminants have been tipped on the site, or have seeped into the ground, or have migrated below the ground onto the site from adjacent pieces of land. However, based on the investigation carried out to date, this is considered unlikely.
- 12.15 It is recommended that if during construction any suspicious or unusual odours, colours, liquids or soils are uncovered, these should be brought to the attention of Michael D Joyce Associates LLP and appropriate advice sought.

13 RECOMMENDATIONS

- 13.1 It is proposed to redevelop the site for residential purposes. At present there do not appear to be any major geotechnical constraints to developing this site. However, there are a number of aspects that need to be taken into consideration when assessing the feasibility and design of this scheme.

13.2 Foundation Criteria

Normal Strip Footings

- 13.2.1 Normal strip footings will be suitable for the new houses. They will have to be sited below any Made Ground and original topsoil still remaining after site clearance, and founded upon the underlying bedrock or weathered bedrock. This material is non-plastic and as such has a low swelling and shrinkage potential, and foundations should be at least 0.75m below groundlevel. At this depth, for foundations sited upon the slightly clayey sand, an allowable bearing pressure of up to 100kN/m^2 can be adopted. If sandstone bedrock is encountered, an allowable bearing pressure of 250kN/m^2 can be adopted. It would also be prudent to lightly reinforce the footings.
- 13.2.2 All foundation excavations must be inspected to ensure that no footings are sited upon any weak Made Ground, softer clays or other such weak materials that would be incapable of safely sustaining the applied foundation loads. This will be particularly important wherever any appreciable amounts of Made Ground occur. Wherever any suspect ground is encountered at proposed foundation level, then that footing must be deepened until a satisfactory bearing medium is obtained.

13.3 Building Near Trees

- 13.3.1 Wherever any houses are located near existing or proposed new trees, their foundations must be sited below the potential root growth zone. Reference should therefore be made to the NHBC Standards Chapter 4.2 "Building Near Trees", which gives guidance on foundation criteria, depths and construction. All services will also have to be similarly protected. It should be noted however that non-plastic soils are expected with negligible swelling and shrinkage properties.

13.4 Ground Gas

- 13.4.1 The site now lies in an area where basic radon protection measures are required.
- 13.4.2 Initial ground gas monitoring indicates that basic gas protection measures will not be required in respect of methane and carbon dioxide.
- 13.4.3 As the basic gas protection measures for radon, methane and carbon dioxide are essentially the same, the membrane chosen protects against all of these. BR211 (2023) "Radon: Guidance on Protective Measures for New Buildings" and BS8485: 2015 + A1: 2020 "Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings", both give construction advice for preventing gases entering buildings. Advice is also given in respect of sealing services where they pass through impermeable membranes.
- 13.4.4 The supervision of the installation will need to be undertaken by a suitably qualified consultant. Detailed records and photographs of the installations should be made. It

is recommended that verification is carried out in accordance with YALPAG Guidance
“Verification Requirements for Gas Protection Systems” Version 1.1 December 2016.

13.5 Existing Drains and Services

13.5.1 No drains or buried service channels are anticipated on the site

13.6 Road Construction

13.6.1 The new road should conform to “The Specifications of Highway Works” and “The Notes for Guidance on the Specification for Highway Works”.

13.6.2 The design of trafficked pavements must take account of the ground conditions and likely traffic loads during the life of the development. Designs meeting the following requirements will normally be acceptable. At sites where particular poor ground conditions are encountered or where it is anticipated that there will be a particularly high frequency of commercial vehicle or abnormal load movements, further analysis in accordance with the “Design Manual for Roads and Bridges” will be required to demonstrate integrity of the design.

13.6.3 A preliminary design can be prepared using an “Equilibrium CBR” value based on the appropriate type of sub-grade material as set out in the table below. However, if this method of CBR estimation is used, testing by an approved laboratory will be required prior to construction in order to verify the CBR value used for design.

--

Equilibrium CBR Value to be used for Design Purposes		
Type of Soil	Plasticity Index	Equilibrium CBR (%)
Heavy Clay	50 or greater	Less than 2
Heavy Clay	40 to 49	2
Heavy Clay	30 to 39	2
Silty Clay	20 to 29	3
Sandy Clay	10 to 19	4
Silt	Less than 10	1
Sand (Poorly graded)	Non-plastic	20
Sand (well graded)	Non-plastic	40
Gravel (poorly graded)	Non-plastic	40
Sandy Gravel (well graded)	Non-plastic	60

(Based on Design Manual for Roads and Bridges)

- 13.6.4 A granular foundation comprising sub-base or a combination of sub-base and a capping layer can be provided in accordance with the table below.

Pavement Foundation Design					
CBR (%)	Capping (mm)	+	Sub-Base (mm)	OR	Sub-Base (mm)
Less than 2	600	+	150		--
2	450	+	150		--
3	350	+	150	OR	300
4	300	+	150	OR	275
5 to 15	250	+	150	OR	225
> than 15	--	+	--		150

- 13.6.5 Sub-grades that have CBR values significantly less than 2% and deform under construction traffic may be unsuitable to support the pavement. In this case, special measures will be required. No material within 450mm of the finished road surface should be frost susceptible.

- 13.6.6 The subgrade comprises either sandstone bedrock or weathered sandstone and a CBR in excess of 15% can be expected, requiring 150mm of sub-base. Prior to the application of any sub-base, all subgrades must be checked by proof rolling to ensure that an adequate CBR exists. Where any loose granular or soft clayey areas remain, these must be either dug out and replaced by compacted material or an additional 150mm of sub-base added. This will be especially important wherever trench works for drains, sewers and other services have been carried out.
- 13.6.7 Any old foundations should be removed to a depth of 1m below subgrade level to prevent hardspots occurring. It will also be necessary to prevent the deterioration of the subgrade due to the effects of wet weather and the site traffic.

13.7 Sustainable Surface Water Drainage

- 13.7.1 As this site is underlain by sandstone bedrock, soakaways for carriageway and/or house roof surface water drainage should be feasible. Each soakaway will have to be sited in the clean, unweathered zone of the sandstone bedrock, which should be at a reasonable depth. If soakaways are proposed, it will be necessary to carry out some further representative tests in order to establish the permeabilities of the sandstone bedrock, and depths of clean unweathered zones at the actual locations of the proposed soakaways. Soakaways should be designed in accordance with BRE Digest 365: *Soakaway Design* and sized so that they discharge the design storm within 24 hours.
- 13.7.2 No soakaways should be placed within 5m of building foundations, nor should they discharge into any Made Ground if encountered.

13.8 Excavations and Groundwater

- 13.8.1 Soft ground plant should prove suitable for most of the excavations. However sandstone bedrock exists at shallow depth in places and will require heavier plant. For all deep excavations in excess of 1.2m where vertical sides are necessary, trench supports should be provided as the soils will not be self-supporting for any appreciable length of time.
- 13.8.2 No groundwater seepages were noted in the near surface. However it should be remembered that trapped groundwater can be released from areas of Made Ground when they are excavated. In addition seasonal variation in groundwater levels will occur and groundwater will be shallower during the winter months.

13.9 Contamination

- 13.9.1 The majority of the topsoil on the site was found to be contaminated. However, asbestos cement sheeting was positively identified in trial pit TP12 and elevated levels of lead were found in trial pit TP14. These coincided with those areas where Made Ground materials were found to be mixed within the topsoil.
- 13.9.2 The following approach should therefore be adopted initially. Figure 4 illustrates the “areas” of topsoil.

Area 1

The eastern half of the site has been found to be uncontaminated. The topsoil can be stripped off and reused in garden and landscaped areas.

Area 2

The northeastern part of the western half of the site (TP10, TP11, TP13 and TP17) also appears to be uncontaminated, and as such is also suitable for reuse. This area should be stockpiled separately, and further testing carried out to ensure it is suitable for reuse.

Area 3

In this area, the Made Ground has been found to be mixed with Made Ground materials and should be assumed to be unsuitable for reuse. In the absence of more detailed investigation and testing, this area should be considered contaminated and the topsoil/Made Ground should be removed from site. It is recommended that further segregation is carried out in this area during the site strip. In particular, the area around trial pit TP12 is segregated as it is known to contain asbestos cement sheeting. However, the other areas of Made Ground may not contain asbestos containing materials. Whilst these materials will need to be removed, the proven absence of ACM's will be significant in respect of disposal costs.

13.10 Cement and Buried Concrete

13.10.1 The soils have been found to contain low levels of water soluble sulphates and slightly acidic pH values.

13.10.2 In accordance therefore with the Building Research Establishment Special Digest No. 1 "Concrete in Aggressive Ground", a normal Portland cement in accordance with Group DS-1 Specifications can be used for all buried concrete and mortar.

13.11 Services

- 13.11.1 Wherever drains and mains services pass from natural to Made Ground strata, adequate flexibility should be provided so that breakages do not occur due to adverse settlements between materials of differing compressibility.

13.12 Further Monitoring and Inspection

- 13.12.1 Should any geotechnical or geoenvironmental problems arise on site or if ground conditions are different from those that we predicted, they should be referred back to Michael D Joyce Associates LLP.

A D Joyce

BSc MSc ARSM CEng CGeol CEnv MICE FGS SiLC SQP

January 2025

This report is subject to the provisions of the Copyright Acts and is for the sole benefit of Jones Homes (Yorkshire) Limited in respect of a preliminary assessment of geotechnical and contamination conditions on the site. It does not purport to provide specialist legal advice in respect of environmental issues. The report cannot be assigned to, or relied on, by any other party without prior permission.

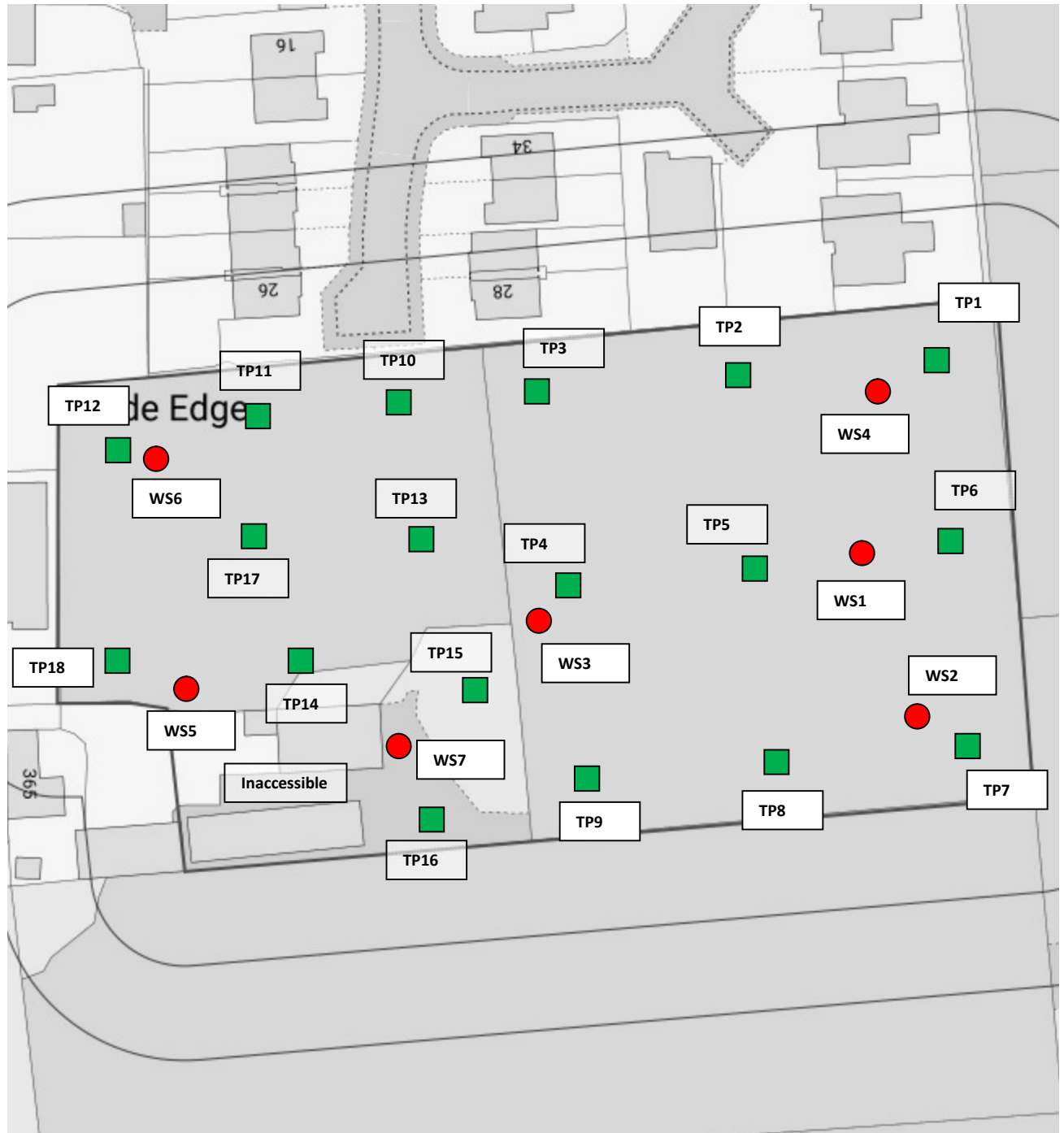
Procedure Notes

The desk study and ground investigation have been carried out in accordance with the principles of BS EN 1997-1: 2004 "Eurocode 7 - Geotechnical Design - Part 1: General Rules", BS EN 1997-2: 2007 "Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing", BS5930: 1999 and BS10175: 2001, and the terms of the client's brief. By its very nature any ground investigation only samples a small percentage of the ground. Consequently changes in ground conditions and soil properties can occur between any two exploratory points, for example local features such as soft ground, pockets of contamination and faults. This is also true of the exploration of mineworkings and such features can extend beneath parts of the site not investigated. Unrecorded bell pits and shafts can also exist between exploratory points. The ground investigation is designed to minimize such risks. Conclusions and recommendations are based on the information presented in this report, but unforeseen features may exist. Therefore, actual ground conditions should be noted during construction and further advice sought if they differ significantly from those predicted.

Further investigation can be carried out to further reduce uncertainty and risk but ultimately these risks cannot be eliminated. Similarly a desk study normally only considers readily available information and further information could be held by other sources. In commissioning further research or investigation the cost/benefit of doing so must be considered.

Where buildings are present on a site, structural and asbestos surveys have not been carried out, unless specifically stated. An unexploded ordnance survey has not been carried out. In relevant situations it would be prudent to commission such surveys.

Where information has been obtained from Third Parties, no liability can be accepted for the accuracy or completeness of this information. Where anecdotal evidence or speculations are presented, they must be treated as such and cannot be relied upon.



365 Dunford Road, Hade Edge
Window Sampling Borehole and Trial Pit Locations

Michael D Joyce Associates LLP
Geotechnical and Geoenvironmental Consultants

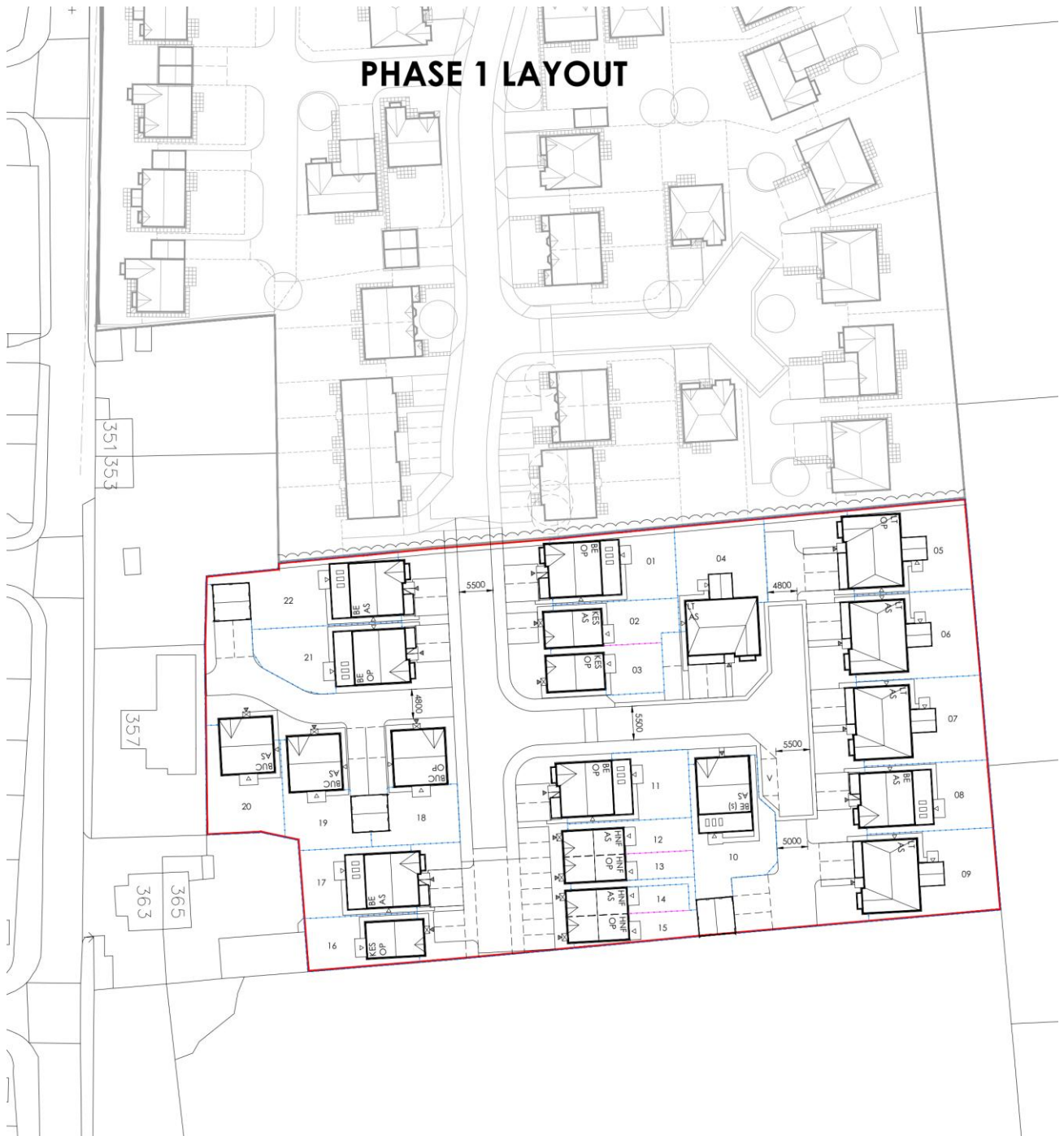
Reproduced from the
Ordnance Survey Map with
the permission of the
controller of Her Majesty's
Stationery Office. Crown
copyright reserved.
Licence No. AL 100004970



Scale: NTS

Figure: 2

PHASE 1 LAYOUT



365 Dunford Road, Hade Edge
Development Proposals

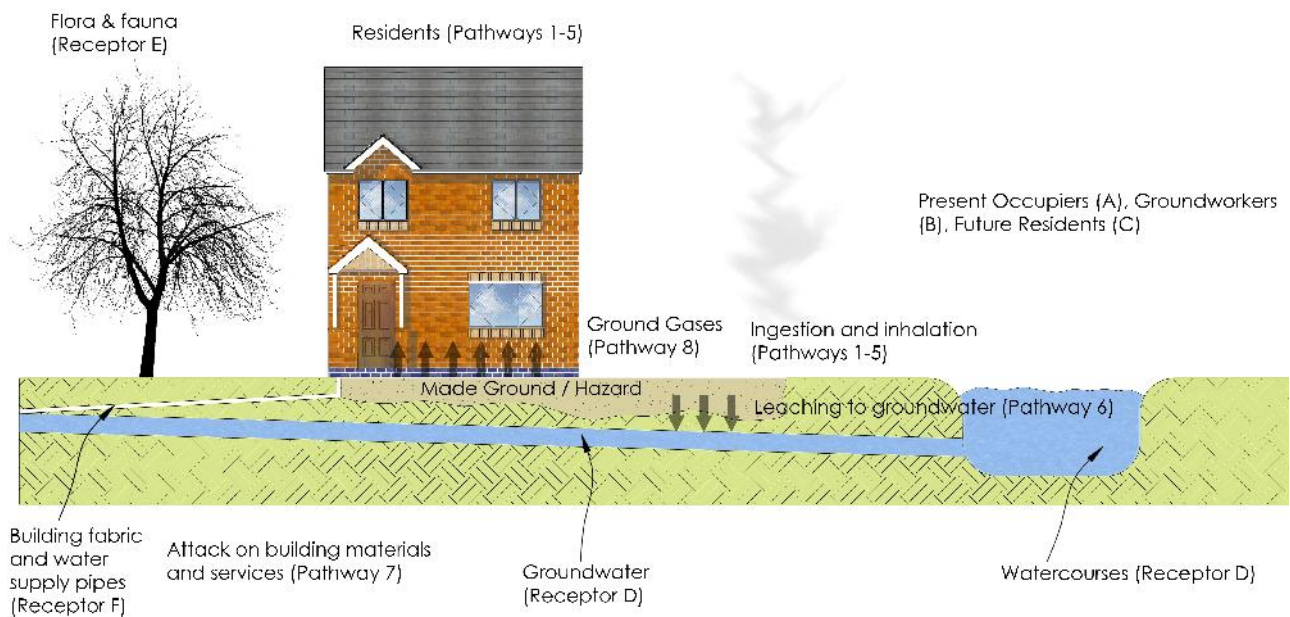
Michael D Joyce Associates LLP
Geotechnical and Geoenvironmental Consultants

Reproduced from the
Ordnance Survey Map with
the permission of the
controller of Her Majesty's
Stationery Office. Crown
copyright reserved.
Licence No. AL 100004970



Scale: NTS

Figure: 2



Pathways

1. Ingestion of contaminated soil/dust
2. Ingestion of contaminated food
3. Ingestion of contaminated water
4. Inhalation of contaminated vapours
5. Dermal contact with contaminated soil/dust or water
6. Pollution of controlled water and off site migration
7. Attack on building materials and services
8. Migration of landfill gases and radon

Receptors

- A. Present site occupiers
- B. Site development personnel
- C. Future residents
- D. Controlled waters
- E. Flora and fauna
- F. Building and services

Schematic Representation of Conceptual Site Model

Schematic Representation of Conceptual Site Model

Michael D Joyce Associates LLP
Geotechnical and Geoenvironmental Consultants

Figure: 3



365 Dunford Road, Hade Edge
Topsoil Areas

Michael D Joyce Associates LLP
Geotechnical and Geoenvironmental Consultants

Reproduced from the
Ordnance Survey Map with
the permission of the
controller of Her Majesty's
Stationary Office. Crown
copyright reserved.
Licence No. AL 100004970



Scale: NTS

Figure: 4

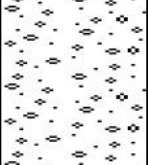
APPENDIX 1

Window Sampling Records

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Method: Terrier Rig
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: WS1

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
1.00	SPT(C)	N>50		0	0	Ground Surface	
						Dark brown slightly silty sandy TOPSOIL.	
				-0.32		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-1	1	Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix.	
1.40	SPT(C)	N>50		-1.4		End of Borehole	
					2		
					3		
					4		
					5		

General:
Groundwater: Dry on completion.
Remarks: Gas installation to 1.4m.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Method: Terrier Rig
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: WS2

Michael D Joyce Associates LLP

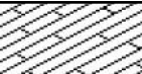
Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
1.00	SPT(C)		N>50	0	0	Ground Surface	
				-0.22		Dark brown slightly silty sandy TOPSOIL.	
						Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-0.7			
				-1	1	Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix.	
						End of Borehole	
					2		
					3		
					4		
					5		

General:
Groundwater: Dry on completion.
Remarks: Gas installation to 1.0m.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Method: Terrier Rig
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: WS3

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
1.00	SPT(C)		N>50	0	0	Ground Surface	
				-0.3		Dark brown slightly silty sandy TOPSOIL.	
				-0.6		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-1		Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix.	
					1	End of Borehole	
					2		
					3		
					4		
					5		

General:
Groundwater: Dry on completion.
Remarks: Gas installation to 1.0m.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Method: Terrier Rig
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: WS4

Michael D Joyce Associates LLP

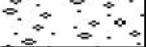
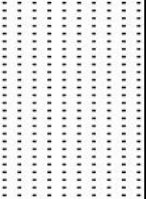
Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
0.80	SPT(C)		N>50	0	0	Ground Surface	
				-0.3		Dark brown slightly silty sandy TOPSOIL.	
				-0.45		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-0.8		Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix.	
					1	End of Borehole	
					2		
					3		
					4		
					5		

General:
Groundwater: Dry on completion.
Remarks: Gas installation to 0.8m.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Method: Terrier Rig
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: WS5

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
1.00	SPT(C)	N>50		0	0	Ground Surface	
						Dark brown slightly silty sandy TOPSOIL.	
				-0.4		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-0.6		Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix.	
1.40	SPT(C)	N>50		-1.4		End of Borehole	
					2		
					3		
					4		
					5		

General:
Groundwater: Dry on completion.
Remarks:

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Method: Terrier Rig
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: WS6

Michael D Joyce Associates LLP

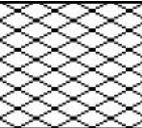
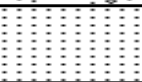
Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
1.00	SPT(C)		N>50	0	0	Ground Surface	
				-0.3		MADE GROUND: Brown gravelly sand and topsoil, mixed with ash, concrete, stone and plastic netting.	
						Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix.	
				-1	1	End of Borehole	
					2		
					3		
					4		
					5		

General:
Groundwater: Dry on completion.
Remarks: Gas installation to 1.0m.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Method: Terrier Rig
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Window Sampling No: WS7

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Reduced Level (m)	Depth (m)	Description	Legend
1.10	SPT(C)		N>50	0	0	Ground Surface	
						MADE GROUND: Brown gravel sand mixed with pieces of tarmac and stone.	
				-0.5		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-0.8		Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix.	
				-1.1	1	End of Borehole	
					2		
					3		
					4		
					5		

General:
Groundwater: Dry on completion.
Remarks: Gas installation to 1.1m.

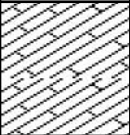
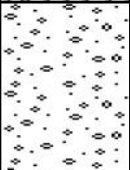
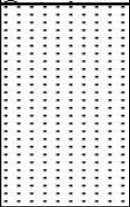
APPENDIX 2

Trial Pit Records

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP1

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
0.10	D			0	0	Ground Surface	
						Dark brown slightly silty sandy TOPSOIL.	
				-0.4		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-0.9	1	Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
				-1.5		End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP2

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
0.05	D			0	0	Ground Surface	
						Dark brown slightly silty sandy TOPSOIL.	
				-0.3		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
0.80	D			-0.7		Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
					1		
				-1.3			
						End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP3

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
						Dark brown slightly silty sandy TOPSOIL.	
				-0.4		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-0.6		Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
				-0.9			
					1	End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP4

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
0.10	D			0	0	Ground Surface	
						Dark brown slightly silty sandy TOPSOIL.	
				-0.35			
0.60	D			-0.45		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
						Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
				-1	1	End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

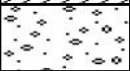
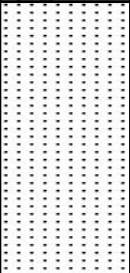
Michael D Joyce Associates LLP

Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP6

Michael D Joyce Associates LLP

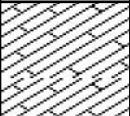
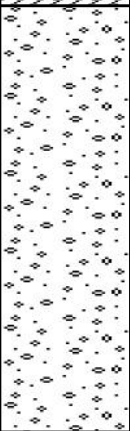
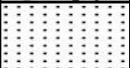
Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
0.10	D			0	0	Ground Surface	
						Dark brown slightly silty sandy TOPSOIL.	
				-0.3		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-0.5		Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
				-1.3		End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP7

Michael D Joyce Associates LLP

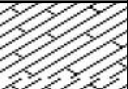
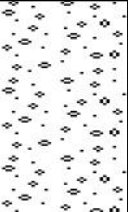
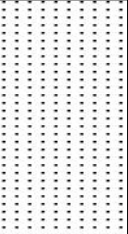
Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
						Dark brown slightly silty sandy TOPSOIL.	
				-0.35		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-1.6		Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
				-1.8		End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP8

Michael D Joyce Associates LLP

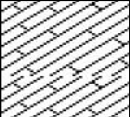
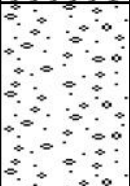
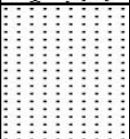
Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
0.10	D			0	0	Ground Surface	
						Dark brown slightly silty sandy TOPSOIL.	
				-0.27		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
0.70	D			-0.9	1	Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
				-1.6		End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP9

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
0.05	D			0	0	Ground Surface	
						Dark brown slightly silty sandy TOPSOIL.	
				-0.35		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-0.9	1	Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
				-1.3		End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP10

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
				-0.25		Dark brown slightly silty sandy TOPSOIL.	
				-0.35		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-1	1	Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
						End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Client: Jones Homes (Yorkshire) Ltd

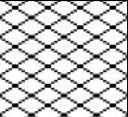
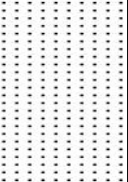
Michael D Joyce Associates LLP

Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP12

Michael D Joyce Associates LLP

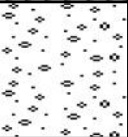
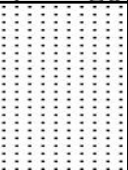
Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
0.10	D			0	0	Ground Surface	
						MADE GROUND: Topsoil mixed with ash, burnt wood, plastics, metal and broken pieces of asbestos cement sheeting.	
				-0.35		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-0.65		Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
				-1.2	1	End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP13

Michael D Joyce Associates LLP

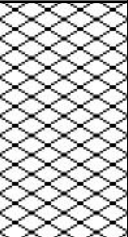
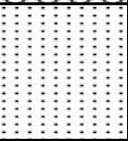
Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
0.20	D			0	0	Ground Surface	
				-0.2		Dark brown slightly silty sandy TOPSOIL.	
				-0.6		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-1.1	1	Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
						End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP14

Michael D Joyce Associates LLP

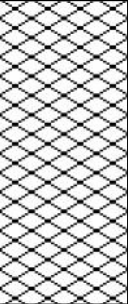
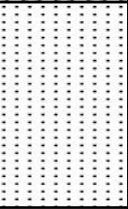
Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
0.80	D			0	0	Ground Surface	
						MADE GROUND: Topsoil mixed with a little ash, burnt wood, concrete and pieces of plastic.	
				-0.7			
						Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
				-1.1	1		
						End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP15

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
						MADE GROUND: Brown gravelly sand and topsoil, mixed with ash, concrete, stone and plastic netting.	
				-0.9	1	Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
				-1.5		End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP16

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
				-0.1		MADE GROUND: Single size stone hardcore.	
						MADE GROUND: Brown gravelly sand and topsoil, mixed with ash, concrete, stone and plastic netting.	
				-0.5			
						Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
				-1	1	End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP17

Michael D Joyce Associates LLP

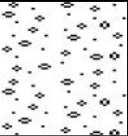
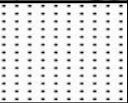
Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
0.15	D			0	0	Ground Surface	
						Dark brown slightly silty sandy TOPSOIL.	
				-0.3		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
0.50	D			-0.5		Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
				-0.8		End of Trial Pit	
					1		
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

Site: 365 DUNFORD ROAD (4431)
Location: HADE EDGE, HOLMFIRTH
Excavated by: JCB 3CX
Date: 29th November 2024
Client: Jones Homes (Yorkshire) Ltd

Trial Pit No: TP18

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
						Dark brown slightly silty sandy TOPSOIL.	
				-0.3		Orangish-brown and yellow-brown slightly silty gravelly SAND.	
				-0.7		Yellow-brown moderately and slightly weathered coarse grained SANDSTONE, recovered as gravel and cobbles in a sand matrix. Trial pits terminated on competent sandstone bedrock.	
				-1	1	End of Trial Pit	
					2		
					3		
					4		

Stability: Sides just stable.
General:
Groundwater: Dry on completion.

APPENDIX 3

Laboratory Test Results

Michael D Joyce Associates LLP

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

e: mdja@geoenvironmental.co.uk

Analytical Report Number : 24-057070

Project / Site name:	365 Dunford Road, Hade Edge	Samples received on:	02/12/2024
Your job number:		Samples instructed on/ Analysis started on:	02/12/2024
Your order number:		Analysis completed by:	10/01/2025
Report Issue Number:	1	Report issued on:	13/01/2025
Samples Analysed:	17 soil samples		

REDACTED

Signed: _____

Charlotte Andrew
Key Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting
	air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 24-057070
Project / Site name: 365 Dunford Road, Hade Edge

Lab Sample Number				396157	396158	396159	396160	396161
Sample Reference				TP2	TP5	TP8	TP9	TP11
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.05	0.10	0.10	0.05	0.15
Date Sampled				29/11/2024	29/11/2024	29/11/2024	29/11/2024	29/11/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					

Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	17	23	24	24	17
Total mass of sample received	kg	0.1	NONE	0.9	0.9	2	0.9	0.9

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KJK	KJK	KJK	KJK	KJK
Actinolite detected	Type	N/A	ISO 17025	-	-	-	-	-
Amosite detected	Type	N/A	ISO 17025	-	-	-	-	-
Anthophyllite detected	Type	N/A	ISO 17025	-	-	-	-	-
Chrysotile detected	Type	N/A	ISO 17025	-	-	-	-	-
Crocidolite detected	Type	N/A	ISO 17025	-	-	-	-	-
Tremolite detected	Type	N/A	ISO 17025	-	-	-	-	-

Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-	-	-	-	-
---	------	-----	-----------	---	---	---	---	---

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	5.9	5.9	5.6	7.9	6.1
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	23	45	42	53	39
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	11.2	22.6	20.9	26.6	19.6
Water Soluble SO ₄ 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	-	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
----------------------------	-------	---	--------	-------	-------	-------	-------	-------

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.06	0.16	0.16	< 0.05	0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.07	0.05	0.07	0.07
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.17	0.1	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.06	0.17	0.1	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.38	1.2	0.71	0.26	0.26
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.26	0.14	0.07	0.08
Fluoranthene	mg/kg	0.05	MCERTS	0.59	1.3	1	0.85	0.91
Pyrene	mg/kg	0.05	MCERTS	0.6	1.3	0.97	0.84	0.86
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.31	0.67	0.52	0.42	0.59
Chrysene	mg/kg	0.05	MCERTS	0.32	0.65	0.51	0.5	0.6
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.4	0.74	0.67	0.9	0.86
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.13	0.23	0.19	0.25	0.25
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.28	0.56	0.46	0.62	0.61
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.16	0.28	0.23	0.37	0.29
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.06	< 0.05	0.08	0.08
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.2	0.27	0.23	0.42	0.29

Analytical Report Number: 24-057070
Project / Site name: 365 Dunford Road, Hade Edge

Lab Sample Number	396157	396158	396159	396160	396161
Sample Reference	TP2	TP5	TP8	TP9	TP11
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix	N/A	N/A	N/A	N/A	N/A
Depth (m)	0.05	0.10	0.10	0.05	0.15
Date Sampled	29/11/2024	29/11/2024	29/11/2024	29/11/2024	29/11/2024
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	3.48	8.09	6.07	5.66	5.8
-----------------------------	-------	-----	-----------	------	------	------	------	-----

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	15	12	13	15
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	< 0.2	0.3	0.4	0.4
Chromium (hexavalent)	mg/kg	1.8	MCERTS	2.4	2.3	2.5	< 1.8	2.1
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	14	14	14	13
Copper (aqua regia extractable)	mg/kg	1	MCERTS	31	40	17	22	20
Lead (aqua regia extractable)	mg/kg	1	MCERTS	110	130	78	73	110
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	8.5	8.7	9.1	8.4	8.3
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	1.2	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	49	42	53	61	47

Subcontracted Analysis

Acid Herbicide Suite (subcontracted)	N/A	N/A	NONE	-	-	-	-	-
Chloroben (subcontracted)	N/A	N/A	NONE	-	-	-	-	-
2,6 - dichlorobenzoic acid (DBA) (subcontracted)	N/A	N/A	NONE	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-057070
Project / Site name: 365 Dunford Road, Hade Edge

Lab Sample Number	396162	396163	396164	396165	396166
Sample Reference	TP13	TP14	TP17	TP2	TP4
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix	N/A	N/A	N/A	N/A	N/A
Depth (m)	0.20	0.20	0.15	0.80	0.60
Date Sampled	29/11/2024	29/11/2024	29/11/2024	29/11/2024	29/11/2024
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	19	18	19	22
Total mass of sample received	kg	0.1	NONE	0.9	0.9	0.9	0.1	0.1

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	-	-
Asbestos Analyst ID	N/A	N/A	N/A	KJK	KJK	KJK	-	-
Actinolite detected	Type	N/A	ISO 17025	-	-	-	-	-
Amosite detected	Type	N/A	ISO 17025	-	-	-	-	-
Anthophyllite detected	Type	N/A	ISO 17025	-	-	-	-	-
Chrysotile detected	Type	N/A	ISO 17025	-	-	-	-	-
Crocidolite detected	Type	N/A	ISO 17025	-	-	-	-	-
Tremolite detected	Type	N/A	ISO 17025	-	-	-	-	-

Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-	-	-	-	-
---	------	-----	-----------	---	---	---	---	---

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	5.8	7.2	7.3	6.1	5.8
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	220	270
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	28	51	39	26	25
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	14.1	25.4	19.5	-	-
Water Soluble SO ₄ 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	-	-	13.1	12.5

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
----------------------------	-------	---	--------	-------	-------	-------	---	---

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.09	0.19	< 0.05	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.36	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.3	< 0.05	-	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.27	< 0.05	-	-
Phenanthrene	mg/kg	0.05	MCERTS	0.26	1.9	0.18	-	-
Anthracene	mg/kg	0.05	MCERTS	0.05	0.65	< 0.05	-	-
Fluoranthene	mg/kg	0.05	MCERTS	0.58	3.7	0.44	-	-
Pyrene	mg/kg	0.05	MCERTS	0.52	3.9	0.4	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.32	1.8	0.19	-	-
Chrysene	mg/kg	0.05	MCERTS	0.31	1.8	0.24	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.46	2.4	< 0.05	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.18	0.82	< 0.05	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.36	2	0.25	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.2	0.93	0.15	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.24	< 0.05	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.2	1.1	0.14	-	-

Analytical Report Number: 24-057070
Project / Site name: 365 Dunford Road, Hade Edge

Lab Sample Number	396162	396163	396164	396165	396166
Sample Reference	TP13	TP14	TP17	TP2	TP4
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix	N/A	N/A	N/A	N/A	N/A
Depth (m)	0.20	0.20	0.15	0.80	0.60
Date Sampled	29/11/2024	29/11/2024	29/11/2024	29/11/2024	29/11/2024
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	3.54	22.3	2	-	-
-----------------------------	-------	-----	-----------	------	------	---	---	---

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	17	14	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	1.1	0.4	-	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	2	< 1.8	1.9	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	24	14	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	17	87	22	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	74	270	94	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	7.5	18	8.3	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1	< 1.0	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	48	300	54	-	-

Subcontracted Analysis

Acid Herbicide Suite (subcontracted)	N/A	N/A	NONE	-	-	-	-	-
Chloroben (subcontracted)	N/A	N/A	NONE	-	-	-	-	-
2,6 - dichlorobenzoic acid (DBA) (subcontracted)	N/A	N/A	NONE	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-057070
Project / Site name: 365 Dunford Road, Hade Edge

Lab Sample Number	396167	396168	396169	396170	396171
Sample Reference	TP5	TP8	TP14	TP17	TP12
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix	N/A	N/A	N/A	N/A	N/A
Depth (m)	0.70	0.70	0.80	0.50	0.10
Date Sampled	29/11/2024	29/11/2024	29/11/2024	29/11/2024	29/11/2024
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	< 0.1	< 0.1	24.1	< 0.1	-
Moisture Content	%	0.01	NONE	25	13	9.2	12	-
Total mass of sample received	kg	0.1	NONE	0.1	0.1	0.1	0.1	-

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	-	-	-	-	Detected
Asbestos Analyst ID	N/A	N/A	N/A	-	-	-	-	KJK
Actinolite detected	Type	N/A	ISO 17025	-	-	-	-	Not-detected
Amosite detected	Type	N/A	ISO 17025	-	-	-	-	Not-detected
Anthophyllite detected	Type	N/A	ISO 17025	-	-	-	-	Not-detected
Chrysotile detected	Type	N/A	ISO 17025	-	-	-	-	Detected
Crocidolite detected	Type	N/A	ISO 17025	-	-	-	-	Not-detected
Tremolite detected	Type	N/A	ISO 17025	-	-	-	-	Not-detected

Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-	-	-	-	Asbestos Cement
---	------	-----	-----------	---	---	---	---	-----------------

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	6.1	6.7	6.7	6.7	-
Total Cyanide	mg/kg	1	MCERTS	-	-	-	-	-
Total Sulphate as SO ₄	mg/kg	50	MCERTS	270	230	260	310	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	24	28	41	23	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1)	mg/l	1.25	MCERTS	11.9	13.8	20.2	11.4	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	-
----------------------------	-------	---	--------	---	---	---	---	---

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-

Analytical Report Number: 24-057070
Project / Site name: 365 Dunford Road, Hade Edge

Lab Sample Number	396167	396168	396169	396170	396171
Sample Reference	TP5	TP8	TP14	TP17	TP12
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix	N/A	N/A	N/A	N/A	N/A
Depth (m)	0.70	0.70	0.80	0.50	0.10
Date Sampled	29/11/2024	29/11/2024	29/11/2024	29/11/2024	29/11/2024
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	-	-	-	-
-----------------------------	-------	-----	-----------	---	---	---	---	---

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	-	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	-	-	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-

Subcontracted Analysis

Acid Herbicide Suite (subcontracted)	N/A	N/A	NONE	-	-	-	-	-
Chloraben (subcontracted)	N/A	N/A	NONE	-	-	-	-	-
2,6 - dichlorobenzoic acid (DBA) (subcontracted)	N/A	N/A	NONE	-	-	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-057070
Project / Site name: 365 Dunford Road, Hade Edge

Lab Sample Number				396172	396173
Sample Reference				TP4	TP6
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				0.10	0.10
Date Sampled				29/11/2024	29/11/2024
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	-	< 0.1
Moisture Content	%	0.01	NONE	-	16
Total mass of sample received	kg	0.1	NONE	-	2

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	-	MBI
Actinolite detected	Type	N/A	ISO 17025	-	-
Amosite detected	Type	N/A	ISO 17025	-	-
Anthophyllite detected	Type	N/A	ISO 17025	-	-
Chrysotile detected	Type	N/A	ISO 17025	-	-
Crocidolite detected	Type	N/A	ISO 17025	-	-
Tremolite detected	Type	N/A	ISO 17025	-	-

Asbestos Containing Material Types Detected (ACM)	Type	N/A	ISO 17025	-	-
---	------	-----	-----------	---	---

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	-	6
Total Cyanide	mg/kg	1	MCERTS	-	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	46
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	22.8
Water Soluble SO ₄ 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0
----------------------------	-------	---	--------	---	-------

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	0.44
Anthracene	mg/kg	0.05	MCERTS	-	0.09
Fluoranthene	mg/kg	0.05	MCERTS	-	0.63
Pyrene	mg/kg	0.05	MCERTS	-	0.64
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	0.28
Chrysene	mg/kg	0.05	MCERTS	-	0.31
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	0.35
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	0.14
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	0.14
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	0.17

Analytical Report Number: 24-057070
Project / Site name: 365 Dunford Road, Hade Edge

Lab Sample Number				396172	396173
Sample Reference				TP4	TP6
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				0.10	0.10
Date Sampled				29/11/2024	29/11/2024
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	3.25
-----------------------------	-------	-----	-----------	---	------

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	13
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	-	2.5
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	12
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	15
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	78
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	6.7
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	1.2
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	36

Subcontracted Analysis

Acid Herbicide Suite (subcontracted)	N/A	N/A	NONE	See Attached	See Attached
Chloroben (subcontracted)	N/A	N/A	NONE	See Attached	See Attached
2,6 - dichlorobenzoic acid (DBA) (subcontracted)	N/A	N/A	NONE	See Attached	See Attached

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 24-057070

Project / Site name: 365 Dunford Road, Hade Edge

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
396157	TP2	None Supplied	0.05	Brown loam and sand with vegetation and stones
396158	TP5	None Supplied	0.1	Brown loam and sand with gravel and vegetation
396159	TP8	None Supplied	0.1	Brown loam and sand with gravel and vegetation
396160	TP9	None Supplied	0.05	Brown loam and sand with gravel and vegetation
396161	TP11	None Supplied	0.15	Brown loam and sand with gravel and vegetation
396162	TP13	None Supplied	0.2	Brown loam and sand with gravel and vegetation
396163	TP14	None Supplied	0.2	Brown loam and sand with gravel and vegetation
396164	TP17	None Supplied	0.15	Brown loam and sand with gravel and vegetation
396165	TP2	None Supplied	0.8	Brown sand with gravel and stones
396166	TP4	None Supplied	0.6	Brown sand with gravel
396167	TP5	None Supplied	0.7	Brown sand with gravel and vegetation
396168	TP8	None Supplied	0.7	Light brown clay and sand
396169	TP14	None Supplied	0.8	Light brown clay and sand with stones
396170	TP17	None Supplied	0.5	Brown clay and sand with gravel
396173	TP6	None Supplied	0.1	Brown loam with gravel and vegetation

Analytical Report Number : 24-057070

Project / Site name: 365 Dunford Road, Hade Edge

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080-PL	W	MCERTS
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS
Subcontracted analysis (soil)	Subcontracted analysis - see attached subcon report.	Subcontracted analysis - see attached subcon report.			NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

Michael D Joyce Associates LLP

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

e: mdja@geoenvironmental.co.uk

Analytical Report Number : 24-057071

Project / Site name: 365 Dunford Road, Hade Edge

Samples received on: 02/12/2024

Your job number:

**Samples instructed on/
Analysis started on:** 02/12/2024

Your order number:

Analysis completed by: 10/12/2024

Report Issue Number: 1

Report issued on: 10/12/2024

Samples Analysed: 2 soil samples

REDACTED

Signed:

Dominika Liana
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.



i2 Analytical

7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YS

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Certificate of Analysis									
BS 3882:2015 Specification For Topsoil									
	Fail BS 3882							client	
Report No:	24-057071						Mlchael D Joyce Associates LLP		
Location	365 Dunford Road, Hade Edge								
Lab Reference (Sample Number)	396174								
Sampling Date	29/11/2024								
Sample ID	TP4								
Depth (m)	0.10			Compliant with range (Y/N)					
		unit	Result	Multi-P	Acid	Calc	Low-F	Low-F(a)	Low-F(c)
Soil texture	<2mm fraction	%m/m	LOAMY SAND	Y	Y	Y	Y	Y	Y
Maximum coarse fragment content:	>2mm	%m/m	5.60	Y	Y	Y	Y	Y	Y
	>20mm	%m/m	0.00	Y	Y	Y	Y	Y	Y
	>50mm	%m/m	0.00	Y	Y	Y	Y	Y	Y
Mass loss on ignition		%	5.80						
	Clay 5-20%		Y	Y	Y	Y	Y	Y	Y
	Clay 20-35%		-	-	-	-	-	-	-
Soil pH:		pH	6.70	Y	N	N	Y	N	N
Carbonate:		%m/m	0.50	-	-	N	-	-	N
Available plant nutrients	Nitrogen	%m/m	0.25	Y	Y	Y	-	-	-
	Extractable Phosphate (as P)	mg/l	27.00	Y	Y	Y	N	N	N
	Extractable Potassium	mg/l	20.10	N	N	N	-	-	-
	Extractable Magnesium	mg/l	85.00	Y	Y	Y	-	-	-
Carbon: Nitrogen Ratio:		:1	13.64	Y	Y	Y	Y	Y	Y
Conductivity		us/cm	1900.00	Y	-	-	-	-	-
Phytotoxic contaminants:	** Total Zinc	mg/kg	43.00	Y	Y	Y	Y	Y	Y
	** Total Copper	mg/kg	17.00	Y	Y	Y	Y	Y	Y
	** Total Nickel	mg/kg	6.60	Y	Y	Y	Y	Y	Y
Visible contaminants:	>2mm	%m/m	0.00	Y	Y	Y	Y	Y	Y
	Plastics	%m/m	0.00	Y	Y	Y	Y	Y	Y
	Sharps	no. in 1 kg	0.00	Y	Y	Y	Y	Y	Y
Compliance:				Fail	Fail	Fail	Fail	Fail	Fail
Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and I2 cannot be held responsible for any discrepancies with current legislation									

** = MCERTS accredited



i2 Analytical
7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YS

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Certificate of Analysis										
BS 3882:2015 Specification For Topsoil										
	Pass BS 3882 for Low fertility;							client		
Report No:	24-057071						Mlchael D Joyce Associates LLP			
Location	365 Dunford Road, Hade Edge									
Lab Reference (Sample Number)	396175									
Sampling Date	29/11/2024									
Sample ID	TP6									
Depth (m)	0.10			Compliant with range (Y/N)						
			unit	Result	Multi-P	Acid	Calc	Low-F	Low-F(a)	Low-F(c)
Soil texture	<2mm fraction		%m/m	SANDY LOAM	Y	Y	Y	Y	Y	Y
Maximum coarse fragment content:	>2mm		%m/m	0.00	Y	Y	Y	Y	Y	Y
	>20mm		%m/m	0.00	Y	Y	Y	Y	Y	Y
	>50mm		%m/m	0.00	Y	Y	Y	Y	Y	Y
Mass loss on ignition			%	9.80						
	Clay 5-20%			Y	Y	Y	Y	Y	Y	Y
	Clay 20-35%			-	-	-	-	-	-	-
Soil pH:			pH	5.80	Y	N	N	Y	N	N
Carbonate:			%m/m	1.70	-	-	Y	-	-	Y
Available plant nutrients	Nitrogen		%m/m	0.38	Y	Y	Y	-	-	-
	Extractable Phosphate (as P)		mg/l	20.00	Y	Y	Y	Y	Y	Y
	Extractable Potassium		mg/l	47.00	N	N	N	-	-	-
	Extractable Magnesium		mg/l	46.00	N	N	N	-	-	-
Carbon: Nitrogen Ratio:			:1	15.14	Y	Y	Y	Y	Y	Y
Conductivity			us/cm	1800.00	Y	-	-	-	-	-
Phytotoxic contaminants:	** Total Zinc		mg/kg	34.00	Y	Y	Y	Y	Y	Y
	** Total Copper		mg/kg	16.00	Y	Y	Y	Y	Y	Y
	** Total Nickel		mg/kg	7.40	Y	Y	Y	Y	Y	Y
Visible contaminants:	>2mm		%m/m	0.00	Y	Y	Y	Y	Y	Y
	Plastics		%m/m	0.00	Y	Y	Y	Y	Y	Y
	Sharps		no. in 1 kg	0.00	Y	Y	Y	Y	Y	Y
Compliance:					Fail	Fail	Fail	Pass	Fail	Fail
Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and I2 cannot be held responsible for any discrepancies with current legislation										

** = MCERTS accredited



Analytical Report Number : 24-057071
Project / Site name: 365 Dunford Road, Hade Edge

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
396174	TP4	None Supplied	0.1	Brown loam with gravel and vegetation
396175	TP6	None Supplied	0.1	Brown loam with gravel and vegetation

Analytical Report Number : 24-057071

Project / Site name: 365 Dunford Road, Hade Edge

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)

Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Coarse Fragment and Contaminant Analysis	Determination of >2mm contaminants	BS3882:2007 & BS8601:2013 & PAS 100:2005	L019B	D	NONE
Density of available extract	Gravimetric determination of density of dried sample up to 2 mm	In-house method	L019B	D	NONE
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Conductivity (BS 3882/BS 8601)	Determination of the conductivity of soil in accordance with BS 3882:2007 methodology	BS 3882:2007 & BS 8601:2013	L031B	D	NONE
Carbonate (Topsoil - BS 3882)	Determination of Carbonate as per BS 3882:2015	Method based on BS 3882:2015	L034-PL	D	NONE
Extractable/Available Metals (BS 3882/BS 8601)	Determination of the extractable metals in soil, in accordance with BS 3882:2007 methodology	BS3882:2007 & BS8601:2013	L038B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Carbon to Nitrogen Ratio (Topsoil - BS3882:2015)	Carbon to Nitrogen ratio (:1) calculated using Loss on Ignition	BS3882:2015	L047-PL/L087B	W	NONE
Mass loss on ignition (Topsoil - BS 3882)	Determination of Loss on Ignition as per BS 3882:2015	Method based on BS 3882:2015	L047-PL	D	NONE
Phosphorus as PO ₄ (BS 3882/BS 8601)	Determination of the extractable phosphorus in soil, in accordance with BS 3882:2007 methodology	Method based on BS 3882:2015 & BS 8601:2013	L048B	D	NONE
Kjeldahl nitrogen in soil	Determination of total nitrogen using the Kjeldahl-digestion method and ion selective electrode	In-house method based on BS 7755-3.7:1995	L087B	D	NONE
pH (BS 3882/BS 8601)	Determination of the pH of soil in accordance with BS 3882:2007 methodology	BS 3882:2007 & BS 8601:2013	L099-PL	D	NONE
Topsoil (BS 3882:2015)	Specification for topsoil	BS 3882:2015	PL		NONE
Textural Classification Diagram (BS 3882:2015)	BS 3882:2015	BS 3882:2015	PL		NONE



Analytical Report Number : 24-057071
Project / Site name: 365 Dunford Road, Hade Edge

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Geotechnical Testing	See attached geotechnical report	See attached geotechnical report	PL		NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

TEST CERTIFICATE

SPECIFICATION FOR TOPSOIL
In-house method based on: BS 3882: 2015

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



Client: Michael D Joyce Associates LLP
Client Address: Not Given

Client Reference: Not Given
Job Number: 24-057071-1
Date Sampled: 29/11/2024
Date Received: 02/12/2024
Date Tested: 05/12/2024
Sampled By: Not Given

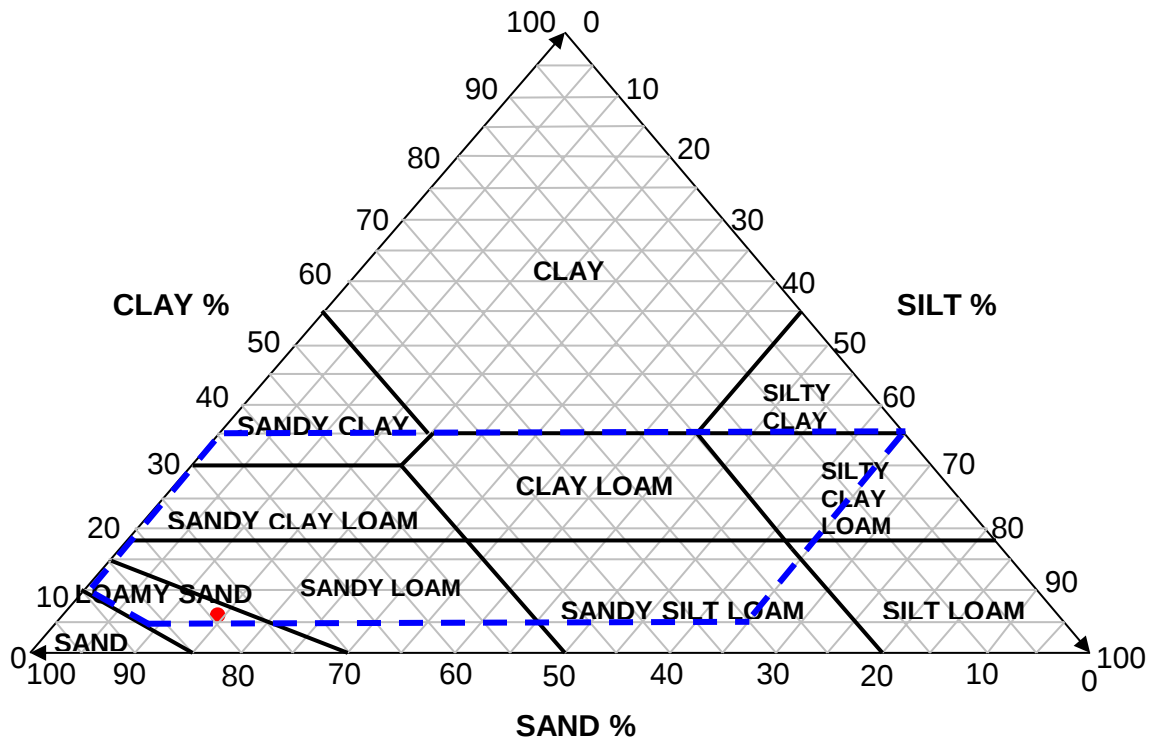
Contact: Not Given
Site Address: 365 Dunford Road, Hade Edge
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 396174
Hole No.: TP4
Sample Reference: Not Given
Sample Description: LOAMY SAND

Depth Top [m]: 0.10
Depth Base [m]: Not Given
Sample Type: D

Soil Texture Triangle



Sample Proportion	% dry mass
Sand	79.8
Silt	13.1
Clay	7.1

Texture within acceptable area (Y/N)

Remarks:

Signed:

Katarzyna Koziel

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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

TEST CERTIFICATE

SPECIFICATION FOR TOPSOIL
In-house method based on: BS 3882: 2015

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



Client: Michael D Joyce Associates LLP
Client Address: Not Given

Client Reference: Not Given
Job Number: 24-057071-1
Date Sampled: 29/11/2024
Date Received: 02/12/2024
Date Tested: 05/12/2024
Sampled By: Not Given

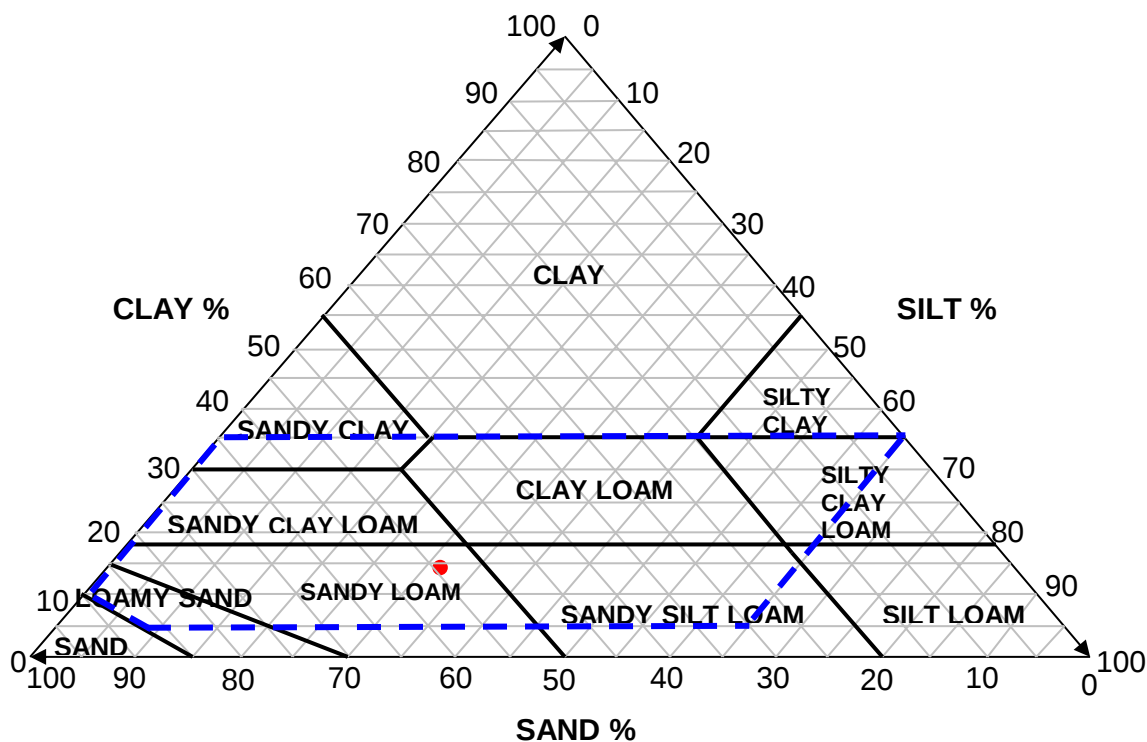
Contact: Not Given
Site Address: 365 Dunford Road, Hade Edge
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 396175
Hole No.: TP6
Sample Reference: Not Given
Sample Description: SANDY LOAM

Depth Top [m]: 0.10
Depth Base [m]: Not Given
Sample Type: D

Soil Texture Triangle



Sample Proportion	% dry mass
Sand	54.7
Silt	29.9
Clay	15.4

Texture within acceptable area (Y/N)

Remarks:

Signed:

Katarzyna Koziel

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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

Certificate of Analysis

Report No.: 24-10048-1

Issue No.: 1

Date of Issue 10/01/2025

Customer Details: i2 Analytical Ltd, 7 Woodshots Meadow, Croxley Green Business Park, Watford, Hertfordshire, WD18 8YS, United Kingdom

Customer Contact: Quotes

Customer Order No.: PO_S_C7373

Customer Reference: Not Supplied

Quotation Reference: Q24-02071 (Issue: 15)

Description: 2 geo samples

Date Received: 05/12/2024

Date Started: 05/12/2024

Date Completed: 10/01/2025

Test Methods: Details available on request (refer to SOP code against relevant result/s)

Notes: None

REDACTED

Approved By: David Long, LIMS Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service.

This certificate shall not be reproduced except in full without the prior written approval of the laboratory.

Observations and interpretations are outside of the scope of UKAS accreditation.

Results reported herein relate only to the items supplied to the laboratory for testing.

Results on an Interim Report are not dry-weight corrected.

Where the laboratory is not responsible for the sampling, results apply to the sample(s) as they were received.

The laboratory shall not be responsible for any information that is supplied by the customer that may affect the validity of results.

rpsgroup.com

RPS Environmental Management Limited trading as RPS Mountainheath. Registered in England No. 01756175.

13 St Martins Way, Bedford, Bedfordshire, MK42 0LF. T +44 1462 480 400

A member of the RPS Group plc. Terms and conditions apply - copy on request

Results Summary

Report No.: 24-10048-1

Customer Reference: Not Supplied

Customer Order No: PO_S_C7373

Customer Sample No	396172	396173
RPS Sample No	78522	78523
Sample Type	GEO	GEO
Sample Matrix	SOIL	SOIL
Sampling Date	29/11/2024	29/11/2024

Determinand	CAS No	Codes	SOP	RL	Units		
2,4,5-trichlorophenoxyacetic acid (2,4,5-T)	93-76-5	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
2,4,5-TP (Fenoprop)	93-72-1	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
2,4-dichlorophenoxyacetic acid (2,4-D)	94-75-7	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
acifluorfen	50594-66-6	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
bentazone	25057-89-0	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
clopyralid	1702-17-6	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
dichlorprop (2,4-DP)	120-36-5	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
dinoseb (DNBP)	88-85-7	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
2-methyl-4-chlorophenoxyacetic acid (MCPA)	94-74-6	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
mecoprop (MCPP)	7085-19-0	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
pentachlorophenol (PCP)	87-86-5	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
2,3,6-trichlorobenzoic acid (2,3,6-TBA)	50-31-7	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
4-[2,4-dichlorophenoxy]butanoic acid (2,4-DB)	94-82-6	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
2,6-dichlorobenzoic acid (2,6-DBA)	50-30-6	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
4-chlorophenoxyacetic acid (4-CPA)	122-88-3	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
benazolin	3813-05-6	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
bromoxynil	1689-84-5	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
chloramben	133-90-4	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
dicamba	1918-00-9	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
diclofop	40843-25-2	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
2-methyl-4,6-dinitrophenol (DNOC)	534-52-1	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
flamprop	58667-63-3	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
fluroxypyr	69377-81-7	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
ioxynil	1689-83-4	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
MCPB	94-81-5	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
picloram	1918-02-1	N	L340	0.1	mg/kg DW	< 0.10	< 0.10
triclopyr	55335-06-3	N	L340	0.1	mg/kg DW	< 0.10	< 0.10

Deviating Samples

Report No.: 24-10048-1

Customer Reference: Not Supplied

Customer Order No: PO_S_C7373

Our policy on Deviating Samples has been implemented in accordance with UKAS Policy on Deviating Samples (TPS63).

RPS is not responsible for the integrity of samples as received, unless RPS personnel performed the sampling. Samples submitted may be declared to be deviating.

Where applicable the analysis method remains UKAS accredited, however results reported for a deviating sample may be compromised.

Where no sampling date was supplied, samples have been declared to be deviating. If the date can be supplied, results may be reissued if assessed not deviating.

Where the sample container used was unsuitable or broken, the sample is flagged as deviating and re-sampling/re-submission may be required.

RPS No.	Customer No.	Customer ID	Date Sampled	Containers Received	Deviating	Reason for Deviation
78522	396172		29/11/2024	250 mL amber glass jar	No	
78523	396173		29/11/2024	250 mL amber glass jar	No	

Report No.: 24-10048-1

Type	Matrix Code	Description
Food	CEREALPROD	Cereals, grains & products
Food	DRIEDFRUIT	Dried fruits
Food	FRIEDBAKED	Fried or baked food
Food	LEGUME	Legumes
Food	MEAT	Meat
Food	POWDERED	Powdered food
Food	PULSE	Pulses (dried legumes)
Food	VEGETABLES	Vegetables
Gas	TDTUBE	TD Tube
Gas	TENAX	Tenax Tube
Gas	TUBE	Tube
Gas	VAPOUR	Gas
Geological	SED_MAR	Marine Sediment
Geological	SED_RIV	River Sediment
Geological	SLUDG_SOL	Sludge (solid only)
Geological	SOIL	Soil
Liquid	BEVERAGE	Beverage
Liquid	BLOOD	Blood
Liquid	CONDENSATE	Condensate
Liquid	FOAM_LIQ	Liquid foam
Liquid	FORMULATN	Formula
Liquid	LEACHATE	Leachate
Liquid	OIL/GREASE	Oil or grease
Liquid	SLUDG_LIQ	Sludge (liquid only)
Liquid	SOLVENT	Solvent
Liquid	URINE	Urine
Sludge	SLUDG_WHL	Sludge for bulk route
Solid	BADGE	Badge
Solid	BEDDING	Bedding
Solid	BIOTA	Biota (general)
Solid	BIOTA_F	Biota (fish)
Solid	BIOTA_SF	Biota (shellfish)
Solid	CONSTRCTN	Construction materials
Solid	FABRIC	Fabrics & furnishing materials
Solid	FEED	Animal feed
Solid	FERTILISER	Fertiliser
Solid	FILTER	Filter
Solid	FOAM	Solid foam material
Solid	LATEX	Latex/Rubber
Solid	PACKAGING	Packaging material
Solid	PAPER	Paper
Solid	PLANT	Plant (vegetation)
Solid	POWDER	Powder
Solid	SWAB	Swab
Water	BAL	Ballast Water
Water	BIL	Bilge Water
Water	DW	Drinking Water
Water	EFFLUENT	Effluent
Water	GW	Ground Water
Water	INFLUENT	Influent
Water	MINEW	Mine Water
Water	SALTW	Salt Water
Water	SW	Surface Water
Water	TW	Tap Water
Water	W	Unknown Water

Report No.: 24-10048-1

Key Code	Description
N	Not Accredited Test
U	UKAS Accredited Test - UKAS accreditation is only implied if the report carries the UKAS logo
UF	UKAS Flexible Scope Test
M	MCERTS Accredited Test - MCERTS accreditation is only implied if the report carries the MCERTS logo
O	Marine Management Organisation (MMO) Validated
SN	Subcontracted to approved laboratory not accredited for the test
SU	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
SIN	Subcontracted to internal RPS Group laboratory not accredited for the test
SIU	Subcontracted to internal RPS Group laboratory UKAS Accredited for the test
SIM	Subcontracted to internal RPS Group laboratory MCERTS/UKAS Accredited for the test
*	Modified standard method
I/S (in results)	Insufficient Sample
U/S (in results)	Unsuitable Sample
S/C (in results)	See Comments
ND (in results)	Not Detected
DW (in units)	Results are expressed on a dry weight basis
L (in results)	Result is outside normal limits

Sample Type	Sample Retention and Disposal Period
Foodstuff	1 month (if frozen) from the issue date of this report
Waters	2 weeks from the issue date of this report
Other Liquids	1 month from the issue date of this report
Solids / Soils	1 month from the issue date of this report
Sediments	1 month from the issue date of this report

Note: Sample retention may be subject to agreement with the customer for particular projects

Where the dry solids value of a sample is low (<50%), reporting limits are automatically raised for all determinants analysed on an as-received basis.

Soil Typing	Description
Type 1	Clay - Brown
Type 2	Clay - Grey/Black
Type 3	Sand
Type 4	Top Soil (Standard)
Type 5	Top Soil (High Peat)
Type 6	Made Ground (>50% Clay)
Type 7	Made Ground (>50% Sand)
Type 8	Made Ground (>50% Top Soil)
Type X	Other

Dev code	Description
D	No sampling date provided.
T	No sampling time provided.
Z	Temperature of samples exceeded in transit/storage.
V	Excessive headspace for volatile determinands.
P	Sample submitted without required preservative(s).
C	Incorrect container.
H	Holding time exceeded (sampling to extraction).
X	Holding time exceeded (sampling to receipt).

Note: Where the following information is included in this certificate, it has usually been supplied by the customer: Customer Sample ID, Sample Location, Sample Depth, Sampling Date and Sampling Time. The laboratory shall not be responsible for any information that is supplied by the customer that may affect the validity of results.

APPENDIX 4

GroundSure Geo-Insight and Enviro-Insight Reports

414680,405230

Order Details

Date: 21/11/2024
Your ref: Dunford Road, Hade Edge
Our Ref: GS-VV8-86J-2DP-L2Z

Site Details

Location: 414699 405219
Area: 0.81 ha
Authority: [Kirklees Council](#) ↗

[Summary of findings](#)[p. 2 > Aerial image](#)[p. 9 >](#)[OS MasterMap site plan](#)[p.14 > Insight User Guide](#) ↗

Contact us with any questions at:

info@groundsure.com ↗

01273 257 755

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
15 >	1.1 >	Historical industrial land uses >	0	1	27	7	-
17	1.2	Historical tanks	0	0	0	0	-
17	1.3	Historical energy features	0	0	0	0	-
17	1.4	Historical petrol stations	0	0	0	0	-
18	1.5	Historical garages	0	0	0	0	-
18	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped >	On site	0-50m	50-250m	250-500m	500-2000m
19 >	2.1 >	Historical industrial land uses >	0	1	33	9	-
21	2.2	Historical tanks	0	0	0	0	-
21	2.3	Historical energy features	0	0	0	0	-
22	2.4	Historical petrol stations	0	0	0	0	-
22	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
23	3.1	Active or recent landfill	0	0	0	0	-
23	3.2	Historical landfill (BGS records)	0	0	0	0	-
23	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
23	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
23	3.5	Historical waste sites	0	0	0	0	-
24	3.6	Licensed waste sites	0	0	0	0	-
24	3.7	Waste exemptions	0	0	0	0	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
25	4.1	Recent industrial land uses	0	0	0	-	-
25	4.2	Current or recent petrol stations	0	0	0	0	-
26	4.3	Electricity cables	0	0	0	0	-
26	4.4	Gas pipelines	0	0	0	0	-
26	4.5	Sites determined as Contaminated Land	0	0	0	0	-



26	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
26	4.7	Regulated explosive sites	0	0	0	0	-
27	4.8	Hazardous substance storage/usage	0	0	0	0	-
27	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
27	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
27	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
27	4.12	Radioactive Substance Authorisations	0	0	0	0	-
28 >	4.13 >	Licensed Discharges to controlled waters >	0	0	0	2	-
28	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
28	4.15	Pollutant release to public sewer	0	0	0	0	-
29	4.16	List 1 Dangerous Substances	0	0	0	0	-
29	4.17	List 2 Dangerous Substances	0	0	0	0	-
29	4.18	Pollution Incidents (EA/NRW)	0	0	0	0	-
29	4.19	Pollution inventory substances	0	0	0	0	-
29	4.20	Pollution inventory waste transfers	0	0	0	0	-
30	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
31	5.1	Superficial aquifer	None (within 500m)				
32 >	5.2 >	Bedrock aquifer >	Identified (within 500m)				
34 >	5.3 >	Groundwater vulnerability >	Identified (within 50m)				
35	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
35	5.5	Groundwater vulnerability- local information	None (within 0m)				
36 >	5.6 >	Groundwater abstractions >	0	0	2	0	20
41 >	5.7 >	Surface water abstractions >	0	0	0	0	15
45 >	5.8 >	Potable abstractions >	0	0	0	0	7
46	5.9	Source Protection Zones	0	0	0	0	-
46	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology >	On site	0-50m	50-250m	250-500m	500-2000m
47 >	6.1 >	Water Network (OS MasterMap) >	0	0	1	-	-



48 >	6.2 >	Surface water features >	0	0	1	-	-
48 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
48 >	6.4 >	WFD Surface water bodies >	0	0	0	-	-
49 >	6.5 >	WFD Groundwater bodies >	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
50	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
50	7.2	Historical Flood Events	0	0	0	-	-
50	7.3	Flood Defences	0	0	0	-	-
51	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
51	7.5	Flood Storage Areas	0	0	0	-	-
52	7.6	Flood Zone 2	None (within 50m)				
52	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
53	8.1	Surface water flooding	Negligible (within 50m)				
Page	Section	Groundwater flooding >					
54 >	9.1 >	Groundwater flooding >	Negligible (within 50m)				
Page	Section	Environmental designations >	On site	0-50m	50-250m	250-500m	500-2000m
55 >	10.1 >	Sites of Special Scientific Interest (SSSI) >	0	0	0	0	2
56	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
56 >	10.3 >	Special Areas of Conservation (SAC) >	0	0	0	0	1
57 >	10.4 >	Special Protection Areas (SPA) >	0	0	0	0	3
57	10.5	National Nature Reserves (NNR)	0	0	0	0	0
58	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
58 >	10.7 >	Designated Ancient Woodland >	0	0	0	1	3
58	10.8	Biosphere Reserves	0	0	0	0	0
59	10.9	Forest Parks	0	0	0	0	0
59	10.10	Marine Conservation Zones	0	0	0	0	0
59 >	10.11 >	Green Belt >	1	0	0	0	1
59	10.12	Proposed Ramsar sites	0	0	0	0	0

