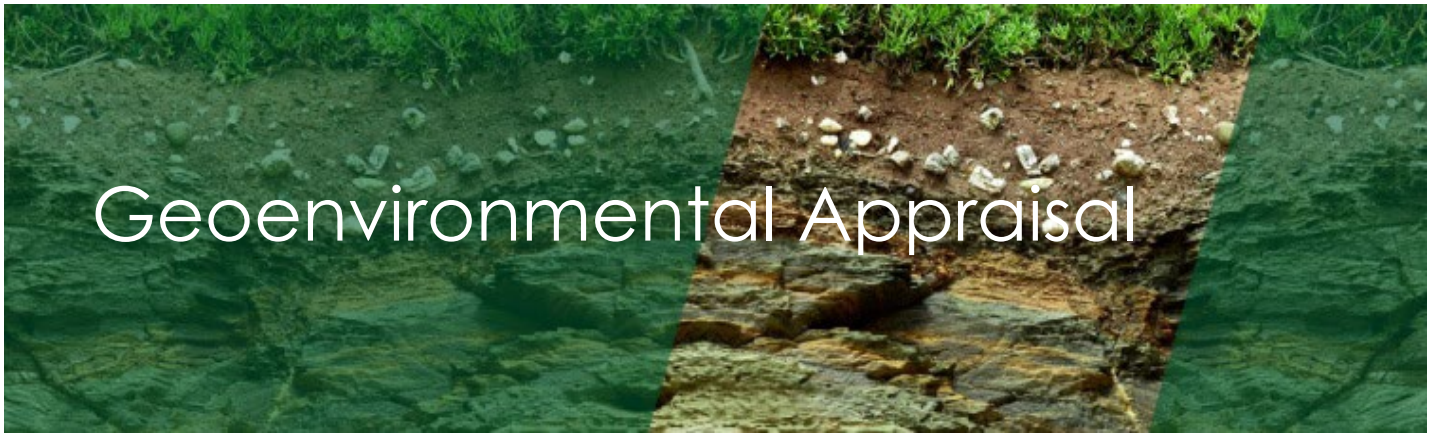
LITHOS



Land at White Hart Road, Penistone

For Bellway Homes Limited (Yorkshire)

Report no: 5655/1

Date: February 2026

SUMMARY OF GEOENVIRONMENTAL ISSUES

Job No.	5655	**Site area/ha**	1.45
Client:	Bellway Homes Limited (Yorkshire)	**NGR:**	SE 243 044
Site:	White Hart Road, Penistone	**Nearest postcode:**	S36 8AS

The site is located off White Hart Road, approximately 1km north of Penistone, and currently comprises an parcel of grassland. Review of historical maps shows that the area has no previous land uses other than farming.

Lithos were commissioned by Bellway to provide a geoenvironmental appraisal of the site, which it is understood is to be redeveloped with housing. Lithos' investigation included a review of 3rd party reports, the site's history and environmental setting, and a ground investigation comprising 10 trial pits.

A summary of salient geoenvironmental issues is provided in the table below.

Issue	Remarks
Natural ground	Cohesive residual soils (firm to stiff clay) overlying Coal Measures Mudstone bedrock beneath the majority of the site. In the far south, the Mudstone is overlain by Penistone Flags Sandstone and granular residual soils (gravel). Bedrock is encountered at c. 0.8m depth (0.3 – 1.3m) across the site.
Contamination	Topsoil, typically 200mm thick underlies the entire site. Testing suggests this material is chemically suitable for re-use.
Mining & quarrying	The site lies within a Mining Remediation Authority Low Risk area, no significant risks have been identified.
Hazardous gas	The site is in an area where 1% to 3% of homes are estimated to be above the radon action level. There are no known or suspected areas of landfilling within 250m, and the site is not in area considered susceptible to mines gas, nor is it underlain by shallow mineworkings. As such, no special precautions against methane / carbon dioxide gas are required.
Preparatory works	Topsoil strip and stockpile. Removal of sandstone boulders in the centre of the site.
Foundations	It is considered that shallow strip footings will be the most suitable foundation solution for the two storey houses constructed at the site. Footings will be founded in sandy gravel, firm clay or on competent rock.
Groundwater & excavations	No significant inflows of groundwater were encountered during the investigation. Stability of excavations within the natural ground was generally good.
Flooding & drainage	The site lies in Flood Zone 1, where the risk of flooding from rivers or the sea is classified as low. Given the presence of mudstone bedrock across the majority of the site, which is largely impermeable, soakaways are unlikely to be a viable solution, therefore, surface water balancing will be required.
Highways	Based on visual inspection of the shallow natural materials and published guidance, the residual soils should provide a CBR value of at least 3%. This value should be verified prior to or during construction.

This brief summary should not be assumed to represent a complete account of all the potential geo-environmental issues that may exist at the site. As such it is strongly recommended that the report be read in its entirety.

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Appendix A - General notes

01	Environmental setting
02	Ground investigation fieldwork
03	Geotechnical testing
04	Contamination laboratory analysis & interpretation

Appendix B - Drawings

Drawing	Revision	Title
5655/1	-	Site Location Plan
5655/2	-	Proposed Layout
5655/3	-	Site Features
5655/4	-	Site Photographs
5655/5	-	Preliminary Conceptual Site Model
5655/6	-	Exploratory Hole Locations
5655/7	-	Revised Conceptual Site Model
5655/8	-	Geology

Appendix C - Commission

Appendix D - Historical OS plans#

Appendix E - Search responses#

From	Date	Content
Groundsure	09/12/2025	Environmental search data
Mining Remediation Authority	12/12/2025	Mining report

Appendix F - Exploratory records

Appendix F	TP01 to TP10

Appendix G - Chemical test results

Appendix H - Geotechnical test results

Some of this data is not included within the paper or PDF copies of this report but can be provided on request.

FOREWORD (GEOENVIRONMENTAL APPRAISAL REPORT)

This report has been prepared for the sole internal use and reliance of the Client named on page 1. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Lithos Consulting Limited (Lithos); such authorisation not to be unreasonably withheld. If any unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill.

This report has been reviewed by a Competent Person, as defined in the National Planning Policy Framework. Lithos ensure that all projects are managed by individuals with necessary experience, relevant qualifications, and current membership of a relevant professional organisation. Records of engineers, project managers and reviewers involved in this project are maintained by us. Lithos QA/QC procedures for all our work forms an integral part of our ISO9001 accreditation and as such is regularly audited.

The report presents observations and factual data obtained during our site investigation and provides an assessment of geoenvironmental issues with respect to information provided by the Client regarding the proposed development. Further advice should be sought from Lithos prior to significant revision of the development proposals.

The report should be read in its entirety, including all associated drawings and appendices. Lithos cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context. However, it should be noted that in order to keep the number of pages to a minimum, some information (e.g. full copy of the Landmark/Groundsure Report) is not included in the PDF; by request it can be provided.

The findings and opinions conveyed in this report (including review of any third-party reports) are based on information obtained from a variety of sources as detailed within this report, and which Lithos believes are reliable. Reasonable care and skill has been applied in examining the information obtained. Nevertheless, Lithos cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

Intrusive investigation can only investigate shallow ground beneath a small proportion of the total site area. It is possible therefore that the intrusive investigation undertaken by Lithos, whilst fully appropriate, may not have encountered all significant subsurface conditions. Consequently, no liability can be accepted for conditions not revealed by the exploratory holes. Any opinion expressed as to the possible configuration of strata between or below exploratory holes is for guidance only and no responsibility is accepted as to its accuracy.

It should be borne in mind that the timescale over which the investigation was undertaken may not allow the establishment of equilibrium groundwater levels. Particularly relevant in this context is that groundwater levels are susceptible to seasonal and other variations and may be higher during wetter periods than those encountered during this commission.

Where the report refers to the potential presence of invasive weeds such as Japanese Knotweed, or the presence of asbestos containing materials, it should be noted that the observations are for information only and should be verified by a suitably qualified expert.

Lithos cannot be responsible for the consequences of changing practices, revisions to waste management legislation etc that may affect the viability of proposed remediation options.

The report represents the findings and opinions of experienced geoenvironmental consultants. Lithos does not provide legal advice and the advice of lawyers may also be required.

Lithos standard terms and conditions apply to the report, a copy of the terms and conditions is available on request or can be found with our proposal in Appendix C.

GEOENVIRONMENTAL APPRAISAL
of land at
WHITE HART ROAD, PENISTONE

1 INTRODUCTION

1.1 The commission and brief

1.1.1 Lithos Consulting Limited were commissioned by Bellway Homes Limited (Yorkshire) to carry out a geoenvironmental appraisal of land at White Hart Road, Penistone.

1.1.2 Correspondence regarding Lithos' appointment, including the brief for this investigation, is included in Appendix C. The agreed scope of works included:

- A review of third party reports
- A site walkover and inspection
- An assessment of the land use history
- Determination of the site's environmental setting
- A mining risk assessment in accordance with Mining Remediation Authority[1] guidance.
- An intrusive ground investigation comprising 10 trial pits
- Assessment of the geotechnical properties of the near surface deposits to enable provision of foundation and highway recommendations
- A qualitative assessment of contamination risks
- Recommendations for the necessary site preparatory works

1.1.3 Primary aims of this investigation were to identify salient geoenvironmental issues affecting the site to support the submission of a planning application, and also to enable Bellway to obtain budget costs for: foundations; gas protection measures; and site preparatory works.

1.2 The proposed development

1.2.1 It is understood that consideration is being given to redevelopment of the site with 51 traditional 2 storey domestic dwellings, associated gardens, POS, adoptable roads and sewers.

1.2.2 A preliminary site layout has been provided by Parker Peel Architectural (Drawing reference 2524-SK-14, dated September 2025) which is reproduced as Drawing 5655/2 in Appendix B to this report.

1.3 Report format and limitations

1.3.1 All standard definitions, procedures and guidance are contained within Appendix A, which includes background, generic information on:

- Assessment of the site's environmental setting
- Ground investigation fieldwork
- Geotechnical testing
- Contamination testing

[1] *On 28th November 2024, the Coal Authority changed their name to the Mining Remediation Authority.*

1.3.2 General notes and limitations relevant to all Lithos geoenvironmental investigations are described in the Foreword and should be read in conjunction with this report. The text of the report draws specific attention to any modification to these procedures and to any other special techniques employed.

2 SITE DESCRIPTION

2.1 General

2.1.1 The site's location is shown on Drawing 5655/1 presented in Appendix B to this report. Site details are summarised in the table below.

Detail	Remarks
Location	1 km north of Penistone town centre
NGR	SE 243 044
Approximate area	1.45 ha
Known services	None anticipated

2.2 Site features

2.2.1 Lithos completed a walkover survey of the site on 4th December 2025.

2.2.2 The site is accessed through a metal farm gate from White Hart Road and comprises one grassed field surrounded by residential houses to the north and east as grassed fields and a dyke to the south and west. The site slopes down gently to the south west however a small section in the north is relatively flat.

2.2.3 The southern site boundary comprises a dry-stone wall with Heras fencing in front of it to prevent unauthorised public access to the field. The Heras fencing extends around the western site boundary as well. Wooden post fencing separates the site from Dunford Drive and White Hart Road in the north and east.

2.2.4 A pile of sandstone boulders is situated in the centre north of the field. They boulders appear to have once been part of dry-stone wall, similar to the one that is present along the southern site boundary. The pile is approximately 2m tall and is surrounded by Heras fencing.

2.2.5 No visual or olfactory evidence of contamination was noted during the walkover.

2.2.6 Existing salient features, at the time of the walkover are presented on Drawing 5655/3 in Appendix B to this report and summarised in the table below.

Feature	Remarks
Current access	Off White Hart Road
Topography	Sloping down to the south west (c. 1 in 14)
Approximate areas	14,300m^2 grass 200m^2 pile of sandstone boulders
Nature of boundaries	North & east – wooden post fencing South – dry-stone wall and Heras fencing West – trees, hedgerow and Heras fencing
Surrounding land uses	North & east – housing with A629 and grassed fields beyond South – grassed fields, scout dyke and Penistone beyond West – small warehouses and grassed fields beyond

2.2.7 A selection of site photographs is included on Drawing 5655/4.

3 SITE HISTORY

3.1 Site centred extracts from Ordnance Survey (OS) plans dating back to 1854 have been examined. Some of these plans are presented in Appendix D to this report.

3.2 The table below provides a summary of the salient points relating to the history of the site. It is not the intention of this report to describe in detail all the changes that have occurred on or adjacent to the site. Significant former uses/operations are highlighted in **bold** text for ease of reference.

Date	Site	Surrounding land
1854	Grassed fields	Grassed fields Scout Dam plantation c. 100m south west Railway line and cutting c. 250m east Scout Dam reservoir & plantation 100m south-west.
1903	No significant change	"**Westhorpe Detonator Works**" located immediately west of the site with associated **tanks**
1929		Additional buildings constructed immediately north west of the site
1960		Detonator Works now labelled as "works"
2025		Residential development constructed immediately north and east of the site

3.1.2 Westhorpe Detonator Works is operated by the Clayton Penistone Group. The company were originally (late 1800s) general electrical and mechanical engineers, but also designed and built lorries and buses, and manufactured fog signals. In recent times the firm has expanded its range of services to encompass mechanical and electrical services for Clean and Waste Water Treatments, but fog signals are still manufactured.

3.1.3 The Clayton railway fog signal is a small metal device containing a limited quantity of explosive. In use, the device is placed on the running surface of a rail such that any rail mounted vehicle passing over it causes it to explode, and in so doing, alerts the driver to a hazard on the line ahead. A common use for railway fog signals is to protect possessions.

4 ENVIRONMENTAL SETTING

4.1 General

4.1.1 Notes describing how the site's environmental setting has been assessed are included in Appendix A to this report. Reference has been made to publicly available Government held digital data via QGIS (an Open Source Geographic Information System). Extracts from the response received from Groundsure, and responses from the Mining Remediation Authority, the BGS and the Environment Agency are presented in Appendix E. These responses are summarised below, together with the findings of our own "desk study" investigation.

Issue	Data reviewed	Summary
Geology	1:50,000 BGS map (Sheet 086) 1:10,000 BGS map (Sheet SE20SW) BGS Memoir/Technical Report	Drift soils – None anticipated, likely some residual soils. Solid (bedrock) – Pennine Lower Coal Measures (Mudstone and Siltstone) and Penistone Flags (Sandstone). Shallowest coal seam – Lower Penistone Coal (0 - 0.3m thick) at about 12m depth. Strata dip – Between 2° and 3° to the north east. Faults – Located c. 200m east, downthrown to the south west.
Mining	Mining Remediation Authority	This site is located within a Coal Mining Development Low Risk Area (within the defined coalfield, but no known defined risks have been recorded by the Mining Remediation Authority; there may still be unrecorded issues). Past and present workings – None recorded. Opencast – None within 500m. Mine entries – None recorded within 100m.
Quarrying	Historical OS plans	No evidence of quarrying recorded on historical plans.
Landfills	Groundsure Report	No known landfills within 250m.
Radon	UK Health Security Agency	The site lies in an area where 1 – 3% of homes are estimated to be above the radon action level. Further details in Section 13.
Hydrogeology	Environment Agency electronic open data via QGIS	Groundwater Source Protection Zone – None shown. Aquifer – Secondary A (Bedrock). Groundwater abstractions – None. Groundwater vulnerability – Medium. Pollution incidents – None of significance.
Hydrology	Defra Catchment data explorer Groundsure Report	Nearest watercourse(s) – Scout Dyke (120m south) flowing into the River Don. Water quality – Moderate. Pollution incidents – Category 1 (Major) incident in 2004, release of unidentified contaminant to Scout Dyke. Abstractions – None. Discharge consents – None.
Flood risk	Environment Agency electronic open data via QGIS	The site lies in Flood Zone 1, where the risk of flooding from rivers or the sea is classified as low. In accordance with Chapter 14 of the National Planning Policy Framework, a site-specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency).
UXO	Zetica website	Low Risk

4.2 Coal & mining

4.2.1 In July 2011 the Mining Remediation Authority (MRA)[2] formalised their requirements in relation to planning applications and introduced some new terminology relating to coal mining development areas. This Section provides the necessary mining risk assessment required by the proposed planning application.

4.2.2 This site is located within a Coal Mining Development **Low Risk Area** - within the defined coalfield, but no known defined risks have been recorded by the Mining Remediation Authority; there may still be unrecorded issues.

4.2.3 Geological maps suggest that 1 coal seam may underlie the site at shallow depth. This is the:

- Lower Penistone Coal, a 'thin' seam (0 – 0.3m), conjectured to outcrop c. 80m south of the site and dip gently to the northeast

4.2.4 The approximate location of the outcrop is shown on Drawing 5655/8.

4.2.5 Given dip and topography, this seam is expected to underlie the entire site. The seam is underlain by at least 20m of Coal Measures bedrock within which there are no further significant coal seams.

4.2.6 It should be noted that seam outcrops plotted on geological maps have been known to be inaccurate by distances in excess of 100m.

4.2.7 An MRA mining report states that no:

- Past underground mining is recorded beneath the site
- Probable unrecorded shallow mineworkings beneath the site
- Spine roadways are recorded at shallow depth
- Recorded mine entries within 100m of the site
- Coal outcrops within the site
- Opencast mines are recorded within 500m of the site
- MRA managed tips are recorded within 500m of the site
- Damage claims relating to coal mining subsidence have been made within 50m of the site
- Mine gasses or mine water treatment schemes have been recorded within 500m of the site

4.2.8 The mining reports suggests there are no known shallow workings (i.e. at less than 30m depth). However, it should be noted that it did not become a statutory requirement to maintain and preserve plans of abandoned mines until the Mine (Coal) Regulations Act of 1872 and consequently there may be mineworkings beneath the site for which the Mining Remediation Authority have no records.

[2] *On 28th November 2024, the Coal Authority changed their name to the Mining Remediation Authority.*

4.3 Agriculture

4.3.1 Historical plans show that the site has been occupied by arable farmland. Generally farming is not considered likely to have caused significant ground contamination. However, activities such as slurry spreading, the discharge of chemicals to ground, and unregulated burial are known to have occurred on farmland. Potential contaminants associated with farming activity could include any of the following.

Agricultural activity	Potential contaminant
Sewage farming, slurry spreading	Methane, metals, nitrates, oxygen depletion
Plant & animal protection	Pesticides & herbicides
Soil conditioners	Metals, sulphates, PAH
Waste burial, land levelling, backfilling ponds/quarries	Methane, metals, PAH etc
Naturally occurring contaminants	Arsenic, metals

4.3.2 Whilst it is likely that pesticides have been applied during arable use of the land, these are not likely to include the persistent organochloride pesticides such as Dieldrin, Aldrin, DDT etc. Pesticides routinely used on arable crops the UK (Phenoxy Acetic acid herbicide or PAAH) rapidly degrade in soils or leach via rainwater infiltration to groundwater. It is highly unlikely these would be detected by soil sampling and therefore it is not proposed to undertake analysis of these.

4.3.3 The generation of ground gas in quantities with the potential to impact upon the proposed development would only occur with the presence of significant quantities of organic matter. Ground gas monitoring is not considered necessary unless significant quantities of organic matter are identified during the ground investigation.

5 PREVIOUS INVESTIGATION FINDINGS

5.1 General

5.1.1 Bellway have provided Lithos with copies of the following reports: "Geo-Environmental Assessment Report: Wellhouse Lane, Penistone" (Ref. DV/C3260/6274), issued by Brownfield Solutions Limited (BSL) in August 2016 and "Supplementary Geo-Environmental Appraisal: Wellhouse Lane, Penistone" (Ref: 18032/976), issued by Groundtech Consulting in October 2019.

5.1.2 The BSL report includes review of historical maps dating back to 1850, data from the British Geological Society, Barnsley Metropolitan Council, Groundsure and the Mining Remediation Authority.

5.1.3 The Groundtech report includes a review of BSL's search data however no additional detail was added. Sections 1 to 4 of this Lithos Report include similar content to the BSL report, but with further detail.

5.1.4 The reports listed above discuss site investigations that cover a larger parcel of land, encompassing the site and the surrounding fields to the north, east and south. Not all information in the reports is pertinent to this site, all relevant information has been reviewed and summarised below.

5.2 Summary of BSL's findings

5.2.1 BSL's ground investigation works within the site area comprised:

- Four trial pits (TPs 39 to 41 & TP47) excavated between 1.2 to 2.6m.
- Geotechnical classification tests (Atterberg Limits, pH, soluble sulphate etc).
- Chemical laboratory tests (including pH, metals, PAH, TOC etc).

5.2.2 Ground conditions encountered by BSL are summarised in the table below:

Hole	Final depth (m)	Depth to bedrock (m)	Nature of natural ground	Remarks
TP39	2.1	1.6	Firm, sandy Clay overlying weathered Mudstone bedrock	Mudstone becoming medium strong and partially weathered from 2.0m
TP40	2.6	1.4	Firm, slightly gravelly, sandy Clay overlying weathered Mudstone bedrock	Mudstone becoming medium strong and partially weathered from 2.5m Residual soils tested and returned as low shrinkability
TP41	1.45	0.2	Weathered Mudstone residual soil beneath topsoil	Mudstone becoming medium strong and partially weathered from 1.3m Topsoil tested and returned no elevated contaminants
TP47	1.2	0.2	Weathered Mudstone residual soil beneath topsoil	Mudstone becoming medium strong and partially weathered from 1.1m Topsoil tested and returned no elevated contaminants

5.3 Summary of Groundtech Consulting's findings

5.3.1 Groundtech Consulting's ground investigation works within the site area comprised:

- Three trial pits (TPs 09 to 11) excavated between 0.5 and 1.95m.

5.3.2 No geotechnical classification tests or chemical laboratory tests were undertaken on samples taken from the three trial pits.

5.3.3 Ground conditions encountered by Groundtech Consulting are summarised in the table below:

Hole	Final depth (m)	Depth to bedrock (m)	Nature of natural ground	Remarks
TP09	1.95	1.9	Firm to stiff slightly gravelly sandy Clay overlying weathered Sandstone bedrock	Bands of gravel in the residual soil
TP10	0.5	0.4	Slightly clayey, slightly gravelly Sand (residual soils) overlying weathered Sandstone bedrock	Unable to excavate through shallow bedrock
TP11	1.15	1.0	Slightly clayey, slightly gravelly Sand (residual soils) overlying weathered Sandstone bedrock	

5.4 Lithos comments

5.3.1 Exploratory hole logs from the two reports consistently describe two different bedrock lithologies beneath the site. BSL describes bedrock to be a very weak mudstone whilst Groundtech describes it as a weak to moderately strong Sandstone.

5.4.1 An insufficient amount of chemical and geotechnical testing of natural soils was carried out between the two site investigations.

5.4.2 It would be prudent to excavate additional trial pits within the site area to confirm the ground conditions beneath the site and collect samples for chemical and geotechnical testing.

6 PRELIMINARY CONCEPTUAL SITE MODEL

6.1 Assessment of contaminated land is based on an evaluation of pollutant linkages (Source-Pathway-Receptor).

6.2 No potentially contaminative industrial land uses have been identified and consequently there are no obvious Sources. The site is essentially greenfield, although farming activities, may have given rise to some (likely minor) contamination; see Section 4.3.

6.3 A preliminary conceptual site model, presented as Drawing 5655/5 in Appendix B, has been prepared after consideration of all the data presented in Sections 2 to 5 inclusive of this report.

6.4 Potential contaminant linkages are shown on the preliminary conceptual site model.

6.5 The conceptual model will likely be subject to modification in light of data arising from the proposed intrusive ground investigation.

7 LAND CONTAMINATION – PART IIA & PLANNING

7.1 Local Authorities have responsibilities with respect to land contamination in the context both of Part IIA of the Environmental Protection Act 1990, and Planning.

7.2 The contaminated land regime in Part IIA was introduced specifically to address the historical legacy of land contamination. It applies where there is unacceptable risk, assessed on the basis of the **current** use and the relevant circumstances of the land. It is not directed to assessing risks in relation to a future use of the land that would require a specific grant of planning permission. This is primarily a task for the planning system, which aims to control development and land use in the **future**.

Planning

7.3 The National Planning Policy Framework (NPPF), supported by web-based planning practice guidance, includes the following with respect to contamination and site investigation:

"*Where a site is affected by contamination or land stability issues, responsibility for securing safe development rests with the developer and/or landowner*".

7.4 Planning policies and decisions should ensure that:

- The site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses, and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation

- After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the environmental protection act 1990
- Adequate site investigation information, prepared by a competent person, is presented'

7.5 Annex 2 of the NPPF states that 'all investigations of land potentially affected by contamination should be carried out in accordance with established procedures (such as BS10175[3])'.

This site

7.6 Underlying Mudstone and Sandstone are classified as a Secondary A aquifer. The nearest surface watercourse is Scout Dyke, which flows in a southerly direction, approximately 120m beyond the site's southern boundary. Therefore, the site's environmental setting is considered to be of moderate sensitivity.

7.7 With respect to human health, the proposed end use (residential) is sensitive.

7.8 Current and previous use of the site as arable farmland is considered unlikely to have given rise to any significant ground and groundwater contamination.

8 GROUND INVESTIGATION DESIGN

8.1 Anticipated ground conditions & potential issues

8.1.1 Based on the data reviewed in Sections 4 (Environmental Setting) and 5 (Previous Investigation Findings), anticipated ground conditions are expected to comprise:

Anticipated condition	Remarks
Made ground	None anticipated beneath the site
Natural soils	Residual soils (completely weathered bedrock) likely to underlie topsoil to a depth of c. 0.5 – 1.0m
Bedrock	Weathered Mudstone and Sandstone bedrock from 0.5 – 1.0m bgl
Mineworkings	None anticipated beneath the site
Groundwater	Likelihood of >1 groundwater body (shallow in residual soils and deep in rock)

8.1.2 Based on the data above and that in Sections 2 (Site Description) and 3 (History), potential ground-related issues associated with this site are likely to include:

Type of issue	Specific issue	Remarks
Potential on-site contamination sources	1. Reworked topsoil (inorganics, organics)	1. Associated with farming 2. Asbestos &\or ACMs
Potential off-site contamination sources	None anticipated	-
Potential geotechnical hazards	None anticipated	-
Other potential constraints	None anticipated	-

[3] *BS10175 (2011) - Code of practice for the investigation of potentially contaminated sites*

8.2 Ground investigation design & strategy

8.2.1 The preliminary conceptual site model was used as a basis for design of an appropriate ground investigation, the scope of which is summarised below.

Exploratory holes	Purpose
Ten Trial Pits	To determine the general nature of soils underlying the site, including the: • Nature, distribution and thickness of shallow soils, including any made ground • Suitability of the ground for founding structures and highways

8.2.2 Proposed exploratory hole locations were selected to provide a representative view of the strata beneath the site, a nominal 40m grid spacing was proposed. Additional exploratory locations might be scheduled by the site engineer in light of the ground conditions actually encountered.

8.2.3 The number of representative samples taken will be reflective of the geological complexity actually encountered. However, in general about 3 samples will be taken from most trial pits.

8.2.4 Review of the site's history (see Section 3) has confirmed the complete absence of any previous development or past potentially contaminative land uses (other than agriculture). Therefore, in accordance with the National Planning Policy Framework, this site is Greenfield rather than Brownfield.

8.2.5 The only potential sources of contamination identified are metals & asbestos (associated with windblown/background or illegal deposits) and organics (associated with leakage from farming machinery). If these contaminants are present, they will be found within near-surface soils (topsoil), rather than at depth (in natural soils) and consequently, contaminant analysis will (at least initially) be restricted to recovered samples of topsoil.

8.2.6 If made ground, or elevated concentrations of contaminants within topsoil, are recorded during the ground investigation, testing of subsoil samples may be necessary.

9 FIELDWORK

9.1 Objectives

9.1.1 The original investigation strategy is outlined in Section 8.2 above.

9.2 Scope of works

9.2.1 Fieldwork was supervised by Lithos on 17th December 2025 and comprised the exploratory holes listed below.

Technique	Exploratory holes	Final depth(s)	Remarks
Trial pitting (machine dug)	TPs 01 to 10	1.1 to 2.5m	Shallow bedrock often limited excavation depth

9.2.2 Notes describing ground investigation techniques, in-situ testing and sampling are included in Appendix A to this report.

9.2.3 Exploratory hole logs are presented in Appendix F to this Report. These logs include details of the:

- Samples taken
- Descriptions of the solid strata, and any groundwater encountered.
- Results of the in-situ testing

9.2.4 Exploratory hole locations are shown on Drawing 5655/6 presented in Appendix B; hole positions are based on data from a hand-held GPS (typically +/- 3m accuracy) and have not been surveyed in.

10 GROUND CONDITIONS

10.1 General

10.1.1 A complete record of strata encountered beneath the proposed development site is given on the various exploratory hole records, presented in Appendix F.

10.1.2 Typical ground conditions encountered at the site are described below in Section 10.2 (natural ground), with a summary provided in the table below.

10.1.3 Made ground was not encountered in any of the trial pits.

10.2 Natural ground

10.2.1 Natural ground was encountered in all of the exploratory holes, and typically comprised:

- **Topsoil:** sandy gravelly clay was identified across the site to a typical depth of 200mm.
- **Residual Soils:** gravelly clay and clayey gravel were encountered in 9 of the 10 pits (TPs 01 – 06 & TPs 08 – 10) to an average depth of 0.8m. Residual soils were not present in TP07, where weathered bedrock was encountered directly underlying the topsoil.
- **Penistone Flags bedrock:** moderately weak Sandstone was encountered in 2 trial pits (TPs 01 & 02) to a maximum depth of 1.1m (TP01) and was underlain by Coal Measures bedrock.
- **Coal Measures bedrock:** very weak to moderately weak Mudstone was encountered across the site from an average depth of 0.8m and increased in strength with depth until deeper excavation was not possible.

Summary of ground conditions

Hole ID	Final Depth	Depth to Base (m bgl)				Depth to bedrock (penetration * - m bgl)
		Topsoil	Natural Soils		Bedrock	
			Granular Residual Soil	Cohesive Residual Soil	Penistone Flags (Sandstone)	Pennine Middle Coal Measures (Mudstone)
TP01	1.8	0.4	0.8	-	1.1	1.1 (0.7)
TP02	1.9	0.2	-	1.2	0.7	1.2 (0.7)
TP03	1.7	0.2	-	0.7	-	0.7 (1.0)
TP04	2.5	0.15	-	1.3	-	1.3 (1.2)
TP05	2.5	0.2	-	0.7	-	0.7 (1.8)
TP06	1.1	0.4	-	0.6	-	0.6 (0.5)
TP07	1.1	0.3	-	-	-	0.3 (0.8)
TP08	1.1	0.3	-	1	-	1.0 (0.1)
TP09	1.5	0.2	-	0.7	-	0.7 (0.8)
TP10	1.1	0.2	-	0.5	-	0.5 (0.6)

Note: * Excavator used was a JCB-3CX.

10.3 Groundwater

10.3.1 No significant inflows of groundwater were encountered during the investigation however minor groundwater seepages were noted in TPs 04 and 10 at c. 1m.

10.4 Stability

10.4.1 Stability of excavations within the natural ground was generally good.

10.5 Revised conceptual ground model (ground conditions)

10.5.1 The Preliminary Conceptual Site Model has been revised in light of data obtained during the ground investigation, most notably with respect to:

- The strength, nature and depth of underlying natural strata

10.5.2 Further refinement of the Conceptual Site Model is presented in Section 12, where the results of laboratory testing for contaminants have been considered.

11 CONTAMINATION (ANALYSIS)

11.1 General

11.1.1 The site has not been the subject of a past potentially contaminative industrial land use. However, historical mapping suggests arable farming has been carried out on the site. Sampling of the topsoil has been undertaken to confirm its suitability for re-use.

11.1.2 An assessment of potential contaminants associated with the former uses has been undertaken; see Section 6.

11.1.3 Where available, Category 4 Screening Levels (C4SL) have also been referenced.

11.1.4 Generic Note 04 in Appendix A provides further details with respect to current guidance and the interpretation of analytical data.

11.2 Testing scheduled

11.2.1 Based on the above assessment, Lithos submitted a test schedule (summarised in the table below) to a UKAS accredited laboratory.

Type of sample	No. of samples	Determinands
Topsoil	10	pH, total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc) & Asbestos ID Speciated Polycyclic Aromatic Hydrocarbons (PAH) Total Organic Carbon (TOC)
Topsoil	3	Clay/sand/silt content and visible contaminants, sharps (glass etc) to check compliance with BS3882:2015

11.3 Soil contamination results

11.3.1 The soil contamination test results are summarised in the tables on page 14.

11.3.2 Laboratory test certificates as received from the laboratory are presented in Appendix G to this report.

Summary of degree of soils contamination

Expl Hole	Depth (m)	Material	Concentrations in mg/kg unless otherwise stated. Trigger Level Concentrations are shown in BLUE and assume a **residential with gardens** end-use.													
			pH	As ∞	B ~	Cd ∞	Cr x	Cu♣$	Pb ∞	Hg *	Ni	Se	Zn $	% TOC	PAH		Asbestos I.D.
															B(a)P ∞	Naphthalene	
				37	5	26	3000	200	200	169	127	350	200		5	10	
TP01	0.2	Topsoil	7.0	10	0.4	0.3	23	21	39	0.08	14	< 0.5	31	66	3.1	< 0.03	< 0.03
TP02	0.1	Topsoil	7.6	7.4	0.6	0.2	16	14	27	< 0.05	11	< 0.5	22	49	2.7	< 0.03	< 0.03
TP03	0.1	Topsoil	7.2	12	0.5	0.3	27	24	48	0.07	17	< 0.5	40	86	3.5	< 0.03	< 0.03
TP04	0.1	Topsoil	7.3	12	0.3	0.2	24	21	46	0.07	16	0.6	39	75	2.6	< 0.03	< 0.03
TP05	0.1	Topsoil	6.9	13	0.5	0.3	24	25	52	0.08	15	< 0.5	41	77	3.2	0.04	< 0.03
TP06	0.1	Topsoil	7.7	11	0.3	0.2	22	23	44	0.07	17	< 0.5	34	76	2.6	< 0.03	< 0.03
TP07	0.1	Topsoil	8.0	12	0.4	0.3	32	32	52	0.11	18	< 0.5	42	92	4.3	< 0.03	< 0.03
TP08	0.1	Topsoil	7.1	14	0.6	0.3	26	30	57	0.15	17	< 0.5	44	87	4.3	< 0.03	< 0.03
TP09	0.1	Topsoil	7.0	12	0.4	0.2	25	25	46	0.09	16	< 0.5	44	82	3.2	< 0.03	< 0.03
TP10	0.1	Topsoil	7.2	12	0.6	0.2	22	25	52	0.26	12	< 0.5	43	66	4.9	< 0.03	< 0.03

Key		Source of guidance trigger level	
36	Parameter tested for and found to be in excess of Tier 1 value.	With the exception of those annotated with one of the symbols below (∞, $, ~), all Soil Screening Values in brackets above have been derived using CLEA v1.071. Values assume contaminants located in a sandy loam, with 6% soil organic matter (SOM).	
179	Parameter tested for and found to be > 5 x Tier 1 value.		
12	Parameter tested for but not found to be in excess of Tier 1 value.	∞	Category 4 Screening Level – SP1010, December 2013 (CL:AIRE/Defra).
	Parameter not tested for.	$	MAFF. Code of Practice for Agricultural Practice for the Protection of Soil, 1998.
♣	Tier 1 Value is pH dependent.	~	Engineering judgement (Lithos). Boron is a phytotoxic, although most phytotoxic compounds can pose a risk to human health if sufficient concentrations are present. However, plants represent the most sensitive receptor, and a Tier 1 value which is protective of flora is therefore also protective of human health.
x	Assumes Cr is CrIII. If demonstrated Cr is CrVI Tier 1 would be 21mg/kg.		
ND	No fibres detected (asbestos screen)		
		*	Assumes mercury present as an inorganic compound (cf elemental metal or within organic compound). See Science Report SC050021/Mercury SGV.

Inorganic determinands

11.3.3 Of the 10 samples of topsoil analysed for inorganic parameters, all can be classified as uncontaminated.

Asbestos

11.3.4 No visual evidence of asbestos-containing materials (ACMs), such as broken fragments of asbestos-cement sheeting, was noted during the excavation of trial pits.

11.3.5 No asbestos fibres were identified in any of the 10 samples screened.

Organic determinands

11.3.6 This site is essentially greenfield and therefore for organic compounds, the Tier 1 Values used in this report have been derived with reference to a CSM that assumes a residential with gardens end use, and that no clean soil cover will be placed in gardens/landscaped areas (Lithos Scenario A).

11.3.7 Lithos have used the CLEA model to derive risk-based screening values for hydrocarbons, in accordance with the methodology detailed by the TPHCWG, and reviewed by a UK workshop of experts with respect to UK adoption of the method.

11.3.8 However, these screening values assume a Soil Organic Matter (SOM) of 6% (equivalent to a TOC of 3.5%). Many organic contaminants are more mobile when the SOM is lower, and consequently comparison of soil results with lower screening values may be required.

11.3.9 In order to check the validity of Lithos' Tier 1 Soil Screening Values, the average TOC for each common fill type (beyond any areas of obvious hydrocarbon impact) have been determined.

Fill type	Typical TOC (%)	Comparison of soil results with revised screening value necessary?
Topsoil	3.5%	No

Polycyclic Aromatic Hydrocarbons (PAH)

11.3.10 There are numerous PAH compounds. The USEPA identified 16 PAHs that are considered to represent the most problematic in terms of toxicology, fate and behaviour. The UK have also focused on these 16 and these are included in the laboratory report where speciated PAH analysis has been scheduled.

11.3.11 Speciated PAH analysis has been undertaken in order to determine concentrations of the key "marker" compounds: benzo(a)pyrene (considered the most toxic of the PAHs); and naphthalene (the most mobile and volatile of the PAHs).

11.3.12 Speciated analysis has confirmed the absence of significant concentrations of both benzo(a)pyrene and naphthalene in the soils beneath this site.

11.4 BS3882 Topsoil testing

11.4.1 Topsoil, typically 200mm thick underlies the entire site. Contaminant testing suggests this material is chemically suitable for re-use.

11.4.2 The presence of visible contaminants, sharps (glass etc) was assessed by the Engineer in the field (inspection of initial trial pit arisings); none were identified. BS3882 considers visual contaminants to comprise 'undesirable potentially injurious foreign object(s) visible to the naked eye'.

11.4.3 The clay/sand/silt content of 3 topsoil samples have been determined to check compliance with BS3882[4] requirements.

11.4.4 The results are summarised below:

Parameter	BS3882 Specification	TP06 @ 0.3m	TP08 @ 0.2m	TP10 @ 0.2m
Retained on 2mm sieve	< 30%	22	15	8
Retained on 20mm sieve	< 10%	5	0	0
Retained on 50mm sieve	0%	0	0	0
Clay content	5 to 35%	26	31	30
Silt content	0 to 65%	42	51	45
Sand content	0 to 90%	32	19	25
Visible contaminants	< 0.5%	0	0	0

11.4.5 The above results suggest that the topsoil at this site complies to the standards set out in BS3882. In terms of textural classification, the topsoil falls into the 'Clay Loam' and 'Silty Caly Loam' classes. A graphical representation of the above data is provided on a ternary plot in Appendix H.

11.4.6 Consequently, topsoil here is expected to be suitable to support plant growth, although only a reduced BS3882 suite of testing has been undertaken (i.e. there has been no analysis for N-P-K etc.).

12 CONTAMINATION (QUALITATIVE RISK ASSESSMENT)

12.1 Topsoil

12.1.1 Topsoil, typically 200mm thick underlies the entire site. Testing suggests this material is chemically suitable for re-use.

12.1.2 Given the nature of the topsoil present on this site it would be expected to be suitable to support plant growth.

12.2 Revised conceptual ground model (contamination)

12.2.1 Ten samples of topsoil taken from the site have been tested for a range of contaminants, including pH, metal contaminants, Total Organic Carbon, marker PAH compounds and asbestos fibres. No plausible contaminant linkages have been identified.

12.2.2 The Preliminary Conceptual Site Model has been amended in light of data obtained during the ground investigation, most notably with respect to the distribution of made ground and contaminants.

12.2.3 A revised Conceptual Site Model is presented as Drawing 5655/7 in Appendix B. The Model includes the potential contaminant linkages (summarised below in Section 12.4) to receptors.

[4] *BS3882:2015. Specification for topsoil. Published by BSI Standards Limited.*

12.3 Environmental setting & end use

12.3.1 The underlying Coal Measures Bedrock is classified as a Secondary A aquifer. The nearest surface watercourse is Scout Dyke, which flows in a south easterly direction, approximately 120m beyond the site's southern boundary. Therefore, the site's environmental setting is considered to be **medium sensitivity**.

12.3.2 With respect to human health, the proposed end use (residential) is considered sensitive.

12.4 Contaminant linkages

12.4.1 The site is essentially greenfield and testing of topsoil across the site has not returned elevated levels of any common contaminants (see Section 11.3 above).

Pathways

12.4.2 No plausible contaminant pathways have been identified.

Receptors

12.4.3 Potential contaminant receptors include:

- The environment – Secondary A aquifer and Scout Dyke watercourse
- End users of the site (residents)

12.5 Waste classification

12.5.1 Some excess arisings (topsoil & subsoil) may be generated by excavations for foundations, sewers etc. If these are intended for retention and reuse on the site, they would be classed as clean naturally occurring soils and would not be considered waste, under the Waste Framework Directive.

12.5.2 Off-site disposal of surplus clean naturally occurring soils to landfill is not recommended. In accordance with the CL:AIRE Code of Practice[5] any excess natural soil arisings should be suitable for Direct Transfer to another development site, for use either as clean cover material, or bulk fill, without the need for waste legislation to be applied.

[5] *The Definition of Waste: Development Industry Code of Practice. CL:AIRE, 2011.*

13 HAZARDOUS GAS

13.1 Methane & carbon dioxide

13.1.1 The site is not believed to be affected by sources of hazardous gas generation as it is:

- Not located within 250m of a known former or current landfill site or backfilled feature (e.g. quarry, pond, canal etc)
- Neither underlain by shallow mineworkings nor located in an area considered susceptible to mines gas emissions
- Not underlain by a significant thickness of made ground
- Not underlain by peat or shallow chalk deposits

13.1.2 Consequently, no gas monitoring is considered necessary.

13.2 Radon

13.2.1 Requirements with respect radon measures are set out in Building Regulations Approved Document C. Probability bandings (based on the proportion of properties in a given area that exceed the Action Level; currently 200 $Bq.m^{-3}$) are used to determine whether a property requires no, basic or full measures.

13.2.2 At present Approved Document C advocates basic measures for the probability banding 3% to 10% (full measures if >10%). However, the UK Health Security Agency (HSA) would like to see all new build include basic measures.

13.2.3 In December 2022, the British Geological Survey (BGS), deployed a revised dataset which increased accuracy and also the number of properties falling within radon affected areas. This revised dataset is now referenced by maps on the HSA website.

13.2.4 The HSA website indicates that the site is in an area where **between 1% and 3%** of homes are estimated to be above the action level.

13.2.5 Consequently, basic radon protection measures are not required. However, in light of HSA advice, the Developer should consider providing all new dwellings with basic radon protection measures.

14 GEOTECHNICAL TESTING

14.1 General

14.1.1 A total of 15 samples of natural soil were delivered to a suitably accredited laboratory with a schedule of geotechnical testing drawn up by Lithos.

14.1.2 The geotechnical laboratory test results are presented in Appendix H to this report.

14.2 Atterberg limits

14.2.1 The plasticity indices of 10 samples of cohesive soil have been determined; results are summarised below.

Soil type	No. samples tested	Moisture content range % (average)	Range of Plasticity Indices % * (average)	Shrinkability
Cohesive Residual Soil	10	14-26 (21)	16-33 (23)	Medium

* Modified where appropriate in accordance with Chapter 4.2 of the NHBC Standards BRE Digest 240 (Low-rise buildings on shrinkable clay soils).

Note. The term Shrinkability is equivalent to the term Volume Change Potential used in Chapter 4.2.

14.2.2 For the purposes of foundation design, it is recommended that all cohesive soils be regarded as being of **medium** shrinkability.

14.3 Particle size distribution

14.3.1 The grading of 4 samples of Cohesive Residual Soil and one sample of Pennine Coal Measures has been determined by wet sieving, and the results are summarised in the table below:

Sample & depth	Field description	% passing 37.5mm sieve	% passing 20mm sieve	% passing 2mm sieve	% fines	Material description (based on grading & plasticity)
TP02, 0.4m	Slightly sandy CLAY	100	100	100	95	Slightly sandy CLAY
TP03, 0.5m	Slightly sandy, slightly gravelly CLAY	100	92	81	71	Slightly sandy, slightly gravelly CLAY
TP05, 0.6m	Slightly gravelly, very sandy CLAY	100	100	94	75	Slightly gravelly, slightly sandy CLAY
TP10, 0.4m	Slightly gravelly, slightly sandy CLAY	100	100	100	92	Slightly sandy CLAY
TP06, 0.8m *	Slightly sandy, clayey GRAVEL	100	68	48	44	Slightly sandy, very clayey GRAVEL

* Sample of granular weathered Coal Measures Bedrock

14.3.2 The results of the grading scheduled broadly confirm field descriptions.

14.3.3 NHBC Chapter 4.2 considers shrinkable soils to be those containing more than 35% fines and having a Modified Plasticity Index greater than 10%.

14.3.4 Fines (silt and clay) were found to comprise between 44% and 95% (average 75%) of the material sampled. The Cohesive Residual Soil encountered on this site should therefore be regarded as shrinkable.

14.3.5 The weathered coal measures bedrock encountered on this site is granular and can therefore be regarded as non-shrinkable.

14.4 Soluble sulphate and pH

14.4.1 In accordance with BRE SD1[6], this site has been classified as greenfield with a mobile groundwater regime.

14.4.2 It is envisaged foundations will extend to depths of about 1m through natural strata and samples taken from this depth range have been submitted for pH and water-soluble sulphate (2:1 soil/water extract).

14.4.3 The concentrations of sulphate in the aqueous natural soil extracts of 10 samples were determined. The pH value of each sample has also been determined.

14.4.4 The highest water-soluble sulphate concentration and the lowest pH value for each soil type analysed are shown in the table below.

Soil type	No. samples tested	Lowest pH values	Highest soluble sulphate concentration (mg/l)
Cohesive Residual Soil	7	5.6	34
Granular Residual Soil	1	6.9	19
Pennine Middle Coal Measures	2	6.1	35

14.4.5 pH values were all above 5.5, therefore concentrations of chloride and nitrate are considered insignificant.

14.4.6 In accordance with Tables C1 and C2 of SD1, sub-surface concrete should be Design Sulphate Class **DS-1**, with the site allocated an ACEC Classification of **AC-1s**.

14.5 Undrained shear strength testing

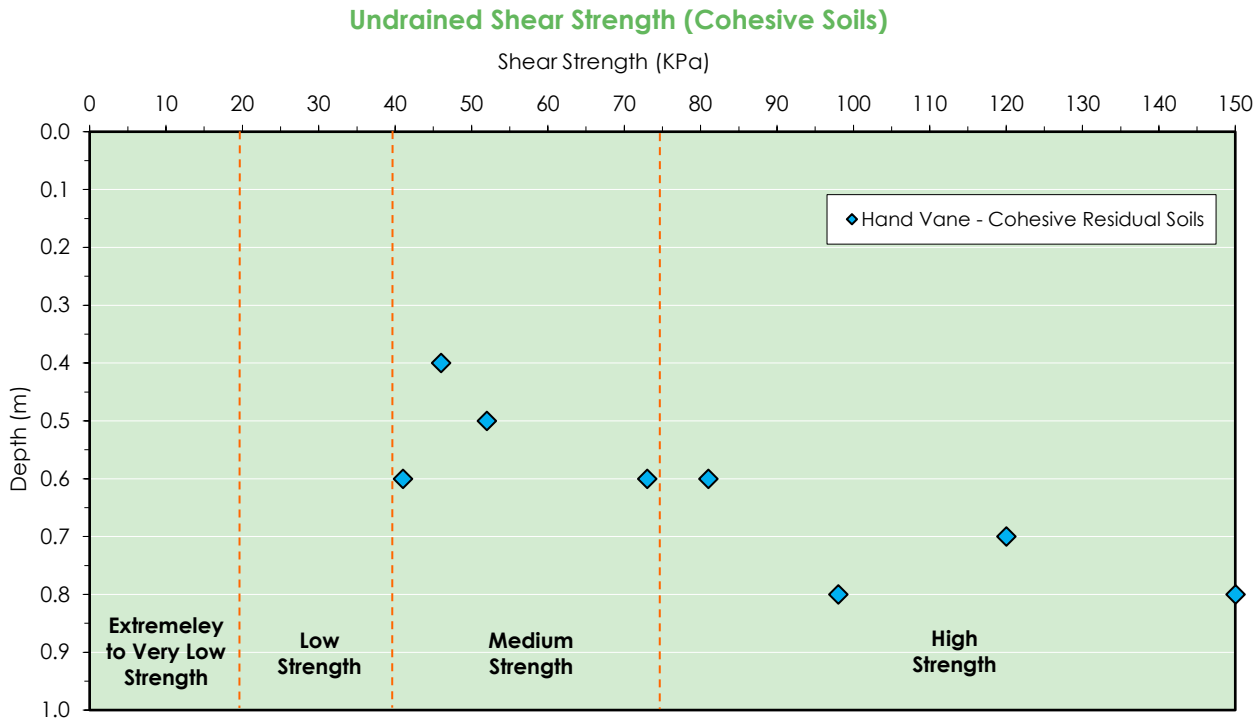
Hand shear vane testing

14.5.1 Hand shear vane testing was undertaken within trial pits in-situ to around 0.8m depth.

14.5.2 The results are summarised within the plot below and illustrate a linear increase in undrained shear strength (Su) with depth within the cohesive residual soils. Below approximately 0.6m depth Su is typically greater than 80kPa.

14.5.3 The plot below provides a summary of undrained shear strengths.

[6] *BRE Special Digest 1 (2005) – Concrete in aggressive ground.*



15 GEOTECHNICAL ISSUES

15.1 Conceptual site model

15.1.1 The site is underlain by cohesive residual soils and shallow Mudstone bedrock and a thin band of granular residual soils overlying Sandstone bedrock in the far south of the site.

15.1.2 The Preliminary Conceptual Site Model has been amended in light of data obtained during the ground investigation, a revised Conceptual Site Model is presented as Drawing 5655/7 in Appendix B.

15.2 Mining & quarrying

15.2.1 This site is underlain at shallow depth by Lower Coal Measures Mudstone and Penistone Flags Sandstone bedrock and the shallowest significant coal seam lies at least 100m below the surface. Whilst the site lies within a Mining Remediation Authority Low Risk area, no significant risks have been identified, and an intrusive mining investigation will not be required.

15.2.2 There are no known quarries on, or within 50m of the site.

15.3 Foundation recommendations

General

15.3.1 It is understood that consideration is being given to redevelopment of the site with 51 traditional 2 storey domestic dwellings, associated gardens, POS, adoptable roads and sewers. A preliminary site layout has been provided by Parker Peel Architectural (Drawing reference 2524-SK-14, dated September 2025) which is reproduced as Drawing 5655/2 in Appendix B to this report.

15.3.2 Foundation recommendations assume that development will be of two or three storey construction and that line loads will not exceed 90kN/m run. If this is not the case significant alteration to these recommendations will be required.

15.3.3 It is assumed that final development levels will not differ significantly from ground levels existing at the time of investigation. Any digital terrain modelling undertaken, or commissioned, by Bellway should consider implications for the foundation recommendations outlined below.

15.3.4 Bellway or their groundworker should seek further advice from Lithos if unexpected ground conditions are encountered in foundation or sewer excavations, including any conflict between soft ground associated with a backfilled trial pit excavation and the line of a proposed footing.

15.3.5 Sub-surface concrete in contact with the natural ground should be Design Sulphate Class DS-1, with the site allocated an ACEC Classification of AC-1s.

15.3.1 Shallow soils beneath this site predominantly comprise clay overlying weathered Mudstone but with localised granular soils and a thin layer of Penistone Flags Sandstone in the south. Given the nature of the ground beneath the site, foundation solution options for two or three storey residential properties constructed on this site are discussed below

Strip/trench fill footings

15.3.2 It is considered that shallow strip or deepened trench fill footings will be the most suitable foundation solution for the two storey houses constructed at the site. Footings will be founded in gravel, firm clay or on competent rock.

15.3.3 Reinforcement, as a precaution against differential settlement, is recommended only where foundation excavations encounter significant lateral and vertical variations in strata. One layer of B385 mesh placed 75mm above the base of the footing is likely to provide suitable reinforcement, but further advice should be sought from the Structural Engineer.

15.3.4 Foundations will be required to be placed below a line drawn up at 45° from the base of any service or similar excavation.

15.3.5 Deepened foundations should be stepped in accordance with NHBC Standards, Chapter 4.3.

15.3.6 In order to minimise softening and swelling of cohesive soils or loosening of granular soils, it is recommended that footings are cast as soon as formation level is reached (or alternatively formation could be blinded using concrete with as low a water:cement ratio as possible).

15.3.7 In addition to the above, Bellway should review proposed plot designs and layouts, since deeper excavations for trench fill are likely to be unstable where the centre-lines of parallel trenches are closer than about 2m (assuming 600mm widths). Bellway should supervise their groundworker to ensure footings are excavated in a controlled and safe manner.

15.3.8 The **granular residual soils** (sand, gravel & cobbles) are assumed to have a relative density of at least medium dense (in accordance with BS5930); it is assumed that the granular residual soils typically have an angle of shearing resistance (ϕ) of c. 34°.

15.3.9 A safe bearing capacity of at least 150kPa, allowing a maximum foundation line load of 90kN/m run, can be assumed if the following are true:

- A foundation length of 8m
- A foundation breadth of 0.6m
- A foundation thickness of 225mm
- A foundation depth of 0.6m depth

- An angle of shearing resistance of ϕ=34° for the granular deposits

15.3.10 Assuming the foundation geometry detailed above, minimal settlements would be anticipated. However, further advice should be sought from the Structural Engineer responsible for foundation design.

15.3.11 In accordance with NHBC Standards, a minimum founding depth of 450mm (due to potential frost susceptibility) is required in granular soils. This depth should be taken from finished ground level to the underside of the footing. If finished ground level is to be above existing ground level then the foundation excavation simply needs to ensure that there is sufficient depth of excavation to allow casting of the footing entirely within natural ground (not made ground or topsoil).

15.3.12 However, if the excavation is dug from original ground level in cold conditions when freezing is expected, then foundation depth should be taken from the existing, not finished, ground level.

15.3.13 It should also be noted that the footing may require deepening or stepping in order to allow plot drainage to exit the plot footprint (either over or under the footing).

15.3.14 It is anticipated that granular residual soils may only underlie plots in the far south of the site (plots 44 – 51 from the site layout reproduced as Drawing 5655/2 in Appendix B), however this should be verified during the construction phase. Any plots found to be underlain entirely by granular residual soils should use the foundation advice outlined above.

15.3.15 Atterberg tests suggest that the **cohesive residual soils** at the site are of medium shrinkability. A minimum founding depth of 900mm (not accounting for any existing or proposed vegetation) is therefore required for all soils on the site where strip footings are proposed.

15.3.16 In accordance with NHBC Standards, founding depths in cohesive soils should be taken from original or finished ground level, whichever is the lower, to the underside of the footing.

15.3.17 Foundations should be deepened near trees in accordance with NHBC Standards Chapter 4.2. It is estimated that up to 10% of the site may be affected by trees.

15.3.18 Trench fill foundations should be designed in accordance with NHBC Standards, Chapter 4.2. Heave precautions (a suitable approved compressible void former) should be used on the internal face of all external walls where the foundation is within the zone of influence of trees and greater than 1.5m deep.

15.3.19 Any trench fill foundation deeper than 2.5m will need to be designed by a Chartered Engineer, whose status is accepted by NHBC (NHBC Standards, Technical Requirement R5); however, it is likely that the presence of bedrock will result in few, if any, foundations being deeper than 2.5m.

15.3.20 A safe bearing capacity of at least 150kPa, allowing a maximum foundation line load of 90kN/m run, can be assumed if the following are true:

- A foundation length of 8m
- A foundation breadth of 0.6m
- A foundation thickness of 225mm
- A foundation depth of 0.9m depth
- An undrained shear strength of around 80kPa for the stiff clay (typical minimum recorded on site at founding depth)

15.3.21 Assuming the foundation geometry detailed above, minimal settlements would be anticipated. This is considered likely to be acceptable, however, further advice should be sought from the Structural Engineer responsible for foundation design.

15.3.22 **Bedrock** at the site comprises mudstone and rare sandstone which can be easily excavated using a backhoe excavator and will be recovered as a tabular gravel. The mudstone bedrock beneath the site is distinctly different in colour from any overlying cohesive residual soils and was recovered as fine to coarse gravel during the excavation of all 10 trial pits.

15.3.23 Both the mudstone and sandstone bedrock are generally considered to have a safe bearing capacity of at least 300kPa and minimal settlements would be anticipated.

15.3.24 Where rock is encountered at shallow depth foundations should be placed **entirely** on rock and not partially on rock and partially on soil. This may, depending on surface gradient, necessitate significant deepening of foundations.

15.3.25 Where in-situ mudstone or sandstone is encountered at founding depth (minimum of 450mm), it should provide a suitable founding stratum for two or three storey dwellings and need only be penetrated by the proposed foundation thickness. Note: any overlying residual soil (typically clay with gravel-sized lithorelicts of mudstone) is likely to be a shrinkable soil; Mudstone and Sandstone are not.

15.4 Floor slabs

15.4.1 Where shallow foundations are within the influence of existing or proposed trees (and underlain by shrinkable soils), NHBC require a suspended floor slab, with sub-floor void. The floor slab is most commonly a precast block and beam construction, but alternatively could comprise a suspended timber floor, or a slab cast on a suitable compressible void former. Ground-bearing and cast in-situ suspended slabs (other than those cast on a void former) are not acceptable where foundations are within the influence of trees.

15.4.2 In accordance with NHBC Standards Chapter 4.2, a minimum void height of 250mm should be adopted for a precast block and beam (or suspended timber) floor; this includes a 150mm ventilation allowance. If a suspended, cast in-situ slab (on a void former) is proposed, a minimum clear void height of 100mm should be adopted; of course, the actual thickness of the void former will be significantly greater.

15.4.3 Ventilation should be provided to precast and timber suspended floors in accordance with NHBC Standards Chapter 5.2.

15.4.4 The natural ground beneath this site includes predominantly cohesive soils and is therefore subject to seasonal variation in moisture content. If ground slabs were constructed on desiccated soil, heave of the slab would occur on re-hydration of the ground. If any significantly desiccated soil is present, a suspended floor slab, with sub-floor void will be required.

15.4.5 It should be noted that NHBC have suffered a significant number of claims resulting from the use of ground bearing floor slabs. Consequently, if ground bearing slabs are proposed, care should be taken to ensure correct and careful construction. For example, if fill to the internal face of the foundation excavation is not properly compacted, subsequent settlement can result in cracking of the slab.

15.4.6 In the unlikely event that coal is exposed beneath the floor void, it would be prudent to prevent air ingress and the potential for spontaneous combustion by blinding with concrete or removing the coal.

15.5 Designated concrete mixes

15.5.1 Designated mixes are considered in BRE SD1[7] and BS 8500[8]. However, in addition to soil chemistry (sulphate class), there are a number of other considerations relating to structural design that need to be taken into account when determining an appropriate concrete mix.

15.5.2 Consequently, Bellway should seek advice from their appointed Structural Engineer.

15.6 Excavations

15.6.1 Based on the results of the investigation it is considered unlikely that major groundwater flows will be encountered in shallow excavations.

15.6.2 Excavations should remain stable in the short term but if left open for any significant period of time may require shoring most notably in granular soils.

15.6.3 Bedrock was encountered in all of the exploratory holes. Based on the exploratory hole logs, excavation greater than 2.0m is likely to prove difficult across about 80% of the site. Any deep excavations such as those that may be required for drainage etc will encounter hard rock; a breaker or ripping attachments will be required.

15.7 Drainage

15.7.1 Based on observations made during the investigation (clays and largely impermeable mudstone), soakaways are **very unlikely** to provide a suitable drainage solution for surface water run-off at the site. It is understood that Bellway has been provided with a surface water outfall for the proposed development.

15.8 Highways

15.8.1 The natural soils present at shallow depth (anticipated formation) are predominantly cohesive or solid rock. Based on visual inspection of the natural materials and the recorded plasticity indices at the site, published guidance[9] and tables[10] indicate that the bedrock and residual soils would be expected to provide a CBR value of at least 3%. These values should be verified prior to or during construction.

15.9 External works

15.9.1 Any digital terrain modelling undertaken, or commissioned, by Bellway should be made available to their Engineering Designer prior to issue of an External Works Drawing.

[7] *BRE Special Digest 1 (2005) – Concrete in aggressive ground.*

[8] *BS 8500-1&2:2015+A2:2019. Concrete. Complementary British Standard to BS EN 206. Method of specifying and guidance for the specifier (1) & Specification for constituent materials and concrete (2).*

[9] *CD225 Design for new pavement foundations Revision 1 (Design Manual for Roads and Bridges)*

[10] *The Structural Design of Bituminous Road, TRRL Laboratory Report 1132 (Table C1, page 36)*

16 REDEVELOPMENT ISSUES

16.1 General

16.1.1 This report has presented options with respect to foundation solutions, re-use of topsoil etc that are considered technically feasible and in line with current good practice. Consequently, Lithos would expect to obtain regulatory approval for whichever option is adopted, although this cannot be guaranteed. Copies of this report should be forwarded to the relevant regulatory authorities (Warranty Provider & Local Authority) for their comment/approval.

16.1.2 If unexpected ground is encountered during the construction phase, the Contractor should immediately seek further advice from the Engineer.

16.2 Remediation strategy

16.2.1 Given the absence of any significant contamination, a remediation strategy is not considered necessary. Nonetheless, some preparatory works will be required, most notably:

- General site clearance of surface materials and vegetation
- Topsoil strip & stockpile
- Provision of 200mm thickness of topsoil in all garden and landscaped areas

16.2.2 It should be ensured that the groundworker understands the need for good materials management. Most notably the importance of not mixing different materials within a given stockpile; i.e. there should be separate stockpiles of: topsoil; excess clean, natural soil arisings; general construction waste etc.

16.2.3 Further characterisation of stockpiled materials is likely to be required if off-site disposal is proposed.

16.2.4 No areas of gross contamination were encountered during the site investigation. However, if any buried drums, "oily", odorous, brightly coloured etc. materials are encountered, further advice should be sought from Lithos.

16.2.5 The Contractor should make all necessary arrangements to prevent off-site migration of contaminated sediment via surface water run-off, and avoid any pollution of the Scout Dyke watercourse. This will necessitate the installation of surface water grips, and removal, sealing-off, or diversion of all redundant former site drains (and any land drains).

16.2.6 A Surface Water Management Plan should be prepared by the Contractor, describing the mitigation measures that will be put in place to intercept direct run-off from any disturbed areas, stockpiles etc, thereby preventing any potential impact of adjacent land and nearby watercourses. Surface water run-off will probably require treatment (as a minimum to allow settlement of fines) prior to consented discharge.

16.3 Management of topsoil

16.3.1 In order to manage surface water and silt, it is recommended that a phased approach is taken to site clearance and construction; prior to construction, topsoil and vegetation form a natural barrier and limit surface water (and silt) run off.

16.3.2 NHBC Conditions require garden areas to be provided with topsoil to a thickness of not less than 100mm. Topsoil thicknesses in excess of 400mm should generally be avoided.

16.3.3 Prior to placement of topsoil, the underlying subsoil should be loosened by ripping or rotovating. Stones and other objects greater than 50mm should be removed from the prepared surface, and the loosened subsoil should be roughly levelled so that an even depth of topsoil can be achieved.

16.3.4 Subsequent trafficking over the loosened subsoil should be minimised.

16.3.5 Topsoil should not be placed during or immediately after heavy rain.

16.3.6 After spreading, any large, compacted lumps should be broken down to produce a fine tilth suitable for planting, turfing and seeding (< 10mm maximum aggregate size).

16.4 Good practice guidance

16.4.1 The construction phase groundworker should follow good environmental practice to minimise the risks of spillage, leakage etc with reference, but not limited, to the following documents:

- CIRIA C741[11]
- EA Pollution Prevention Guidelines[12]:
  - PPG6 - Working at construction and demolition sites
  - PPG2 - Above ground oil storage tank
  - PPG7 – The safe operation of refuelling facilities
  - PPG21 – Incident Response Planning

16.4.2 Site preparatory works associated with this project are likely to involve the re-use of natural soils on site. The Contractor could prepare a Materials Management Plan (MMP) in accordance with the CL:AIRE Code of Practice (v2, March 2011) [13].

16.4.3 The MMP would document how all of the materials to be excavated during the proposed site preparatory and remediation earthworks are to be dealt with.

16.5 New utilities

16.5.1 It is strongly recommended that all statutory service bodies are consulted at an early stage with respect to the ground conditions within which they will lay services in order to enable them to assess at an early stage any potential abnormal costs.

16.5.2 Drainage and other utilities should not be placed within any coal seam; the seam should either be removed to below the base of the lowest service, or services should be placed in oversize trenches cut into the seam & backfilled with inert material.

16.5.3 This site is greenfield, and no previous or current usage of the site or its immediate surroundings is likely to have resulted in ground contamination. Furthermore, no significant made ground was encountered in any of the exploratory holes during the ground investigation.

16.5.4 Consequently, the use of **'standard' polyethylene** water supply pipes should be acceptable, although Bellway should consult the adopting Water Authority at the earliest opportunity to confirm this.

[11] *CIRIA C741 (2015) - Environmental Good Practice on Site*
[12] *Whilst this has formally been withdrawn it can still be accessed via the EA archives and provides useful information on managing risks.*
[13] *The Definition of Waste: Development Industry Code of Practice. CL:AIRE, 2011.*

16.6 Health & safety issues - construction workers

16.6.1 Access into excavations etc. must be controlled and undertaken in accordance with the CDM Regulations 2015, most notably Regulation 22, to mitigate risk of collapse or asphyxiation.

16.6.2 Before site operations are started, the necessary COSHH statements and Health & Safety Plan should be drafted in accordance with the CDM regulations.

16.7 Potential development constraints

16.7.1 Some deterioration of the surface is likely to be caused by trafficking, especially after topsoil has been stripped and during/after periods of significant rainfall. Consequently, it would be prudent to consider placement of a minimum 200mm thickness of suitable granular fill (i.e. a "blanket" of 6F2) along the line of proposed highways and any temporary haul roads to protect formation during the construction phase.

17 SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

17.1 General

17.1.1 The site comprises c. 1.4 hectares of land located in Penistone about 10km West of Barnsley town centre. Review of historical plans shows no previous site uses other than farming. It is understood that Bellway are considering acquisition of the site with a view to redevelopment with housing.

17.1.2 Ground conditions beneath the site comprise a thin layer of cohesive residual soils over Coal measures Mudstone and localised granular residual soils over Penistone Flags Sandstone bedrock in the far south. Bedrock was encountered between 0.3 and 1.3m, typically present from c. 0.8m bgl.

17.2 Mining

17.2.1 This site is underlain at depth by Coal measures Mudstone bedrock, and the shallowest significant coal seams lies at least 100m below the surface. Whilst the site lies within a Mining Remediation Authority Low Risk area, no significant risks have been identified, and an intrusive mining investigation will not be required.

17.3 Hazardous gas

17.3.1 The site is in an area where 1 – 3% of homes are estimated to be above the radon action level. Radon protection is not required, but the Developer might consider providing new dwellings with basic measures in light of UK Health Security Agency advice.

17.3.2 There are no known or suspected areas of landfilling within 250m, and the site is not in area considered susceptible to mines gas, nor is it underlain by shallow mineworkings. As such, no special precautions against methane / carbon dioxide gas are required.

17.4 Contamination & remediation

17.4.1 Topsoil, typically 200mm thick underlies the entire site. Testing suggests this material is chemically suitable for re-use. Given the nature of the topsoil present on this site it would be expected to be suitable to support plant growth.

17.5 Foundations

17.5.1 It is considered that shallow strip or deepened trench fill footings will be the most suitable foundation solution for the two and three storey houses constructed at the site. Footings will be founded in gravel, firm clay or on competent rock.

17.6 Flooding

17.6.1 The site lies in Flood Zone 1, where the risk of flooding from rivers or the sea is classified as low.

17.7 Drainage

17.7.1 Based on observations made during the investigation, soakaways are very unlikely to provide a suitable drainage solution for surface water run-off at the site. It is understood that Bellway has been provided with a drainage outfall for the proposed development.

17.8 Highways

17.8.1 Based on visual inspection of the shallow natural materials and published guidance, the residual soils should provide a CBR value of at least 2%. This value should be verified prior to or during construction.

Appendix A

General Notes

01 - Environmental setting
Generic notes – geoenvironmental investigations

General

Third party information obtained from the British Geological Survey (BGS), the Coal Authority, the Local Authority etc is presented in the "Search Responses" Appendix of this Geoenvironmental Report.

Geology, mining & quarrying

In order to establish the geological setting of a site, Lithos refer to BGS maps for the area, and the relevant geological memoir. Further information is sourced by reference to current and historical OS plans.

In July 2011, the Coal Authority (CA) formalised their requirements in relation to planning applications and introduced some new terminology. The CA, using its extensive records has prepared plans for all coalfield Local Planning Authorities, which effectively refines the defined coalfield areas into High Risk and Low Risk areas. **High Risk** areas are likely to be affected by a range of legacy issues that pose a risk to surface stability, including: mine entries; shallow coal workings; workable coal seam outcrops; mines gas; and previous surface mining sites. **Low Risk** areas comprise the remainder of the defined coalfield, and are areas where no known defined risks have been recorded; although there may still be unrecorded issues. Where a site lies within either a High or Low Risk area, a mining report is obtained from the CA.

Landfills

Reference is made to publicly available Government held digital data via **QGIS** (an Open Source Geographic Information System), data from Landmark or Groundsure, and sometimes the Environment Agency and the Local Authority with respect to known areas of landfilling within 250m of the proposed development site.

Historical OS plans are also inspected for evidence of backfilled quarries, railway cuttings, colliery spoil tips etc.

Radon

Radon is a colourless, odourless gas, which is radioactive. It is formed in strata that contain uranium and radium (most notably granite), and can move though fissures eventually discharging to atmosphere, or the spaces under and within buildings. Where radon occurs in high concentrations, it can pose a risk to health.

In order to assess potential risks associated with radon gas, Lithos refer to BRE Report BR211[1], and the UK Health Protection Agency (HPA) website. In December 2022, the British Geological Survey (BGS), deployed a revised dataset which increased accuracy and also the number of properties falling within radon affected areas. This revised dataset is now referenced by maps on the HSA website.

Advice on the limitation of exposure of the population to radon in buildings was originally published in 1990 by the National Radiological Protection Board (NRPB), which joined the HPA in 2005; the HPA updated NRPB advice in July 2010[2].

The HPA recommended that the NRPB radon Action Level for homes be retained, and a new Target Level for radon in homes be introduced. The values of the Action Level and Target Level, expressed as the annual average radon concentration in the home, are 200 Bqm^{-3} and 100 Bqm^{-3} respectively. The Target Level was to provide an objective for remedial action in existing homes and preventive action in new homes.

The term 'radon Affected Area' is defined as those parts of the country with >1% of homes estimated to be above the Action Levels. The level of protection needed is site-specific and can be determined by reference to this mapping on the Public Health England website, which indicates the highest radon potential within each 1km grid square. Each 1km grid square is classified on the basis of the percentage of existing homes within that grid square estimated to have radon concentrations above the Action Level. There are 6 'bands': <1%; 1 to 3%; 3 to 5%; 5 to 10%; 10 to 30%; and >30%.

The NRPB advised that action should be taken to reduce radon concentrations in existing homes if the radon concentration exceeded the Action Level of 200 Bqm^{-3} in room air averaged over a year; ten times the average UK domestic radon concentration. NRPB advice informed changes in the requirements for radon protection in new buildings.

- **Basic** preventive measures are required in new buildings, extensions, conversions and refurbishments if the probability of exceeding the Action Level is **>3%** in England and Wales, and >1% in Scotland and Northern Ireland.
- Provision for further preventive (**Full**) measures is required in new buildings if the probability of exceeding the Action Level is **>10%**.

At present Building Regulations Approved Document C advocates basic measures for the probability banding 3% to 10%, and full measures if >10%. However, HPA would like to see all new build include basic measures.

Action & Target Levels should also be applied to non-domestic buildings with public occupancy exceeding 2,000 hrs/yr and to all schools.

Hydrogeology

Reference is made to publicly available Government held digital data via QGIS, and Landmark or Groundsure with respect to:

- Groundwater quality
- Recorded pollution incidents
- Licensed groundwater abstractions

From April 2010 the EA's Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply), but also their role in supporting surface water flows and wetland ecosystems. The aquifer designation data is based on geological mapping provided by the British Geological Survey. The maps are split into two different types of aquifer designation:

- Superficial (Drift) - permeable unconsolidated (loose) deposits. For example, sands and gravels
- Bedrock - solid permeable formations e.g. sandstone, chalk and limestone

The maps display the following aquifer designations:

Principal aquifers: These are layers of rock or superficial deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary aquifers: These include a wide range of rock layers or superficial deposits with an equally wide range of water permeability and storage. Secondary aquifers are subdivided into three types:

- **Secondary A** - 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
- **Secondary B** - predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers
- Secondary undifferentiated - In most cases, this is because the rock type in question has previously been designated as both a minor and non-aquifer in different locations due to the variable characteristics.

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1 BRE Report BR211, 2023: "Radon: guidance on protective measures for new buildings (including supplementary advice for extensions, conversions and refurbishment projects".

2 Limitation of Human Exposure to Radon, Documents of the Health Protection Agency - Radiation, Chemical and Environmental Hazards, RCE-15. July 2010.

Unproductive strata: These are rock layers or superficial deposits with low permeability that have negligible significance for water supply or river base flow.

The EA maps only display the principal and secondary aquifers as coloured areas. All uncoloured areas on the map will be unproductive strata. However, for uncoloured areas on the superficial (drift) designation map it is not possible to distinguish between areas of unproductive strata and areas where no superficial deposits are present; to do this, it is necessary to consult the published geological survey maps.

For the purposes of the EA's Groundwater Protection Policy the following default position applies, unless there is site specific information to the contrary:

- If no superficial (drift) aquifers are shown, the bedrock designation is adopted
- In areas where the bedrock designation shows unproductive strata (the uncoloured areas) the superficial designation is adopted
- In all other areas, the more sensitive of the two designations is used (e.g. If secondary superficial overlies principal bedrock, an overall designation of principal is assumed)

The EA have also designated groundwater Source Protection Zones, which are based on proximity to a groundwater source (springs, wells and abstraction boreholes). The size of a Source Protection Zone is a function of the aquifer, volume of groundwater abstracted and the effective rainfall, and may vary from tens to several thousand hectares.

Hydrology

Reference is made to publicly available Government held digital data via QGIS, and Landmark or Groundsure with respect to:

- Surface water quality
- Recorded pollution incidents
- Licensed abstractions (groundwater & surface waters)
- Licensed discharge consents
- Site susceptibility to flooding

The EA have set **water quality** targets for all rivers. These targets are known as River Quality Objectives (RQOs). The water quality classification scheme used to set RQO planning targets is known as the River Ecosystem scheme. The scheme comprises five classes (RE1 to RE5) which reflect the chemical quality requirements of communities of plants and animals occurring in our rivers.

General Quality Assessment (GQA) grades reflect actual water quality. They are based on the most recent analytical testing undertaken by the EA. There are 6 GQA grades (denoted A to F) defined by the concentrations of biochemical oxygen demand, total ammonia and dissolved oxygen.

The susceptibility of a site to **flooding** is assessed by reference to a Flood Map on the Environment Agency's website. These maps show natural floodplains - areas potentially at risk of flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas. There are two different kinds of area shown on the Flood Map:

1. Dark blue areas (Flood Zone 3) could be flooded by the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year, or by a river by a flood that has a 1% (1 in 100) or greater chance of happening each year
2. Light blue areas (Flood Zone 2) show the additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1% (1 in 1000) chance of occurring each year

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements. Where there is no blue shading (Flood Zone 1), there is less than a 0.1% (1 in 1000) chance of flooding occurring each year.

The maps also show all flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, or floods from the sea with a 0.5% (1 in 200) chance of happening each year, together with some, but not all, older defences and defences which protect against smaller floods.

The Agency's assessment of the likelihood of flooding from rivers and the sea at any location is based on the presence and effect of all flood defences, predicted flood levels, and ground levels.

It should also be noted that as the floodplain shown is the 1 in 100 year, areas outside this may be flooded by more extreme floods (e.g. the 1 in 1000 year flood). Also, parts of the areas shown at risk of flooding will be flooded by lesser floods (e.g. the 1 in 5 year flood). In some places due to the shape of the river valley, the smaller floods will flood a very similar extent to larger floods but to a lesser depth.

If a site falls within a floodplain, it is recommended that a flood survey be undertaken by a specialist who can advise on appropriate mitigating measures; i.e. raising slab levels, provision of storage etc. In accordance with Chapter 10 of the National Planning Policy Framework, a site-specific flood risk assessment is required for: proposals of 1 hectare or greater in Flood Zone 1, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency); and any new development in Flood Zones 2 and 3.

COMAH & explosive sites

Lithos obtain information from Landmark or Groundsure with respect to Control of Major Accident Hazards (COMAH) or explosive sites within 1km of the proposed development site. Lithos' report refers to any that are present, and recommends that the Client seeks further advice from the HSE.

Areas around COMAH sites (chemical plants etc) are zoned with respect to the implementation of emergency plans. The HSE are a statutory consultee to the local planning authority for all COMAH sites. The COMAH site may have to revise its emergency action plan if development occurs. This might be quite straightforward or could entail significant expenditure. Consequently, the COMAH site may object to a proposed development (although it is the Local Authority who have final say, and they are likely to place more weight on advice from the HSE).

Preliminary conceptual site model

The site's environmental setting (and proposed end use) is used by Lithos to assess the significance of any contamination encountered during the subsequent ground investigation.

Assessment of contaminated land is based on an evaluation of pollutant linkages (source-pathway-receptor). Contaminants within the near surface strata represent a potential source of pollution. The environment (most notably groundwater), site workers and end users are potential receptors.

Potential pollutant linkages are shown on a preliminary conceptual site model (pCSM). A CSM is essentially a cross-section through a site that reflects both the surface topography and underlying geology, and shows surface features of interest. The most significant sources of contamination are then superimposed onto this cross-section together with potential receptors (human health & controlled waters), and plausible pathways between the two. In addition to environmental issues, the CSM should also highlight geotechnical issues.

A pCSM is prepared after consideration of all available "desk study" data, and before design of the ground investigation. Data reviewed should include historical plans (with superimposition on a current-day plan), previous SI reports, geological maps etc. The pCSM, in conjunction with knowledge of site constraints (buildings, services, slopes etc) is used to design the ground investigation.

The revised CSM takes account of data obtained during the ground investigation, including the distribution of made ground, the nature and distribution of contamination etc.

02 - Ground investigation fieldwork
Generic notes – geoenvironmental investigations

General

Lithos Ground Investigations are undertaken in accordance with current UK guidance including:

- BS5930:2015 "Code of practice for site investigation"
- Eurocode 7: BS EN 1997-1:2004. Geotechnical design - Part 1: General rules
- Eurocode 7: BS EN 1997-2:2007. Geotechnical design - Part 2: Ground investigation and testing
- BS10175:2013 "Code of practice for the identification of potentially contaminated sites"
- "Technical Aspects of Site Investigation" – EA R&D Technical Report P5-065/TR (2000)
- "Development of appropriate soil sampling strategies for land contamination" – EA R&D Technical Report P5-066/TR (2001)
- Contaminated Land Reports 1 to 6, most notably CLR Report No. 4 "Sampling strategies for contaminated land"
- "Guidance on the protection of housing on contaminated land" – NHBC & EA R&D Publication 66 (2000)
- AGS: 1996 "Guide to the selection of Geotechnical Soil Laboratory Testing"

Exploratory hole locations

Exploratory hole locations are selected by Lithos, prior to commencement of fieldwork, to provide a representative view of the strata beneath the site and to target potential contaminant sources identified during the preliminary investigation (desk study). Additional exploratory locations are often determined by the site engineer in light of the ground conditions actually encountered; this enables better delineation of the depth and lateral extent of organic contamination, poor ground, relict structures etc.

Investigation techniques

Ground conditions can be investigated by a number of techniques; the procedures used are in general accordance with BS5930: 2015 and BS1377: 1990. Techniques most commonly used by Lithos include:

- Machine excavated **trial pits**, usually equipped with a backactor and a 0.6m wide bucket. Allows a thorough inspection of the ground; especially the uppermost 1m or so (but able to reach depths of up to c. 4m), with the recovery of representative, disturbed samples. Also used to conduct soakaway testing.
- **Window or windowless** sampling boreholes (**dynamic sampling**). Constraints associated with existing buildings, operations and underground service runs can render some sites partly or wholly inaccessible to a mechanical excavator. In such circumstances, window sampling is often the most appropriate technique. A window sampling drilling rig can be manoeuvred in areas of restricted access and results in minimal disturbance of the ground (a 150mm diameter tarmac/concrete core can be lifted and put to one side). However, it should be noted that window sampling allows only a limited inspection of the ground (especially made ground with a significant proportion of coarse material).
- **Cable percussive** (Shell & Auger) boreholes, typically using 150mm diameter tools and casing. Enables the recovery of soil samples and data from greater depth than is possible via trial pitting or a mini-percussive drill rig. Also enables the installation of better/deeper monitoring wells (cf use of a mini-percussive drill rig) due to the utilisation of temporary steel casing during drilling.
- **Rotary percussive** open-hole probeholes are typically drilled using a tri-cone rock roller or polycrystalline diamond compact (PDC) bit with air as the flushing medium. Probeholes are generally lined through made ground with temporary steel casing to prevent hole collapse. Often used to penetrate bedrock to investigate abandoned shallow mineworkings
- **Rotary cored** boreholes. A rock core is cut by a bit, passes up into the inner barrel and, at the end of the coring run, the core barrel assembly is lifted to the surface. Core drilling is relatively expensive, but essential if quality data is required to assess issues associated with deep excavation, rock slope stability etc.

Where installed, gas\groundwater monitoring **wells** typically comprise a lower slotted section, surrounded by a filter pack of 10 mm non-calcareous gravel and an upper plain section surrounded in part by a bentonite seal and in part by gravel or arisings. The top of the plain pipe is cut off below ground level and the monitoring well protected by a square, stopcock type manhole cover set in concrete, or the plain pipe is cut off just above ground level and the well protected by 100mm diameter steel borehole helmet set in concrete. Monitoring well details, including the location of the response zone and bentonite seal are presented on the relevant exploratory hole logs.

In-situ testing

Relative densities of granular materials given on the trial pit logs are based on visual inspection only, they do not relate to any specific bearing capacities.

The relative densities of granular materials encountered in cable percussive boreholes are based on Standard Penetration Test (SPT) results. SPTs are carried out boreholes, in accordance with BS 1377 1990, Part 9 Section 3.3. Where full penetration (600mm) is not possible, N values are calculated by linear extrapolation and are shown on the logs as N* = x. The strength of cohesive deposits is determined using a hand shear vane.

Shear strength test results (hand vane readings) reported on trial pit logs are considered to be more reliable than those reported on window sample logs. Significant sample disturbance occurs during window sampling and consequently shear strength results on disturbed window samples are generally lower than results obtained during trial pitting, in-situ or in large excavated blocks.

Sampling

Typically Lithos collect at least three soil samples from each exploratory hole, although in practice a greater number are often taken. The collection of a sufficient number of samples provides a sound basis upon which to schedule laboratory analysis, ensuring:

- A sufficient number of samples from each (common) site material are tested
- Horizontal and vertical coverage of the site is adequate, thereby providing a robust data set for use in the conceptual ground model
- Any localised, significant, but non-pervasive conditions are considered

Made ground and natural soils encountered in the field during a ground investigation often contain a significant proportion of coarse grained material (e.g. brick etc). Soil samples obtained during most investigations are often only truly representative of the in-situ soil mass where there is an absence of particles coarser than medium gravel; i.e the entire soil mass would pass a 20mm sieve.

Representative bulk samples of the **soil mass** are retrieved from coarse soils for specific geotechnical tests (most notably grading and compaction); this typically requires the collection of at least 10kg of soil, and occasionally >50kg. However, in the context of assessing land contamination, it is generally accepted that samples should be representative of the **soil matrix** of the stratum from which they are taken. Consequently, truly representative samples of coarse soils for subsequent contaminant analysis are not obtained - only the finer fraction is placed in sample containers. Coarse constituents not sampled would typically comprise any 'particles' with an average diameter greater than about 20mm (i.e. coarse gravel, cobble and boulder).

At present, neither ISO/IEC 17025 nor MCERTS specify sample pre-treatment with respect to stone removal. Unsurprisingly therefore UKAS accredited testing laboratories do not adopt the same approach to stones[1] – some crush and test the "as received" soil, whilst others sieve out stones and analyse only the residual soil (the sieve size used varies depending on the laboratory).

In essence, samples taken from coarser soils for contaminant analysis are "screened" by the geoenvironmental engineer in the field, and often sieved again by the laboratory during sample preparation. Geoenvironmental engineers do not typically re-calculate soil mass contaminant concentrations by taking account of the unsampled coarse fraction. Likewise, laboratories that remove stones typically report contaminant concentrations based on the dry weight of soil passing the sieve. In the context of land contamination and human health risk assessment, this is considered reasonable, because it is the soil matrix which is of greatest concern. Stones are unlikely to:

- Provide a significant source for plant uptake (consumption of vegetables)
- Remain on vegetables after washing (consumption of vegetables)
- Be eaten (accidentally by an adult, or deliberately by a child)
- Be whipped-up by the wind for dust generation (inhalation)
- Stick to the skin for any length of time (dermal contact)
- Yield toxic vapour (inhalation)

Consequently, Lithos instruct labs to remove all stones >10mm, and to report the results as dry-weight based on the mass of matrix tested. However, the laboratory are given site-specific instruction where coarse stones are coated in say oil, or impregnated with mobile contaminants such as diesel. Where the stones are predominantly natural, or inert (e.g. brick, concrete etc), removal will clearly result in higher reported concentrations, than if the stones were crushed and added to the matrix.

Where the stones include a significant proportion of contaminant-rich material (e.g. slag, fragments of galvanised metal etc) an argument could be made for crushing and analysing. However, provided the stones are stable (i.e. unlikely to disintegrate or degrade) they should not pose a significant risk to human health for the reasons stated above.

Sometimes it is necessary to obtain samples that are not representative of the wider soil matrix, for example when investigating localised, significant, but non-pervasive conditions. Any such unrepresentative samples are annotated with the suffix '*' (eg 2D*, or 4G*). Lithos' site engineer describes both the unrepresentative sample, and the soil mass from which it was been taken.

Sample Containers (for contaminant analysis). Samples of soil for contaminant testing are placed into appropriate containers (see below). Soil samples for organic analysis are stored in cool boxes, at a temperature of approximately 4ºC, until delivery to the selected laboratory.

Anticipated testing	Container(s)
Asbestos identification	1000ml plastic tub
pH & metals	1000ml plastic tub or 250ml glass jars
non-volatile organics	250ml glass jars
Speciated TPH	250ml & 50ml glass jars
VOCs (incl. naphthalene and \or GRO)	50ml glass jar

Sample Containers (for geotechnical analysis). The majority of samples are only scheduled for PI and sulphate testing, for which 500g of sample is required (a full 0.5-litre plastic tub). However, bulk bags are taken where scheduling of compaction or grading tests is proposed.

Groundwater

Where encountered during fieldwork, groundwater is recorded on exploratory hole logs. If monitoring wells are installed, groundwater levels are also recorded on one or more occasions after completion of the fieldwork. Long-term monitoring of standpipes or piezometers is always recommended if water levels are likely to have a significant effect on earthworks or foundation design.

It should be borne in mind that the rapid excavation rates used during a ground investigation may not allow the establishment of equilibrium water levels. Water levels are likely to fluctuate with season/rainfall and could be substantially higher at wetter times of the year than those found during this investigation.

Description of strata

Soils encountered during a Lithos investigation are described (logged) in general accordance with BS 5930:2015. The descriptions and depth of strata encountered are presented on the exploratory hole logs and summarised in the Ground Conditions section within the main body of text. The materials encountered in the trial pits are logged, samples taken, and tests performed on the in-situ materials in the excavation faces, to depths of up to 1.2m; below this depth these operations are conducted at the surface on disturbed samples recovered from the excavation.

[1] *Mark Perrin. Stoned – Sample Preparation for Soils Analysis. Ground Engineering, April 2007.*

03 – Geotechnical laboratory testing
Generic notes – geoenvironmental investigations

General

Soil samples are delivered to the laboratory for testing along with a schedule of testing drawn up by Lithos. All tests are carried out in accordance with BS 1377:1990. The following laboratory testing is routinely carried out on a selection of samples:

- Atterberg limits & moisture contents
- Soluble sulphate & pH

Where soft, cohesive soils are encountered, one-dimensional consolidation tests are scheduled in order to assess settlement characteristics, and unconsolidated undrained triaxial compression tests to assess shear strength.

The additional tests are typically only scheduled where significant earthworks regrade is anticipated:

- Grading
- Compaction tests
- Particle density

Test results are presented as received in an Appendix to the Geoenvironmental Report.

Atterberg limits & moisture content

The Liquid and Plastic Limits of samples of natural in-situ clay are determined using the cone penetrometer method and the rolling thread test. These tests enable determination of an average Plasticity Index (PI) for each "type" of clay, although judgement is applied where variable results are reported.

PI can be related to shrinkability (low, medium or high) and then to minimum founding depth. Lithos typically only consider a soil to be shrinkable if the proportion finer than 63µm is >35%. PI results are compared against guidance given in the NHBC Standards, Chapter 4.2 (revised April 2003), which advocates the use of modified Plasticity Index (I'p), defined as:

I'p = Ip * (%< 425µm/100)

i.e. if PI is 30%, but the soil contains 80% < 425µm, then: I'p = 30 * 80/100 = 24%.

It should be noted that in accordance with the requirements of BS 1377, the % passing the 425µm sieve is routinely reported by testing labs. Lithos apply engineering judgment where PI results are spread over a range of classifications. Consideration is given to:

- The average values for each particular soil type (ie differentiate between residual soil and alluvium)
- The number of results in each class and
- The actual values

Unless the judgment strongly indicates otherwise, Lithos typically adopts a conservative approach and recommends assumption of the higher classification.

Soluble sulphate and pH

Sulphates in soil and groundwater are the chemical agents most likely to attack sub-surface concrete, resulting in expansion and softening of the concrete to a mush. Another common cause of concrete deterioration is groundwater acidity.

The rate of chemical attack depends on the concentration of aggressive ions and their replenishment at the reaction surface. The rate of replenishment is related to the presence and mobility of groundwater.

Lithos refer to BRE Special Digest 1 (SD1) "Concrete in aggressive ground. Part 1: Assessing the aggressive chemical environment" (2005). SD 1 provides definitions of:

- The nature of the site (greenfield, brownfield or pyritic)
- The groundwater regime (static, mobile or highly mobile)
- The design sulphate class (DS class) and
- The aggressive chemical environment for concrete (ACEC class)

Lithos reports clearly state each of the above for the site being considered.

The concentrations of sulphate in aqueous soil/fill extracts are determined in the laboratory using the gravimetric method. The results are expressed in terms of SO_4 for direct comparison with BS 5328:1997. The pH value of each sample was determined by the electrometric method.

SD1 also discusses determination of "representative" sulphate concentration from a number of tests. Essentially if <10 samples of a given soil-type have been tested, the highest measured sulphate concentration should be taken. If >10 samples have been tested, the mean of the highest 20% of the sulphate test results can be taken. With respect to groundwater, the highest sulphate concentration should always be taken.

With respect to pH (soil & groundwater) the value used is the lowest value if <10 samples have been tested and the mean of the lowest 20% if >10 samples have been tested.

Oedometer (Consolidation) tests

Oedometer tests measure a soil's consolidation properties, and are performed by applying different loads to a soil sample and measuring the deformation response. Typically the sample is subject to 5 incremental pressures (4 loading & 1 unloading), and the convention is for each subsequent pressure to be double the previous pressure. BS1377 suggests the **initial** pressure should be:

a) For stiff soils the effective overburden pressure*
b) For firm soils "somewhat less" than the effective overburden pressure
c) For soft soils "appreciably less" than the effective overburden pressure, usually 25 kPa or less
d) For very soft soils very low, typically 5 kPa or 10 kPa

* Effective **overburden pressure** (kNm^{-2}) = depth (m) x soil bulk unit weight (kNm^{-3})

Results from these tests are used to predict how a soil in the field will deform in response to a change in effective stress.

Triaxial tests

This test measures the mechanical properties of a soil by placing the sample between two parallel platens which apply stress in one (usually vertical) direction, with fluid used to apply a confining pressure in the perpendicular directions. During the test, the surrounding fluid is pressurized, and then stress on the platens is increased until the material in the cylinder fails.

From triaxial test data, it is possible to extract fundamental material parameters, including its angle of shearing resistance, apparent cohesion, and dilatancy angle. These parameters are then used in computer models to predict how the material will behave in a larger-scale engineering application.

Quick (single stage, Unconsolidated, Undrained tests) are most appropriate for foundation design. This is because load is applied relatively quickly, and shear strength of the clay will be lowest initially; after the applied load causes some consolidation of the ground (after drainage results in dissipation of short-term excess pore water pressure), the in-situ clays will become progressively stronger and hence the factor of safety will increase. Confining pressure is specified as equivalent to overburden pressure (kNm^{-2}).

Foundations on granular soils would use effective shear strength parameters (c' and phi') to assess safe bearing capacity, as the soil would fully drain quickly. These effective shear strength parameters could be determined from Consolidated Undrained (or sometimes the more expensive Consolidated Drained) triaxial tests, but often correlations to the SPT are used.

Unconsolidated Undrained triaxial tests are most appropriate for assessment of the stability of fill slopes on clays. Similar to foundations, the application of load gradually increases the strength of the clays and hence the critical case is the short term undrained condition.

Consolidated Undrained (or sometimes **Consolidated Drained**) triaxial tests are most appropriate for assessment of the stability of cut slopes in clays. This is because unloading of the ground leads to short term reduction in pore pressures that approximately balance the unloading, hence the soil strength is largely unchanged. Over time the reduced pore pressures suck water in, which leads in to the progressive increase in pore pressure and loss of strength. The fully drained state is critical, which must be modelled using effective strength parameters and a reasonable estimate of the long term water table conditions.

Slopes formed in granular soils would use effective shear strength parameters (c' and phi') to assess safe bearing capacity, as the soil would fully drain quickly. These effective shear strength parameters could be determined from Consolidated Undrained (or sometimes the more expensive Consolidated Drained) triaxial tests, but often correlations to the SPT are used.

Determination of analytical suite

An assessment of potential contaminants associated with the former usages of the site is undertaken with reference to CLR 8 "Potential contaminants for the assessment of land" and the relevant DETR Industry Profile(s).

Common contaminants

Common **Inorganic** Contaminants include:

- Metals, most notably cadmium, copper, chromium, mercury, lead, nickel, and zinc
- Semi-metals, most notably arsenic, selenium, and (water soluble) boron
- Non-metals, most notably sulphur
- Inorganic anions, most notably cyanides (free & complex), sulphates, sulphides, and nitrates

With respect to the terminology used by most analytical laboratories:

Total cyanide = Free cyanide + Complex cyanide

Total cyanide (CN) is determined by acid extraction; whereas free cyanide is the water soluble fraction. Complex cyanide is "bound" in compounds and is hard to breakdown. Laboratory determination of complex CN involves subjecting the sample to UV digestion for determination of both free and total CN.

Thiocyanate (SCN) is a different species combined with sulphur.

Elemental sulphur (S) and free sulphur are the same. Total sulphur is all forms, including that present in sulphates (SO_4), sulphides etc.

There are 2 forms of chromium (Cr), chromium VI and chromium III. Chromium VI is the more toxic of these. In soils, total chromium is determined by a strong aqua regia acid digestion. Chromium VI is an empirical method based on a water extract test.

Common **Organic** Contaminants include hydrocarbons, phenols, and polychlorinated biphenyls.

Petroleum is a mixture of hydrocarbons produced from the distillation of crude oil, and includes aliphatics (alkanes, alkenes and cycloalkanes), aromatics (benzene and derivatives) and hydrocarbon-like compounds containing minor amounts of oxygen, sulphur or nitrogen. Petroleum hydrocarbons can be grouped based on the carbon number range:

- GRO – Gasoline Range Organics (typically C_6 to C_{10}). Also referred to as PRO – Petroleum Range Organics
- DRO – Diesel Range Organics (typically C_{10} to C_{28})
- LRO - Lubricating Oil Range Organics (typically C_{28} to C_{40})
- MRO – Mineral Oil Range Organics (typically C_{18} to C_{44})

However, it should be borne in mind that the terms "GRO" and "DRO" analysis are purely descriptive terms, the exact definition of which varies. Total Petroleum Hydrocarbons (TPH) is also a poorly defined term; some testing laboratories regard TPH as hydrocarbons ranging from C_5-C_{40}, whereas others define TPH as C_{10}-C_{30}.

The composition of a TPH plume migrating through the ground can vary significantly; this is primarily dictated by the nature of the source (e.g. petrol, diesel, engine oil etc). Furthermore, different hydrocarbons are affected differently by weathering processes, and this can result in further variation in the chemical composition of the TPH.

Gasoline contains light aliphatic hydrocarbons (especially within the C_4 to C_5 range) that are volatile. The aromatic hydrocarbons in gasoline are primarily benzene, toluene, ethylbenzene and xylenes, referred to as BTEX. Small amounts of polycyclic aromatic hydrocarbons (PAHs) such as benzo(a)pyrene may also be present. Diesel and light fuel oils have higher molecular weights than gasoline. Consequently, they are less volatile and less water soluble. About 25 to 35% is composed of aromatic hydrocarbons. BTEX concentrations are generally low.

Heavy Fuel Oils are typically dark in colour and considerably more viscous than water. They contain 15 to 40% aromatic hydrocarbons. Polar nitrogen, sulphur and oxygen-containing compounds (NSO) compounds are also present. Lubricating Oils are relatively viscous and insoluble in groundwater. They may contain 10 to 30% aromatics, including the heavier PAHs. NSO compounds are also common.

Polycyclic Aromatic Hydrocarbons (PAHs) have two or more fused benzene rings as a structural characteristic. PAH compounds are present in both petrol and diesel, although in significantly lower concentrations than in coal tars. Certain PAH compounds are carcinogenic (benzo(a)pyrene) and\or mobile in the environment (naphthalene).

Volatile Organic Compounds (VOCs) are organic chemicals, and most are liquids that readily evaporate on exposure to air. Examples include benzene, toluene, xylene, chloroform etc. Semi-Volatile Organic Compounds (sVOCs) include phenol and benzo(a)pyrene, and have relatively low boiling points. Both groups of chemicals are readily absorbed through skin and some, such as benzene, are believed to be linked to tumour growth.

Phenols are compounds that have a hydroxyl group (-OH) attached to an aromatic ring (ie include a benzene ring and an –OH group). Most are colourless solids. A solution of phenol in water is known as carbolic acid, and is a powerful antiseptic. However, phenol vapour is toxic, and skin contact can result in burns.

Polychlorinated Biphenyls (PCBs) were used in pre-1974 transformers as dielectric fluids. PCB's are of increasing toxicity relative to the degree of chlorination. Acute symptoms of PCB poisoning are irritation of the respiratory tract leading to coughing and shortness of breath. Nausea, vomiting and abdominal pain are caused by ingestion of PCB's.

Dioxins and furans (polychlorinated dibenzodioxins and polychlorinated dibenzofurans) are some of the most toxic chemicals known; in the environment, they tend to bio-accumulate in the food chain. Dioxin is a general term that describes a group of hundreds of chemicals that are highly persistent in the environment. The most toxic compound is 2,3,7,8-tetrachlorodibenzo-p-dioxin or TCDD.

Dioxin is formed by burning chlorine-based chemical compounds with hydrocarbons. The major source of dioxin in the environment comes from waste-burning incinerators and also from backyard burn-barrels. Dioxin pollution is also affiliated with paper mills which use chlorine bleaching in their process and with the production of Polyvinyl Chloride (PVC) plastics and with the production of certain chlorinated chemicals (like many pesticides).

Methods of analysis (organic compounds)

TPH by GC-FID is an analytical technique which only detects hydrocarbons (aliphatic and aromatic) in the range C_{10} to C_{40} (volatiles, heavy tars, humic material and sulphur are not detected). The laboratory can provide a broad, 'banded' breakdown of the TPH results into gasoline range organics (GRO), diesel range organics (DRO) and heavier lubricating oil range organics (LRO), or fully speciated results with the reporting of hydrocarbon concentrations in 14 specific carbon bandings based upon behavioural characteristics, e.g. aliphatic C_6 to C_8, aromatic C_{10} to C_{12} etc.

Speciated VOC (by GC-MS) analysis quantifies the concentrations of 30 USA-EPA priority compounds. These include chlorinated alkanes and alkenes (in the molecular weight range chloroethane to tetrachloroethane); trimethylbenzenes; dichlorobenzenes; and the 4 BTEX compounds (benzene, ethyl-benzene, toluene & xylene).

Speciated sVOC by (GC-MS) analysis quantifies the concentrations of a variety of organic compounds, including the 16 USA-EPA priority PAHs, phenols, 7 USA EPA priority PCB congeners, herbicides & pesticides.

Note: PAHs are hydrocarbons and consequently (where present) will be picked-up when scheduling TPH by GC-FID.

Note: Risk assessment models require physiochemical properties (solubilities, toxicities etc) of compounds in order to model their behaviour in the environment. These physiochemical properties cannot be derived from a single "TPH", "GRO" or "DRO" value. However, the carbon banded fractions can be used in risk assessment models.

Current UK guidance

The UK approach to contaminated land is set out in Land Contamination Risk Management (2020). The approach is based upon risk assessment, where risk is defined as the combination of the probability of occurrence of a defined hazard and the magnitude of the consequences of the occurrence.

In the context of land contamination, there are three essential elements to any risk: (1) a contaminant source; (2) a receptor (eg controlled water or people); and (3) a pathway linking (1) and (2). Risk can only exist where all three elements combine to create a pollutant linkage. Risk assessment requires the formulation of a conceptual model which supports the identification and assessment of pollutant linkages.

Lithos adopt a tiered approach to risk assessment, consistent with UK guidance and best practice. The initial step of such a risk assessment (or Tier 1) is the comparison of site data with appropriate UK guidance levels, Lithos risk-derived screening values, or remedial targets. It should be noted that exceedance of Tier 1 does not necessarily mean that remedial action will be required.

Soil screening values used by Lithos

In March 2002 DEFRA and the Environment Agency published a series of technical papers (R&D Publications CLR 7, 8, 9 & 10) outlining the UK approach to the assessment of risk to human health from land contamination. In 2008 CLR 7, 9 & 10 and all corresponding SGV and Tox reports were withdrawn and superseded by new guidance including:

- Guidance on Comparing Soil Contamination Data with a Critical Concentration - CL:AIRE and CIEH, May 2008
- Evaluation of models for predicting plant uptake of chemicals from soil - Science Report – SC050021/SR
- Human health toxicological assessment of contaminants in soil - Science Report: SC050021/SR2
- Updated technical background to the CLEA model - Science Report: SC050021/SR3
- CLEA Software Handbook, Science report: SC050021/SR4
- Compilation of data for priority organic pollutants for derivation of Soil Guideline Values - Science Report: SC050021/SR7

In December 2013 Defra published the results of research project SP1010 – Development of Category 4 Screening Levels (C4SLs) for Assessment of Land Affected by Contamination. The objective of this project was to provide technical guidance in support of Defra's revised Statutory Guidance for Part 2A of the Environmental Protection Act 1990 (Part 2A). The revised Statutory Guidance, published in April 2012, introduced a new four-category system for classifying land under Part 2A, where Category 1 includes land where the level of risk is clearly unacceptable, and Category 4 includes land where the level of risk posed is acceptably low. Project SP1010 aimed to deliver:

- A methodology for deriving C4SLs for four generic land-uses comprising residential, commercial, allotments and public open space; and
- Demonstration of the methodology, via derivation of C4SLs for 6 substances – arsenic, cadmium, chromium IV, lead, benzene & benzo(a)pyrene.

The methodology for deriving both the previous Soil Guideline Values and the Category 4 Screening Levels is based on the Environment Agency's Contaminated Land Exposure Assessment (CLEA) methodology. Development of C4SLs has been achieved by modifying the toxicological and\or exposure parameters used within CLEA (while maintaining current exposure parameters).

Part 2A Statutory Guidance was developed on the basis that C4SLs could be used under the planning regime. Defra anticipate that, where they exist, C4SLs will be used as generic screening criteria, and Lithos consider C4SLs to be suitable for use as Tier 1 Screening Values. Lithos have discussed this matter with both NHBC and YALPAG (collection of Yorkshire & Lincolnshire local authorities) and received confirmation that they are satisfied with this approach.

The CLEA conceptual site model assumes a source located in a sandy loam, with 6% soil organic matter (SOM) - equivalent to 3.5% total organic carbon (TOC). However, many organic contaminants are more mobile when the SOM is lower, and consequently comparison of soil results with revised, lower screening values may be required. Other CLEA default characteristics adopted by Lithos are:

Sandy Loam characteristics (source)	Default values adopted
Total porosity (fraction)	0.53
Water filled porosity (fraction)	0.33
Air filled porosity (fraction)	0.2

Lithos have derived Screening Values for five different CSMs (scenarios); these are:

A - Residential with gardens, but no cover (or only up to 300mm)

B - Residential with gardens and 600mm 'clean' cover

C - Residential apartments with landscaping (i.e. no home grown produce)

D - Commercial/industrial with landscaping

E – Importation of soil cover

The **exposure** pathways considered for each scenario are detailed in the table below.

Scenario	Land use	Pathways	Justification
A	Residential with garden, but no cover (or only up to 300mm)	• Direct ingestion of soil • Dermal contact • Consumption of vegetables & soil attached to vegetables • Inhalation of indoor vapours and dust • Inhalation of outdoor vapours and dust	Minimal cover – insufficient to break any pathways therefore all exposure pathways are relevant.
B	Residential with garden minimum 600mm cover	• Inhalation of indoor vapours • Inhalation of outdoor vapours	The 600mm cover removes the risk from all pathways other than inhalation.
C	Residential apartments with landscaped areas and minimum 300mm cover	• Direct ingestion of soil • Dermal contact • Inhalation of indoor vapours and dust • Inhalation of outdoor vapours and dust	All pathways applicable due to possible exposure from landscaped areas. However consumption of home grown produce not included as unlikely to be grown in landscaped areas. Where vegetables are to be grown site specific QRA may be required.

Scenario	Land use	Pathways	Justification
D	Commercial/ industrial with landscaped areas no cover	• Direct ingestion of soil • Dermal contact • Inhalation of indoor vapours and dust • Inhalation of outdoor vapours and dust	All pathways applicable due to possible exposure from landscaped areas. Assumed the commercial development consists of offices to provide a conservative assessment.
E	Importation of soil for cover in garden and landscaped areas	• Direct ingestion of soil • Dermal contact • Consumption of vegetables & soil attached to vegetables • Inhalation of outdoor vapours and dust	Material used as cover to break existing pathways therefore all direct and indirect pathways relevant; however cover is **not** placed below plots therefore indoor inhalation is not relevant.

Lithos have assumed the source of contamination is directly below the building foundation; i.e. a depth to source of 0.15m as opposed to the CLEA default of 0.65m. This assumption provides for a more conservative approach than the UK default.

Lithos have derived Tier 1 values for a number of inorganic and organic determinands in the context of the five Scenarios A to E. The Tier 1 values are **not** intended to be used when considering potential risks associated with:

- Existing land uses in the context of Part 2A of the Environment Protection Act 1990;
- End uses such as allotments, sports fields, children's playgrounds, care homes, hospitals etc; or
- Groundwater and surface water

Inorganic Tier 1 values for scenarios A to E

Inorganic contaminant	Tier 1 assessment criteria (mg/kg) for Scenarios A to E							Comments/notes
	SGV*	C4SL*	A	B	C	D	E	
As	32	37	37	Use (A) in SI Report for initial "screen" If >5 x A, then consider increase of cover to 1,000mm	40	640	37	C4SL adopted
Cd	10	26	26		149	410	26	C4SL adopted
Cr			4,000		4,000	28,767	4,000	Assumes Cr is CrIII
Pb	450	200	200		314	2,330	200	C4SL adopted
Ni	130		109		123	892	109	Assessment of health risk only
Se	350		434		596	13,018	434	
Hg	170		199		244	3,603	199	Assumes in an inorganic compound
Vn			584		586	4,994	584	
B			5		5	5	5	Based on phytotoxic risks as plants are the more sensitive receptor (Cu is pH dependant)
Cu			100		100	100	100	
Zn			200		200	200	200	

Organic Tier 1 values for scenarios A to E

Organic contaminant (all sourced via CLEA)	Tier 1 assessment criteria (mg/kg) for Scenarios A to E							Comments/notes
	SGV*	C4SL*	A	B	C	D	E	
Benzene	0.33	0.87	0.7	<1^	<1^	63	<1	<1 based on professional judgement and lower than calculated value.
Toluene	610		836	2,048	1,912	5,000	<1	Scenario D based on professional judgement and lower than calculated value.
Ethyl Benzene	350		379	592	566	5,000	<10	
Xylenes	240		535	590	585	5,000	<10	Scenario E based on professional judgement and lower than calculated value.
Phenol	420		1,434	3,360	2,264	5,000	<10	
PCBs			2	8	2	38	N/A	Based on toxicity of EC7
Benzo(a)pyrene		5	5	25	5	76	5	C4SL adopted. Scenario B 5 times scenario A
Naphthalene			37	37	37	422	<10	Scenario E based on professional judgement and lower than calculated value
Gasoline Range Organics			22	23	23	2178	626	See 3-step assessment of TPH below ^Based on professional judgement and lower than calculated value
Diesel Range Organics			215	218	215	^5,000	1,429	
Lubricating Range Org			3,299	5,000	3,829	^5,000	3,299	

* *For a residential end use*

The significance of PAHs can be determined by considering indicator compounds. In most cases benzo(a)pyrene (BaP) is adopted as an indicator due to the amount of toxicological data available and has been used by various authoritative bodies to assess the carcinogenic risk of PAHs in food. A surrogate marker approach can be used to estimate the toxicity of a mixture of PAHs in soil using toxicity data for individual indicator compounds within that mixture. Exposure to the surrogate marker is assumed to represent exposure to all PAHs in that matrix. The surrogate marker approach relies on a number of assumptions:

- Surrogate marker (BaP) must be present in all soil samples
- Profile of the different PAH relative to BaP should be similar in all samples
- PAH profile in the soil samples should be similar to that used in the pivotal toxicity study[1]

To assess the PAH profile in a soil sample, the ratio of the seven genotoxic PAHs (benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, chrysene, dibenz[a,h]anthracene and indeno[1,2,3-c,d]pyrene), relative to BaP, should be calculated. The ratio relative to BaP should lie within an order of magnitude above and below the mean ratio to BaP.

[1] SP1010 Appendix E, Provisional C4SIs for benzo(a)pyrene as a surrogate marker for PAHs, CL:AIRE 2013

Naphthalene should also be considered separately against its generic screen. Whilst classed as a PAH, naphthalene is more volatile and mobile in the environment than most other PAHs. As such the significance of naphthalene cannot be considered within the surrogate marker approach.

Similarly, **TPH** cannot be assessed as a single "total" value, and reference has been made to the Environment Agency's document P5-080/TR3, "The UK approach for evaluating human health risks from petroleum hydrocarbons in soils". This document supports the assumptions and recommendations made by the US Total Petroleum Hydrocarbons Criteria Working Group (TPHCWG). The TPHCWG have broken down "TPH" into representative constituent fractions or "EC Bandings". The TPHCWG have derived a series of physiochemical and toxicological parameters for each of the bandings.

The significance of speciated TPH results can be assessed by following the 3 steps outlined in the tables below.

Step	Result	Action
1. Consider indicator compounds: Are BTEX, naphthalene, benzo(a)pyrene above their respective Tier 1 values?	Yes	Remediation or dQRA required
	No	Proceed to Step 2
2. Consider individual TPH fractions: are they above respective screening values?	Yes	Remediation or dQRA required
	No	Proceed to Step 3
3. Assess Cumulative effects: Is the calculated Hazard Index for each source >1	Yes	Remediation or dQRA required
	No	TPH compounds pose no significant risk

The equation used to assess cumulative effects in step 3 is shown below.

$$HI = \sum_{F_i=1}^{16} HQ\ F_i = \frac{Measured\ concentration\ F_i\ (mg\,kg^{-1})}{SGV\ F_i\ (mg\,kg^{-1})}$$

where HI = Hazard Index
HQ = Hazard Quotient
F_i = Fraction $_i$
SGV = Soil Guideline Value

Statistical Assessment

Current UK guidance is provided by CL:AIRE[2], and uses two-way confidence intervals and graphical summaries, to assist assessors when determining whether or not a dataset is adequate to answer the question posed; e.g. "is existing site topsoil suitable for retention & re-use?". To answer such a question, it is necessary to recover and test a large number of samples (a minimum of 10; ideally 20+) in order to undertake meaningful statistical analysis.

However, in the context of site investigation to assess the significance of contamination on brownfield sites which are typically underlain by **heterogenous made ground**, some remediation is almost always required (placement of soil cover, excavation of gross contamination etc). Consequently, in such circumstances, it is not necessary to demonstrate that made ground soils are "clean" and therefore there is no need to test large numbers of samples and undertake statistical analysis. Sample results can simply be compared directly with appropriate screening values (e.g. Lithos Tier 1 values).

The CL:AIRE (2020) guidance replaces the withdrawn "Guidance on Comparing Soil Contamination Data with a Critical Concentration" (2008).

The old approach to statistical analysis was based on a definitive yes/no answer which required limited consideration of the dataset and Conceptual Site Model. It was widely accepted that this did not allow sites or risk to be adequately assessed. The updated approach requires a comprehensive understanding of the datasets within the context of the Conceptual Site Model.

Current guidance requires that:

- A robust CSM is in place which identifies source areas, averaging areas and averaging zones
- Sampling locations are relatively evenly spread across the site and were selected using simple or stratified random sampling with no targeting being undertaken
- The field data and CSM do not suggest the presence of a hotspot of contamination which should be treated as a separate zone
- The samples are all taken from a similar same depth and within the same material type across the zone being assessed
- A minimum of 10 samples have been taken. It should be appreciated that confidence in a dataset increases as the number of samples obtained and tested from a zone increases.

The statistical analysis assumes a homogenous distribution of strata and contamination and therefore the dataset will be normally distributed (symmetric, log symmetric or fat tailed).

A normally distributed dataset is assessed using a number of statistical tools to generate a Dot and Box Plot which includes summary statistics and confidence intervals. The review of statistical data enables the assessor to make a decision, with an associated level of confidence, where the true mean of the sample population lies in relation to the critical concentration.

It is essential when using statistics to assess sample data that all decisions relate back to the conceptual site model. Statistics cannot indicate if contamination on a site is likely to present a risk to the end user, this is the role of the 'competent person' i.e. Lithos.

However, broadly speaking the following applies:

- Mean and UCL below the critical concentration – no further assessment required.
- Mean below the critical concentration, but UCL above – consider the CSM and likely sources.
- Mean and UCL above the critical concentration – further assessment required, remediation likely depending on the CSM.
- LCL, Mean & UCL above the critical concentration – further assessment required, remediation likely.

[2] *CL:AIRE, 2020.Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration.*

Other screening values used by Lithos

Tier 1 risk assessment of **hazardous gas** is undertaken through reference to the following documents (and further information is presented in Generic Note No. 5 – Hazardous Gas):

- Approved Document C, Building Regulations 2000
- Boyle & Witherington (2007) – Guidance on evaluation on development proposals on sites where methane and carbon dioxide are present, incorporating "traffic lights". Report Ref. 10627-R01-(02), for NHBC
- CIRIA C665 (2007) – Assessing risks posed by hazardous ground gases to buildings
- BS 8485:2015 – Code of Practice for the characterisation & remediation from ground gas in affected developments

With respect to the assessment of potential **phytotoxic effects** of contaminants, Lithos refer to The Sewage Sludge in Agriculture: Code of Practice 2018 for copper and zinc (at pH 5.5 to 6.0). The CLEA derived Tier 1 value is adopted for nickel due to its human health effects.

The potential risk to **building materials** is considered through reference to relevant BRE Digests, with particular emphasis on BRE Special Digest 1, 'Concrete in aggressive ground', 2005.

With respect to the interpretation of the **calorific values**, at present there are no accepted methods to assess whether a sample is combustible and under what circumstances it might smoulder. Some guidance is given in ICRCL Note 61/84 "Notes on the fire hazards of contaminated land" which states that: "*In general … it seems likely that materials whose CV's exceed 10MJ/kg are almost certainly combustible, while those with values below 2MJ/kg are unlikely to burn*".

Tier 1 **groundwater risk assessments** are always site specific and compare leachate or groundwater concentrations with the appropriate water quality standard based on the CSM and consideration of relevant water quality impacts and assessments.

Waste classification & WAC

In the context of waste soils generated by remediation and\or groundworks activities on brownfield sites, the following definitions (from the Landfill Regulations 2002) apply:

- Inert (e.g. uncontaminated 'natural' soil, bricks, concrete, tiles & ceramics)
- Non-Hazardous (e.g. soil excavated from a contaminated site which contains dangerous substances, but at concentrations below prescribed thresholds)
- Hazardous (e.g. soil excavated from a contaminated site which contains dangerous substances at concentrations above prescribed thresholds)

Dangerous substances include compounds containing a variety of determinants commonly found in contaminated soils on brownfield sites, for example arsenic, lead, chromium, benzene etc.

Landfill operators require Waste Acceptance Criteria (WAC) laboratory data, if soil waste is classified as **hazardous**. However, subject to WAC testing it may be possible to classify it as stable, non-reactive hazardous waste, which can be placed within a dedicated cell within the non-hazardous landfill.

Lithos typically only include WAC analysis in site investigation proposals and reports, if significant off-site disposal (of soil classified as hazardous waste) is anticipated, for example where redevelopment proposals include basement construction etc. If off-site disposal of soils classified as hazardous waste during redevelopment is anticipated, then WAC analysis should be scheduled at an early stage in the remediation programme. However, organic compounds (BTEX, TPH, PAH etc) are the most common contaminants that result in soils being classed as hazardous, and these contaminants can often be dealt with by alternative technologies (e.g. by bioremediation or stabilisation) and consequently retention on site is often possible.

It should be noted that **non-hazardous** soil waste can go to a non-hazardous landfill facility; no further testing (e.g. WAC) is required.

Possible action in event of Tier 1 exceedance

Should any of the Tier 1 criteria detailed above be exceeded, then three potential courses of action are available. (The first is only applicable in terms of human health, but the second and third could also be applied to groundwater or landfill gas).

1. Undertake further statistical analysis following the approach set out in Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration, 2020 (see above) in order to determine whether contaminant concentrations of inorganic contaminants within soil\fill actually present a risk (only applicable to assessing the risk to human health).
2. Carry out a more detailed quantitative risk assessment in order to determine whether contamination risks actually exist.
3. Based on a qualitative risk assessment, advocate an appropriate level of remediation to "break" the pollutant linkage - for example the removal of the contaminated materials or the provision of a clean cover.

Prior to undertaking any statistical analysis the issue of the **averaging area** requires further consideration. Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration, 2020 provides some guidance on averaging areas noting that they are the area within which a receptor may be exposed to contamination but leaving the site assessor to determine the appropriate averaging area for their site.

Lithos consider the entire site needs to be characterised by reference to the Conceptual Site Model. Consequently, Lithos gather and analyse sample results by fill type, and\or by former use in a given sub-area of the site, before undertaking statistical analysis; i.e. the averaging area is associated with the extent of a particular fill type, or an area affected by spillage\leakage.

In terms of brownfield redevelopment, this is considered a more appropriate methodology which provides a more representative sample population for statistical analysis. As such the entire site is considered in terms of the proposed end use, be this residential with, or without gardens.

Analysis by soil\fill type is appropriate for essentially immobile contaminants associated with a particular fill type, for example arsenic in colliery spoil, metals in ash & clinker, sulphate in plaster-rich demolition rubble etc.

Analysis by former use is appropriate where more mobile contaminants have entered the ground, for example diesel associated with leakage from a former fuel tank, downward migration of leachable metals through granular materials, various soluble contaminants present in a wastewater leaking into the ground via a fractured sewer etc. In these circumstances, it may be appropriate to undertake statistical analysis of sample results from a variety of different soil\fill types. However, consideration would have to be given to factors such as porosity which might influence impregnation of a mobile contaminant into the soil mass, i.e. contamination would normally be more pervasive and significant in granular soils than cohesive soils

Appendix B

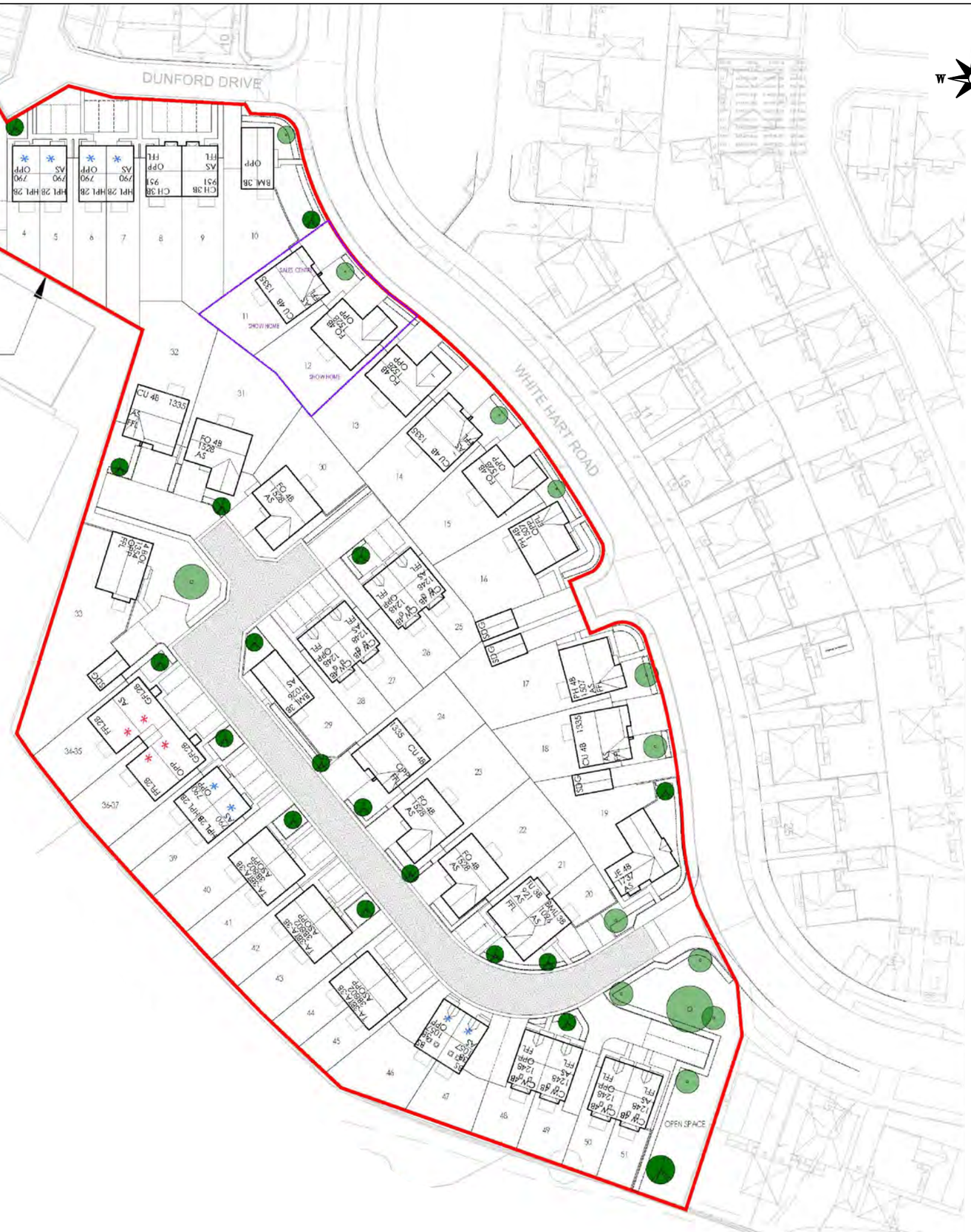
Drawings



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LITHOS CONSULTING
info@lithos.co.uk
www.lithos.co.uk
Tel 01937 545330

CLIENT	BELLWAY HOMES LIMITED (YORKSHIRE)
JOB TITLE	WHITE HART ROAD, PENISTONE
DRAWING TITLE	SITE LOCATION PLAN
DRAWN	DW
DATE	16/12/2025
CHECKED	AG
DATE	16/12/2025
STATUS	FOR COMMENT ☐ DRAFT ☐ FOR APPROVAL ☐ FINAL ☑
SCALE	1:25,000
SHEET	A4
DRAWING NO.	5655/1
REVISION	



NOTES

APPROXIMATE SITE BOUNDARY

REPRODUCED FROM PARKER PEEL ARCHITECTURAL PRELIMINARY SKETCH LAYOUT DRAWING REFERENCE 2524-SK-14, DATED SEPTEMBER 2025

REV.	DESCRIPTION	DATE

LITHOS CONSULTING

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CLIENT

BELLWAY HOMES LIMITED (YORKSHIRE)

JOB TITLE

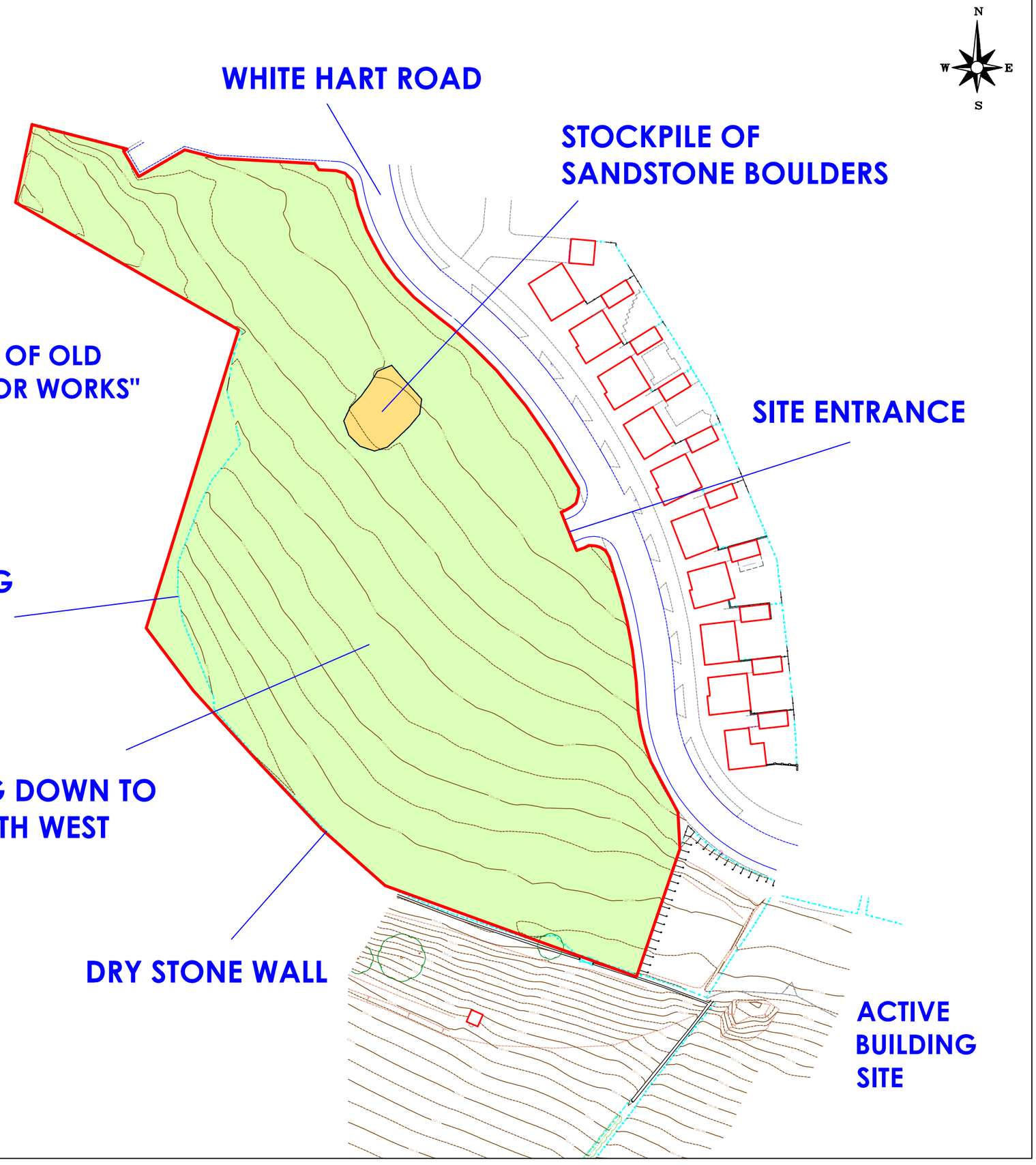
WHITE HART ROAD, PENISTONE

DRAWING TITLE

PROPOSED SITE LAYOUT

DRAWN	DATE	STATUS
DW	16/12/2025	FOR COMMENT ☐
CHECKED	DATE	FOR APPROVAL ☐
AG	16/12/2025	DRAFT ☐
		FINAL ☑

SCALE	SHEET	DRAWING NO.	REVISION
1:800	A3	5655/2	



NOTES

- GRASS & OVERGROWN AREAS
- PILE OF SANDSTONE BOULDERS
- APPROXIMATE SITE BOUNDARY

REV.	DESCRIPTION	DATE

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CLIENT

BELLWAY HOMES LIMITED (YORKSHIRE)

JOB TITLE

WHITE HART ROAD, PENISTONE

DRAWING TITLE

SITE FEATURES

DRAWN	DATE	STATUS
DW	18/12/2025	FOR COMMENT ☐
CHECKED	DATE	FOR APPROVAL ☐
AG	18/12/2025	DRAFT ☐
		FINAL ☑

SCALE	SHEET	DRAWING NO.	REVISION
1:1000	A3	5655/3	















NOTES

- GRASS & OVERGROWN AREAS
- PILE OF SANDSTONE BOULDERS
- APPROXIMATE SITE BOUNDARY
- LOCATION & ORIENTATION OF PHOTOGRAPH

REV.	DESCRIPTION	DATE

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CLIENT

BELLWAY HOMES LIMITED (YORKSHIRE)

JOB TITLE

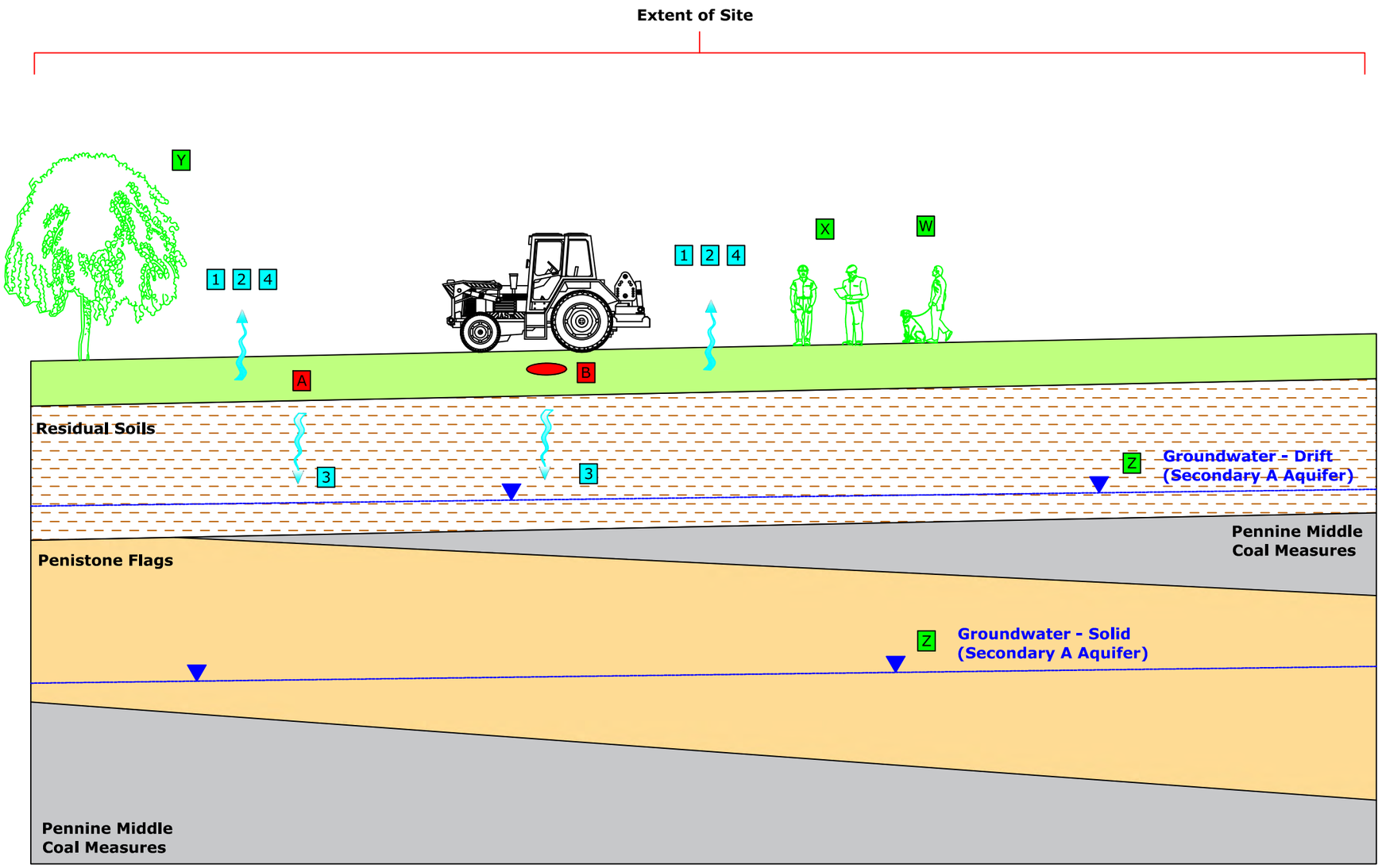
WHITE HART ROAD, PENISTONE

DRAWING TITLE

SITE PHOTOGRAPHS

DRAWN	DATE	STATUS
DW	19/12/2025	FOR COMMENT ☐
CHECKED	DATE	FOR APPROVAL ☐
AG	19/12/2025	DRAFT ☐
		FINAL ☑

SCALE	SHEET	DRAWING NO.	REVISION
NOT TO SCALE	A3	5655/4	



KEY
TOPSOIL
CLAY
SANDSTONE
MUDSTONE & SILTSTONE

SOURCES
A MADE GROUND (INORGANICS)
B LEAKAGE/SPILLAGE (ORGANICS)

PATHWAYS
1 DERMAL CONTACT
2 INGESTION/INHALATION
3 LEACHING OF CONTAMINANTS
4 UPTAKE BY PLANTS

RECEPTORS
W END USERS (RESIDENTS)
X SITE WORKERS
Y VEGETATION
Z GROUNDWATER

NOTES

REV.	DESCRIPTION	DATE

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CLIENT

BELLWAY HOMES LIMITED (YORKSHIRE)

JOB TITLE

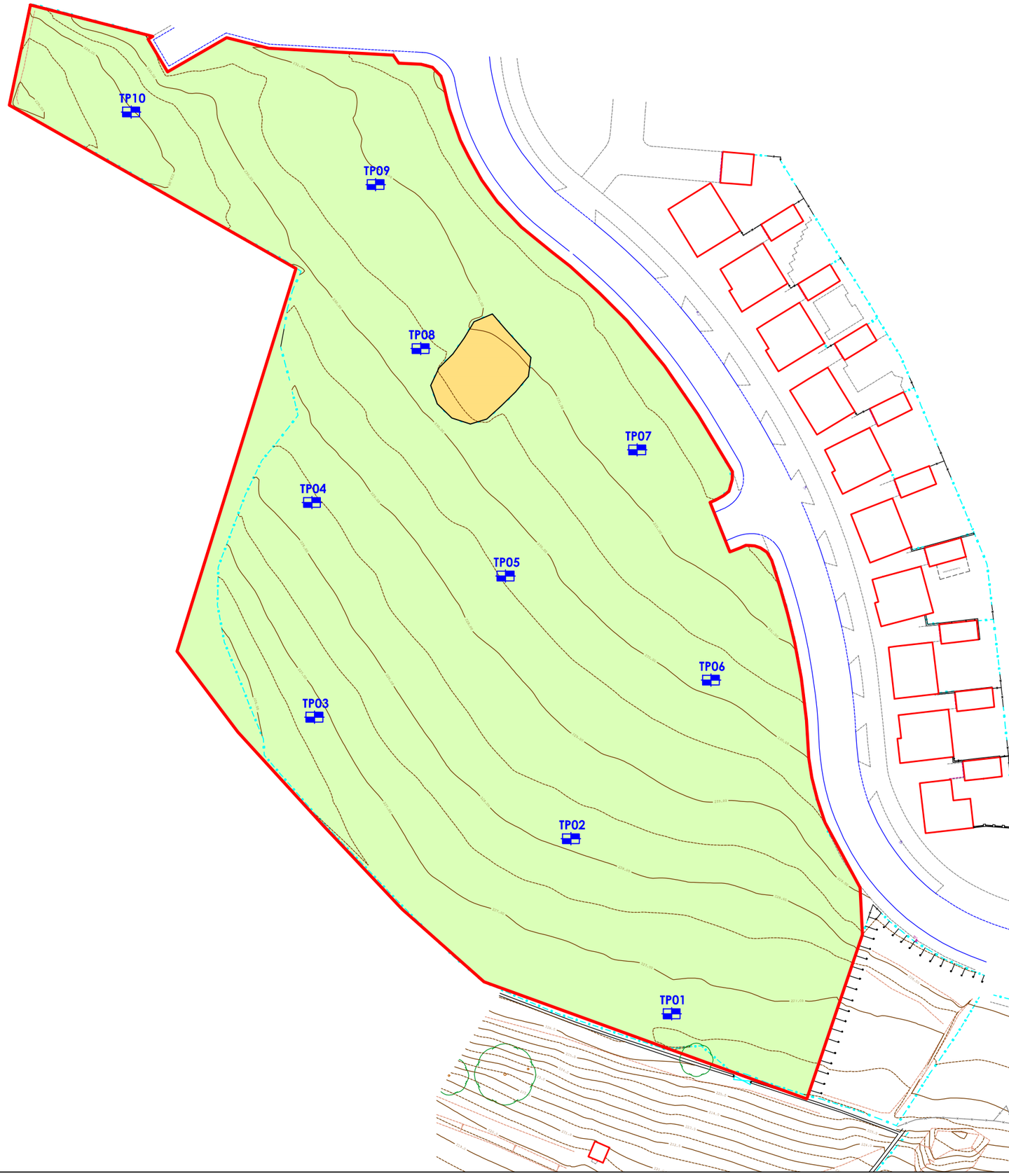
WHITE HART ROAD, PENISTONE

DRAWING TITLE

PRELIMINARY CONCEPTUAL SITE MODEL

DRAWN	DATE	STATUS
DW	15/12/2025	FOR COMMENT ☐
CHECKED	DATE	FOR APPROVAL ☐
AG	15/12/2025	DRAFT ☐
		FINAL ☑

SCALE	SHEET	DRAWING NO.	REVISION
Not to scale	A3	5655/5	



NOTES

- TRIAL PIT LOCATION
- GRASS & OVERGROWN AREAS
- PILE OF SANDSTONE BOULDERS
- APPROXIMATE SITE BOUNDARY

EXPLORATORY HOLE LOCATIONS BASED ON DATA FROM A HAND-HELD GPS (+/- 3M ACCURACY)

REV.	DESCRIPTION	DATE

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CLIENT

BELLWAY HOMES LIMITED (YORKSHIRE)

JOB TITLE

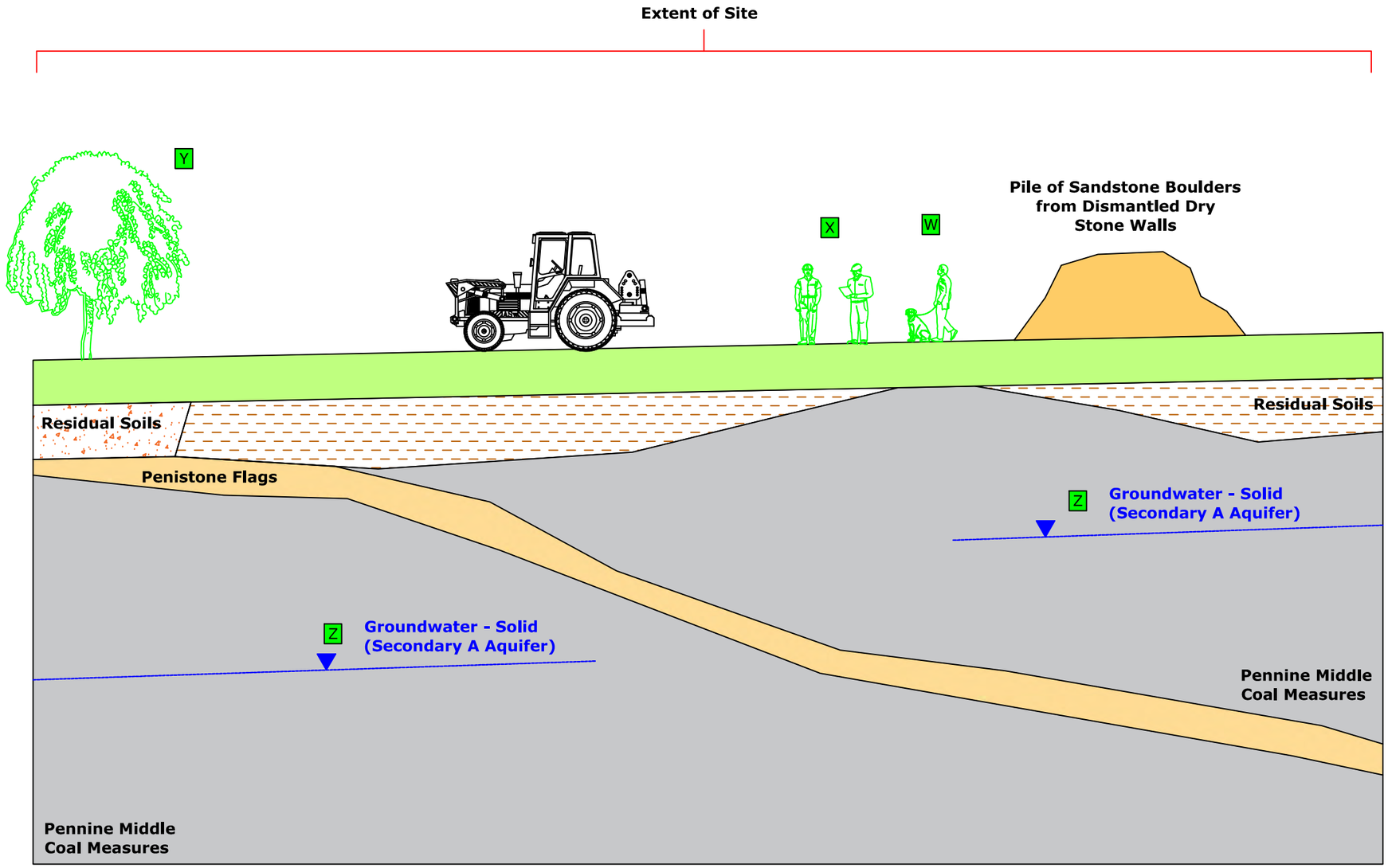
WHITE HART ROAD, PENISTONE

DRAWING TITLE

EXPLORATORY HOLE LOCATIONS

DRAWN	DATE	STATUS
DW	18/12/2025	FOR COMMENT ☐
CHECKED	DATE	FOR APPROVAL ☐
AG	18/12/2025	DRAFT ☐
		FINAL ☑

SCALE	SHEET	DRAWING NO.	REVISION
1:800	A3	5655/6	



KEY
TOPSOIL
CLAY
SAND & GRAVEL
MUDSTONE & SILTSTONE
SANDSTONE

SOURCES
NONE IDENTIFIED

PATHWAYS
NONE IDENTIFIED

RECEPTORS
W END USERS (RESIDENTS)
X SITE WORKERS
Y VEGETATION
Z GROUNDWATER

NOTES

REV.	DESCRIPTION	DATE

LITHOS CONSULTING

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CLIENT

BELLWAY HOMES LIMITED (YORKSHIRE)

JOB TITLE

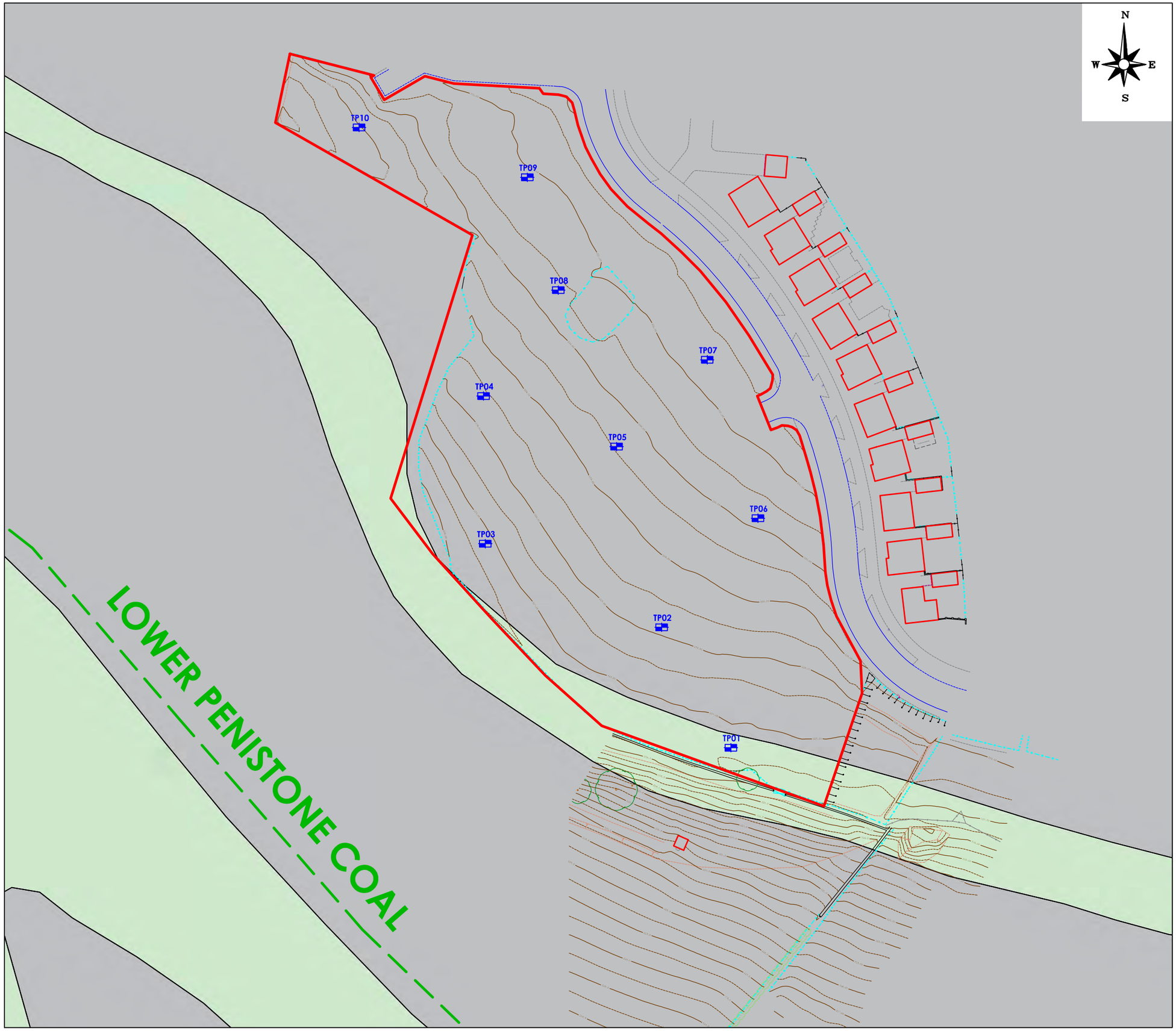
WHITE HART ROAD, PENISTONE

DRAWING TITLE

REVISED CONCEPTUAL SITE MODEL

DRAWN	DATE	STATUS
DW	19/12/2025	FOR COMMENT ☐
CHECKED	DATE	FOR APPROVAL ☐
AG	19/12/2025	DRAFT ☐
		FINAL ☑

SCALE	SHEET	DRAWING NO.	REVISION
Not to scale	A3	5655/7	



NOTES

- TRIAL PIT LOCATION
- PENNINE MIDDLE COAL MEASURES
- PENISTONE FLAGS FORMAITON
- APPROXIMATE COAL OUTCROP (BGS)
- APPROXIMATE SITE BOUNDARY

REV.	DESCRIPTION	DATE

LITHOS CONSULTING

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CLIENT

BELLWAY HOMES LIMITED (YORKSHIRE)

JOB TITLE

WHITE HART ROAD, PENISTONE

DRAWING TITLE

GEOLOGY

DRAWN	DATE	STATUS
DW	16/12/2025	FOR COMMENT ☐
CHECKED	DATE	FOR APPROVAL ☐
AG	16/12/2025	DRAFT ☐
		FINAL ☑

SCALE	SHEET	DRAWING NO.	REVISION
1:1500	A3	5655/8	

Appendix C

Commission

002/5655/AG

02nd December 2025

Registered in England 07068066

Parkhill
Wetherby
West Yorkshire
LS22 5DZ

T 01937 545 330

www.lithos.co.uk

Mr L Clarke
Bellway Homes Limited (Yorkshire)
2150 Century Way
Thorpe Park
Leeds
LS15 8ZB

Dear Liam

White Hard Road, Penistone

Further to your recent invitation, please find attached our proposal for undertaking a site investigation on the above land. We understand that proposed development will include c. 50 traditional 2 storey domestic dwellings with associated gardens, POS and adoptable roads and sewers, with a sketch layout provided.

Review of the information supplied suggests that the site consists of a single parcel of land of (c. 1.4 ha). Review of Google Maps suggests the site is undeveloped scrub land on the west side of White Hard Road, which provides access to a recent and ongoing housing development to the east and south.

Brief review of internet data and the Groundtech report supplied suggests the site:

- Appears to have remained undeveloped throughout its history;
- Is not located within 250m of a known landfill site;
- Is not within a groundwater source protection zone;
- Is in an area where 1-3% of homes are recorded to be above the racon action level;
- Is in an area where the risk of encountering UXO is considered low; and
- Lies within a Coal Mining Development Low Risk Area, although shallow coal has been encountered across the wider site, it was not found to be thick enough to be economic.

The Groundtech report supplied was 'thin' on detail within your parcel, with only two trial pits excavated (TP09 & 10) and no lab testing. TP09 encountered firm to stiff clays to 1.9m depth, over weathered sandstone, whereas TP10 encountered extremely weak sandstone directly beneath the topsoil, becoming weak to moderately strong at 0.4m depth.

It is not clear what excavator was used to dig the trial pits, but assuming a JCB-3CX or similar, hard digging in excavations >1m depth may be required in the north of the parcel.

The scope of works outlined in this letter should enable us to assess abnormal development issues, associated with the ground. However, the nature of site investigation is such that it is not always possible to foresee all the potential issues. Consequently, it is sometimes necessary to recommend additional work, but where this occurs we will inform you immediately, provide costs, and seek your further instruction. We have reviewed available internet data and our geological maps in order to minimise the likelihood of further work.

We will need a Promap or topo survey in CAD format, to provide a base plan for technical drawings etc. If you do not have one, we could obtain for an E\O of £

8320

Our site investigation will be undertaken in accordance with UK good practice (as outlined in BS5930, BS10175, LCRM etc). Our Report may not be fully compliant with Eurocode 7 (EC7) and will not purport to be a Ground Investigation Report, nor a Geotechnical Design Report as defined by EC7. Our ground appraisal is intended to assist others as they proceed with design of the proposed development.

This proposal allows for the following works:

Desk study: Environmental search data and historical maps (obtained from Landmark or Groundsure), will be reviewed in order to determine whether past land uses have had any effect on the proposed development. In addition, published geological plans of the area will be examined.

We will also visit site to review current operations and undertake a walkover survey.

Given the site's location within a Coal Mining Low Risk Area, a Consultant's mining report will be obtained.

We will complete a more detailed review of the Groundtech report.

Fieldwork: We have allowed for a day's trial pitting (c. 10 positions), with all trial pits supervised and logged by an experienced geoenvironmental engineer.

This proposal has been put together without a recent site visit. If ground conditions are found to be significantly wet/boggy at the time of the investigation, it may be necessary to hire additional resources (bog mats, tracked excavators, tractors, stone etc) in order for works to continue. We will discuss the requirement for any such items and associated costs with you prior to ordering.

Trial pitting will enable us to determine the:

- Nature of any made ground, including:
  - visual/olfactory evidence of potential contamination and the proportion of undesirable elements e.g. biodegradable matter, relict foundations etc
  - the proportion of "oversize", boulder-sized material
- Nature, distribution and thickness of shallow soils
- Suitability of the ground for founding structures and highways

We have assumed that it will be possible to excavate the pits and move around site using a wheeled JCB 3CX-type excavator, but this proposal has been put together without a recent site visit. If ground conditions are found to be significantly wet/boggy at the time of the investigation, it may be necessary to hire a tracked 360º excavator (E\O of £).

Representative soil samples of natural and man-made ground, including any contaminated samples, will be taken during the works. In-situ shear strengths of any cohesive soils encountered will be determined by the use of a hand-held shear vane.

We will make every effort to compact arisings and 'sweep' them over each trial pit. However, you should be aware that on completion of the investigation, "graves" of spoil (each about 3m long by 1m wide) unsuitable for trafficking, will be left up to 400mm proud at each trial pit location. At this stage, no allowance has been made for any further reinstatement such as removal of excess arisings, replacement of turf etc.

If the pitting encounters significant thicknesses of made ground or very soft/loose deposits (neither considered likely), boreholes may be required to obtain geotechnical data from greater depth. We will advise you of any need for boreholes within 2 days of completion of the pitting.

We understand that you have been provided with a drainage outfall, meaning **soakaway** testing is not required.

Exploratory holes will be positioned using a hand-held GPS (typically +/- 3m accuracy); if required we could arrange for a **surveyor** to pick-up exploratory holes (and provide co-ordinates/ground levels) for an E\O cost of £.

This site is greenfield and therefore highly unlikely to be underlain by significant thicknesses of made ground. Furthermore, we are not aware of any other sources of hazardous **gas** (shallow mine workings, landfill sites etc) within influencing distance of the site.

Consequently, at this stage, we have not allowed for undertaking a hazardous gas risk assessment but we will review the need for this in light of desk study data and the ground conditions actually encountered. It would be prudent to allow a contingency of £ in your budget for a gas investigation including the installation of monitoring wells (six recommended) and gas monitoring (minimum 6 visits over a 3-month period).

Testing: This will comprise routine **geotechnical** soils analysis, including 10 moisture content & Atterberg limits, and 10 pH & water-soluble sulphate and 5 gradings.

This site is greenfield and therefore we could obtain in-situ CBR values from plate tests on site. However, at this stage, we will simply estimate CBR values from strata descriptions and classification test results.

The site is understood to be essentially Greenfield, and therefore testing of potentially **contaminated** samples should only be required if made ground is encountered in the exploratory holes. However, we have allowed for analysis of topsoil (10 samples) to confirm its suitability for re-use. The test suite will include heavy metals and speciated PAH.

If more significant made ground is encountered, we will inform you immediately and provide costs for the recommended chemical testing.

Within in our proposal we have allowed for the screening (ID) of 10 samples for asbestos. In the event that positive IDs are reported, it is likely that we will need to schedule further analysis (asbestos quantification), in order to determine the significance of the results. Asbestos quantification is currently a relatively expensive test and consequently we have not allowed for it at this stage. We will inform you immediately after receipt of results if we consider asbestos quantification is required.

Visible contaminants, sharps and the clay/sand/silt content of 3 topsoil samples will be determined to check compliance with BS3882 requirements.

Reporting & timescales: In order to provide you with sufficient information to enable assessment of abnormal costs at the earliest opportunity we will issue a concise overview report within 3 days of fieldwork completion.

On completion of the desk study, fieldwork and laboratory testing a comprehensive, factual and interpretative report will be issued. This will contain exploratory hole logs, laboratory test results, copies of all relevant correspondence and drawings of the site. The report will include qualitative risk assessment with respect to both controlled waters and human health. The report will also include consideration of foundation types.

At the time of writing, fieldwork could be commenced within 4 weeks of receipt of your written instruction to proceed. Our comprehensive geoenvironmental appraisal report will be issued within 4 weeks of fieldwork completion.

This report will include a **mining risk assessment** in accordance with Coal Authority guidance.

A completed copy of the **HBF** Contaminated Land Assessment Form will be included in an Appendix to our Report. However, this site is greenfield, and therefore consideration of soil contaminant concentrations should not be required (as stated in the UKWIR guidance) and the use of 'standard' polyethylene water supply pipes should be acceptable.

Invoicing: The attached proposal provides a breakdown of the costs associated with this project. This breakdown is for information only and the proposal can be regarded as a lump sum price of **£** plus VAT. Variation will only occur in the event that a given item is not undertaken or that substantial additional works are recommended, in which case we will inform you immediately, provide costs for the required works, and seek your prior consent. Revision of the costings provided may be required if works are not instructed within **3 months** of the date this proposal was issued.

Our proposal allows for submission of a single piece of correspondence with NHBC and\or the local authority to address any queries they may have. Any further meetings, correspondence etc, would be chargeable.

We will submit invoices for this project on completion of each Item(s) instructed.

Please note if following instruction of the works outlined in this proposal, it is necessary to subsequently **postpone or cancel**, this should be done at least 3 working days before Lithos are due to commence intrusive investigation on site. We reserve the right to charge a cancellation fee in the event of later notification to cover plant / drill rig costs and abortive consultancy time. The cancellation fee will not exceed £ plus VAT.

Health, safety & welfare: The works outlined above will be carried out in accordance with Lithos' task- and site- specific Risk Assessments and Method Statements.

Details of welfare will be included within the Method Statements. However, this investigation is expected to be completed within 1 working day and therefore it is not considered reasonably practicable to provide formal welfare facilities, and our proposal makes no allowance for so doing.

Utility plans are required in order to protect operatives from the hazards associated with striking buried services and avoid potentially substantial disruption\repair costs. We will make every effort not to damage any services (including review of utility plans and use of a CAT detector). However, Lithos cannot accept liability for damage to any underground services that are not accurately marked on plans made available to us prior to commencement of our field investigation, or have not been accurately marked on the ground by a responsible third party (e.g. utility company, site owner).

Most developers have copies of the necessary utility plans (including electricity, gas, water, drainage & telecom), and it would be appreciated if you could forward these prior to the proposed fieldworks. However, if you do not have the necessary plans, Lithos will obtain them direct from each of the utility companies.

Under the **CDM** Regulations 2015, Lithos must be provided with pre-construction information already in your possession, or information that can reasonably be obtained through sensible enquiry. This information must be relevant to the project, have an appropriate level of detail, and be proportionate to the nature of the risks.

If no other designers or contractors have been appointed, Lithos could perform the role of Principal Contractor but only for the duration of the site investigation outlined in this proposal. If you require us to perform the role of Principal Contractor, please make this clear in your instruction. It should be noted that we are not suitably qualified to perform this role where other designers or contractors are also appointed.

Whilst it is anticipated that the site investigation outlined in this proposal will be undertaken several months before any development is commenced, our works may be considered to constitute part of 'the construction works' and consequently you may need to notify the HSE that works which involve breaking ground are being commissioned. It would be appreciated if you could forward a copy of the **F10** prior to commencement of investigation fieldwork.

Terms & conditions: This work will be undertaken in accordance with our Standard Terms and Conditions, a copy of which are enclosed.

It is hoped the above is sufficient for your present needs. However, should you require any further information, please contact the undersigned.

Yours sincerely



Adam Gombocz
Director
for and on behalf of
LITHOS CONSULTING LIMITED

1 DEFINITIONS AND INTERPRETATION

1.1 In this Agreement, unless the context otherwise requires, the following words and expressions have the following meanings:

"Agreement" means these Terms (entitled "Terms and Conditions for the Appointment of Lithos Consulting"), the Proposal, any document recording your unequivocal acceptance of the Proposal and any other documents or parts of other documents expressly referred to in any of the foregoing;

"Documents" means all documents of any kind and includes plans, drawings, reports, programmes, specifications, Bills of Quantities, calculations, letters, e-mails, faxes, memoranda, films and photographs (including negatives), or any other form of record prepared or provided or received by, or on behalf of us, and whether in paper form or stored electronically or on disk, or otherwise;

"Intellectual Property" includes all rights to, and any interests in, any patents, designs, trade marks, copyright, know-how, trade secrets and any other proprietary rights or forms of intellectual property (protectable by registration or not) in respect of any technology, concept, idea, data, programme or other software (including source and object codes), specification, plan, drawing, schedule, minutes, correspondence, scheme, programme, design, system, process logo, mark, style, or other matter or thing, existing or conceived, used, developed or produced by any person;

"Project" means the project described in the Proposal and any enquiry from you on which we have based our Proposal;

"Proposal" means the offer document prepared by us in response to an enquiry or otherwise, in connection with the proposed provision of the Services;

"Services" means the work and services relating to the Project to be provided by us pursuant to the Agreement and as set out in the Proposal and includes any additions or amendments thereto made in accordance with these Terms;

"Terms" means these terms entitled "Lithos Consulting Terms of Appointment" as amended from time to time.

1.2 Words importing the singular only shall also include the plural and vice versa, where the context requires.

1.3 Words importing persons or parties shall include firms, corporations and any organisation having legal capacity and vice versa, where the context requires; and words importing a particular gender include all genders.

1.4 The sub-headings to the clauses of these Terms are for convenience only and shall not affect the construction of the Agreement.

1.5 A reference to legislation includes that legislation as from time to time amended, re-enacted or substituted and any Orders in Council, orders, rules, regulations, schemes, warrants, by-laws, directives or codes of practice issued under any such legislation.

1.6 In the event of conflict between the documents forming part of the Agreement, the Proposal shall prevail, followed by the Terms.

2 APPOINTMENT

2.1 You agree to engage us and we agree to provide the Services in accordance with the provisions of this Agreement.

3 OUR OBLIGATIONS

3.1 We shall perform the Services using the reasonable standard of skill and care normally exercised by qualified members of our profession, performing similar services under similar conditions.

3.2 We shall use all reasonable endeavours to perform the Services in accordance with relevant environmental and safety legislation.

4 YOUR OBLIGATIONS

4.1 Throughout the period of this Agreement you shall afford to us, or procure for our benefit, access to any site where access is required for the performance of the Services.

4.2 You accept responsibility for ensuring that we are notified in writing of all special site and/or plant conditions, including without prejudice to the generality of the foregoing, the existence and precise location of all underground services, cables, pipes, drains or underground buildings, constructions or any hazards, which you shall clearly mark on the ground or identify on accurate location plans supplied to us prior to the commencement of the Services. You shall also inform us in writing of any relevant operating procedures including any site safe operating procedures and any other regulations relevant to the carrying out of the Services. You shall indemnify us against all costs, losses, claims, demands and expenses arising as a result of any non-disclosure in this respect, including but not limited to indemnification against any action brought by the owner of the land or otherwise.

4.3 If you discover any conflict, defect or other fault in the information or designs provided by us pursuant to the Agreement, you will advise us in writing of such defect, conflict or other fault and we shall have the right to rectify the same or where necessary, to design the solution for rectification of any works carried out by others pursuant the conflicting, defective or in any other way faulty information or designs.

5 COPYRIGHT

5.1 The copyright in all Intellectual Property prepared by or on behalf of us in connection with the Project for delivery to you shall remain vested in us.

5.2 You shall have a non-exclusive licence to copy and use such Intellectual Property for purposes directly related to the Project. Such licence shall enable you to copy and use the Intellectual Property but solely for your own purposes in connection with the Project and such use shall not include any licence to reproduce any conceptual designs or professional opinions contained therein nor shall it include any license to amend any drawing, design or other Intellectual Property produced by us.

5.3 Should you wish to use such Intellectual Property in connection with any other works or for any other purpose not directly related to the Project or wish to pass any Intellectual Property to any third party, you must obtain our prior written consent. The giving of such consent shall be at our absolute discretion and shall be upon such terms as we may require. We shall not be liable to you for the use by any person of such Intellectual Property for any purpose other than that for which the same were prepared by or on our behalf.

5.4 Ownership of any proposals submitted to you that are not subsequently confirmed as part of the Services to be provided for you remain with us and such proposals must not be used as the basis for any future work undertaken by you or a third party and no liability can be accepted howsoever arising from such proposals.

5.5 In the event of you being in default of payment of any fees or other amounts due, we may suspend further use of the licence on giving no less than 2 calendar days' notice of the intention to do so. Use of the licence may be resumed on receipt of the outstanding amounts.

6 CONFIDENTIALITY

6.1 Neither you nor we shall at any time disclose to any person any confidential information concerning the business, affairs, customers, clients or suppliers of the other party or of any member of the group of companies to which the other party belongs, except as permitted by clauses 6.2 and 6.4.

6.2 Each party may disclose the other party's confidential information:

(a) to its employees, officers, representatives, contractors, sub-contractors or advisers who need to know such information for the purposes of exercising the party's rights or carrying out its obligations under or in connection with this Agreement. Each party shall ensure that its employees, officers, representatives, contractors, sub-contractors or advisers to whom it discloses the other party's confidential information comply with this paragraph 6; and

(b) as may be required by law, to a court of competent jurisdiction or any governmental or regulatory authority.

6.3 Neither you nor we shall use any other party's confidential information for any purpose other than to exercise our rights or perform our respective obligations under or in connection with this Agreement.

6.4 Subject to the above and our privacy policy which can be found on www.lithos.co.uk, we shall be permitted to use information related to the Services we provide in connection with the Project for the purposes of marketing its services and in proposals for work of a similar type.

7 ASSIGNMENT

7.1 You may assign the benefit of this Agreement on two occasions with our prior written consent (not to be unreasonably withheld) and any additional assignments shall be with our prior consent.

7.2 We may at any time assign, mortgage, charge, subcontract, delegate, declare a trust over or deal in any other manner with any or all of our rights and obligations under this Agreement.

8 INSURANCE

8.1 We shall maintain a professional indemnity insurance policy covering our liabilities for negligence under this Agreement, with a limit of indemnity of £5,000,000 (FIVE MILLION POUNDS) any one claim, save for pollution and contamination claims and asbestos claims both of which carry £2,000,000 (TWO MILLION POUNDS) in the aggregate cover. This policy is annually renewable and whilst renewal is not automatic, We shall maintain such insurance at all times until six years from the date of the completion (or termination) of the Services under this Agreement, provided such insurance is available at commercially reasonable rates and terms.

8.2 If for any period such insurance is not available at commercially reasonable rates and terms, we shall inform you and shall obtain in respect of such period such reduced level of professional indemnity insurance as is available and as would be fair and reasonable in the circumstances for us to obtain.

9 PAYMENT

9.1 Invoices for services rendered will be submitted for payment in accordance with the Proposal.

9.2 You shall pay you any VAT properly chargeable on the Services and any amount expressed as payable to us under this Agreement is exclusive of VAT unless stated otherwise.

9.3 The due date for payment is the date of the invoice and the final date for payment is 28 days from the date of the invoice.

9.4 If you dispute the amount included for payment in an invoice then you must serve a written notice on us no later than 14 calendar days before the final date for payment. If no notice is given within the required timeframe the amount due shall be the amount stated in the invoice.

9.5 If you fail to pay any monies in accordance with the foregoing payment provisions, we shall be entitled to charge interest on any monies owed to us, such interest to be at a rate of 4% above the base rate of a clearing bank from time to time calculated from the final date for payment to the date of actual payment on a compound basis. The parties acknowledge that our liability under this clause 10.5 is a substantial remedy for the purposes of section 9(1) of the Late Payment of Commercial Debts (Interest) Act 1998.

10 LIMITATIONS ON LIABILITY

10.1 Unless otherwise agreed in writing, our total liability under or in connection with this Agreement whether in contract, tort, negligence, breach of statutory duty or otherwise (other than in respect of personal injury or death) shall be limited to and shall not exceed the lesser of either the level of insurance cover referred to within clause 8.1 above, or 20 times the total value of invoices issued to you for the Services.

10.2 No action or proceedings under or in respect of the Agreement whether in contract, tort, negligence, under statute or otherwise shall be commenced against us after the expiry of a period of six years from the date of the completion (or termination) of the Services under this Agreement.

10.3 Whilst we usually scan for potential exploratory locations with a Cable Avoidance Tool, we shall not be liable for any damage to underground services, cables, pipes, drains or underground buildings, constructions and the like which were either not marked on site or for which accurate plans were not provided.

10.4 We shall not be liable for the cost of rectifying any defect, conflict or other fault in the information or designs provided by us or for the cost of designing a solution for and rectifying any subsequent works carried out by others pursuant to the conflicting, defective or in any other way faulty information or designs, unless we have been advised in writing of the same by you and have been given the opportunity to rectify the same or where necessary, to design the solution for rectification of any subsequent works carried out by others pursuant to the same.

11 DELAY

We shall comply with any timescale agreed for completion of the Services unless delayed or prevented by circumstances beyond our reasonable control and in the event of any such circumstances arising we undertake to complete the Services within a reasonable period, but will not be liable to you for any delay as a result.

12 TERMINATION

12.1 The Agreement may be terminated by either of us in the event of the other making a composition or arrangement with its creditors, becoming bankrupt, or being a company, making a proposal for a voluntary arrangement for a composition of debts, or has a provisional liquidator appointed, or has a winding-up order made, or passes a resolution for voluntary winding-up (except for the purposes of a bona fide scheme of amalgamation or reconstruction), or has an administrator or an administrative receiver appointed to the whole or any part of its assets. Notice of termination must be given to the party which is insolvent by the other party.

12.2 If for any reason our Services are suspended for a period in excess of three calendar months then we shall be entitled to terminate our appointment under this Agreement in respect of the Services by no less than seven days written notice to you.

12.3 If you fail to pay in full any sum due under the terms of this Agreement by the final date for payment for that sum and no effective pay less notice is issued, we may serve written notice to you demanding payment within 14 days of such notice. If you fail to comply with such notice, we shall be entitled to terminate our employment under this Agreement forthwith.

12.4 Any termination of our appointment howsoever caused shall be without prejudice to our rights to require payment for all Services performed up to the date of such termination including but not limited to payment of a fair and reasonable proportion of any figure identified in the Proposal or otherwise for fees in respect of a particular service which Lithos has started, but not completed.

13 THIRD PARTY RIGHTS

The Agreement shall not confer and shall not purport to confer on any third party any benefit or any right to enforce any term of this Agreement for the purposes of the Contracts (Rights of Third Parties) Act 1999 or otherwise.

14 COLLATERAL WARRANTIES & LETTERS OF RELIANCE

We shall consider and may consent to a request from you for us to enter into a collateral warranty or letter of reliance with a third party with regard to the Services provided under this Agreement. The giving of such consent shall be at our absolute discretion and providing we agree to our standard form of collateral warranty or letter of reliance (subject to any reasonable changes to be approved by us at our absolute discretion) and in return for payment of a fee (to be notified at the time of the request).

15 NOTICES

15.1 Any notice provided for in the Agreement shall be in writing and shall be deemed to be properly given if delivered by hand or sent by pre-paid first class post to the address of the relevant party as may have been notified by each party to the other or, in the absence of notification, to our respective registered office addresses.

15.2 Such notice shall be deemed to have been received on the day of delivery if delivered by hand or on the second working day after the day of posting if sent by pre-paid first class post.

16 ENTIRE AGREEMENT

16.1 The Agreement constitutes the complete and entire agreement between us with respect to the Services and supersedes any prior oral and/or written warranties, terms, conditions, communications and representations, whether express or implied and any claim against us in respect of the Services can only be made in contract under the provisions of this Agreement and not otherwise under the law or tort or otherwise.

16.2 No amendments, modifications or variation of this Agreement shall be valid unless made in writing and agreed to by us; such agreement must be recorded in writing by at least one of us.

16.3 We shall not be bound by any standard or printed terms or conditions furnished by you in any of your documents unless we specifically state in writing separately from such documents that we intend such terms and conditions to apply.

17 DISPUTES, JURISDICTION AND GOVERNING LAW

17.1 This Agreement shall be governed by and construed in accordance with English law and we irrevocably and unconditionally submit to the jurisdiction of the English Courts.

17.2 Where the Housing Grants, Construction and Regeneration Act 1996 applies, any dispute between us may be referred to adjudication in accordance with The Scheme for Construction Contracts Regulations 1998 or any amendment or modification thereof being in force at the time of the dispute, as applicable to England, Wales, Scotland and Northern Ireland.

Subject: FW: 5655 - White Hard Road, Penistone - SI quote

From: Liam Clarke <Liam.Clarke@bellway.co.uk>
Sent: 08 December 2025 14:11
To: Adam Gombocz <Adam.Gombocz@lithos.co.uk>
Cc: David Connole <david.connole@bellway.co.uk>; Liam Barton <Liam.Barton@lithos.co.uk>; Stewart Thomson <stewart.thomson@bellway.co.uk>; Mathew Drake <Mathew.Drake@bellway.co.uk>
Subject: Re: 5655 - White Hard Road, Penistone - SI quote

Hi Adam

Hope you had a good weekend.

Please find attached appointment doc for this investigation. If you could squeeze the trial pitting in this side of Christmas that would be great, please confirm a date by return and we will arrange access.

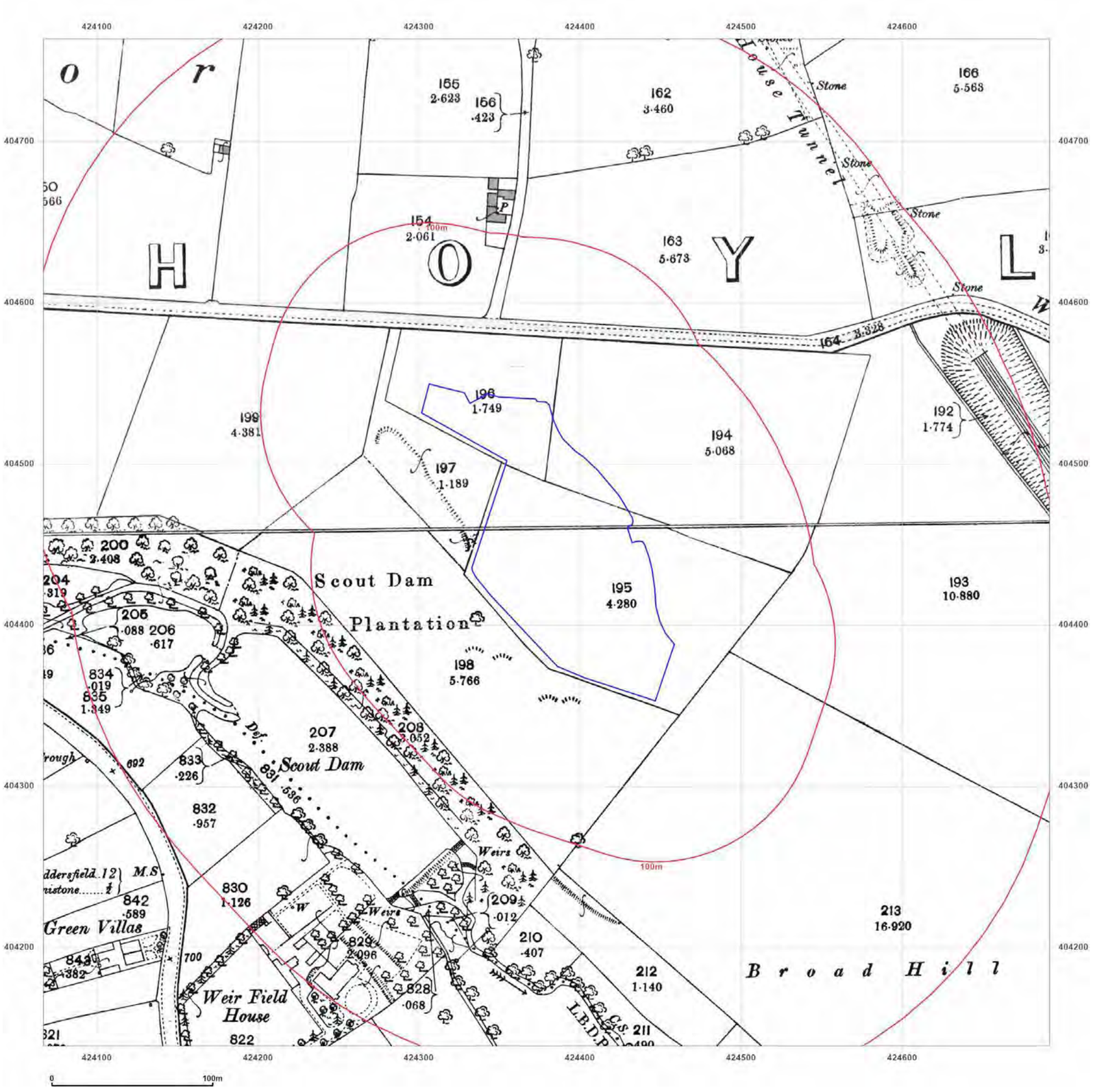
Kind Regards

Liam
Liam Clarke
Engineering Manager

0113 3900 800
Bellway Homes Limited (Yorkshire)
2150 Century Way
Thorpe Park
Leeds
West Yorkshire
LS15 8ZB
www.bellway.co.uk

Appendix D

Historical OS Plans



Groundsure INSIGHTS

Site Details:

WHITE HART ROAD,
PENISTONE, BARNSLEY, S36
8AS

Client Ref: PO25616/5655/DW
Report Ref: GS-4BY-1IY-7FM-LM2
Grid Ref: 424379, 404451

Map Name: County Series
Map date: **1893**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1893
Revised 1893
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition 1893
Copyright N/A
Levelled N/A

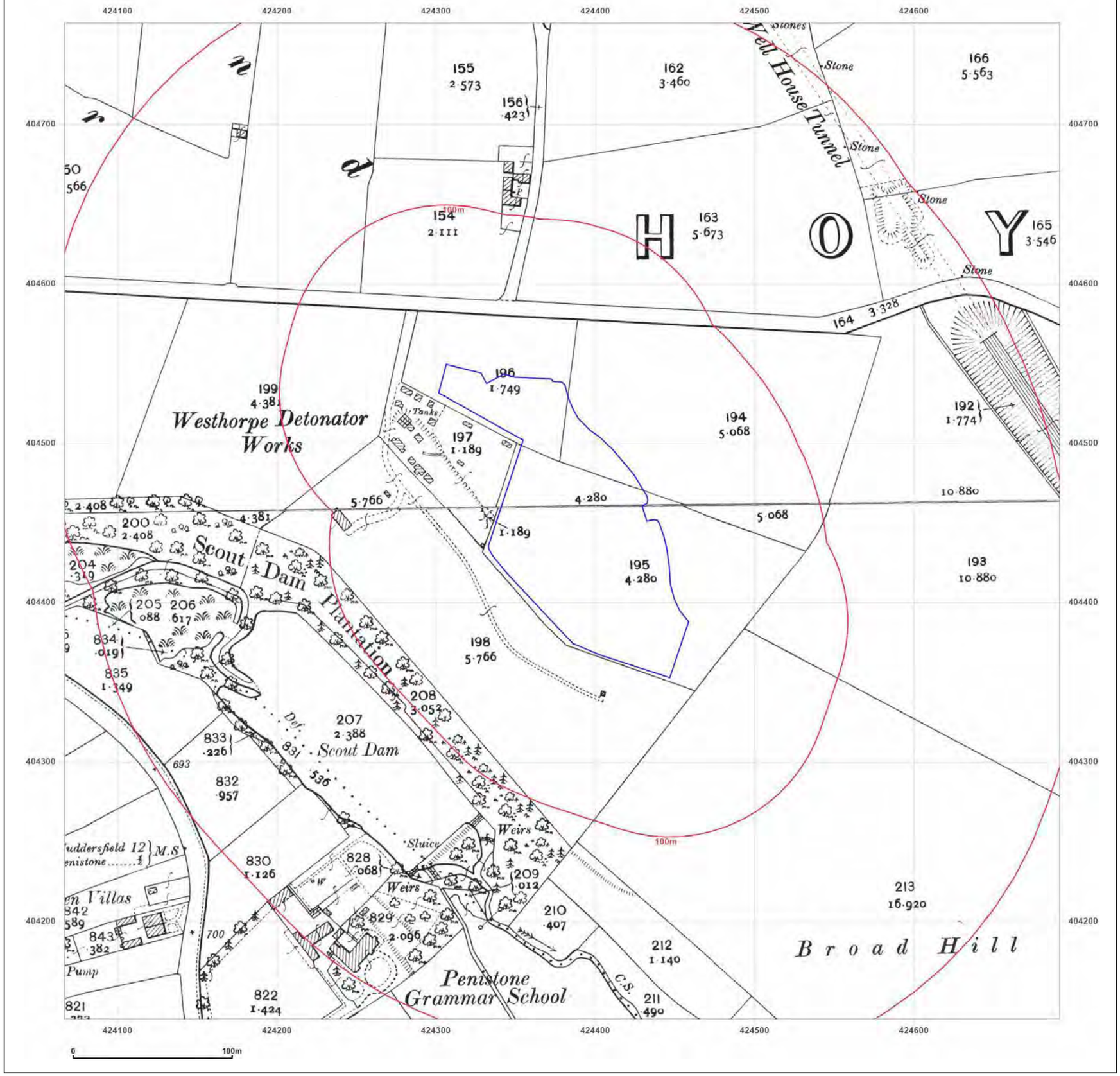
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Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

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Production date: 09 December 2025

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

WHITE HART ROAD,
PENISTONE, BARNSLEY, S36
8AS

Client Ref: PO25616/5655/DW
Report Ref: GS-4BY-1IY-7FM-LM2
Grid Ref: 424379, 404451

Map Name: County Series

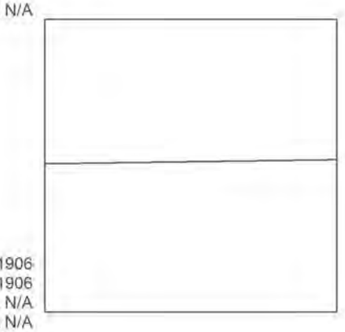
Map date: **1906**

Scale: 1:2,500

Printed at: 1:2,500

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Edition N/A
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Surveyed 1906
Revised 1906
Edition N/A
Copyright N/A
Levelled N/A

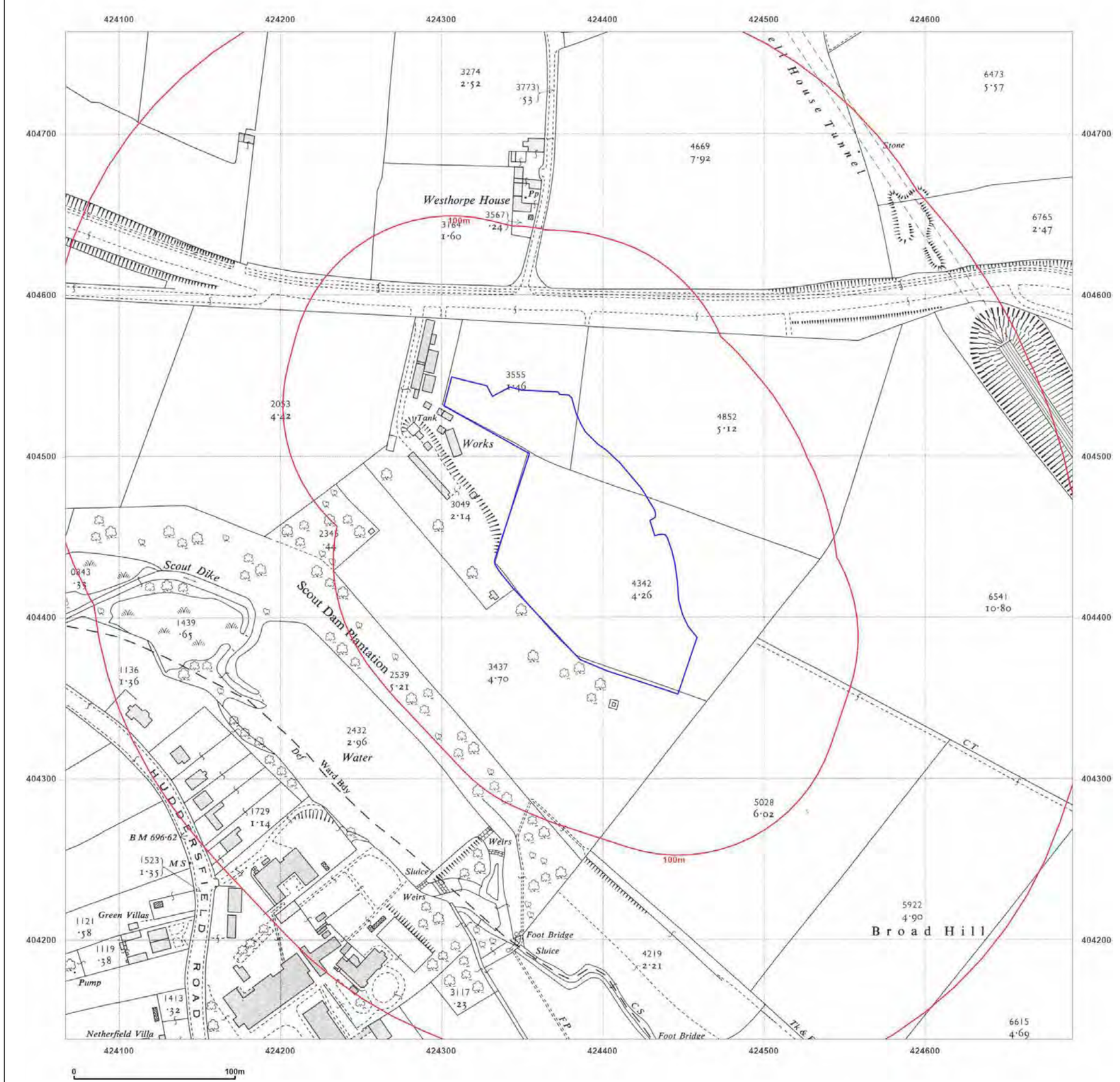
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Production date: 09 December 2025

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

WHITE HART ROAD,
PENISTONE, BARNSLEY, S36 8AS

Client Ref: PO25616/5655/DW
Report Ref: GS-4BY-1IY-7FM-LM2
Grid Ref: 424379, 404451

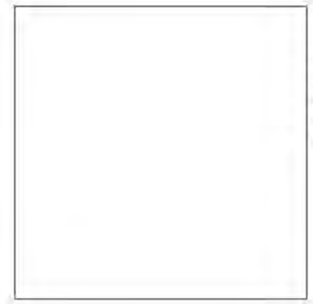
Map Name: National Grid

Map date: **1960**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1959
Revised 1959
Edition N/A
Copyright 1960
Levelled 1930

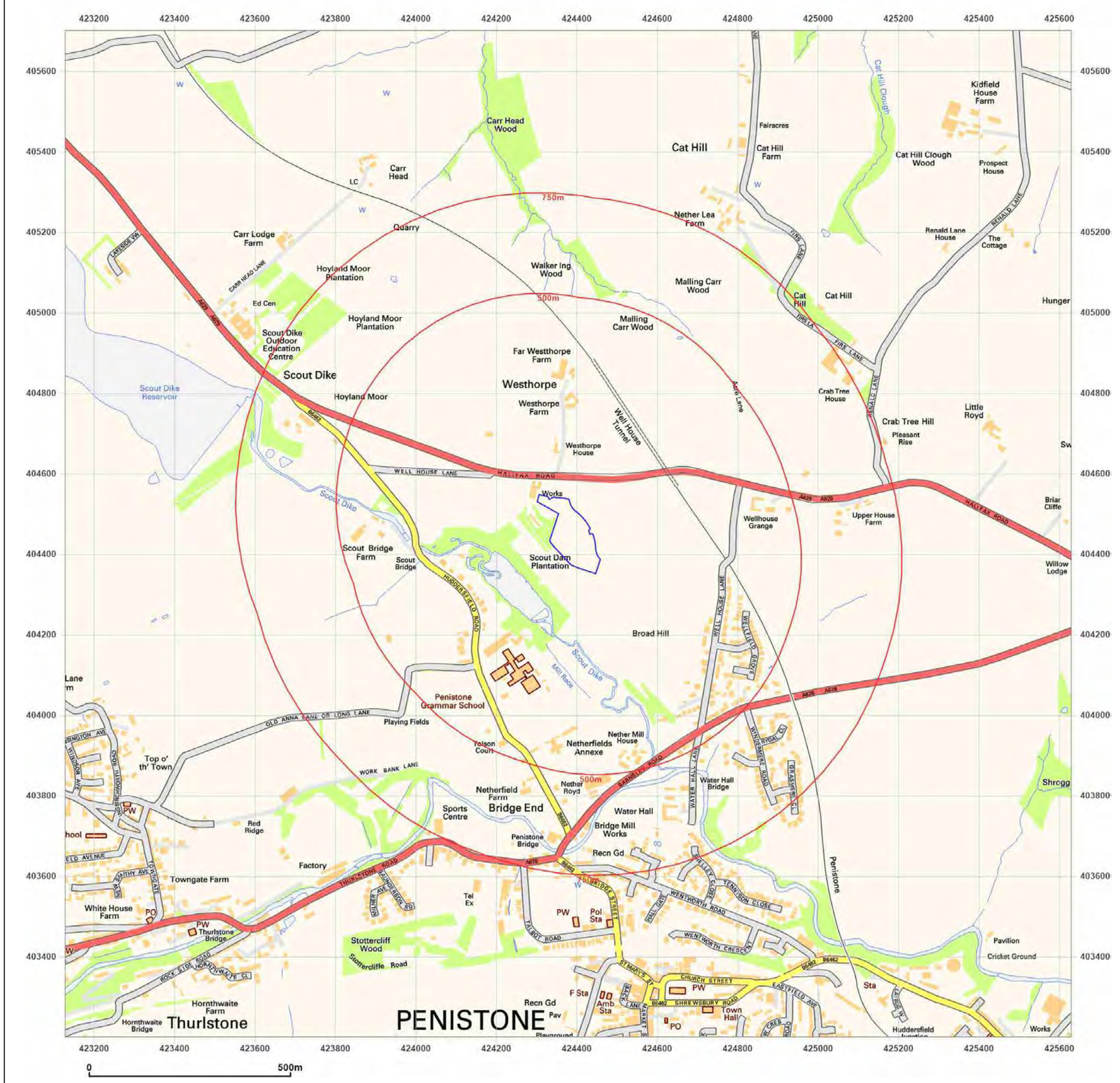
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Production date: 09 December 2025

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

WHITE HART ROAD,
PENISTONE, BARNSLEY, S36 8AS

Client Ref: PO25616/5655/DW
Report Ref: GS-4BY-1IY-7FM-LM2
Grid Ref: 424379, 404451

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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Production date: 09 December 2025

Map legend available at:
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Appendix E

Search Responses & other Correspondence

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

WHITE HART ROAD, PENISTONE, BARNSLEY, S36 8AS

Order Details

Date: 09/12/2025

Your ref: PO25616/5655/DW

Our Ref: GS-BOC-XOP-ILP-YV4

Site Details

Location: 424388 404448

Area: 1.48 ha

Authority: Barnsley Metropolitan Borough Council ↗



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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

Certified B Corporation

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 >	2	4	14	19	-
17 >	1.2 >	Historical tanks >	0	2	0	0	-
17	1.3	Historical energy features	0	0	0	0	-
18	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 >	3	4	21	29	-
22 >	2.2 >	Historical tanks >	0	3	0	0	-
22	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	-
24	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
24	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
24 >	3.5 >	Historical waste sites >	0	0	0	1	-
24 >	3.6 >	Licensed waste sites >	0	0	0	1	-
25	3.7	Waste exemptions	0	0	0	0	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
26 >	4.1 >	Recent industrial land uses >	0	2	1	-	-
27	4.2	National Geographic Database (NGD) - Current or recent tanks	0	0	0	-	-
27	4.3	Current or recent petrol stations	0	0	0	0	-
27	4.4	Electricity cables	0	0	0	0	-
27	4.5	Gas pipelines	0	0	0	0	-

27	4.6	Sites determined as Contaminated Land	0	0	0	0	-
28	4.7	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
28 >	4.8 >	Regulated explosive sites >	1	0	0	0	-
28 >	4.9 >	Hazardous substance storage/usage >	0	1	0	0	-
29	4.10	Historical licensed industrial activities (IPC)	0	0	0	0	-
29	4.11	Licensed industrial activities (Part A(1))	0	0	0	0	-
29	4.12	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
29	4.13	Radioactive Substance Authorisations	0	0	0	0	-
29	4.14	Licensed Discharges to controlled waters	0	0	0	0	-
30	4.15	Pollutant release to surface waters (Red List)	0	0	0	0	-
30	4.16	Pollutant release to public sewer	0	0	0	0	-
30	4.17	List 1 Dangerous Substances	0	0	0	0	-
30	4.18	List 2 Dangerous Substances	0	0	0	0	-
30 >	4.19 >	Pollution Incidents (EA/NRW) >	0	0	1	2	-
31	4.20	Pollution inventory substances	0	0	0	0	-
31	4.21	Pollution inventory waste transfers	0	0	0	0	-
31	4.22	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology >	On site	0-50m	50-250m	250-500m	500-2000m
32 >	5.1 >	Superficial aquifer >	Identified (within 500m)				
33 >	5.2 >	Bedrock aquifer >	Identified (within 500m)				
35 >	5.3 >	Groundwater vulnerability >	Identified (within 50m)				
36	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
36	5.5	Groundwater vulnerability- local information	None (within 0m)				
37 >	5.6 >	Groundwater abstractions >	0	0	0	0	6
39 >	5.7 >	Surface water abstractions >	0	0	0	0	1
39 >	5.8 >	Potable abstractions >	0	0	0	0	1
40	5.9	Source Protection Zones	0	0	0	0	-
40	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology >	On site	0-50m	50-250m	250-500m	500-2000m

41 >	6.1 >	Water Network (OS MasterMap) >	0	0	12	-	-
43 >	6.2 >	Surface water features >	0	0	3	-	-
43 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
43 >	6.4 >	WFD Surface water bodies >	0	0	1	-	-
44 >	6.5 >	WFD Groundwater bodies >	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
45	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
45	7.2	Historical Flood Events	0	0	0	-	-
45	7.3	Flood Defences	0	0	0	-	-
46	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
46	7.5	Flood Storage Areas	0	0	0	-	-
47	7.6	Flood Zone 2	None (within 50m)				
47	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
48	8.1	Surface water flooding	Negligible (within 50m)				
Page	Section	Groundwater flooding >					
49 >	9.1 >	Groundwater flooding >	Negligible (within 50m)				
Page	Section	Environmental designations >	On site	0-50m	50-250m	250-500m	500-2000m
50	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
51	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
51	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
51	10.4	Special Protection Areas (SPA)	0	0	0	0	0
51	10.5	National Nature Reserves (NNR)	0	0	0	0	0
52	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
52 >	10.7 >	Designated Ancient Woodland >	0	0	0	0	5
52	10.8	Biosphere Reserves	0	0	0	0	0
53	10.9	Forest Parks	0	0	0	0	0
53	10.10	Marine Conservation Zones	0	0	0	0	0
53 >	10.11 >	Green Belt >	0	1	0	0	0

53	10.12	Proposed Ramsar sites	0	0	0	0	0
54	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
54	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
54	10.15	Nitrate Sensitive Areas	0	0	0	0	0
54 >	**10.16 >**	**Nitrate Vulnerable Zones >**	0	0	1	1	2
56	10.17	SSSI Impact Risk Zones	0	-	-	-	-
56	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
57	11.1	World Heritage Sites	0	0	0	-	-
57	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
57	11.3	National Parks	0	0	0	-	-
57	11.4	Listed Buildings	0	0	0	-	-
58	11.5	Conservation Areas	0	0	0	-	-
58	11.6	Scheduled Ancient Monuments	0	0	0	-	-
58	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	**Agricultural designations >**	On site	0-50m	50-250m	250-500m	500-2000m
59 >	**12.1 >**	**Agricultural Land Classification >**	Urban (within 250m)				
60	12.2	Open Access Land	0	0	0	-	-
60	12.3	Tree Felling Licences	0	0	0	-	-
60	12.4	Environmental Stewardship Schemes	0	0	0	-	-
60 >	**12.5 >**	**Countryside Stewardship Schemes >**	0	0	1	-	-
Page	Section	**Habitat designations >**	On site	0-50m	50-250m	250-500m	500-2000m
62 >	**13.1 >**	**Priority Habitat Inventory >**	1	2	8	-	-
63	13.2	Habitat Networks	0	0	0	-	-
63	13.3	Open Mosaic Habitat	0	0	0	-	-
63	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	**Geology 1:10,000 scale >**	On site	0-50m	50-250m	250-500m	500-2000m
65 >	**14.1 >**	**10k Availability >**	Identified (within 500m)				
66 >	**14.2 >**	**Artificial and made ground (10k) >**	0	0	3	6	-

68 >	14.3 >	Superficial geology (10k) >	0	0	2	1	-
69	14.4	Landslip (10k)	0	0	0	0	-
70 >	14.5 >	Bedrock geology (10k) >	2	1	9	16	-
72 >	14.6 >	Bedrock faults and other linear features (10k) >	0	0	4	4	-
Page	Section	Geology 1:50,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
73 >	15.1 >	50k Availability >	Identified (within 500m)				
74	15.2	Artificial and made ground (50k)	0	0	0	0	-
74	15.3	Artificial ground permeability (50k)	0	0	-	-	-
75 >	15.4 >	Superficial geology (50k) >	0	0	2	1	-
76	15.5	Superficial permeability (50k)	None (within 50m)				
76	15.6	Landslip (50k)	0	0	0	0	-
76	15.7	Landslip permeability (50k)	None (within 50m)				
77 >	15.8 >	Bedrock geology (50k) >	2	1	8	10	-
79 >	15.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
79 >	15.10 >	Bedrock faults and other linear features (50k) >	0	0	4	3	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
80	16.1	BGS Boreholes	0	0	0	-	-
Page	Section	Natural ground subsidence >					
81 >	17.1 >	Shrink swell clays >	Very low (within 50m)				
83 >	17.2 >	Running sands >	Negligible (within 50m)				
84 >	17.3 >	Compressible deposits >	Negligible (within 50m)				
85 >	17.4 >	Collapsible deposits >	Very low (within 50m)				
86 >	17.5 >	Landslides >	Low (within 50m)				
88 >	17.6 >	Ground dissolution of soluble rocks >	Negligible (within 50m)				
Page	Section	Mining and ground workings >	On site	0-50m	50-250m	250-500m	500-2000m
90 >	18.1 >	BritPits >	0	0	0	1	-
91 >	18.2 >	Surface ground workings >	0	0	24	-	-
92 >	18.3 >	Underground workings >	0	0	6	0	1
93	18.4	Underground mining extents	0	0	0	0	-

93	18.5	Historical Mineral Planning Areas	0	0	0	0	-
93	18.6	Non-coal mining	0	0	0	0	0
93	18.7	JPB mining areas	None (within 0m)				
93	18.8	The Coal Authority non-coal mining	0	0	0	0	-
94	18.9	Researched mining	0	0	0	0	-
94	18.10	Mining record office plans	0	0	0	0	-
94	18.11	BGS mine plans	0	0	0	0	-
94 >	**18.12 >**	**Coal mining >**	Identified (within 0m)				
95	18.13	Brine areas	None (within 0m)				
95	18.14	Gypsum areas	None (within 0m)				
95	18.15	Tin mining	None (within 0m)				
95	18.16	Clay mining	None (within 0m)				
Page	Section	Ground cavities and sinkholes	On site	0-50m	50-250m	250-500m	500-2000m
96	19.1	Natural cavities	0	0	0	0	-
96	19.2	Mining cavities	0	0	0	0	0
96	19.3	Reported recent incidents	0	0	0	0	-
96	19.4	Historical incidents	0	0	0	0	-
Page	Section	**Radon >**					
98 >	**20.1 >**	**Radon >**	Less than 1% (within 0m)				
Page	Section	**Soil chemistry >**	On site	0-50m	50-250m	250-500m	500-2000m
100 >	**21.1 >**	**BGS Estimated Background Soil Chemistry >**	2	2	-	-	-
100	21.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
101	21.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	**Railway infrastructure and projects >**	On site	0-50m	50-250m	250-500m	500-2000m
102	22.1	Underground railways (London)	0	0	0	-	-
102	22.2	Underground railways (Non-London)	0	0	0	-	-
103 >	**22.3 >**	**Railway tunnels >**	0	0	1	-	-
103 >	**22.4 >**	**Historical railway and tunnel features >**	0	0	12	-	-
104	22.5	Royal Mail tunnels	0	0	0	-	-

104	22.6	Historical railways	0	0	0	-	-
104 >	**22.7 >**	**Railways >**	0	0	3	-	-
104	22.8	Crossrail 2	0	0	0	0	-
105	22.9	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 30/05/2021

Site Area: 1.48ha

Recent site history - 2018 aerial photograph



Capture Date: 29/06/2018

Site Area: 1.48ha

Recent site history - 2012 aerial photograph



Capture Date: 26/03/2012

Site Area: 1.48ha

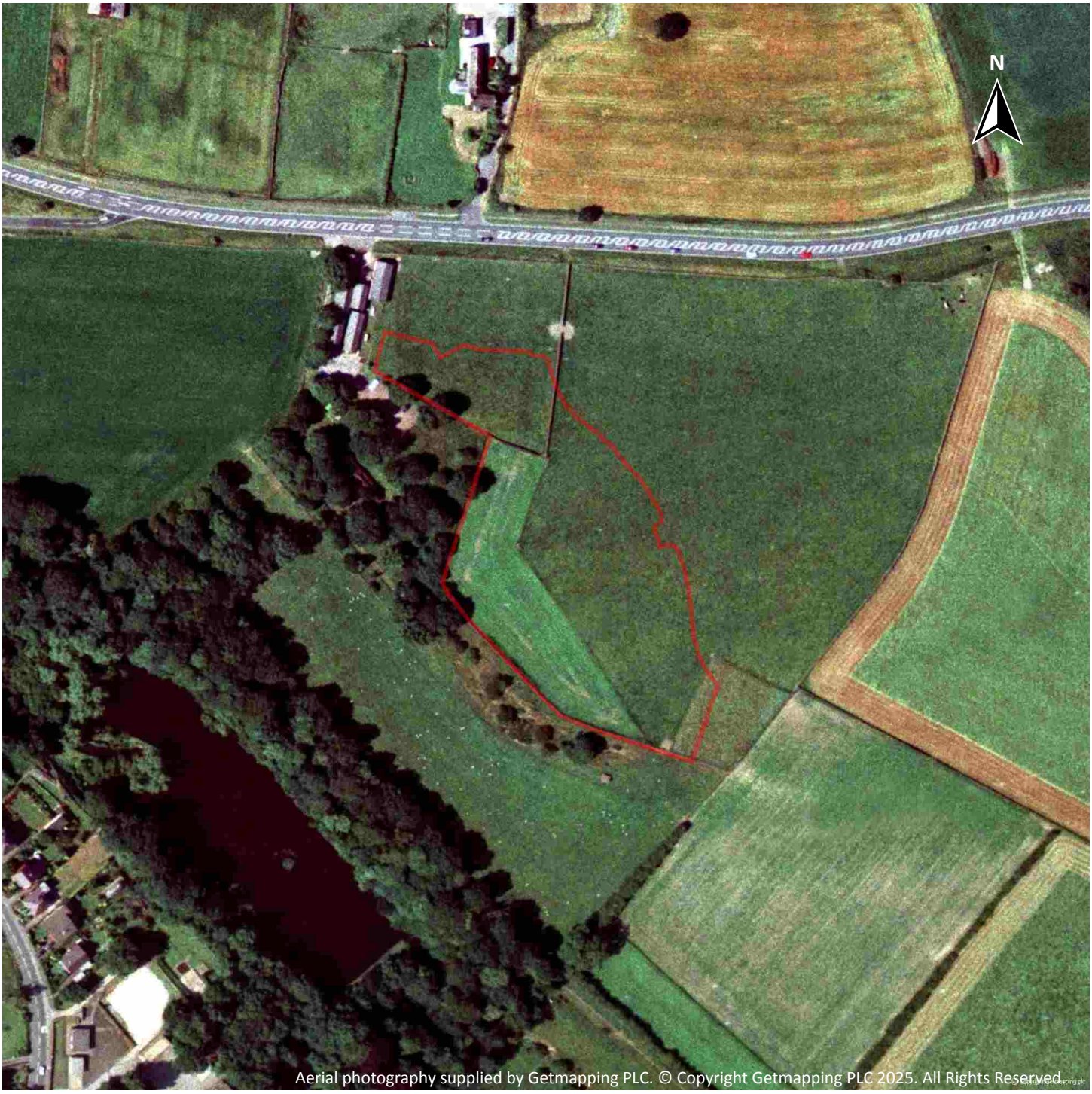
Recent site history - 2009 aerial photograph



Capture Date: 11/09/2009

Site Area: 1.48ha

Recent site history - 1999 aerial photograph



Capture Date: 10/07/1999

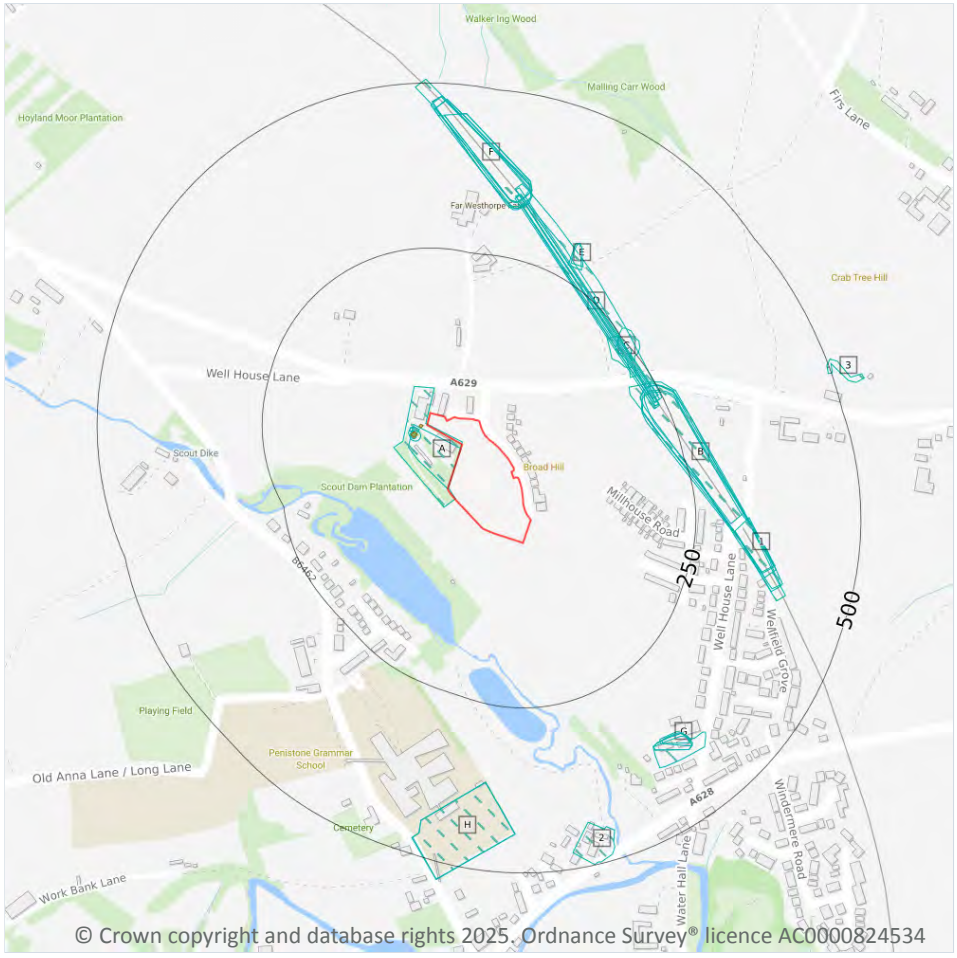
Site Area: 1.48ha

OS MasterMap site plan



Site Area: 1.48ha

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

1.1 Historical industrial land uses

Records within 500m	39

Potentially contaminative land use features digitised from historical Ordnance Survey® mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 15 >**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Detonator Works**	**1903**	**1460989**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Unspecified Works**	**1967 - 1987**	**1573258**
A	14m SW	Unspecified Tank	1951	1501450
A	16m SW	Unspecified Tank	1938	1544154
A	21m W	Unspecified Tank	1929	1524205
A	23m SW	Unspecified Tank	1948	1538114
B	208m NE	Cuttings	1929	1526621
B	212m NE	Cuttings	1891	1554870
B	213m NE	Cuttings	1938 - 1948	1527783
B	213m NE	Cuttings	1903	1572173
C	218m NE	Unspecified Heap	1938	1511021
B	218m NE	Cuttings	1951 - 1987	1483980
B	221m NE	Cuttings	1850	1547905
C	222m NE	Unspecified Pit	1850	1453186
D	227m NE	Tunnel	1891	1565742
D	229m NE	Tunnel	1903 - 1929	1544049
D	229m NE	Tunnel	1948	1561329
D	232m NE	Tunnel	1938	1565967
D	233m NE	Tunnel	1850	1532283
D	234m NE	Tunnel	1951 - 1987	1525168
E	272m NE	Unspecified Pit	1948	1451408
E	277m NE	Unspecified Heap	1938	1570033
1	310m E	Cuttings	1951 - 1987	1562918
F	323m N	Cuttings	1891	1504885
F	326m N	Cuttings	1903 - 1929	1496560
F	326m N	Cuttings	1948	1514892
F	328m N	Cuttings	1938	1511645
F	334m N	Cuttings	1850	1564196
F	335m N	Cuttings	1987	1531364

ID	Location	Land use	Dates present	Group ID
F	335m N	Cuttings	1951 - 1967	1531490
G	363m SE	Unspecified Pit	1951	1578657
G	365m SE	Unspecified Pit	1948	1513118
G	365m SE	Unspecified Pit	1903	1517153
G	366m SE	Unspecified Pit	1938	1536539
G	367m SE	Sandstone Quarry	1850	1445017
H	367m S	Unspecified Commercial/Industrial	1948	1431769
H	367m S	Unspecified Workhouse	1891 - 1903	1535681
2	435m S	Nether Mill	1929	1454608
3	495m E	Unspecified Ground Workings	1967 - 1987	1560708

This data is sourced from Ordnance Survey® / Groundsure.

1.2 Historical tanks

Records within 500m	**2**

Tank features digitised from historical Ordnance Survey® mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 15 >**

ID	Location	Land use	Dates present	Group ID
A	6m W	Unspecified Tank	1992	238445
A	21m SW	Unspecified Tank	1960 - 1989	259155

This data is sourced from Ordnance Survey® / Groundsure.

1.3 Historical energy features

Records within 500m	**0**

Energy features digitised from historical Ordnance Survey® mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or

succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey® / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey® mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey® / Groundsure.

1.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey® mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey® / Groundsure.

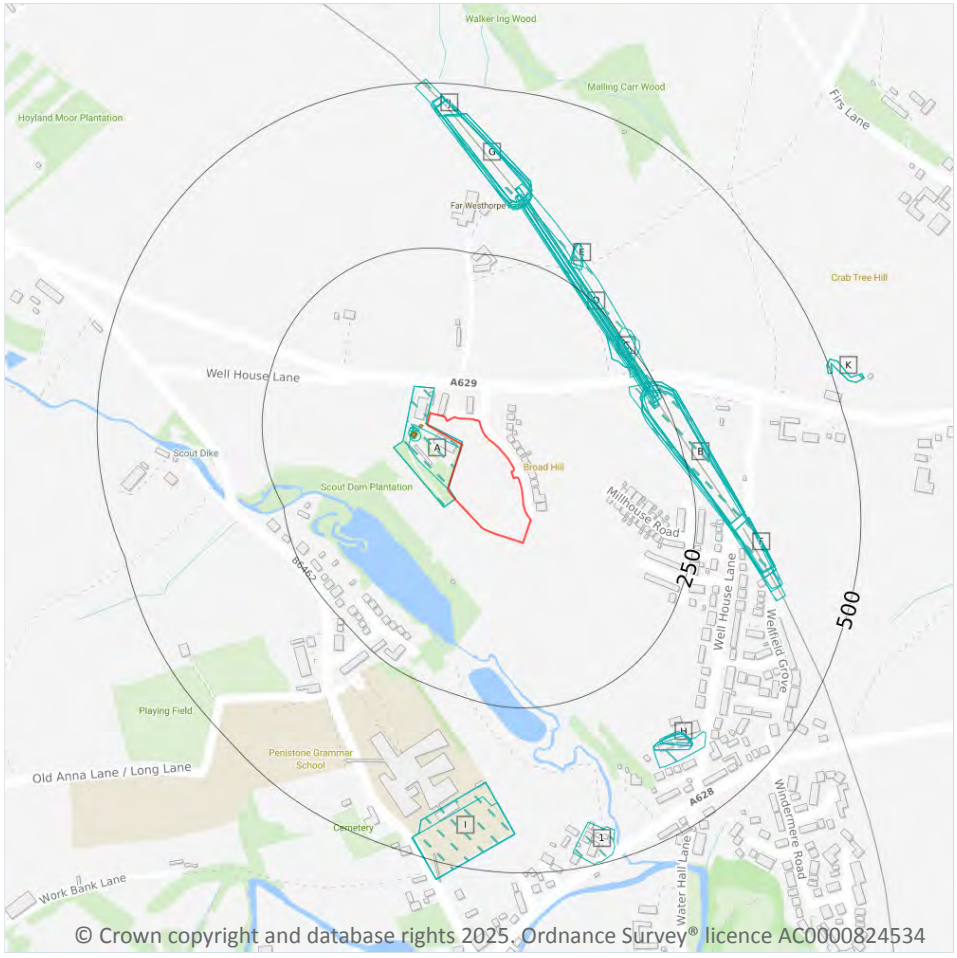
1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey® / Groundsure / other sources.

2 Past land use - un-grouped



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

2.1 Historical industrial land uses

Records within 500m	57

Potentially contaminative land use features digitised from historical Ordnance Survey® mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19 >**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Unspecified Works**	**1967**	**1573258**
A	**On site**	**Detonator Works**	**1903**	**1460989**
A	**On site**	**Unspecified Works**	**1987**	**1573258**

ID	Location	Land Use	Date	Group ID
A	14m SW	Unspecified Tank	1951	1501450
A	16m SW	Unspecified Tank	1938	1544154
A	21m W	Unspecified Tank	1929	1524205
A	23m SW	Unspecified Tank	1948	1538114
B	208m NE	Cuttings	1929	1526621
B	212m NE	Cuttings	1891	1554870
B	213m NE	Cuttings	1948	1527783
B	213m NE	Cuttings	1903	1572173
B	217m NE	Cuttings	1938	1527783
C	218m NE	Unspecified Heap	1938	1511021
C	218m NE	Unspecified Heap	1938	1511021
B	218m NE	Cuttings	1967	1483980
B	218m NE	Cuttings	1987	1483980
B	218m NE	Cuttings	1951	1483980
B	221m NE	Cuttings	1850	1547905
C	222m NE	Unspecified Pit	1850	1453186
D	227m NE	Tunnel	1891	1565742
D	229m NE	Tunnel	1948	1561329
D	229m NE	Tunnel	1903	1544049
D	231m NE	Tunnel	1929	1544049
D	232m NE	Tunnel	1938	1565967
D	233m NE	Tunnel	1850	1532283
D	234m NE	Tunnel	1987	1525168
D	234m NE	Tunnel	1967	1525168
D	234m NE	Tunnel	1951	1525168
E	272m NE	Unspecified Pit	1948	1451408
E	277m NE	Unspecified Heap	1938	1570033
E	277m NE	Unspecified Heap	1938	1570033

ID	Location	Land Use	Date	Group ID
F	310m E	Cuttings	1967	1562918
F	310m E	Cuttings	1987	1562918
F	310m E	Cuttings	1951	1562918
G	323m N	Cuttings	1891	1504885
G	326m N	Cuttings	1948	1514892
G	326m N	Cuttings	1903	1496560
G	328m N	Cuttings	1938	1511645
G	330m N	Cuttings	1929	1496560
G	334m N	Cuttings	1850	1564196
G	335m N	Cuttings	1967	1531490
G	335m N	Cuttings	1987	1531364
G	335m N	Cuttings	1951	1531490
H	363m SE	Unspecified Pit	1951	1578657
H	365m SE	Unspecified Pit	1948	1513118
H	365m SE	Unspecified Pit	1903	1517153
H	366m SE	Unspecified Pit	1938	1536539
H	366m SE	Unspecified Pit	1938	1536539
H	367m SE	Sandstone Quarry	1850	1445017
I	367m S	Unspecified Commercial/Industrial	1948	1431769
I	367m S	Unspecified Workhouse	1903	1535681
I	389m S	Unspecified Workhouse	1891	1535681
1	435m S	Nether Mill	1929	1454608
J	451m N	Cuttings	1967	1531490
J	451m N	Cuttings	1951	1531490
K	495m E	Unspecified Ground Workings	1967	1560708
K	495m E	Unspecified Ground Workings	1987	1560708

This data is sourced from Ordnance Survey® / Groundsure.

2.2 Historical tanks

Records within 500m	3

Tank features digitised from historical Ordnance Survey® mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19 >**

ID	Location	Land Use	Date	Group ID
A	6m W	Unspecified Tank	1992	238445
A	21m SW	Unspecified Tank	1960	259155
A	22m SW	Unspecified Tank	1989	259155

This data is sourced from Ordnance Survey® / Groundsure.

2.3 Historical energy features

Records within 500m	0

Energy features digitised from historical Ordnance Survey® mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey® / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey® mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey® / Groundsure.

2.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey® mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey® / Groundsure.

3 Waste and landfill



Site Outline

Search buffers in metres (m)

Historical waste sites

Licensed waste sites

3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey®/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	1

Waste site records derived from Local Authority planning records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 23 >**

ID	Location	Address	Further Details	Date
2	436m SE	Site Address: 33 Barnsley Road, Penistone, SHEFFIELD, South Yorkshire, S36 8AE	Type of Site: Contract Cleaning Business/Waste Transfer Station (Conversion) Planning application reference: B/02/1480/PU Description: Scheme comprises of conversion to contract cleaning business and waste transfer station. An application (ref: B/02/1480/PU) for Detailed Planning permission was submitted to Barnsley B.C. on 11th October 2002. Data source: Historic Planning Application Data Type: Point	-

This data is sourced from Ordnance Survey®/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	1

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

Features are displayed on the Waste and landfill map on **page 23 >**

ID	Location	Details		
1	435m SE	Site Name: U K Hygiene Site Address: 33, Barnsley Road, Penistone, Sheffield, South Yorkshire, S36 8AE Correspondence Address: -	Type of Site: Clinical Waste Transfer Station Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 655424 EPR reference: EA/EPR/MP3592ZW Operator: Kathrine Wood Waste Management licence No: 65253 Annual Tonnage: 0	Issue Date: 30/01/2003 Effective Date: 30/01/2003 Modified: - Surrendered Date: 30/01/2003 Expiry Date: - Cancelled Date: - Status: Surrendered

This data is sourced from the Environment Agency and Natural Resources Wales.

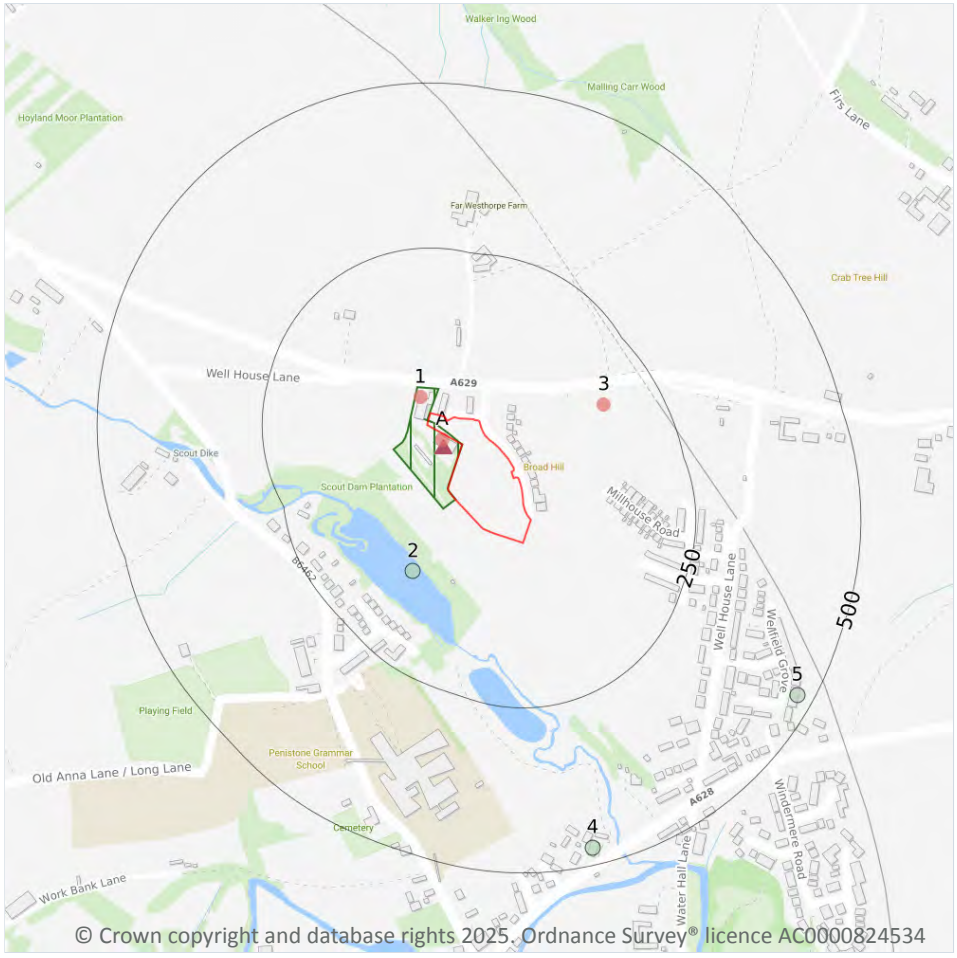
3.7 Waste exemptions

Records within 500m	0

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



Site Outline

Search buffers in metres (m)

Recent industrial land uses

Regulated explosive sites

Hazardous substance storage/usage

Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m	3

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 26 >**

ID	Location	Company	Address	Activity	Category
A	8m SW	Works	South Yorkshire, S36	Unspecified Works Or Factories	Industrial Features
1	29m NW	Clayton Penistone Group	West Thorpe Works, Halifax Road, Penistone, Barnsley, South Yorkshire, S36 7EY	Air and Water Filtration	Industrial Products

ID	Location	Company	Address	Activity	Category
3	167m NE	Electricity Sub Station	South Yorkshire, S36	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey®.

4.2 National Geographic Database (NGD) - Current or recent tanks

Records within 250m	0

Current or recent tanks identified from the Ordnance Survey® NGD.

This data is sourced from Ordnance Survey®.

4.3 Current or recent petrol stations

Records within 500m	0

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.4 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.5 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.6 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.7 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.8 Regulated explosive sites

Records within 500m	1

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

Features are displayed on the Current industrial land use map on **page 26 >**

ID	Location	Company	Operational Address
A	**On site**	**Clayton & Co .(Penistone),limited**	**Westhopre Works, Halifax Road, Westhorpe Works, Penistone, S.Yorks, SS30 7EY**

This data is sourced from the Health and Safety Executive.

4.9 Hazardous substance storage/usage

Records within 500m	1

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 26 >**

ID	Location	Details	
A	17m SW	Application reference number: No Details Application status: Historical Consent Application date: No Details Address: Clayton & Co (Penistone), Westhopre Works, Halifax Road, Westhorpe Works, Penistone, South Yorkshire, England, S30 6EY	Details: No Details Enforcement: No Details Date of enforcement: No Details Comment: No Details

This data is sourced from Local Authority records.

4.10 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.12 Licensed pollutant release (Part A(2)/B)

Records within 500m	0

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from Local Authority records.

4.13 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Licensed Discharges to controlled waters

Records within 500m	0

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 List 2 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution Incidents (EA/NRW)

Records within 500m	3

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 26 >**

ID	Location	Details	
2	121m SW	Incident Date: 08/10/2004 Incident Identification: 270865 Pollutant: Other Pollutant Pollutant Description: Other	Water Impact: Category 1 (Major) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
4	473m S	Incident Date: 31/07/2003 Incident Identification: 178220 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
5	475m SE	Incident Date: 25/06/2003 Incident Identification: 168676 Pollutant: Organic Chemicals/Products Pollutant Description: Paints and Varnishes	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.20 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.21 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

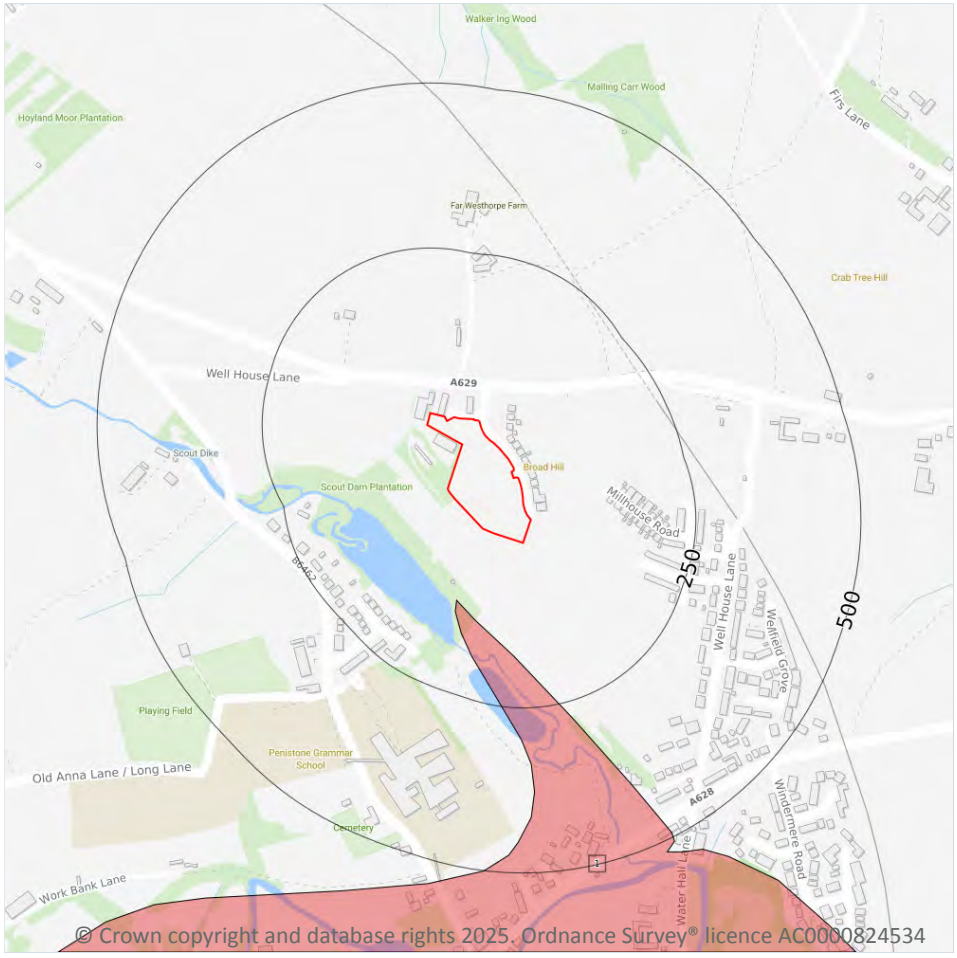
4.22 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	1

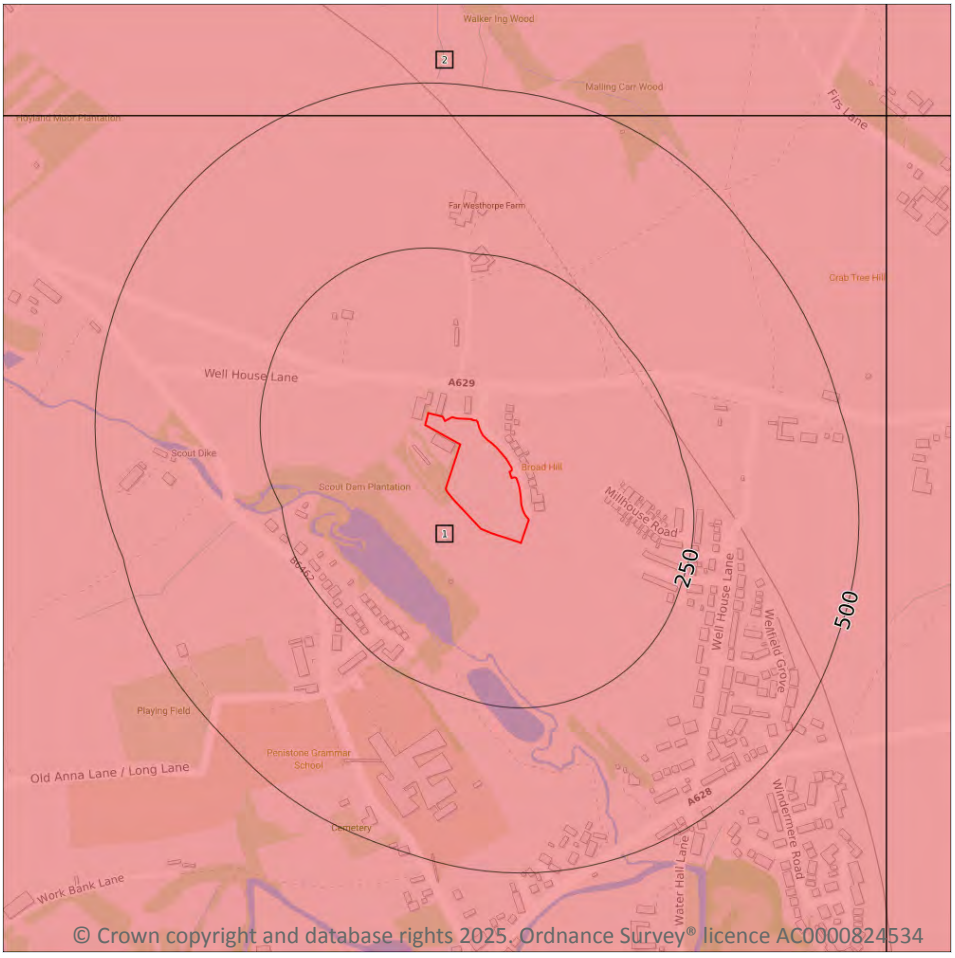
Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 32 >**

ID	Location	Designation	Description
1	115m SW	Secondary A	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

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m	2

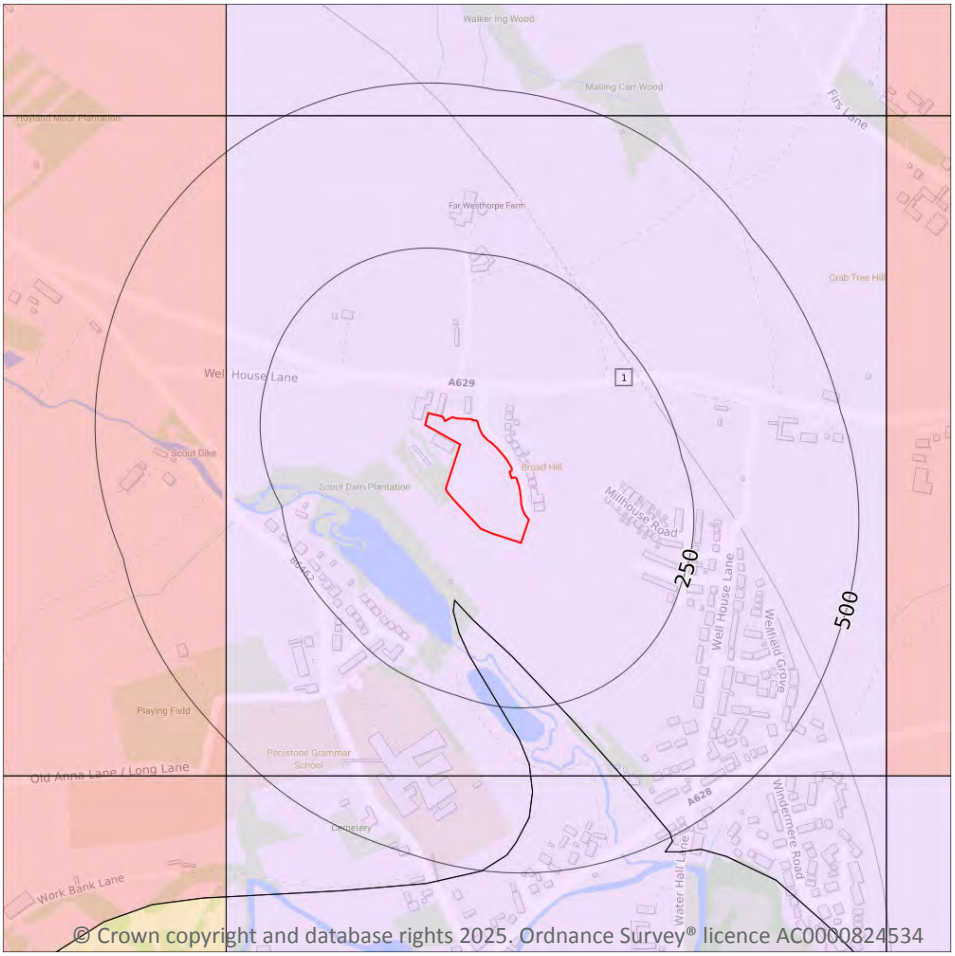
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 33 >**

ID	Location	Designation	Description
1	**On site**	**Secondary A**	**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**
2	450m N	Secondary A	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

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability

- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability

- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information

- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	1

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 35 >**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	**On site**	**Summary Classification: Secondary bedrock aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, No Superficial Aquifer**	**Leaching class: Low Infiltration value: <40% Dilution value: 300-550mm/year**	**Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data**	**Vulnerability: Medium Aquifer type: Secondary Flow mechanism: Well connected fractures**

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	**0**

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

Records on site	**0**

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk ↗.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	6

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 37 >**

ID	Location	Details	
-	827m NE	Status: Historical Licence No: 2/27/08/077 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING Data Type: Line Name: WHITTLESTONE Easting: 424700 Northing: 405700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 26/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/06/1976 Version End Date: -
-	827m NE	Status: Historical Licence No: 2/27/08/077 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING 2 - CHERRY TREE FARM PENISTONE Data Type: Point Name: WHITTLESTONE Easting: 424700 Northing: 405300	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 26/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/06/1976 Version End Date: -
-	890m NE	Status: Historical Licence No: 2/27/08/084 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING FED TROUGH Data Type: Point Name: LINLEY Easting: 424840 Northing: 405300	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 26/02/1969 Expiry Date: - Issue No: 100 Version Start Date: 07/01/1970 Version End Date: -
-	1205m N	Status: Historical Licence No: 2/27/08/077 Details: General Farming & Domestic Direct Source: GROUNDWATERS Point: SPRING 1 - CHERRY TREE FARM Data Type: Point Name: WHITTLESTONE Easting: 424700 Northing: 405700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 26/05/1966 Expiry Date: - Issue No: 100 Version Start Date: 30/06/1976 Version End Date: -
-	1555m S	Status: Historical Licence No: 2/27/05/010 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE X2 Data Type: Point Name: WILLIAM COOK HI-TEC INTEGRITY LTD Easting: 425000 Northing: 402900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 07/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 31/05/1996 Version End Date: -

ID	Location	Details	
-	1555m S	Status: Historical Licence No: 2/27/05/010 Details: General use relating to Secondary Category (Medium Loss) Direct Source: GROUNDWATERS Point: BOREHOLE X2 - COAL MEASURES - PENISTONE Data Type: Point Name: WILLIAM COOK HI-TEC INTEGRITY LTD Easting: 425000 Northing: 402900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 07/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 31/05/1996 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	**1**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 37 >**

ID	Location	Details	
-	1920m W	Status: Active Licence No: 2/27/05/013 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: ROYD MOOR STORAGE RESERVOIR Data Type: Point Name: Yorkshire Water Services Ltd Easting: 422400 Northing: 404800	Annual Volume (m^3): 2954961.84 Max Daily Volume (m^3): 8095.79 Original Application No: 2113 Original Start Date: 07/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 07/12/1965 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	**1**

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 37 >**

ID	Location	Details	
-	1920m W	Status: Active Licence No: 2/27/05/013 Details: Potable Water Supply - Direct Direct Source: SURFACE WATER Point: ROYD MOOR STORAGE RESERVOIR Data Type: Point Name: Yorkshire Water Services Ltd Easting: 422400 Northing: 404800	Annual Volume (m^3): 2954961.84 Max Daily Volume (m^3): 8095.79 Original Application No: 2113 Original Start Date: 07/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 07/12/1965 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	**0**

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

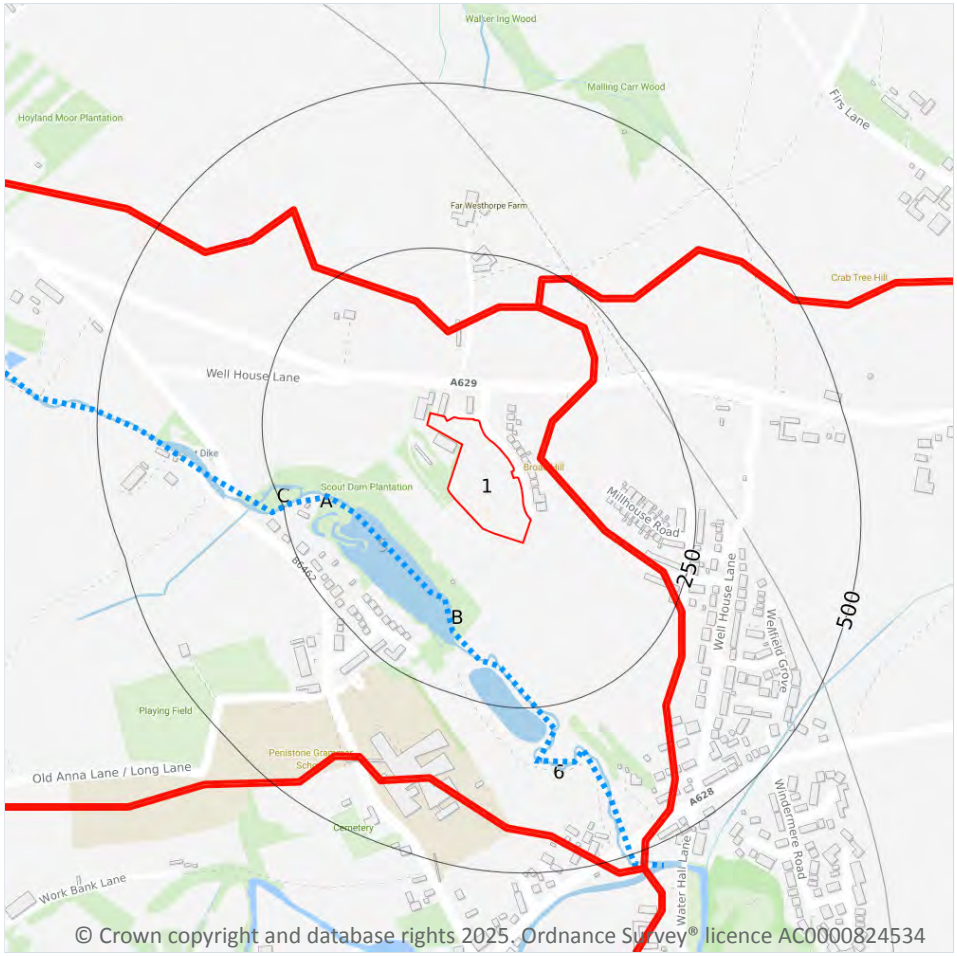
5.10 Source Protection Zones (confined aquifer)

Records within 500m	**0**

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	12

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 41 >**

ID	Location	Type of water feature	Ground level	Permanence	Name
B	121m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Scout Dike

ID	Location	Type of water feature	Ground level	Permanence	Name
B	121m SW	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	Scout Dike
5	132m SW	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	Scout Dike
B	138m SW	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	Scout Dike
B	149m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Scout Dike
B	149m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Scout Dike
B	165m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Scout Dike
B	165m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Scout Dike
A	175m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Scout Dike
6	177m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Scout Dike
C	215m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	218m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Scout Dike

This data is sourced from the Ordnance Survey®.

6.2 Surface water features

Records within 250m	3

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 41 >**

This data is sourced from the Ordnance Survey®.

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 41 >**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	**On site**	**River**	**Scout Dyke from Source to River Don**	**GB104027057530**	**Don Upper**	**Don and Rother**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 41 >**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
3	121m SW	River	Scout Dyke from Source to River Don	GB104027057530 ↗	Moderate	Fail	Moderate	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 41 >**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
1	**On site**	**Don & Rother Millstone grit & Coal Measures**	**GB40402G992300** ↗	**Poor**	**Poor**	**Good**	**2019**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m	0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding

8.1 Surface water flooding

Highest risk on site	**Negligible**
Highest risk within 50m	**Negligible**

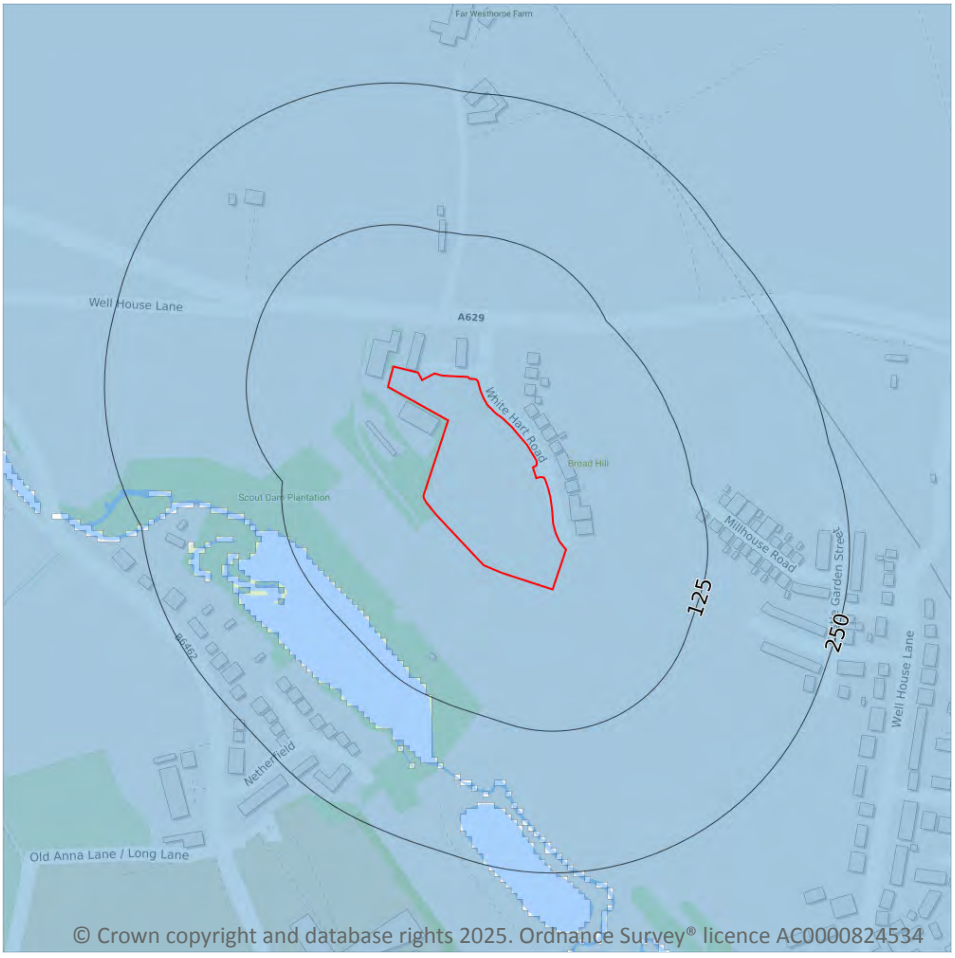
Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site. The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Negligible
1 in 250 year	Negligible
1 in 100 year	Negligible
1 in 30 year	Negligible

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



Site Outline

Search buffers in metres (m)

High

Moderate - High

Moderate

Low

Negligible

9.1 Groundwater flooding

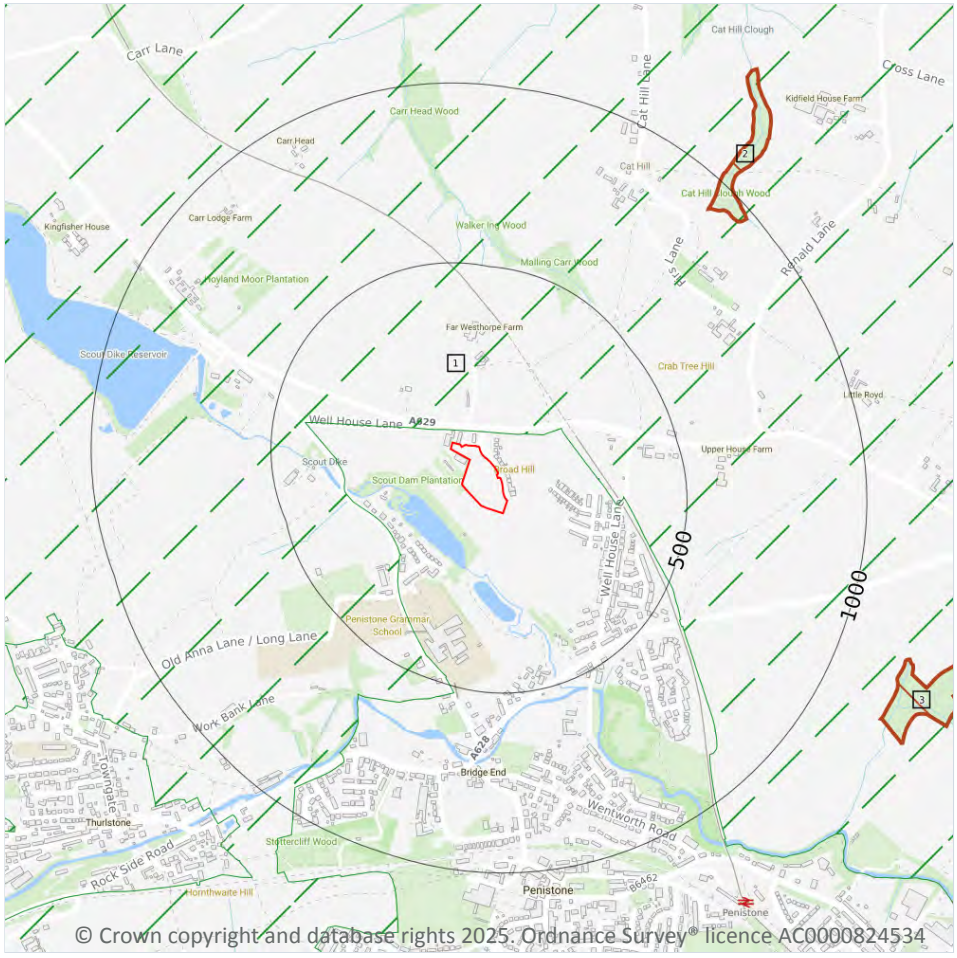
Highest risk on site	**Negligible**
Highest risk within 50m	**Negligible**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 49 >**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



Site Outline

Search buffers in metres (m)

Designated Ancient Woodland

Green Belt

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	5

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 50 >**

ID	Location	Name	Woodland Type
2	919m NE	Cat Hill Clough Wood	Ancient Replanted Woodland
3	1189m SE	Shrogg Wood	Ancient & Semi-Natural Woodland
-	1591m N	Clough Wood	Ancient & Semi-Natural Woodland
-	1898m S	Unknown	Ancient Replanted Woodland
-	1914m SE	Spring Vale Wood	Ancient & Semi-Natural Woodland

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	1

Areas designated to prevent urban sprawl by keeping land permanently open.

Features are displayed on the Environmental designations map on **page 50 >**

ID	Location	Name	Local Authority name
1	35m N	South and West Yorkshire Green Belt	Barnsley

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m	4

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
150m N	River Dearne NVZ	Surface Water	278	Existing

Location	Name	Type	NVZ ID	Status
459m NW	River Dearne NVZ	Surface Water	278	Existing
1432m N	River Dearne NVZ	Surface Water	278	Existing
1448m N	River Dearne NVZ	Surface Water	278	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units

10.17 SSSI Impact Risk Zones

Records on site	0

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

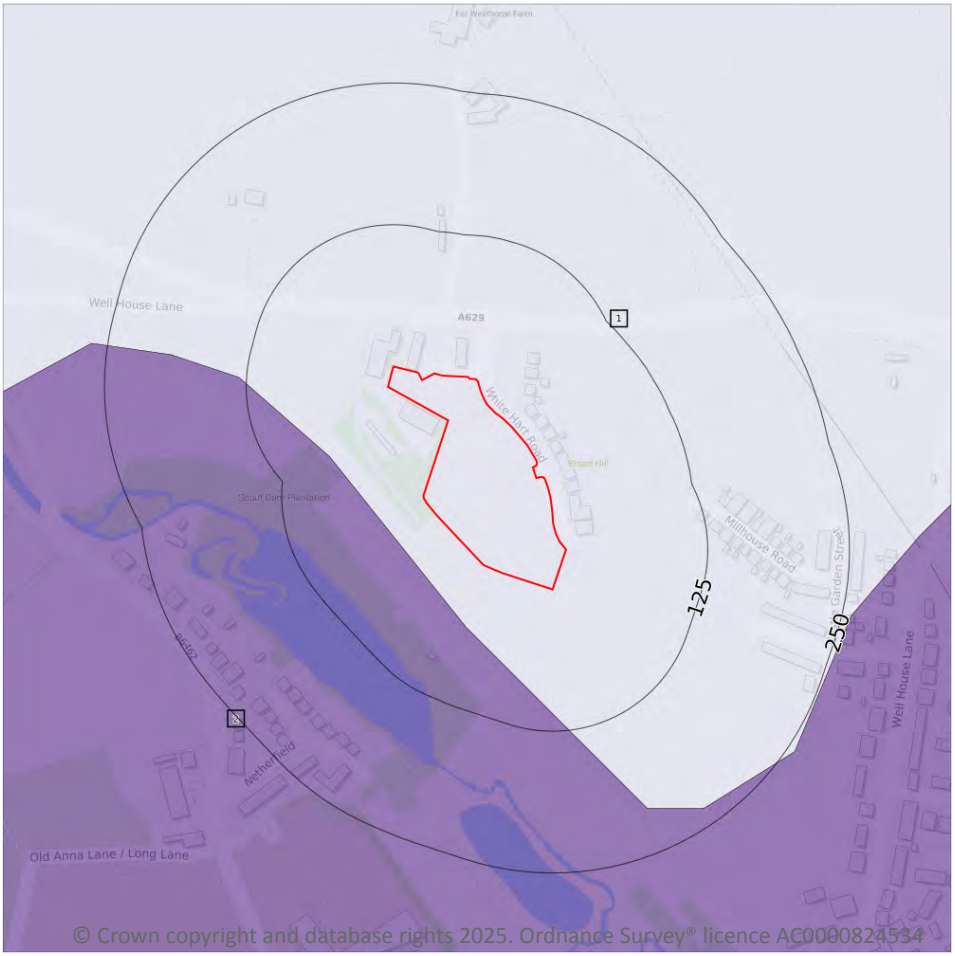
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	2

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 59 >**

ID	Location	Classification	Description
1	On site	Grade 4	**Poor quality agricultural land. Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.**

ID	Location	Classification	Description
2	41m SW	Urban	Non-agricultural/no quality assigned

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	1

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

Location	Reference	Scheme	Start Date	End Date
246m S	1082076	Countryside Stewardship (Middle Tier)	01/01/2021	31/12/2025

This data is sourced from Natural England.

13 Habitat designations



Site Outline

Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks

Primary Habitat
Restorable Habitat
Associated Habitats
Habitat Restoration-Creation
Network Enhancement Zone 1
Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	11

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 62 >**

ID	Location	Main Habitat	Other habitats
1	**On site**	**Deciduous woodland**	**Main habitat: DWOOD (INV > 50%)**
2	10m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
3	14m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
4	72m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

ID	Location	Main Habitat	Other habitats
5	80m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
6	117m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
7	145m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	169m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
8	170m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
9	175m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	190m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

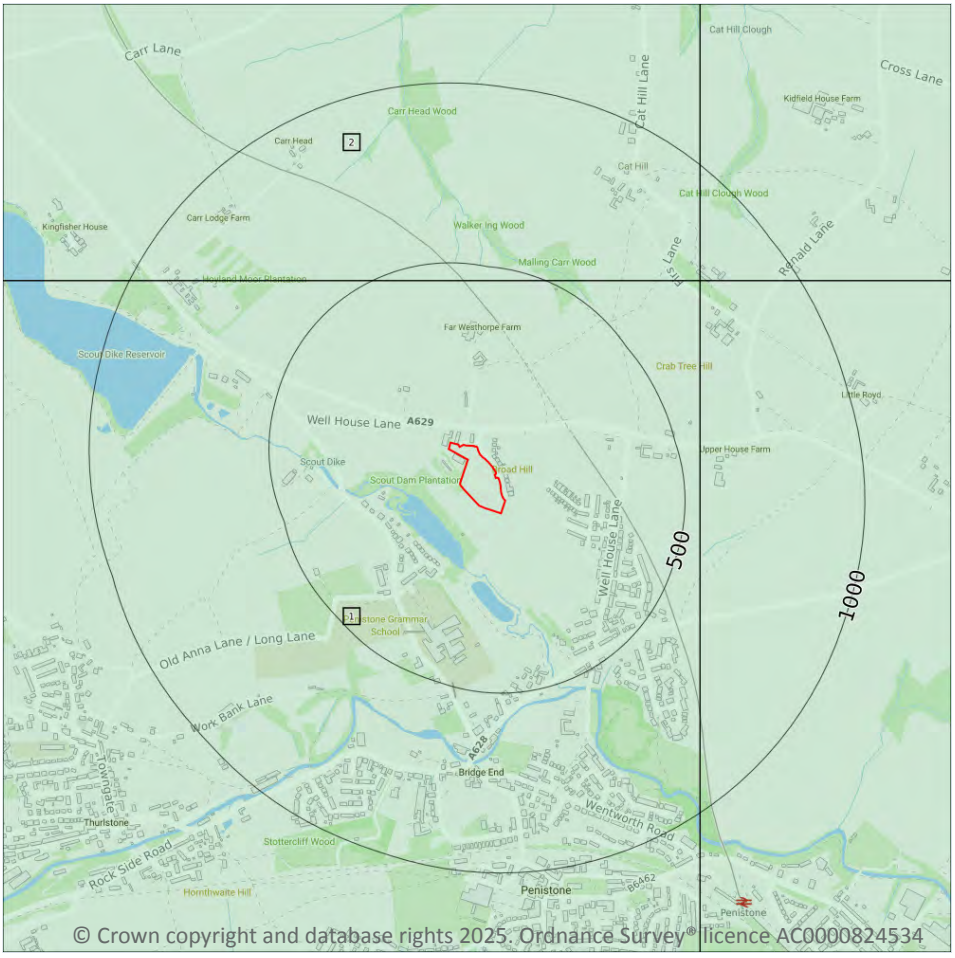
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m	2

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 65 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**SE20SW**
2	450m N	Full	Full	Full	Full	SE20NW

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground



Site Outline

Search buffers in metres (m)

- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m	9

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

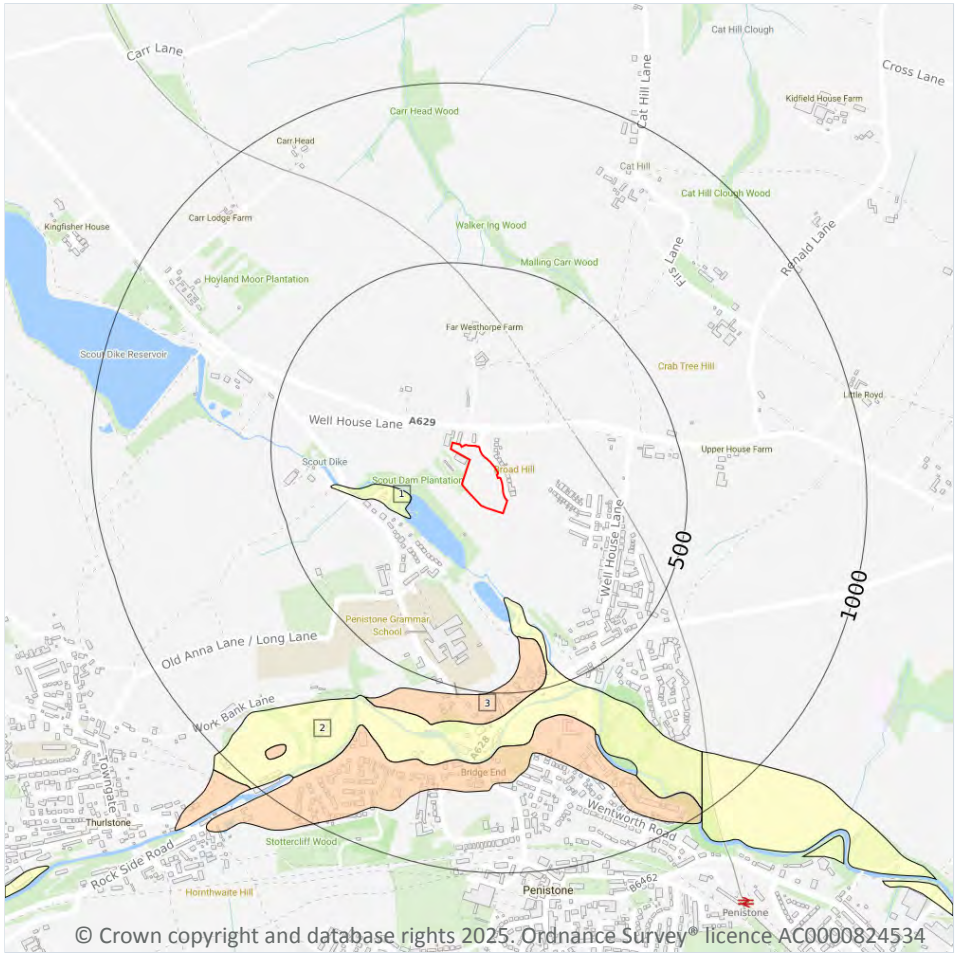
Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 66 >**

ID	Location	LEX Code	Description	Rock description
1	115m SW	MGR-ARTDP	Made Ground (Undivided)	Artificial deposit
2	144m NW	MGR-ARTDP	Made Ground (Undivided)	Artificial deposit
3	218m NE	WGR-VOID	Worked Ground (Undivided)	Void
4	272m NE	WGR-VOID	Worked Ground (Undivided)	Void

ID	Location	LEX Code	Description	Rock description
5	323m S	MGR-ARTDP	Made Ground (Undivided)	Artificial deposit
6	328m N	WGR-VOID	Worked Ground (Undivided)	Void
7	361m SE	WGR-VOID	Worked Ground (Undivided)	Void
8	443m E	MGR-ARTDP	Made Ground (Undivided)	Artificial deposit
A	493m E	WGR-VOID	Worked Ground (Undivided)	Void

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



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Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m	3

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 68 >**

ID	Location	LEX Code	Description	Rock description
1	146m W	ALV-XCZ	Alluvium-Clay And Silt	Clay and silt
2	235m S	ALV-XCZ	Alluvium-Clay And Silt	Clay and silt
3	346m S	RTD1-XSV	River Terrace Deposits, 1-Sand And Gravel	Sand and gravel

This data is sourced from the British Geological Survey.

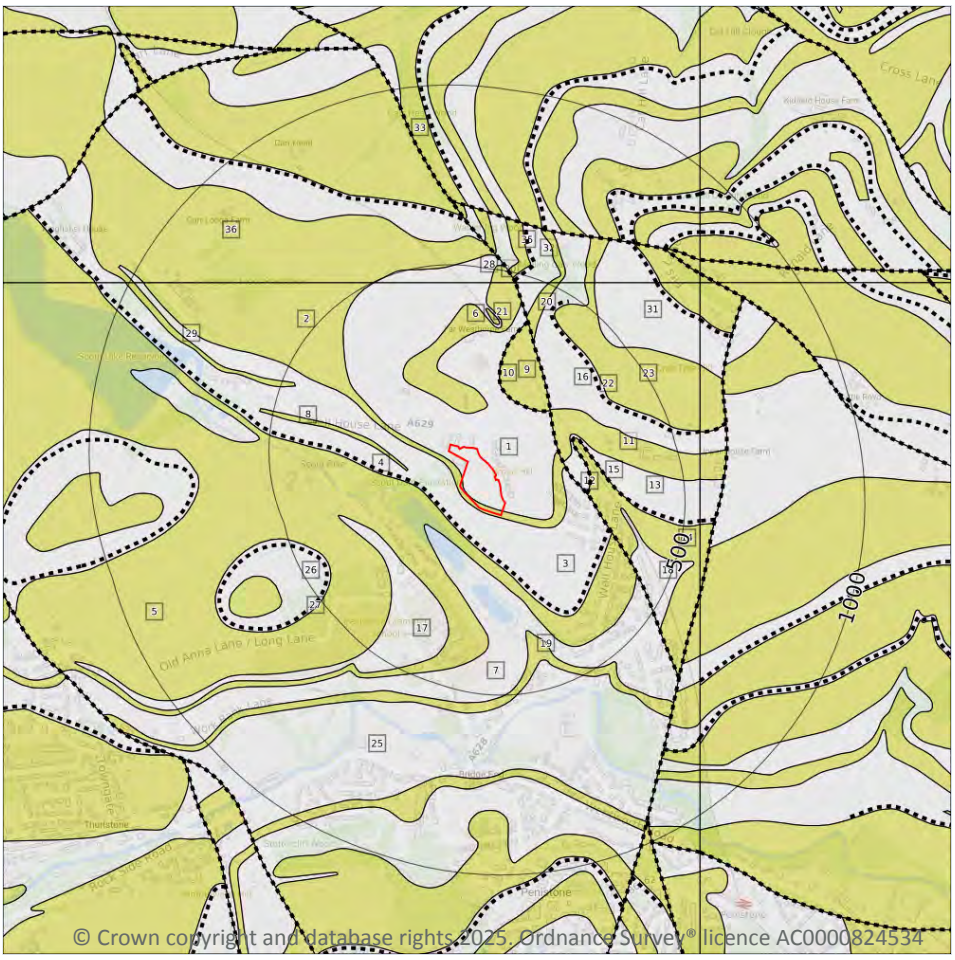
14.4 Landslip (10k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



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Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m **28**

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 70 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**PLCM-MDSI**	**Pennine Lower Coal Measures Formation-Mudstone And Siltstone**	**Westphalian**
2	**On site**	**PF-SDST**	**Penistone Flags-Sandstone**	**Westphalian**
3	6m SW	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone And Siltstone	Westphalian

ID	Location	LEX Code	Description	Rock age
5	85m SW	PF-SDST	Penistone Flags-Sandstone	Westphalian
6	94m N	PF-SDST	Penistone Flags-Sandstone	Westphalian
7	122m SW	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone And Siltstone	Westphalian
8	125m SW	PF-SDST	Penistone Flags-Sandstone	Westphalian
9	168m NE	PF-SDST	Penistone Flags-Sandstone	Westphalian
11	184m E	PF-SDST	Penistone Flags-Sandstone	Westphalian
13	186m E	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone And Siltstone	Westphalian
14	229m E	PF-SDST	Penistone Flags-Sandstone	Westphalian
16	229m NE	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone And Siltstone	Westphalian
17	256m SW	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone And Siltstone	Westphalian
18	322m E	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone And Siltstone	Westphalian
19	329m S	PF-SDST	Penistone Flags-Sandstone	Westphalian
20	336m NE	PF-SDST	Penistone Flags-Sandstone	Westphalian
21	349m N	PF-SDST	Penistone Flags-Sandstone	Westphalian
23	377m NE	PF-SDST	Penistone Flags-Sandstone	Westphalian
24	391m N	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone And Siltstone	Westphalian
25	419m S	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone And Siltstone	Westphalian
26	424m SW	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone And Siltstone	Westphalian
28	450m N	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone And Siltstone	Westphalian
29	461m W	PF-SDST	Penistone Flags-Sandstone	Westphalian
30	462m N	PF-SDST	Penistone Flags-Sandstone	Westphalian
31	472m NE	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone And Siltstone	Westphalian

ID	Location	LEX Code	Description	Rock age
32	474m N	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone And Siltstone	Westphalian
35	485m N	PF-SDST	Penistone Flags-Sandstone	Westphalian
36	491m N	PF-SDST	Penistone Flags-Sandstone	Westphalian

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m **8**

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 70 >**

ID	Location	Category	Description
4	77m SW	ROCK	Coal seam, inferred
10	168m NE	ROCK	Coal seam, inferred
12	184m E	FAULT	Fault, inferred, displacement unknown
15	229m E	ROCK	Coal seam, inferred
22	367m NE	ROCK	Coal seam, inferred
27	435m SW	ROCK	Coal seam, inferred
33	474m N	FAULT	Fault, inferred, displacement unknown
34	479m N	ROCK	Coal seam, inferred

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 73 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**EW086_glossop_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

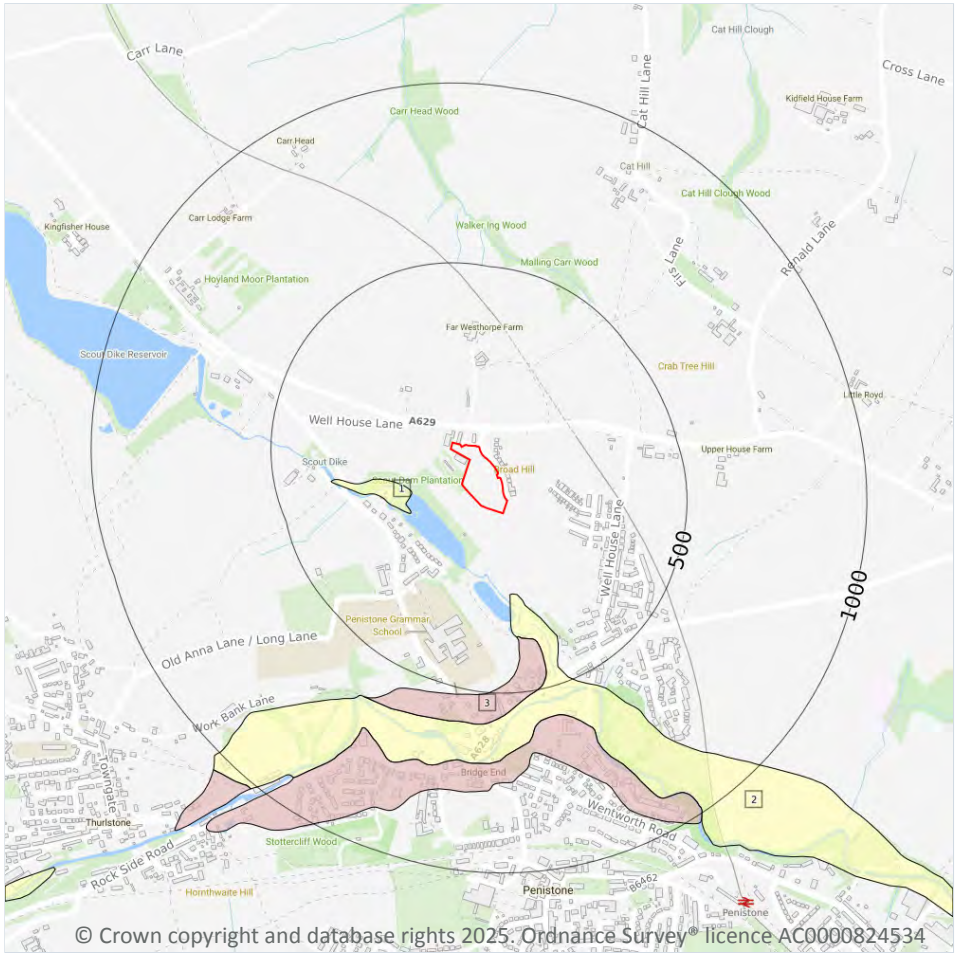
15.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m **3**

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 75 >**

ID	Location	LEX Code	Description	Rock description
1	142m W	ALV-XCZ	Alluvium	Clay and silt
2	226m S	ALV-XCZ	Alluvium	Clay and silt
3	346m S	RTD1-XSV	River Terrace Deposits, 1	Sand and gravel

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

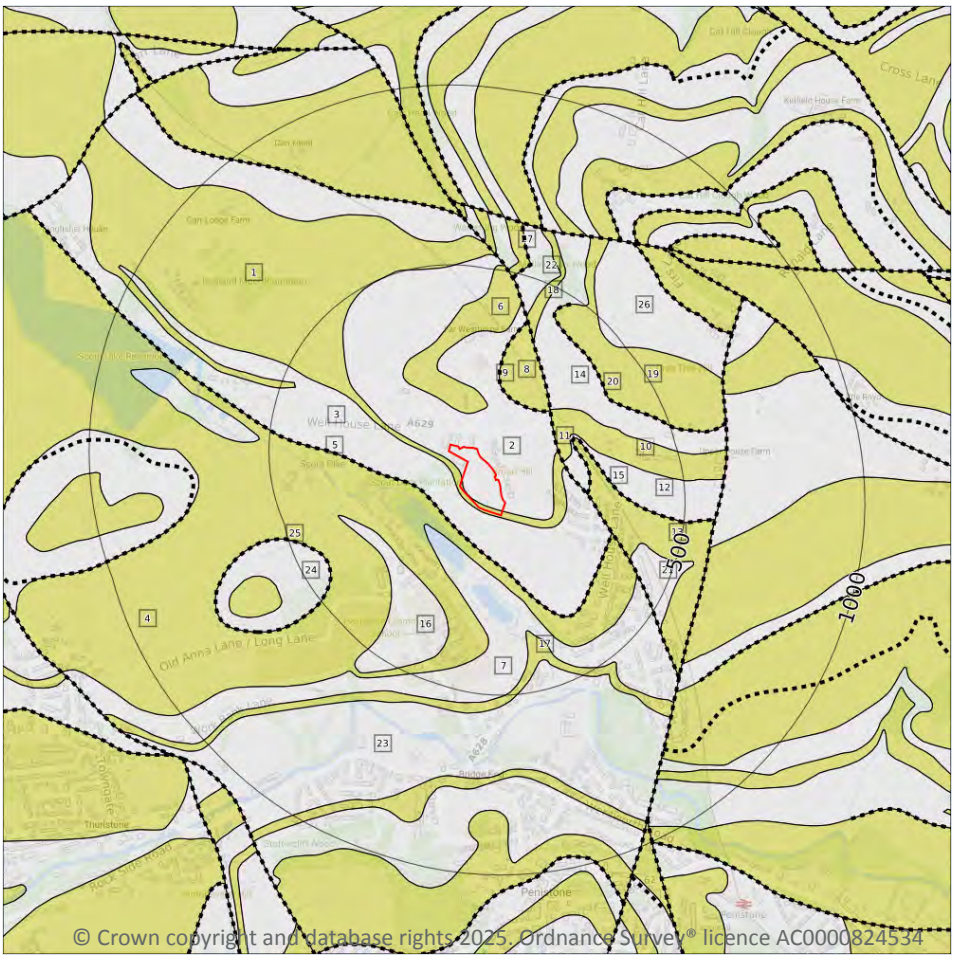
15.7 Landslip permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m **21**

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 77 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**PF-SDST**	**Penistone Flags-Sandstone**	**Westphalian**
2	**On site**	**PLCM-MDSI**	**Pennine Lower Coal Measures Formation-Mudstone and siltstone**	**Westphalian**
3	7m SW	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone and siltstone	Westphalian

ID	Location	LEX Code	Description	Rock age
4	85m SW	PF-SDST	Penistone Flags-Sandstone	Westphalian
6	94m N	PF-SDST	Penistone Flags-Sandstone	Westphalian
7	122m SW	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone and siltstone	Westphalian
8	168m NE	PF-SDST	Penistone Flags-Sandstone	Westphalian
10	184m E	PF-SDST	Penistone Flags-Sandstone	Westphalian
12	186m E	PLCM-MDSS	Pennine Lower Coal Measures Formation-Mudstone, siltstone and sandstone	Westphalian
13	229m E	PF-SDST	Penistone Flags-Sandstone	Westphalian
14	229m NE	PLCM-MDSS	Pennine Lower Coal Measures Formation-Mudstone, siltstone and sandstone	Westphalian
16	256m SW	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone and siltstone	Westphalian
17	330m S	PF-SDST	Penistone Flags-Sandstone	Westphalian
18	336m NE	PF-SDST	Penistone Flags-Sandstone	Westphalian
19	377m NE	PF-SDST	Penistone Flags-Sandstone	Westphalian
21	379m E	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone and siltstone	Westphalian
22	391m N	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone and siltstone	Westphalian
23	419m S	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone and siltstone	Westphalian
24	424m SW	PLCM-MDSI	Pennine Lower Coal Measures Formation-Mudstone and siltstone	Westphalian
26	472m NE	PLCM-MDSS	Pennine Lower Coal Measures Formation-Mudstone, siltstone and sandstone	Westphalian
27	485m N	PF-SDST	Penistone Flags-Sandstone	Westphalian

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	3

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**Moderate**	**Low**
On site	**Fracture**	**High**	**Moderate**
7m SW	Fracture	Moderate	Low

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	7

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 77 >**

ID	Location	Category	Description
5	85m SW	ROCK	Coal seam, inferred
9	168m NE	ROCK	Coal seam, inferred
11	184m E	FAULT	Fault, inferred, crossmark on downthrow side, throw in metres
15	229m E	ROCK	Coal seam, inferred
20	377m NE	ROCK	Coal seam, inferred
25	424m SW	ROCK	Coal seam, inferred
28	485m N	ROCK	Coal seam, inferred

This data is sourced from the British Geological Survey.

16 Boreholes

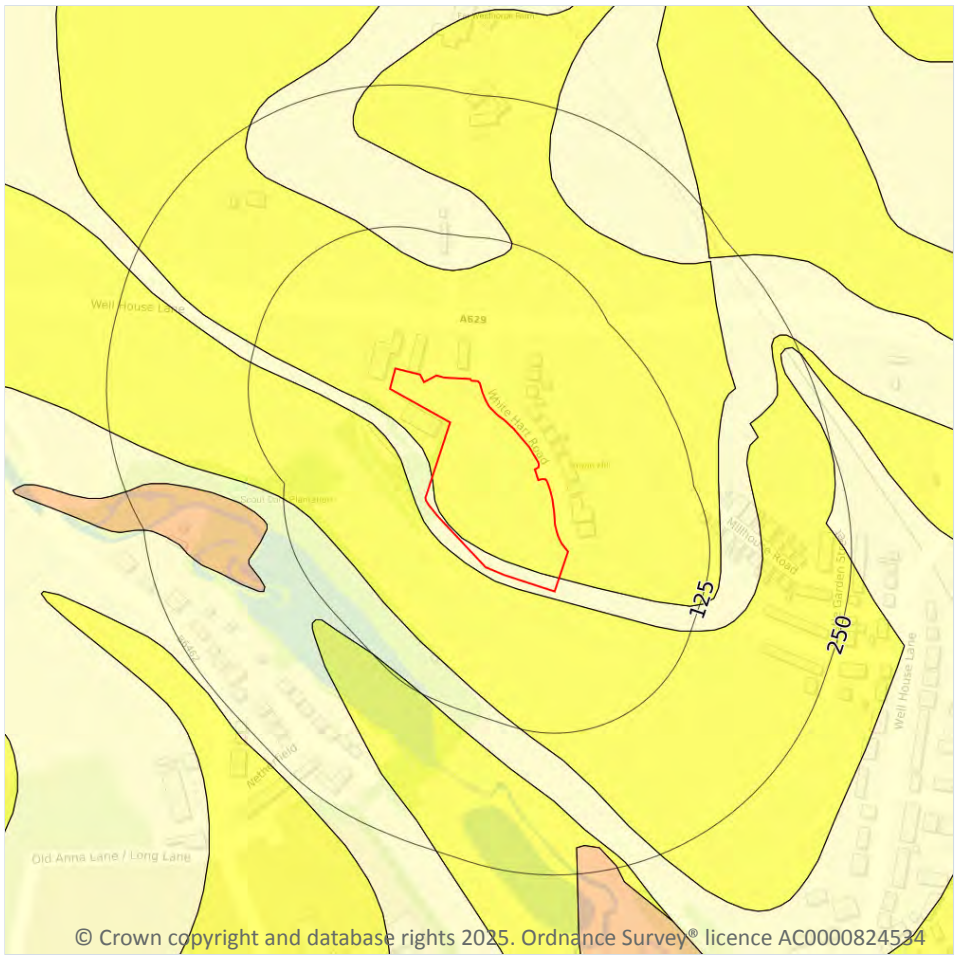
16.1 BGS Boreholes

Records within 250m	**0**

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	3

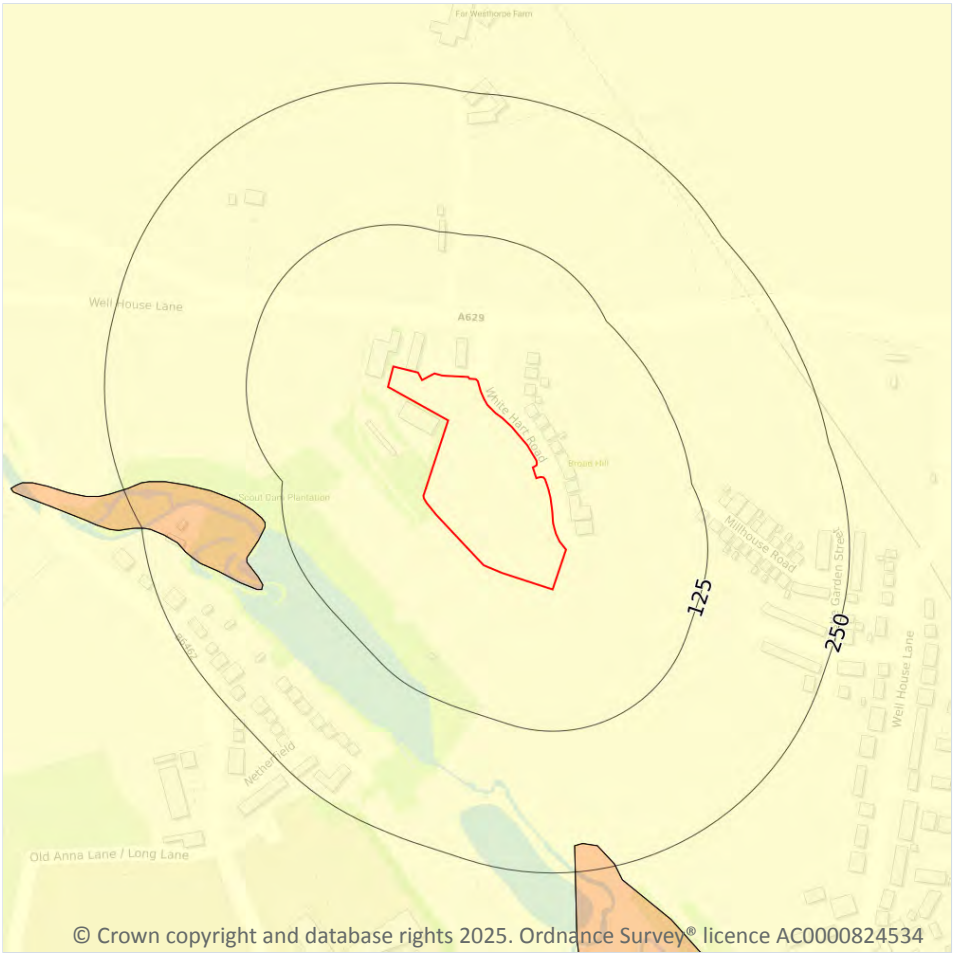
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 81 >**

Location	Hazard rating	Details
On site	**Negligible**	**Ground conditions predominantly non-plastic.**
On site	**Very low**	**Ground conditions predominantly low plasticity.**
7m SW	Very low	Ground conditions predominantly low plasticity.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	1

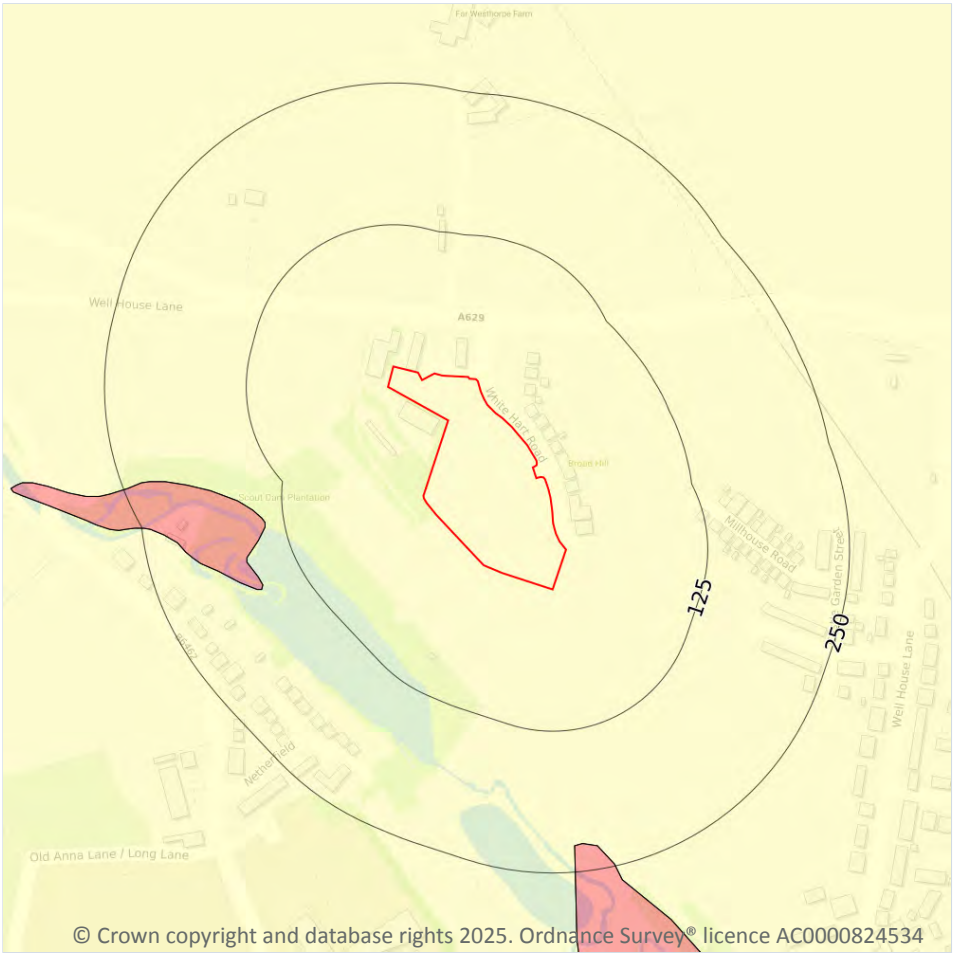
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 83 >**

Location	Hazard rating	Details
On site	**Negligible**	**Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



17.3 Compressible deposits

Records within 50m	1

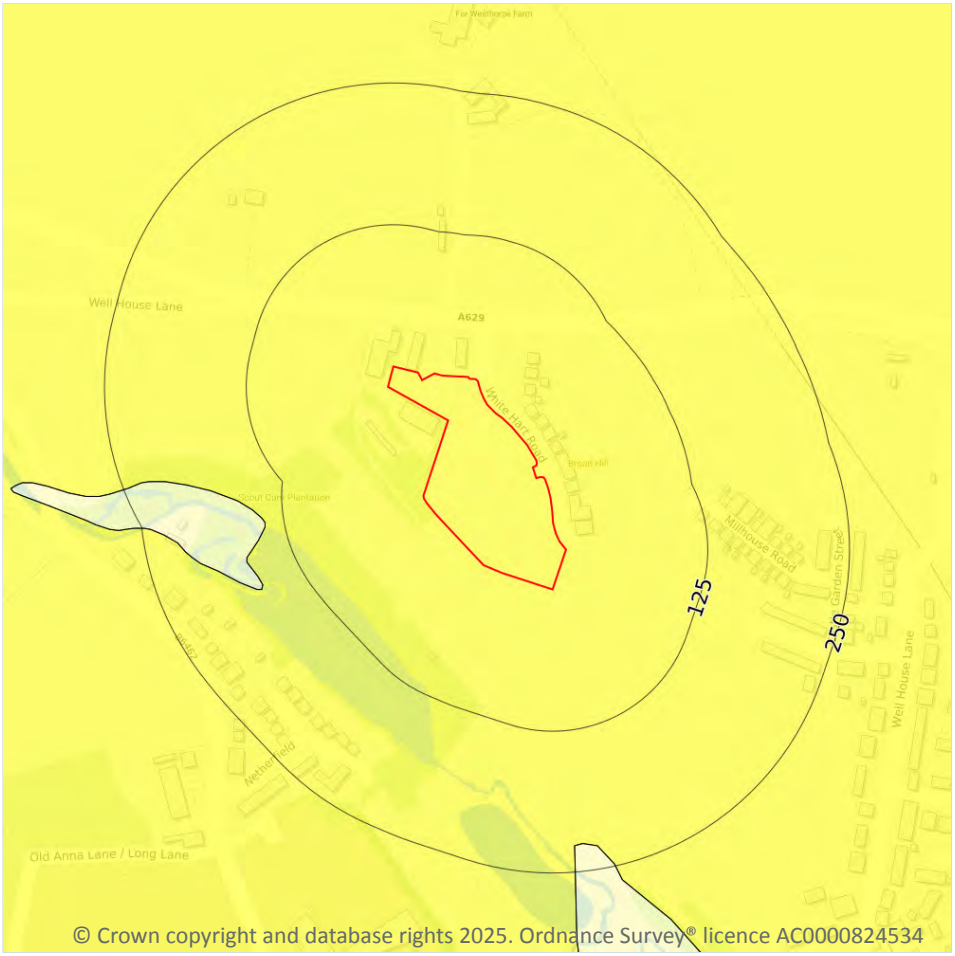
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 84 >**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	1

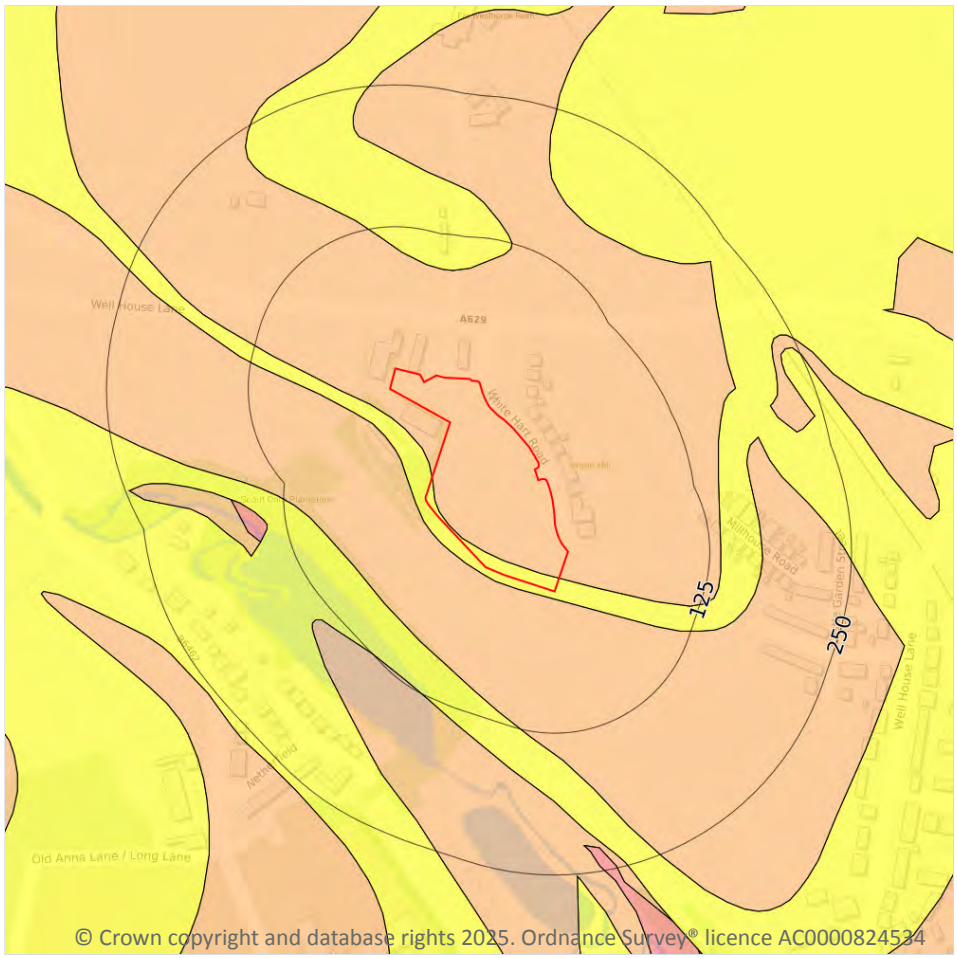
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 85 >**

Location	Hazard rating	Details
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	3

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

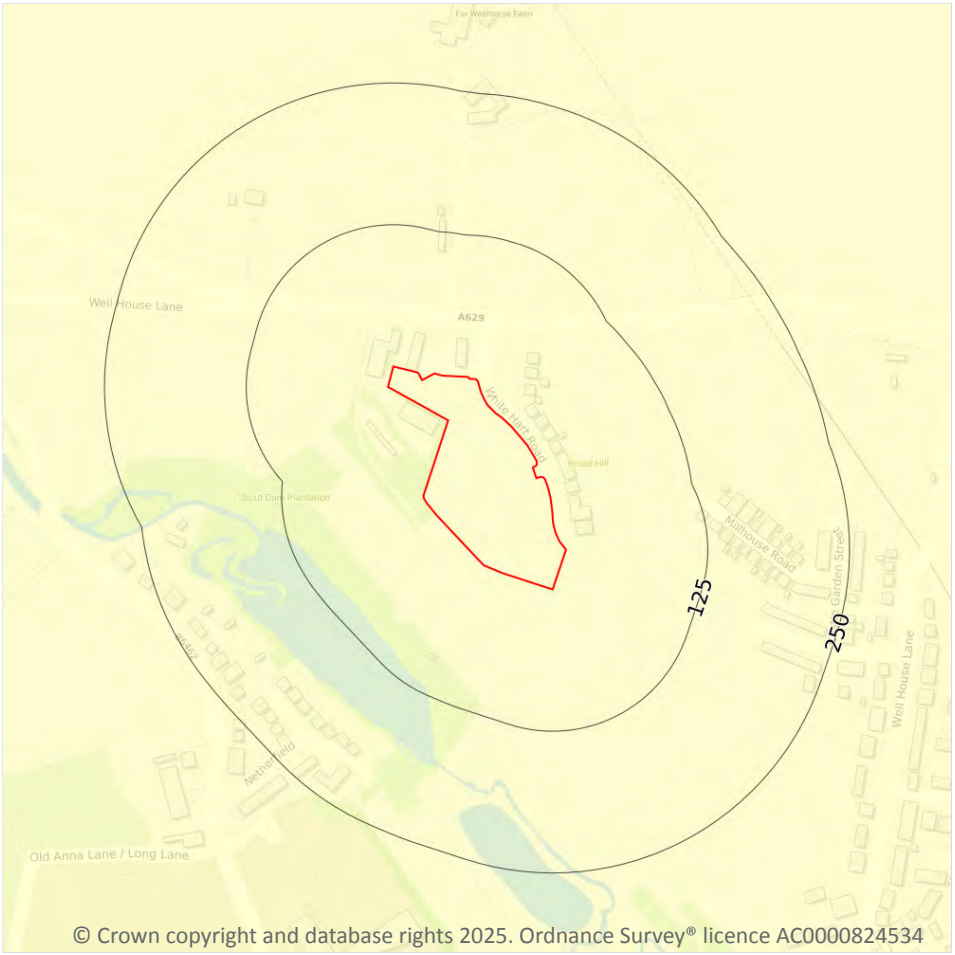
Features are displayed on the Natural ground subsidence - Landslides map on **page 86 >**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

Location	Hazard rating	Details
On site	**Low**	**Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.**
7m SW	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



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Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

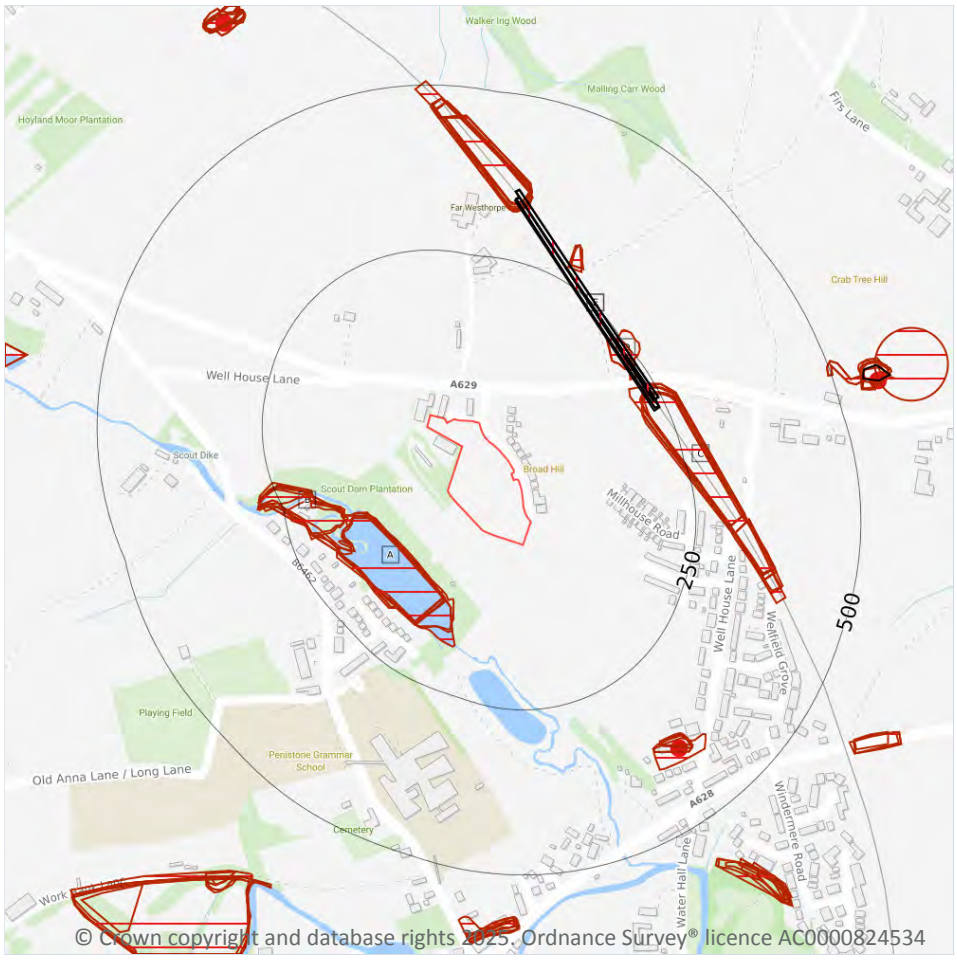
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 88 >**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining and ground workings



Site Outline

Search buffers in metres (m)

BritPits

Surface ground workings

Underground workings

Underground mining extents

Historical mineral planning areas

TCA non-coal mining

Non Coal Mining

Sporadic underground mining of restricted extent possible

Localised small scale underground mining possible

Small scale mining possible

Underground mining known or likely within or in close proximity

Underground mining known within or in very close proximity

18.1 BritPits

Records within 500m	1

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining and ground workings map on **page 90 >**

ID	Location	Details	Description
I	388m SE	Name: Broad Hill Address: PENISTONE, South Yorkshire Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Delf, Delph, Gravel Pit, Sand Pit, Sand and Gravel Pit, Clay Pit, Pit, Opencast Coal Site or Surface Mine. It may be mapped as Worked Ground or Worked and Made Ground on BGS mapping. Status description: Site which has ceased to extract minerals. May be considered as 'Closed' by operator. May be considered to have 'Active', 'Dormant' or 'Expired' planning permissions by the Mineral Planning Authority.

This data is sourced from the British Geological Survey.

18.2 Surface ground workings

Records within 250m **24**

Historical land uses identified from Ordnance Survey® mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining and ground workings map on **page 90 >**

ID	Location	Land Use	Year of mapping	Mapping scale
A	104m SW	Water Body	1850	1:10560
A	106m SW	Ponds	1951	1:10560
A	107m SW	Water Body	1938	1:10560
A	108m SW	Ponds	1987	1:10000
A	108m SW	Ponds	1967	1:10560
A	109m SW	Water Bodies	1948	1:10560
A	109m SW	Water Bodies	1903	1:10560
A	109m SW	Water Body	1929	1:10560
A	111m SW	Water Body	1891	1:10560
B	161m W	Ponds	1929	1:10560
B	162m W	Ponds	1891	1:10560
B	203m SW	Pond	1938	1:10560
C	208m NE	Cuttings	1929	1:10560
C	212m NE	Cuttings	1891	1:10560
C	213m NE	Cuttings	1948	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
C	213m NE	Cuttings	1903	1:10560
C	217m NE	Cuttings	1938	1:10560
D	218m NE	Unspecified Heap	1938	1:10560
D	218m NE	Unspecified Heap	1938	1:10560
C	218m NE	Cuttings	1987	1:10000
C	218m NE	Cuttings	1951	1:10560
C	218m NE	Cuttings	1967	1:10560
C	221m NE	Cuttings	1850	1:10560
D	222m NE	Unspecified Pit	1850	1:10560

This is data is sourced from Ordnance Survey®/Groundsure.

18.3 Underground workings

Records within 1000m	**7**

Historical land uses identified from Ordnance Survey® mapping that indicate the presence of underground workings e.g. mine shafts.

Features are displayed on the Mining and ground workings map on **page 90 >**

ID	Location	Land Use	Year of mapping	Mapping scale
E	227m NE	Tunnel	1891	1:10560
E	229m NE	Tunnel	1948	1:10560
E	229m NE	Tunnel	1903	1:10560
E	234m NE	Tunnel	1987	1:10000
E	234m NE	Tunnel	1967	1:10560
E	234m NE	Tunnel	1951	1:10560
K	544m E	Old Coal Pit	1903	1:10560

This is data is sourced from Ordnance Survey®/Groundsure.

18.4 Underground mining extents

Records within 500m	0

This data identifies underground mine workings that could present a potential risk, including adits and seam workings. These features have been identified from BGS Geological mapping and mine plans sourced from the BGS and various collections and sources.

This data is sourced from Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 JPB mining areas

Records on site	0

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.8 The Coal Authority non-coal mining

Records within 500m	0

This data provides an indication of the potential zone of influence of recorded underground non-coal mining workings. Any and all analysis and interpretation of Coal Authority Data in this report is made by Groundsure, and is in no way supported, endorsed or authorised by the Coal Authority. The use of the data is restricted to the terms and provisions contained in this report. Data reproduced in this report may be the copyright of the

Coal Authority and permission should be sought from Groundsure prior to any re-use.

This data is sourced from The Coal Authority.

18.9 Researched mining

Records within 500m	0

This data indicates areas of potential mining identified from alternative or archival sources, including; BGS Geological paper maps, Lidar data, aerial photographs (from World War II onwards), archaeological data services, websites, Tithe maps, and various text/plans from collected books and reports. Some of this data is approximate and Groundsure have interpreted the resultant risk area and, where possible, specific areas of risk have been captured.

This data is sourced from Groundsure.

18.10 Mining record office plans

Records within 500m	0

This dataset is representative of Mining Record Office and/or plan extents held by Groundsure and should be considered approximate. Where possible, plans have been located and any specific areas of risk they depict have been captured.

This data is sourced from Groundsure.

18.11 BGS mine plans

Records within 500m	0

This dataset is representative of BGS mine plans held by Groundsure and should be considered approximate. Where possible, plans have been located and any specific areas of risk they depict have been captured.

This data is sourced from Groundsure.

18.12 Coal mining

Records on site	1

Areas which could be affected by past, current or future coal mining.

Location	Details
On site	**The site is located within a coal mining area as defined by the Coal Authority. A Consultants Coal Mining Report is recommended to further assess coal mining issues at the site. This can be ordered directly through Groundsure or your preferred search provider.**

This data is sourced from the Coal Authority.

18.13 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.14 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.15 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

18.16 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Ground cavities and sinkholes

19.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

19.2 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

19.3 Reported recent incidents

Records within 500m	0

This data identifies sinkhole information gathered from media reports and Groundsure's own records. This data goes back to 2014 and includes relative accuracy ratings for each event and links to the original data sources. The data is updated on a regular basis and should not be considered a comprehensive catalogue of all sinkhole events. The absence of data in this database does not mean a sinkhole definitely has not occurred during this time.

This data is sourced from Groundsure.

19.4 Historical incidents

Records within 500m	0

This dataset comprises an extract of 1:10,560, 1:10,000, 1:2,500 and 1:1,250 scale historical Ordnance Survey® maps held by Groundsure, dating back to the 1840s. It shows shakeholes, deneholes and other 'holes' as noted on these maps. Dene holes are medieval chalk extraction pits, usually comprising a narrow shaft with a number of chambers at the base of the shaft. Shakeholes are an alternative name for suffusion sinkholes, most commonly found in the limestone landscapes of North Yorkshire but also extensively noted around the Brecon Beacons National Park.

Not all 'holes' noted on Ordnance Survey® mapping will necessarily be present within this dataset.

This data is sourced from Groundsure.

20 Radon



Site Outline

Search buffers in metres (m)

- Greater than 30%
- Between 10% and 30%
- Between 5% and 10%
- Between 3% and 5%
- Between 1% and 3%
- Less than 1%

20.1 Radon

Records on site	1

The Radon Potential data classifies areas based on their likelihood of a property having a radon level at or above the Action Level in Great Britain. The dataset is intended for use at 1:50,000 scale and was derived from both geological assessments and indoor radon measurements (more than 560,000 records). A minimum 50m buffer should be considered when searching the maps, as the smallest detectable feature at this scale is 50m. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain (1:100,000 scale).

Features are displayed on the Radon map on **page 98 >**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None**

This data is sourced from the British Geological Survey and UK Health Security Agency.

21 Soil chemistry

21.1 BGS Estimated Background Soil Chemistry

Records within 50m	4

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
3m SW	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
42m E	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

21.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

21.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

22 Railway infrastructure and projects



Site Outline

Search buffers in metres (m)

- Crossrail 2 Stations
- Crossrail 2 Route
- Crossrail 2 Worksites
- Crossrail 2 Safeguarding
- Crossrail 2 Headhouses
- Railway stations
- Active railways
- Active tunnels
- Abandoned railways
- Historic railways
- Historic tunnels
- Underground stations
- Underground Lines
- Royal Mail tunnels
- HS2 optimised route
- HS2 Stations
- HS2 Depots
- HS2 Surface Safeguarding
- HS2 Subsurface Safeguarding

22.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

22.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

22.3 Railway tunnels

Records within 250m	1

Railway tunnels taken from contemporary Ordnance Survey® mapping.

Features are displayed on the Railway infrastructure and projects map on **page 102 >**

Location	Type
236m NE	Railway Tunnel

This data is sourced from the Ordnance Survey®.

22.4 Historical railway and tunnel features

Records within 250m	12

Railways and tunnels digitised from historical Ordnance Survey® mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 102 >**

Location	Land Use	Year of mapping	Mapping scale
227m NE	Tunnel	1891	10560
229m NE	Tunnel	1948	10560
229m NE	Tunnel	1903	10560
230m NE	Tunnel	1989	2500
231m NE	Tunnel	1992	2500
231m NE	Tunnel	1929	10560
232m NE	Tunnel	1938	10560
232m NE	Tunnel	1960	2500
233m NE	Tunnel	1850	10560
234m NE	Tunnel	1987	10000
234m NE	Tunnel	1967	10560
234m NE	Tunnel	1951	10560

This data is sourced from Ordnance Survey®/Groundsure.

22.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

22.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

22.7 Railways

Records within 250m	3

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

Features are displayed on the Railway infrastructure and projects map on **page 102 >**

Location	Name	Type
238m NE	Well House Tunnel	rail
239m NE	Not given	Single Track
239m NE	Penistone Line	rail

This data is sourced from Ordnance Survey® and OpenStreetMap.

22.8 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

22.9 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference ↗.

Terms and conditions

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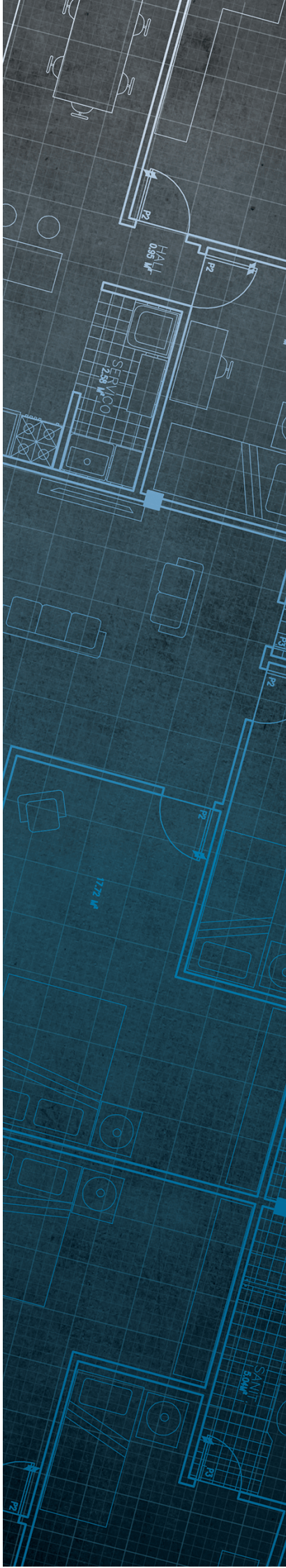
The Coal Authority

Consultants

Coal Mining Report

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Penistone
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S36 8AS

Date of enquiry:	**12 December 2025**
Date enquiry received:	**12 December 2025**
Issue date:	**12 December 2025**
Our reference:	**51003543427001**
Your reference:	**PO25629/5655/DW**



Consultants
Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

LITHOS CONSULTING

Enquiry address

White Hart Road
Penistone
Barnsley
S36 8AS



Approximate position of property

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Section 1 – Mining activity and geology

Past underground mining
No past mining recorded.

Probable unrecorded shallow workings
None.

Spine roadways at shallow depth
No spine roadway recorded at shallow depth.

Mine entries
None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers
None available.

Outcrops
No outcrops recorded.

Geological faults, fissures and breaklines
No faults, fissures or breaklines recorded.

Opencast mines
None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips
None recorded within 500 metres of the enquiry boundary.

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Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

Distance to site investigation (m)	Direction
27.8	South-East

See Section 4 for further information.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

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Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

Coal mining licensing
None recorded within 200 metres of the enquiry boundary.

Court orders
None recorded.

Section 46 notices
No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices
The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land
The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

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Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within 500m of the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

Site investigations

The site is within an area of previous interest. It is close to where the Coal Authority has received information relating to past site investigations.

The site requires further investigation and may influence how you approach your risk assessment.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please email us at reports@miningremediation.gov.uk.

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Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **email us at reports@miningremediation.gov.uk.**

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

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Opencast mines
Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips
Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations
Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites
Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence
Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas
Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded.

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Mine water treatment schemes
Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining
Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing
Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders
Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices
Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices
Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

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Summary of findings

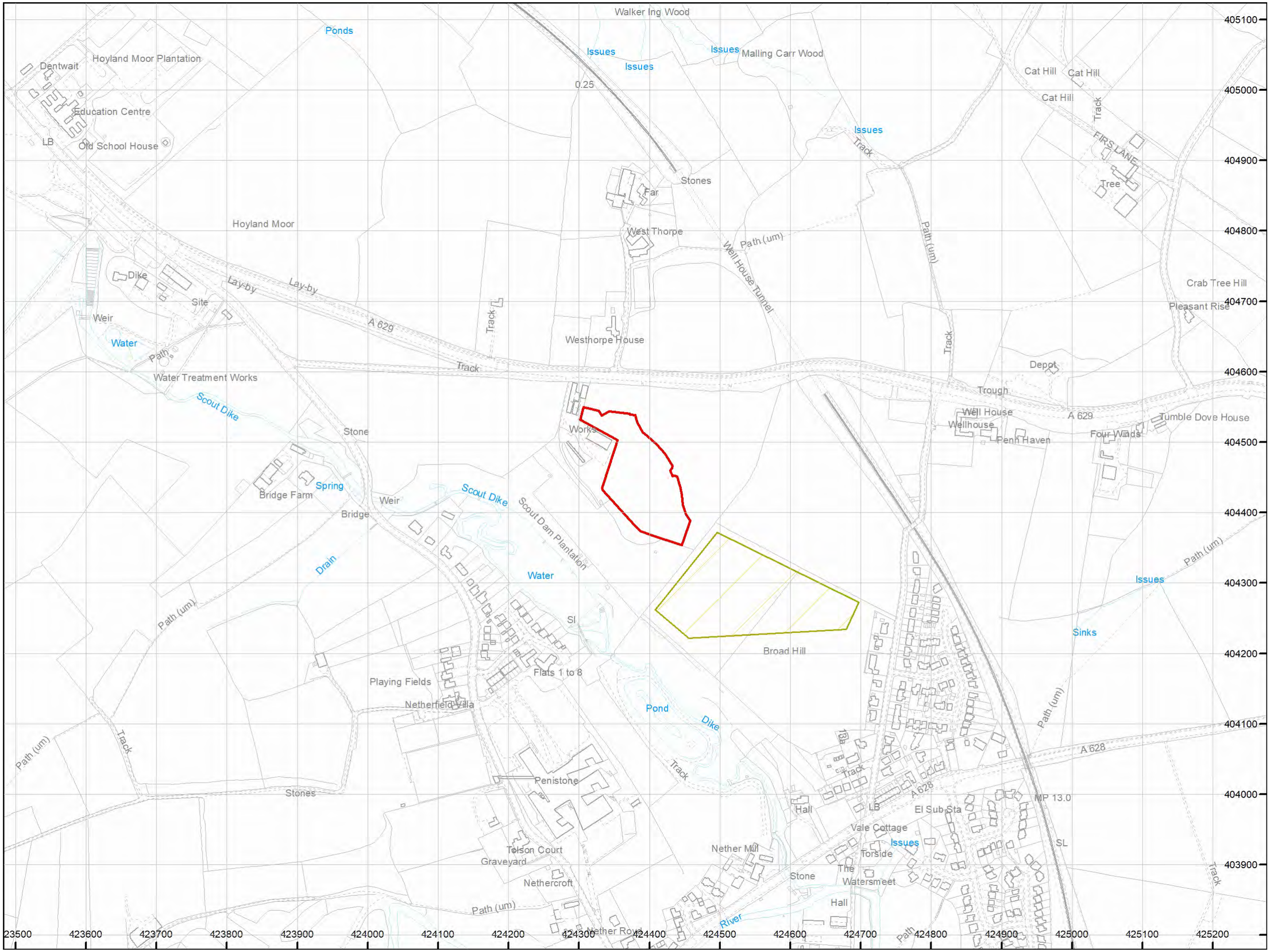
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The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

Approximate position of the enquiry boundary shown

Site investigations



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Appendix F

Trial Pit Logs

LITHOS CONSULTING

Trial Pit Log

TrialPit No: TP01
Sheet 1 of 1

Project Name: White Hart Road	Project No. 5655	Co-ords: 424422.00 - 404369.00 Level:	Date 17/12/2025
Equipment & Method: JCB 3CX with 0.6m wide toothed bucket.		Dimensions (m): 2.50 × 0.60, Depth 1.80	Scale 1:20
Client: Bellway Homes Ltd (Yorkshire)			Logged DW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20	J&T					Dark brown slightly gravelly sandy CLAY with frequent rootlets. Gravel is subangular to subrounded fine to medium of mudstone and sandstone. (TOPSOIL)
	0.50	D		0.40			Yellowish brown slightly clayey sandy tabular angular to subangular fine to coarse GRAVEL of sandstone with rare tabular angular to subangular sandstone cobbles. (GRANULAR RESIDUAL SOIL)
				0.80			Weak to moderately strong yellowish brown SANDSTONE recovered as sandy tabular angular to subangular fine to coarse gravel and tabular angular to subangular cobbles. (PENISTONE FLAGS FORMATION)
				1.10			Very weak to weak brown thinly laminated MUDSTONE recovered as sandy tabular angular to subangular fine to coarse gravel. (PENNINE MIDDLE COAL MEASURES)
				1.80			*At 1.8m, base of pit, no hard bedrock encountered.* End of Pit at 1.80m

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Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. Backfilled with materials arising upon completion. 4. Co-ordinates from hand held GPS, hole not surveyed in.

Stability: 1. The sides of the trial pit remained stable during excavation.

AGS

LITHOS CONSULTING

Trial Pit Log

TrialPit No: TP02
Sheet 1 of 1

Project Name: White Hart Road	Project No. 5655	Co-ords: 424404.00 - 404400.00	Date 17/12/2025
Equipment & Method: JCB 3CX with 0.6m wide toothed bucket.		Dimensions (m): 2.50 x 0.60	Scale 1:20
Client: Bellway Homes Ltd (Yorkshire)		Depth 1.90	Logged DW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	J&T		0.20			Dark greyish brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular to subrounded fine to medium of mudstone. (TOPSOIL)
	0.40	D&B					Firm yellowish brown mottled light grey slightly sandy CLAY. (COHESIVE RESIDUAL SOIL)
	0.50	HSV	HSV=52kPa				*From 0.5m, colour becomes grey mottled orangish brown.*
				0.60			
				0.70			Moderately strong brown SANDSTONE. Recovered as tabular angular to subangular medium to coarse gravel. (PENISTONE FLAGS FORMATION)
	0.80	D					Very stiff grey and orangish brown slightly gravelly thinly laminated CLAY. Gravel is subangular to subrounded fine to medium of mudstone. (COHESIVE RESIDUAL SOIL)
	0.80	HSV	HSV=150kPa				
				1.20			Very weak to weak dark greyish brown mottled orangish brown thinly laminated MUDSTONE recovered as slightly sandy tabular angular to subangular fine to coarse gravel. (PENNINE MIDDLE COAL MEASURES)
				1.80			Weak to moderately weak thinly laminated MUDSTONE recovered as tabular angular to subangular medium to coarse gravel with occasional black staining on bedding surfaces. (PENNINE MIDDLE COAL MEASURES)
				1.90			*At 1.9m, scraping on mudstone bedrock, unable to excavate further.* End of Pit at 1.90m

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Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. Backfilled with materials arising upon completion. 4. Co-ordinates from hand held GPS, hole not surveyed in.

Stability: 1. The sides of the trial pit remained stable during excavation.

AGS

LITHOS CONSULTING

Trial Pit Log

TrialPit No: TP03
Sheet 1 of 1

Project Name: White Hart Road	Project No. 5655	Co-ords: 424358.00 - 404422.00	Date 17/12/2025
Equipment & Method: JCB 3CX with 0.6m wide toothed bucket.		Dimensions (m): 2.50 × 0.60, Depth 1.70	Scale 1:20
Client: Bellway Homes Ltd (Yorkshire)			Logged DW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	J&T					Dark greyish brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular to subrounded fine to medium of mudstone. (TOPSOIL)
	0.20	B		0.20			Firm light brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mudstone. (COHESIVE RESIDUAL SOIL)
	0.50	D&B					
	0.60	HSV	HSV=73kPa				
				0.70			Very weak dark greyish brown thinly laminated MUDSTONE recovered as slightly sandy slightly clayey tab angular to subangular fine to coarse gravel with occasional black staining on bedding surfaces. (PENNINE MIDDLE COAL MEASURES) *From 0.9 to 1.1m, moderately weak band of mudstone, difficulty excavating through.*
				1.60			Moderately weak dark greyish brown thinly laminated MUDSTONE recovered as slightly sandy slightly clayey tab angular to subangular fine to coarse gravel and tabular angular cobbles with occasional black staining on bedding surfaces. (PENNINE MIDDLE COAL MEASURES)
				1.70			*At 1.7m, scraping on mudstone bedrock, unable to excavate further.* End of Pit at 1.70m

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Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. Backfilled with materials arising upon completion. 4. Co-ordinates from hand held GPS, hole not surveyed in.

Stability: 1. The sides of the trial pit remained stable during excavation.

AGS

LITHOS CONSULTING

Trial Pit Log

TrialPit No: TP04
Sheet 1 of 1

Project Name: White Hart Road	Project No. 5655	Co-ords: 424429.00 - 404428.00	Date 17/12/2025
Equipment & Method: JCB 3CX with 0.6m wide toothed bucket.		Dimensions (m): 2.50 x 0.60, Depth 2.50	Scale 1:20
Client: Bellway Homes Ltd (Yorkshire)			Logged DW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	J&T		0.15			Dark greyish brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular to subrounded fine to medium of mudstone. (TOPSOIL)
	0.40 0.40	D HSV	HSV=46kPa				Firm light grey mottled orangish brown slightly gravelly CLAY. Gravel is tabular angular to subangular medium to coarse of mudstone. (COHESIVE RESIDUAL SOIL)
	0.70	HSV	HSV=120kPa	0.60			Very stiff brown mottled grey slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mudstone. (COHESIVE RESIDUAL SOIL)
	1.10	D&B					
▼				1.30			Very weak dark greyish brown thinly laminated MUDSTONE recovered as slightly sandy clayey tab angular to subangular fine to coarse gravel with occasional black staining on bedding surfaces. (PENNINE MIDDLE COAL MEASURES)
							At 1.4m, slight groundwater seepage from the top of the mudstone bedrock.
							From 1.8m, rare tabular angular cobbles of mudstone recovered.
				2.40			Moderately weak dark greyish brown thinly laminated MUDSTONE recovered as slightly sandy clayey tab angular to subangular fine to coarse gravel and tabular angular cobbles with occasional black staining on bedding surfaces. (PENNINE MIDDLE COAL MEASURES)
				2.50			*At 2.5m, scraping on mudstone bedrock, unable to excavate further.*
							End of Pit at 2.50m

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Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater encountered at 1.4m during excavation. 3. Backfilled with materials arising upon completion. 4. Co-ordinates from hand held GPS, hole not surveyed in.

Stability: 1. The sides of the trial pit remained stable during excavation.

AGS

LITHOS CONSULTING

Trial Pit Log

TrialPit No: TP05
Sheet 1 of 1

Project Name: White Hart Road	Project No. 5655	Co-ords: 424392.00 - 404447.00 Level:	Date 17/12/2025
Equipment & Method: JCB 3CX with 0.6m wide toothed bucket.		Dimensions (m): 2.50 × 0.60 Depth 2.50	Scale 1:20
Client: Bellway Homes Ltd (Yorkshire)			Logged DW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	J&T		0.20			Dark greyish brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular to subrounded fine to medium of mudstone. (TOPSOIL)
	0.30	D&B		0.40			Soft light grey mottled orangish brown slightly gravelly very sandy CLAY. Gravel is subangular to subrounded fine to medium of mudstone. (COHESIVE RESIDUAL SOIL)
	0.60 0.60	D&B HSV	HSV=41kPa	0.70			Soft yellowish brown mottled orangish brown slightly gravelly very sandy CLAY. Gravel is subangular to subrounded fine to coarse of mudstone. (COHESIVE RESIDUAL SOIL)
							Very weak dark greyish brown thinly laminated MUDSTONE recovered as slightly sandy clayey tab angular to subangular fine to coarse gravel with occasional black staining on bedding surfaces. (PENNINE MIDDLE COAL MEASURES)
							From 1.2m, rare cobble sized pockets of stiff clay.
				2.50			*At 2.5m, base of pit, no hard bedrock encountered.* End of Pit at 2.50m

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Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. Backfilled with materials arising upon completion. 4. Co-ordinates from hand held GPS, hole not surveyed in.

Stability: 1. The sides of the trial pit remained stable during excavation.

AGS

LITHOS CONSULTING

Trial Pit Log

TrialPit No: TP06
Sheet 1 of 1

Project Name: White Hart Road	Project No. 5655	Co-ords: 424358.00 - 404460.00	Date 17/12/2025
Equipment & Method: JCB 3CX with 0.6m wide toothed bucket.		Dimensions (m): 2.50 x 0.60, Depth 1.10	Scale 1:20
Client: Bellway Homes Ltd (Yorkshire)			Logged DW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	J&T					Dark brown slightly gravelly sandy CLAY with frequent rootlets. Gravel is subangular to subrounded fine to medium of mudstone and sandstone. (TOPSOIL)
	0.30	B					
				0.40			
	0.50	D		0.50			Firm yellowish brown mottled grey slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of mudstone. (COHESIVE RESIDUAL SOIL)
	0.60	HSV	HSV=81kPa	0.60			Stiff grey mottled orangish brown slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse of mudstone. (COHESIVE RESIDUAL SOIL)
	0.80	B					Very weak light grey thinly laminated MUDSTONE recovered as slightly sandy clayey tab angular to subangular fine to coarse gravel. (PENNINE MIDDLE COAL MEASURES)
				1.00			
				1.10			Moderately weak light grey thinly laminated MUDSTONE recovered as tabular angular to subangular fine to coarse gravel and tabular angular cobbles. (PENNINE MIDDLE COAL MEASURES)
							At 1.1m, scraping on mudstone bedrock, unable to excavate further.
							End of Pit at 1.10m

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Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. Backfilled with materials arising upon completion. 4. Co-ordinates from hand held GPS, hole not surveyed in.

Stability: 1. The sides of the trial pit remained stable during excavation.

AGS

LITHOS CONSULTING

Trial Pit Log

TrialPit No: TP07
Sheet 1 of 1

Project Name: White Hart Road	Project No. 5655	Co-ords: 424416.00 - 404470.00	Date 17/12/2025
Equipment & Method: JCB 3CX with 0.6m wide toothed bucket.		Dimensions (m): 2.50 x 0.60 Depth 1.10	Scale 1:20
Client: Bellway Homes Ltd (Yorkshire)			Logged DW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	J&T					Dark greyish brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular to subrounded fine to medium of mudstone. (TOPSOIL)
				0.30			
	0.40	D					Very weak light grey thinly laminated MUDSTONE recovered as slightly sandy clayey tab angular to subangular fine to coarse gravel. (PENNINE MIDDLE COAL MEASURES)
				0.50			Weak to moderately weak light grey and brown thinly laminated MUDSTONE recovered as tabular angular to subangular fine to coarse gravel and tabular angular cobbles and boulders with occasional black staining on bedding surfaces. (PENNINE MIDDLE COAL MEASURES)
							From 0.6 to 0.8m, moderately weak band of mudstone, difficulty excavating through
							At 1.1m, scraping on mudstone bedrock, unable to excavate further.
				1.10			End of Pit at 1.10m

Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. Backfilled with materials arising upon completion. 4. Co-ordinates from hand held GPS, hole not surveyed in.

Stability: 1. The sides of the trial pit remained stable during excavation.

AGS

LITHOS CONSULTING

Trial Pit Log

TrialPit No: TP08
Sheet 1 of 1

Project Name: White Hart Road	Project No. 5655	Co-ords: 424377.00 - 404488.00	Date 17/12/2025
Equipment & Method: JCB 3CX with 0.6m wide toothed bucket.		Dimensions (m): 2.50 x 0.60 Depth 1.10	Scale 1:20
Client: Bellway Homes Ltd (Yorkshire)			Logged DW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	J&T					Dark greyish brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular to subrounded fine to medium of mudstone. (TOPSOIL)
	0.20	B		0.30			Firm yellowish brown slightly sandy very gravelly CLAY with rare tabular angular mudstone cobbles. Gravel is tabular angular to subangular fine to coarse of mudstone. (COHESIVE RESIDUAL SOIL)
				0.60			Firm grey mottled orangish brown slightly sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of mudstone. (COHESIVE RESIDUAL SOIL)
	0.80	HSV	HSV=98kPa				
	0.90	D&B		1.00			Moderately weak light grey and brown thinly laminated MUDSTONE recovered as tabular angular to subangular fine to coarse gravel and tabular angular cobbles and boulders with occasional black staining on bedding surfaces. (PENNINE MIDDLE COAL MEASURES)
				1.10			*At 1.1m, scraping on mudstone bedrock, unable to excavate further.* End of Pit at 1.10m

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Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. Backfilled with materials arising upon completion. 4. Co-ordinates from hand held GPS, hole not surveyed in.

Stability: 1. The sides of the trial pit remained stable during excavation.

AGS

LITHOS CONSULTING

Trial Pit Log

TrialPit No: TP09
Sheet 1 of 1

Project Name: White Hart Road	Project No. 5655	Co-ords: 424369.00 - 404517.00 Level:	Date 17/12/2025
Equipment & Method: JCB 3CX with 0.6m wide toothed bucket.		Dimensions (m): 2.50 x 0.60 Depth 1.50	Scale 1:20
Client: Bellway Homes Ltd (Yorkshire)			Logged DW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	J&T		0.20			Dark greyish brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular to subrounded fine to medium of mudstone. (TOPSOIL)
				0.70			Firm orangish brown slightly sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of mudstone. (COHESIVE RESIDUAL SOIL)
	1.00	D		1.30			Very weak grey mottled light brown thinly laminated MUDSTONE recovered as clayey tabular angular to subangular fine to coarse gravel. (PENNINE MIDDLE COAL MEASURES)
				1.50			Weak to moderately weak grey mottled light brown thinly laminated MUDSTONE recovered as clayey tabular angular to subangular fine to coarse gravel and tabular angular cobbles and boulders with rare black staining on bedding surfaces. (PENNINE MIDDLE COAL MEASURES) *At 1.5m, scraping on mudstone bedrock, unable to excavate further.* End of Pit at 1.50m

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Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. Backfilled with materials arising upon completion. 4. Co-ordinates from hand held GPS, hole not surveyed in.

Stability: 1. The sides of the trial pit remained stable during excavation.

AGS

LITHOS CONSULTING

Trial Pit Log

TrialPit No: TP10
Sheet 1 of 1

Project Name: White Hart Road	Project No. 5655	Co-ords: 424325.00 - 404530.00	Date 17/12/2025
Equipment & Method: JCB 3CX with 0.6m wide toothed bucket.		Dimensions (m): 2.50 x 0.60, Depth 1.10	Scale 1:20
Client: Bellway Homes Ltd (Yorkshire)			Logged DW

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	J&T					Dark greyish brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is subangular to subrounded fine to medium of mudstone. (TOPSOIL)
	0.20	B		0.20			Firm light grey mottled yellowish brown slightly gravelly slightly sandy CLAY. Gravel is tabular angular to subangular fine to coarse of mudstone. (COHESIVE RESIDUAL SOIL)
	0.40 0.40	D&B HSV	HSV=70kPa	0.50			Very weak grey mottled light brown thinly laminated MUDSTONE recovered as clayey tabular angular to subangular fine to coarse gravel. (PENNINE MIDDLE COAL MEASURES)
	0.80	D					
▼				1.00			Weak to moderately weak grey mottled light brown thinly laminated MUDSTONE recovered as clayey tabular angular to subangular fine to coarse gravel and tabular angular cobbles and boulders with rare black staining on bedding surfaces. (PENNINE MIDDLE COAL MEASURES)
				1.10			*At 1.0m, slight groundwater seepage.* *At 1.1m, scraping on mudstone bedrock, unable to excavate further.* End of Pit at 1.10m

1 2 3 4

Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater encountered at 1.0m during excavation. 3. Backfilled with materials arising upon completion. 4. Co-ordinates from hand held GPS, hole not surveyed in.

Stability: 1. The sides of the trial pit remained stable during excavation.

AGS

Appendix G

Chemical Results

Certificate of Analysis

Certificate Number	25-29756
Issued:	

Client Lithos Consulting Ltd
Parkhill
Walton Rd
Wetherby
LS22 5DZ

Our Reference	25-29756
Client Reference ~	5655
Order No ~	PO25653
Contract Title ~	White Hart Road, Penistone
Description	10 Soil samples.
Date Received	19-Dec-25
Date Started	19-Dec-25
Date Completed	07-Jan-26
Test Procedures	Identified by prefix DETSn (details on request).

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

Approved By

Louise Cook
Contracts Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 25-29756
Client Ref ~ 5655
Contract Title ~ White Hart Road, Penistone

	Lab No	2618222	2618223	2618224	2618225	2618226	2618227
	Sample ID ~	TP01	TP02	TP03	TP04	TP05	TP06
	Depth ~	0.20	0.10	0.10	0.10	0.10	0.10
	Other ID ~	1	1	1	1	1	1
	Sample Type ~	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampling Date ~	17/12/2025	17/12/2025	17/12/2025	17/12/2025	17/12/2025	17/12/2025
	Sampling Time ~	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Preparation							
Stones >10mm	DETSC 1003*	1	% m/m	12	11	< 1.0	20	< 1.0	8.0
Moisture Content	DETSC 1004	0.1	%	17	20	20	20	24	18
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	10	7.4	12	12	13	11
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.4	0.6	0.5	0.3	0.5	0.3
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.2	0.3	0.2	0.3	0.2
Chromium	DETSC 2301#	0.15	mg/kg	23	16	27	24	24	22
Chromium III	DETSC 2301*	0.15	mg/kg	23	16	27	24	24	22
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	21	14	24	21	25	23
Lead	DETSC 2301#	0.3	mg/kg	39	27	48	46	52	44
Mercury	DETSC 2325#	0.05	mg/kg	0.08	< 0.05	0.07	0.07	0.08	0.07
Nickel	DETSC 2301#	1	mg/kg	14	11	17	16	15	17
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.6	< 0.5	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	31	22	40	39	41	34
Zinc	DETSC 2301#	1	mg/kg	66	49	86	75	77	76
Inorganics							
pH	DETSC 2008#		pH	7.0	7.6	7.2	7.3	6.9	7.7
Total Organic Carbon	DETSC 2084#	0.5	%	3.1	2.7	3.5	2.6	3.2	2.6
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.04	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	0.04	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Summary of Chemical Analysis
Soil Samples

Our Ref 25-29756
Client Ref ~ 5655
Contract Title ~ White Hart Road, Penistone

	Lab No	2618228	2618229	2618230	2618231
	Sample ID ~	TP07	TP08	TP09	TP10
	Depth ~	0.10	0.10	0.10	0.10
	Other ID ~	1	1	1	1
	Sample Type ~	SOIL	SOIL	SOIL	SOIL
	Sampling Date ~	17/12/2025	17/12/2025	17/12/2025	17/12/2025
	Sampling Time ~	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
Stones >10mm	DETSC 1003*	1	% m/m	< 1.0	< 1.0	< 1.0	< 1.0
Moisture Content	DETSC 1004	0.1	%	18	21	20	23
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	12	14	12	12
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.4	0.6	0.4	0.6
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.3	0.2	0.2
Chromium	DETSC 2301#	0.15	mg/kg	32	26	25	22
Chromium III	DETSC 2301*	0.15	mg/kg	32	26	25	22
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	32	30	25	25
Lead	DETSC 2301#	0.3	mg/kg	52	57	46	52
Mercury	DETSC 2325#	0.05	mg/kg	0.11	0.15	0.09	0.26
Nickel	DETSC 2301#	1	mg/kg	18	17	16	12
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Vanadium	DETSC 2301#	0.8	mg/kg	42	44	44	43
Zinc	DETSC 2301#	1	mg/kg	92	87	82	66
Inorganics					
pH	DETSC 2008#		pH	8.0	7.1	7.0	7.2
Total Organic Carbon	DETSC 2084#	0.5	%	4.3	4.3	3.2	4.9
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	0.04	0.04	0.04
Pyrene	DETSC 3303#	0.03	mg/kg	0.04	0.04	0.03	0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10

Summary of Asbestos Analysis
Soil Samples

Our Ref 25-29756
Client Ref ~ 5655
Contract Title ~ White Hart Road, Penistone

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2618222	TP01 1 0.20	SOIL	NAD	none	Lee Kerridge
2618223	TP02 1 0.10	SOIL	NAD	none	Lee Kerridge
2618224	TP03 1 0.10	SOIL	NAD	none	Lee Kerridge
2618225	TP04 1 0.10	SOIL	NAD	none	Lee Kerridge
2618226	TP05 1 0.10	SOIL	NAD	none	Lee Kerridge
2618227	TP06 1 0.10	SOIL	NAD	none	Lee Kerridge
2618228	TP07 1 0.10	SOIL	NAD	none	Lee Kerridge
2618229	TP08 1 0.10	SOIL	NAD	none	Lee Kerridge
2618230	TP09 1 0.10	SOIL	NAD	none	Lee Kerridge
2618231	TP10 1 0.10	SOIL	NAD	none	Lee Kerridge

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

Information in Support of the Analytical Results

Our Ref 25-29756
Client Ref ~ 5655
Contract ~ White Hart Road, Penistone

Containers Received & Deviating Samples

Lab No	Sample ID ~	Date Sampled ~	Containers Received	Holding time exceeded for tests	Incorrect container for tests
2618222	TP01 0.20 SOIL	17/12/25	GJ 250ml, PT 1L		
2618223	TP02 0.10 SOIL	17/12/25	GJ 250ml, PT 1L		
2618224	TP03 0.10 SOIL	17/12/25	GJ 250ml, PT 1L		
2618225	TP04 0.10 SOIL	17/12/25	GJ 250ml, PT 1L		
2618226	TP05 0.10 SOIL	17/12/25	GJ 250ml, PT 1L		
2618227	TP06 0.10 SOIL	17/12/25	GJ 250ml, PT 1L		
2618228	TP07 0.10 SOIL	17/12/25	GJ 250ml, PT 1L		
2618229	TP08 0.10 SOIL	17/12/25	GJ 250ml, PT 1L		
2618230	TP09 0.10 SOIL	17/12/25	GJ 250ml, PT 1L		
2618231	TP10 0.10 SOIL	17/12/25	GJ 250ml, PT 1L		

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

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 250µm sieve
Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Key:
~ Sample details are provided by the client and can affect the validity of the results
***** -not accredited.
# -MCERTS (accreditation only applies if report carries the MCERTS logo).
$ -subcontracted.
n/s -not supplied.
I/S -insufficient sample.
U/S -unsuitable sample.
t/f -to follow.
nd -not detected.

End of Report Ver 25.10.03

Appendix H

Geotechnical Test Results

LABORATORY REPORT

Contract Number: PSL26/0013

Report Date: 21 January 2026

Client's Reference: 5655

Client Name: Lithos Consulting
Parkhill
Walton Road
Wetherby
North Yorkshire
LS22 5DZ

For the attention of: Dan Williams

Contract Title: White Hart Road

Date Received: 19/12/2025
Date Commenced: 19/12/2025
Date Completed: 21/1/2026

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins (Managing Director)	R Berriman (Associate Director)	S Royle (Laboratory Manager)
L Knight (Assistant Laboratory Manager)	S Eyre (Senior Technician)	T Watkins (Senior Technician)

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

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP02	3	D	0.80		Brown slightly sandy CLAY.
TP04	2	D	0.40		Brown mottled grey slightly sandy CLAY.
TP06	3	D	0.50		Brown mottled grey slightly sandy CLAY.
TP02	2	D&B	0.40		Brown mottled grey slightly sandy CLAY.
TP03	3	D&B	0.50		Brown slightly sandy slightly gravelly CLAY.
TP04	3	D&B	1.10		Brown mottled grey slightly sandy CLAY.
TP05	2	D&B	0.30		Brown slightly sandy slightly gravelly CLAY.
TP05	3	D&B	0.60		Brown mottled grey slightly sandy slightly gravelly CLAY.
TP08	3	D&B	0.90		Brown mottled grey slightly gravelly silty CLAY.
TP10	3	D&B	0.40		Brown mottled grey slightly sandy CLAY.
TP06	4	B	0.80		Brown mottled grey slightly sandy gravelly CLAY.
TP06	2	B	0.30		Brown TOPSOIL.
TP08	2	B	0.20		Brown TOPSOIL.
TP10	2	B	0.20		Brown TOPSOIL.

UKAS TESTING 4043

PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY

White Hart Road

Contract No:

PSL26/0013

Client Ref:

5655

SUMMARY OF SOIL CLASSIFICATION TESTS

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

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Water Content %	Linear Shrinkage	Particle Density Mg/m^3	Liquid Limit %	Plastic Limit %	Plasticity Index %	Passing 0.425mm %	Remarks
TP02	3	D	0.80		18.5			49	25	24	100	Medium Plasticity CIM
TP04	2	D	0.40		22.6			57	26	31	100	High Plasticity CIH
TP06	3	D	0.50		20.4			41	22	19	100	Medium Plasticity CIM
TP02	2	D&B	0.40		24.9			60	27	33	100	High Plasticity CIH
TP03	3	D&B	0.50		21.5			47	23	24	75	Medium Plasticity CIM
TP04	3	D&B	1.10		20.8			51	24	27	91	High Plasticity CIH
TP05	2	D&B	0.30		19.5			44	23	21	95	Medium Plasticity CIM
TP05	3	D&B	0.60		24.8			40	21	19	93	Medium Plasticity CIM
TP08	3	D&B	0.90		13.7			36	19	17	96	Medium Plasticity CIM
TP10	3	D&B	0.40		26.4			54	25	29	100	High Plasticity CIH

Water Content - BS 1377 - Part 2 : 2022 : Clause 4 in accordance with BS EN ISO 17892 - 1 : 2014 + A1 : 2022
Linear Shrinkage - BS 1377 - Part 2 : 2022 : Clause 7
Particle Density (Gas Jar method) - BS 1377 - Part 2 : 2022 : Clause 9
Liquid, Plastic Limit & Plasticity Index - BS 1377 - Part 2 : 2022 : Clause 5 & 6 in accordance with BS EN ISO 17892 - 12 : 2018 + A2 : 2022

SYMBOLS : NP = Non Plastic

UKAS TESTING 4043

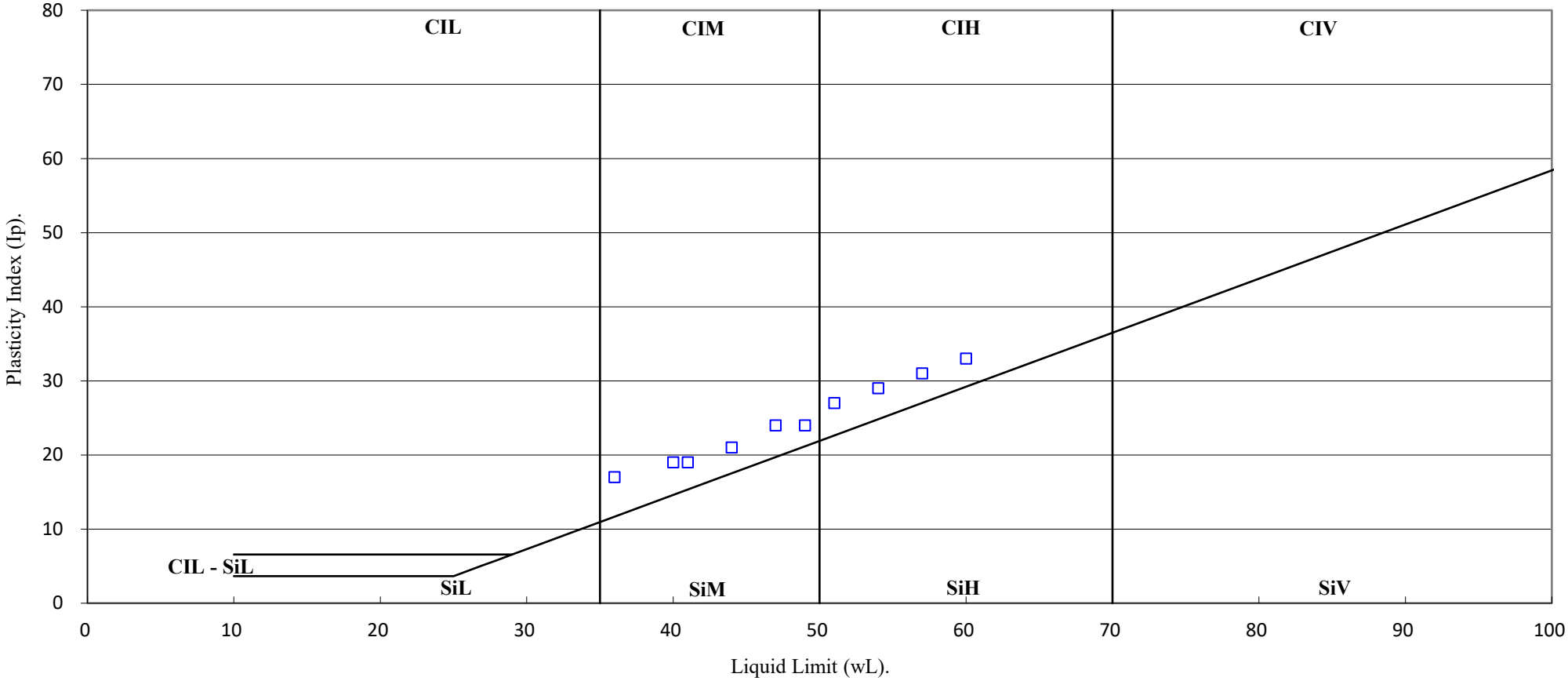
PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY

White Hart Road

Contract No:
PSL26/0013
Client Ref:
5655

PLASTICITY CHART

BS EN ISO 14688-2:2017 Clause 4.4



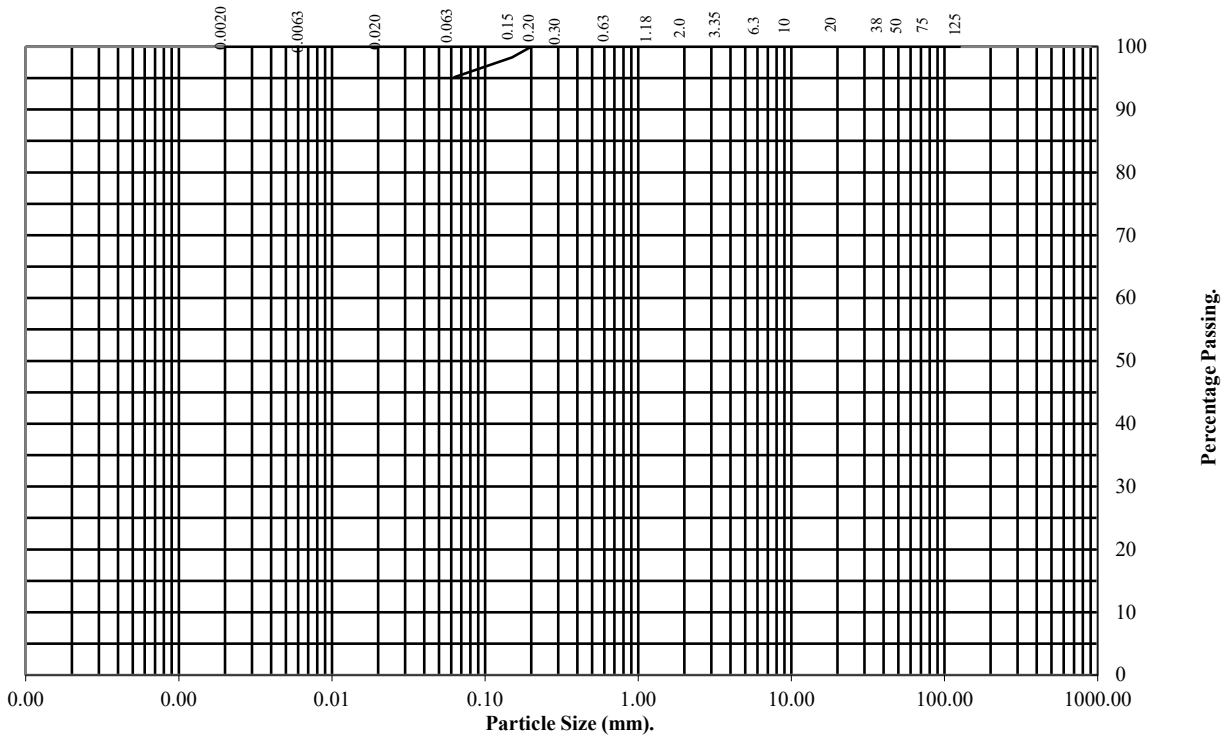
UKAS TESTING 4043 / PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY	**White Hart Road**	**Contract No:**
		PSL26/0013
		Client Ref:
		5655

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 - Part 2 : 2022 : Clause 10 in accordance with BS EN ISO 17892 - 4 : 2016

Sieve Method, Clause 5.2

Hole Number:	**TP02**	**Top Depth (m):**	**0.40**
Sample Number:	**2**	**Base Depth (m):**	
Sample Type:	**D&B**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
50	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.63	100
0.3	100
0.2	100
0.15	98
0.063	95

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	5
Silt/Clay	95

Remarks:

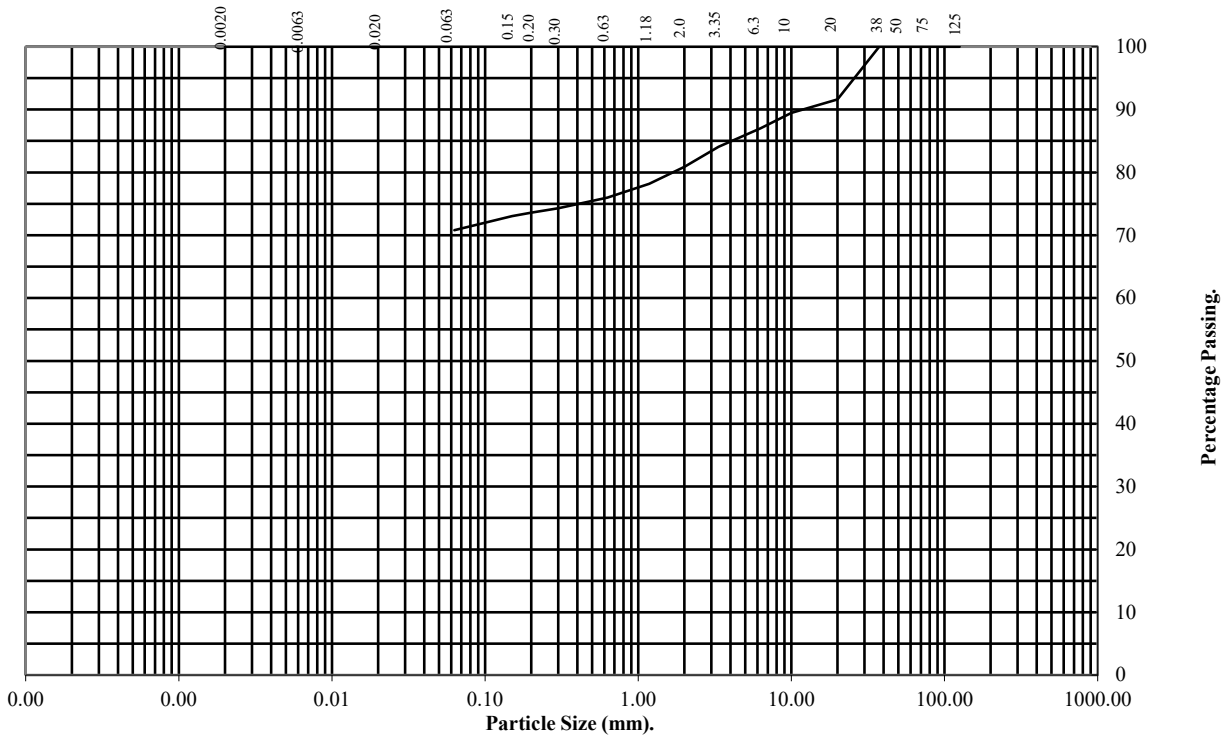
See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 - Part 2 : 2022 : Clause 10 in accordance with BS EN ISO 17892 - 4 : 2016

Sieve Method, Clause 5.2

Hole Number:	**TP03**	**Top Depth (m):**	**0.50**
Sample Number:	**3**	**Base Depth (m):**	
Sample Type:	**D&B**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
50	100
37.5	100
20	92
10	89
6.3	87
3.35	84
2	81
1.18	78
0.63	76
0.3	74
0.2	74
0.15	73
0.063	71

Soil Fraction	Total Percentage
Cobbles	0
Gravel	19
Sand	10
Silt/Clay	71

Remarks:

See Summary of Soil Descriptions

UKAS TESTING 4043

PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY

White Hart Road

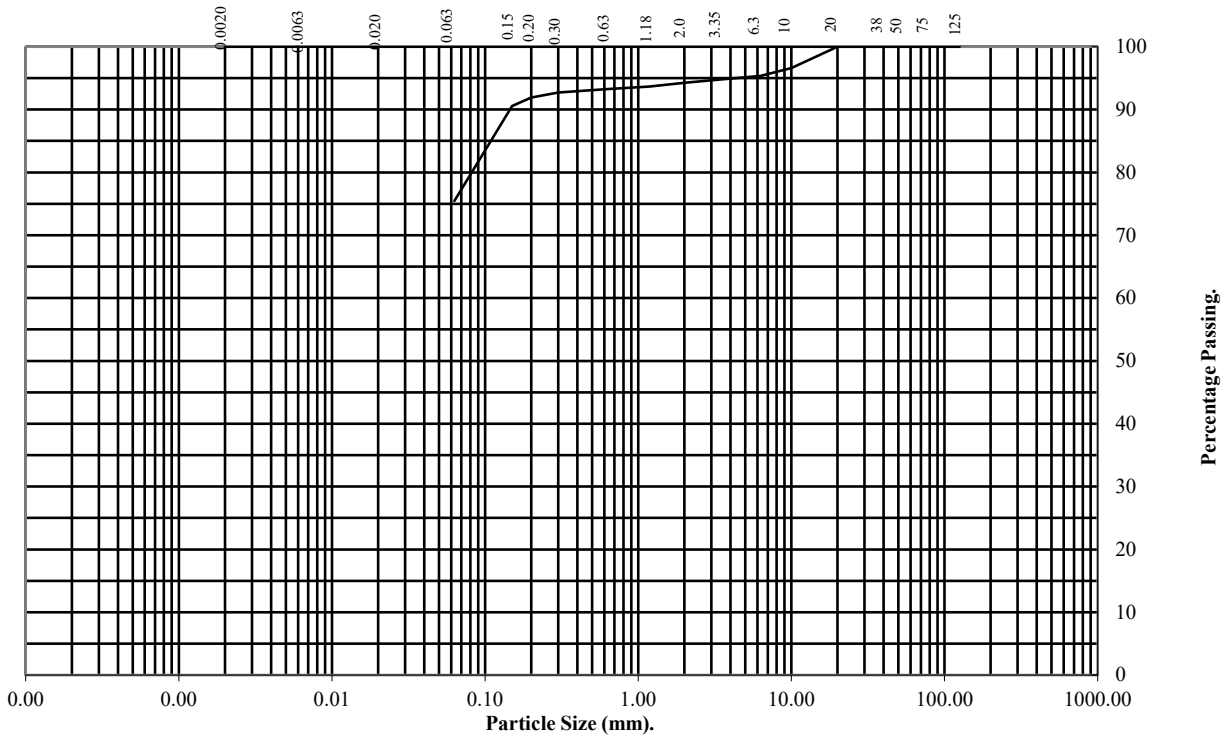
Contract No:
PSL26/0013
Client Ref:
5655

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 - Part 2 : 2022 : Clause 10 in accordance with BS EN ISO 17892 - 4 : 2016

Sieve Method, Clause 5.2

Hole Number:	**TP05**	**Top Depth (m):**	**0.60**
Sample Number:	**3**	**Base Depth (m):**	
Sample Type:	**D&B**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
50	100
37.5	100
20	100
10	97
6.3	95
3.35	95
2	94
1.18	94
0.63	93
0.3	93
0.2	92
0.15	91
0.063	75

Soil Fraction	Total Percentage
Cobbles	0
Gravel	6
Sand	19
Silt/Clay	75

Remarks:

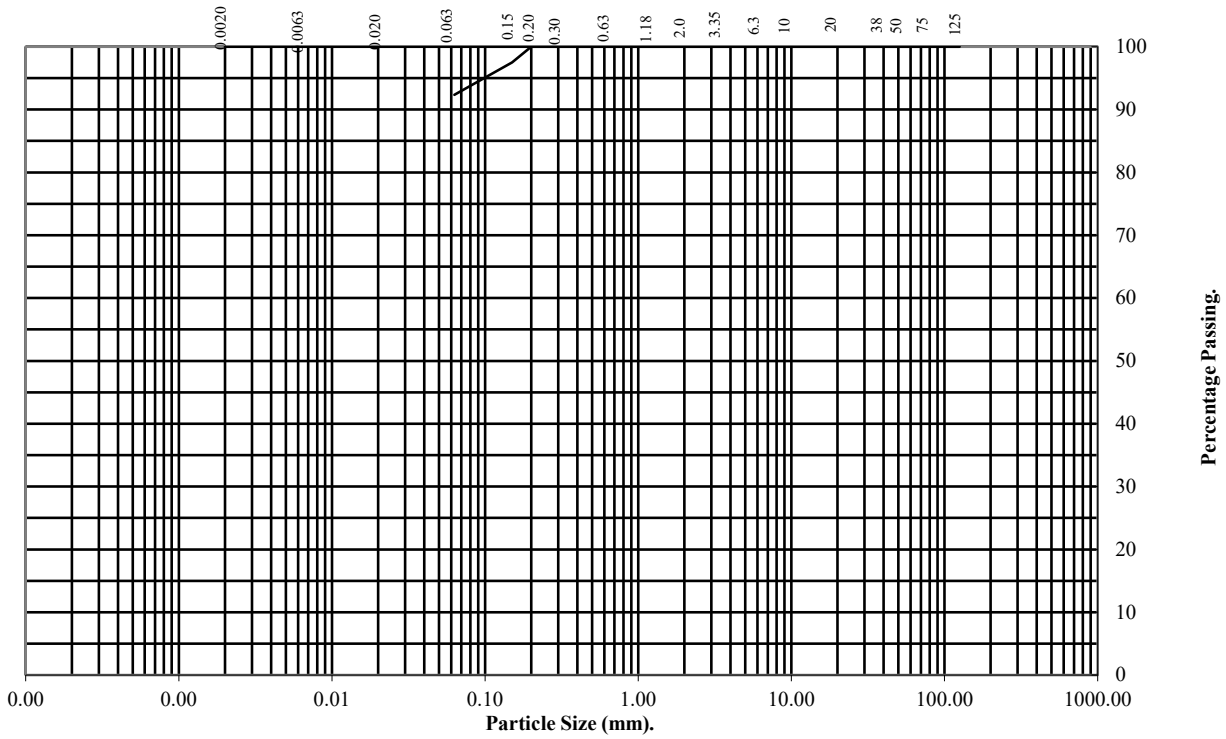
See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 - Part 2 : 2022 : Clause 10 in accordance with BS EN ISO 17892 - 4 : 2016

Sieve Method, Clause 5.2

Hole Number:	**TP10**	**Top Depth (m):**	**0.40**
Sample Number:	**3**	**Base Depth (m):**	
Sample Type:	**D&B**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
50	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.63	100
0.3	100
0.2	100
0.15	98
0.063	92

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	8
Silt/Clay	92

Remarks:

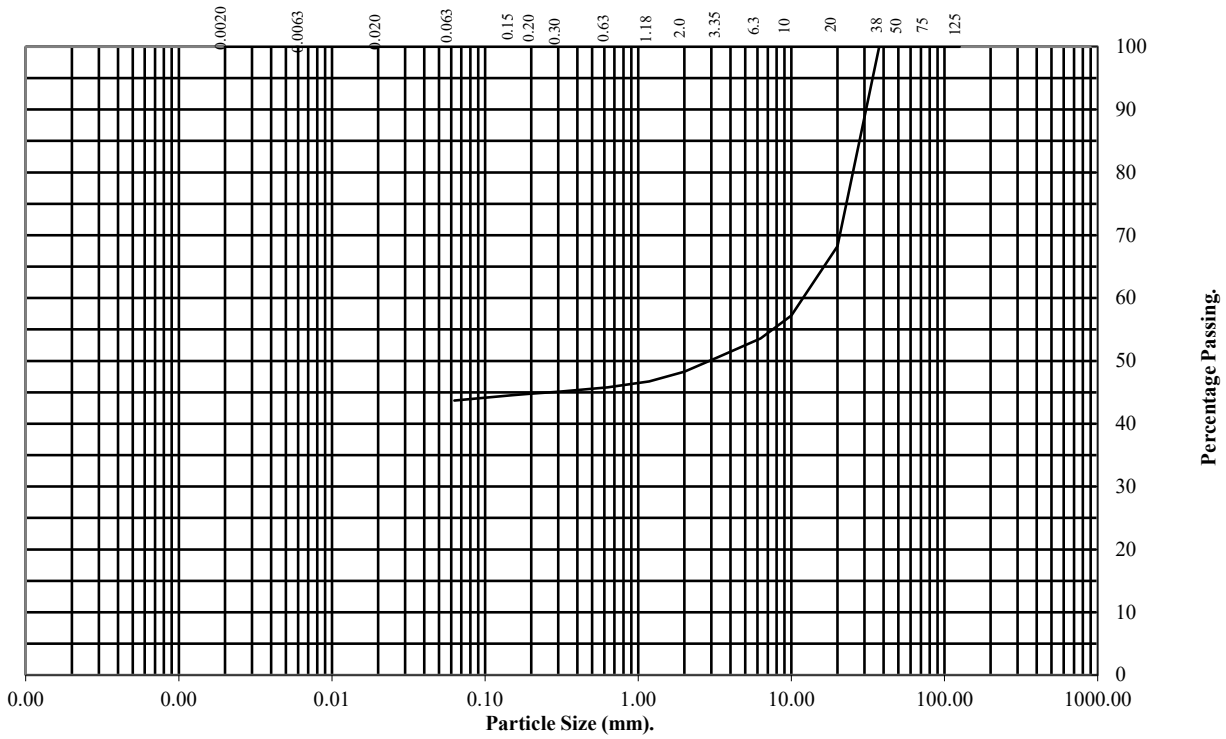
See Summary of Soil Descriptions

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 - Part 2 : 2022 : Clause 10 in accordance with BS EN ISO 17892 - 4 : 2016

Sieve Method, Clause 5.2

Hole Number:	**TP06**	**Top Depth (m):**	**0.80**
Sample Number:	**4**	**Base Depth (m):**	
Sample Type:	**B**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
50	100
37.5	100
20	68
10	57
6.3	54
3.35	51
2	48
1.18	47
0.63	46
0.3	45
0.2	45
0.15	45
0.063	44

Soil Fraction	Total Percentage
Cobbles	0
Gravel	52
Sand	4
Silt/Clay	44

Remarks:

See Summary of Soil Descriptions

UKAS TESTING 4043

PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY

White Hart Road

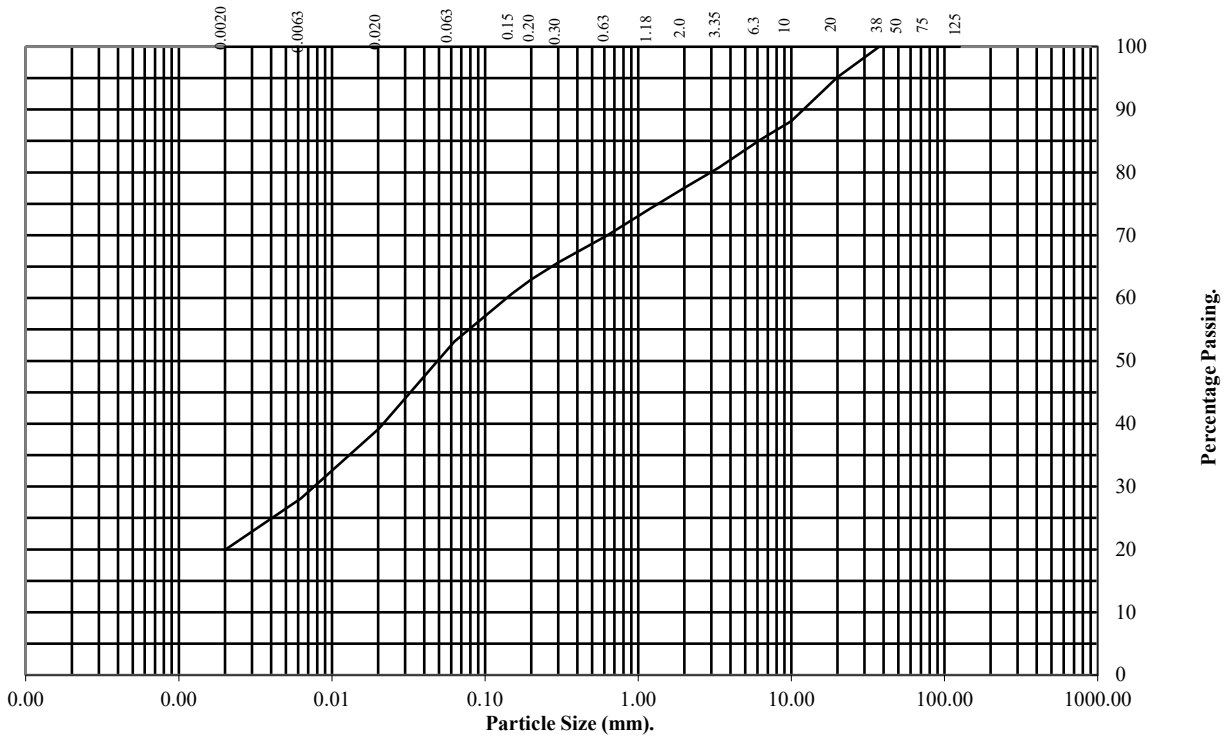
Contract No:
PSL26/0013
Client Ref:
5655

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 - Part 2 : 2022 : Clause 10 in accordance with BS EN ISO 17892 - 4 : 2016

Sieve Method, Clause 5.2 & Pipette Method, Clause 5.4

Hole Number:	**TP06**	**Top Depth (m):**	**0.30**
Sample Number:	**2**	**Base Depth (m):**	
Sample Type:	**B**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
50	100
37.5	100
20	95
10	88
6.3	85
3.35	81
2	78
1.18	74
0.63	70
0.3	66
0.2	63
0.15	61
0.063	53

Particle Diameter	Percentage Passing
0.020	39
0.0063	28
0.0020	20
Particle Density - 2.65 Mg/m3 assumed	

Soil Fraction	Total Percentage
Cobbles	0
Gravel	22
Sand	25
Silt	33
Clay	20

Remarks:

See Summary of Soil Descriptions

UKAS TESTING 4043

PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY

White Hart Road

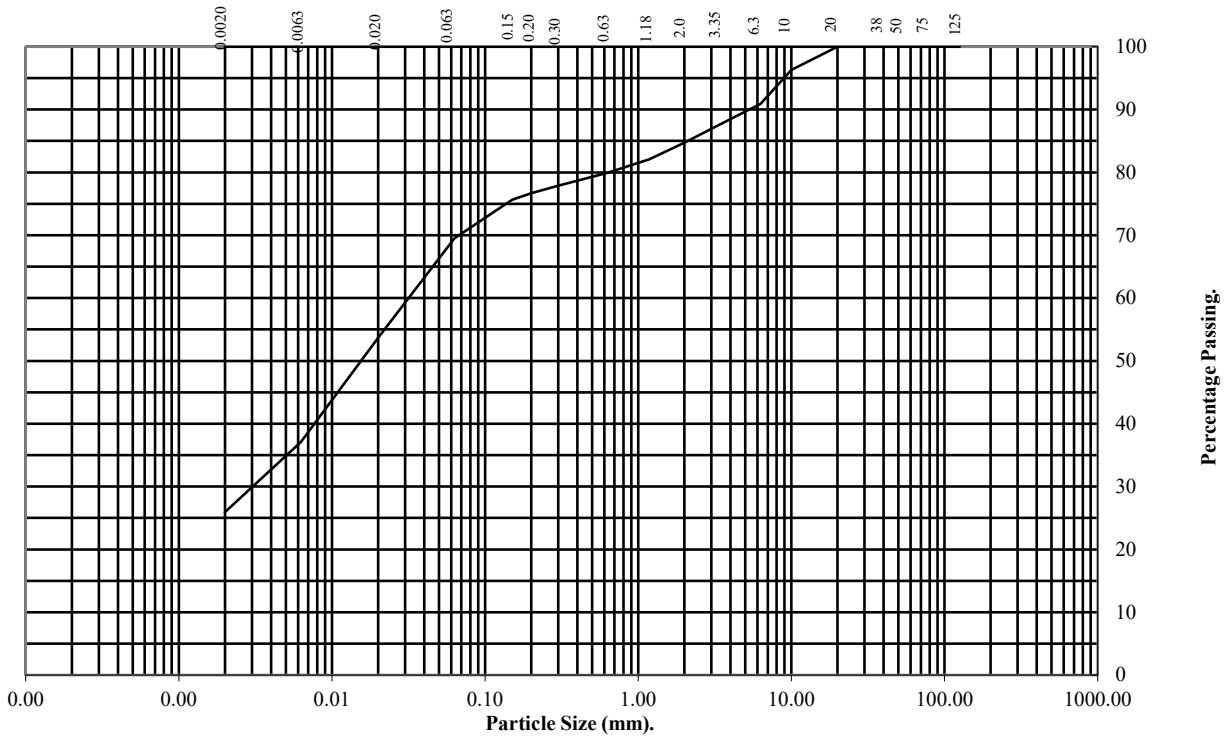
Contract No:
PSL26/0013
Client Ref:
5655

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 - Part 2 : 2022 : Clause 10 in accordance with BS EN ISO 17892 - 4 : 2016

Sieve Method, Clause 5.2 & Pipette Method, Clause 5.4

Hole Number:	**TP08**	**Top Depth (m):**	**0.20**
Sample Number:	**2**	**Base Depth (m):**	
Sample Type:	**B**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
50	100
37.5	100
20	100
10	96
6.3	91
3.35	88
2	85
1.18	82
0.63	80
0.3	78
0.2	77
0.15	76
0.063	69

Particle Diameter	Percentage Passing
0.020	54
0.0063	37
0.0020	26
Particle Density - 2.65 Mg/m3 assumed	

Soil Fraction	Total Percentage
Cobbles	0
Gravel	15
Sand	16
Silt	43
Clay	26

Remarks:

See Summary of Soil Descriptions

UKAS TESTING 4043

PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY

White Hart Road

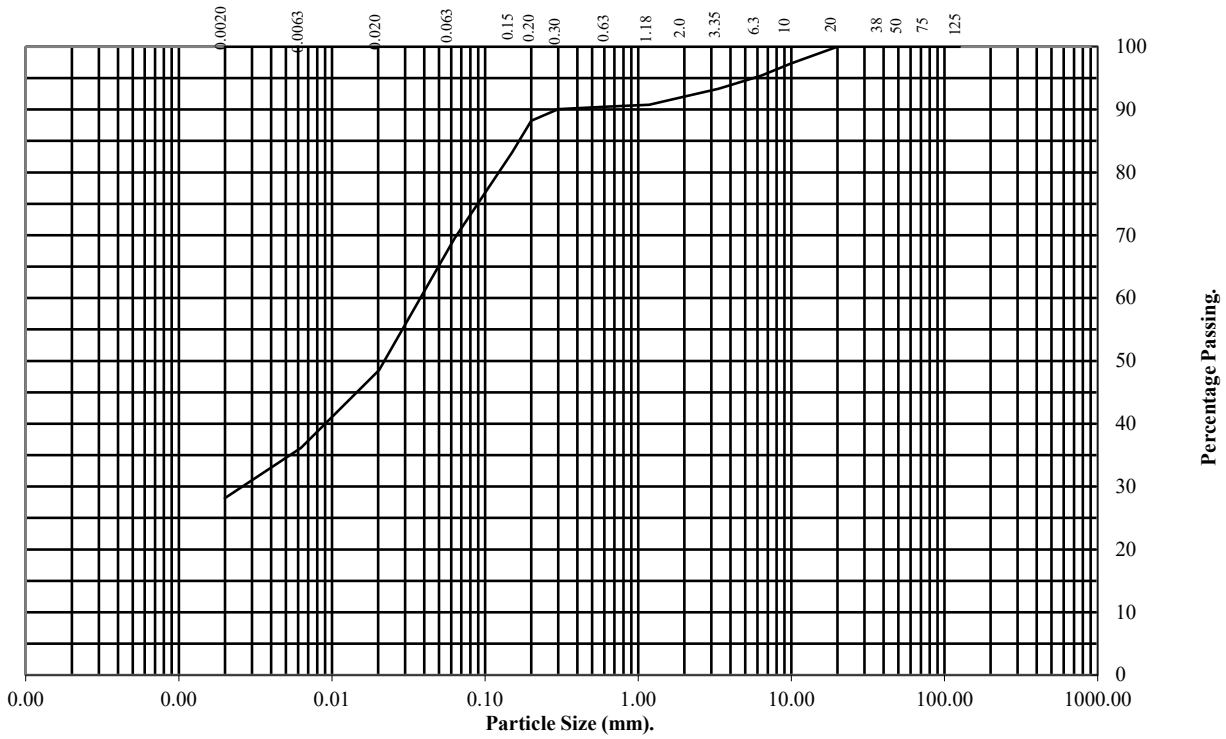
Contract No:
PSL26/0013
Client Ref:
5655

PARTICLE SIZE DISTRIBUTION TEST

BS 1377 - Part 2 : 2022 : Clause 10 in accordance with BS EN ISO 17892 - 4 : 2016

Sieve Method, Clause 5.2 & Pipette Method, Clause 5.4

Hole Number:	**TP10**	**Top Depth (m):**	**0.20**
Sample Number:	**2**	**Base Depth (m):**	
Sample Type:	**B**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
50	100
37.5	100
20	100
10	97
6.3	95
3.35	93
2	92
1.18	91
0.63	90
0.3	90
0.2	88
0.15	83
0.063	69

Particle Diameter	Percentage Passing
0.020	49
0.0063	36
0.0020	28
Particle Density - 2.65 Mg/m3 assumed	

Soil Fraction	Total Percentage
Cobbles	0
Gravel	8
Sand	23
Silt	41
Clay	28

Remarks:
See Summary of Soil Descriptions

UKAS TESTING 4043

PSL PROFESSIONAL SOILS LABORATORY A PHENNA GROUP COMPANY

White Hart Road

Contract No:
PSL26/0013
Client Ref:
5655

Analytical Test Report	**E26/00026/PSL/26-00110**	**Tested on Behalf of**
Clients Project Reference	PSL26/0013 White Hart Road	Professional Soils Laboratory
Clients Order Number	PSL26/0013	5/7 Hexthorpe Road
Sample(s) Analysed	10	Hexthorpe
Sample(s) received / instructed	06/01/2026 / 06/01/2026	Doncaster
Sample(s) Tested	06/01/2026 to 13/01/2026	
Report issued	14/01/2026	DN4 0AR
Report issue number	1	

Signed



James Gane
Analytical Services Manager

Notes:

General

This report shall not be reproduce except in full

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

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

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

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

Uncertainty of measurement values are available on request.

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

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

Stone Content was determined in accordance with CTS method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

Deviating Samples

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

Accreditation Key

U = UKAS Accreditation, M = MCERTS Accreditation, N = Unaccredited, SC = Subcontracted

E26/00026/PSL/26-00110

PSL26/0013 White Hart Road

Analytical Test Results - ENV Analysis Soils

Lab Reference				675378	675379	675380	675381
Client Sample ID				-	-	-	-
Client Sample Location				TP01	TP02	TP06	TP03
Client Sample Type				D	D	D	D&B
Client Sample Number				2	3	3	3
Depth - Top (m)				0.5	0.8	0.5	0.5
Depth - Bottom (m)				0.5	0.8	0.5	0..50
Date of Sampling				17/12/2025	17/12/2025	17/12/2025	17/12/2025
Time of Sampling				-	-	-	-
Sample Matrix				Clay	Clay	Clay	Clay
Determinant	**Units**	**LOD**	**Accreditation**				
pH	pH units	1	M	6.9	5.5	6.6	7.0
Water Soluble Sulphate (as SO4)	mg/L	10	N	19	< 10	< 10	12

Date of Issue: 21.01.25
Issued by: J. Gane
Issue No: 1
Rev No: 9

Testing performed at
7-11 Harding Street, Leicester, LE1 4DH

4161

E26/00026/PSL/26-00110

PSL26/0013 White Hart Road

Analytical Test Results - ENV Analysis Soils

Lab Reference				675382	675383	675384	675385
Client Sample ID				-	-	-	-
Client Sample Location				TP04	TP05	TP08	TP10
Client Sample Type				D&B	D&B	D&B	D&B
Client Sample Number				3	3	3	3
Depth - Top (m)				1.1	0.6	0.9	0.4
Depth - Bottom (m)				1.1	0.6	0.9	0.4
Date of Sampling				17/12/2025	17/12/2025	17/12/2025	17/12/2025
Time of Sampling				-	-	-	-
Sample Matrix				Clay	Clay	Clay	Clay
Determinant	**Units**	**LOD**	**Accreditation**				
pH	pH units	1	M	5.2	6.7	6.6	6.8
Water Soluble Sulphate (as SO4)	mg/L	10	N	29	12	< 10	34

Date of Issue: 21.01.25
Issued by: J. Gane
Issue No: 1
Rev No: 9

Testing performed at
7-11 Harding Street, Leicester, LE1 4DH

4161

E26/00026/PSL/26-00110

PSL26/0013 White Hart Road

Analytical Test Results - ENV Analysis Soils

Lab Reference				675386	675387
Client Sample ID				-	-
Client Sample Location				TP07	TP09
Client Sample Type				D	D
Client Sample Number				2	2
Depth - Top (m)				0.4	1
Depth - Bottom (m)				0.4	1
Date of Sampling				17/12/2025	17/12/2025
Time of Sampling				-	-
Sample Matrix				Clay	Clay
Determinant	**Units**	**LOD**	**Accreditation**		
pH	pH units	1	M	6.7	6.1
Water Soluble Sulphate (as SO4)	mg/L	10	N	35	11

Date of Issue: 21.01.25
Issued by: J. Gane
Issue No: 1
Rev No: 9

Testing performed at
7-11 Harding Street, Leicester, LE1 4DH

4161

E26/00026/PSL/26-00110

PSL26/0013 White Hart Road

Sample Descriptions

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)	Passing 2mm test sieve (%)
675378	-	TP01	SOIL	-	Light brown silty clay with rare rootlets with occasional mudstone	-	-	100
675379	-	TP02	SOIL	-	Brown silty clay with occasional mudstone	-	-	100
675380	-	TP06	SOIL	-	Light brown silty clay with rare rootlets	-	-	100
675381	-	TP03	SOIL	-	Brown silty clay with rare rootlets	-	-	100
675382	-	TP04	SOIL	-	Greyish brown silty clay with rare rootlets	-	-	100
675383	-	TP05	SOIL	-	Light brown silty clay	-	-	100
675384	-	TP08	SOIL	-	Greyish brown silty clay with rare rootlets with occasional mudstone	-	-	100
675385	-	TP10	SOIL	-	Light greyish brown silty clay with rare rootlets	-	-	100
675386	-	TP07	SOIL	-	Greyish brown silty clay with occasional mudstone	-	-	100
675387	-	TP09	SOIL	-	Brown silty clay	-	-	100

Testing performed at
7-11 Harding Street, Leicester, LE1 4DH

4161

E26/00026/PSL/26-00110

PSL26/0013 White Hart Road

Analysis Methodologies - Please refer to sample comments page (if present) for any changes to methods Methods

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preperation	Test Details
ANIONSS	MS - CL - Anions by Aquakem (2:1Extract)	Oven dried	Passing 2mm test sieve	Determination of Anions (inc Sulphate, chloride etc.) in soils by Aquakem. Analysis is based on a 2:1 water to soil extraction ratio
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis

E26/00026/PSL/26-00110

PSL26/0013 White Hart Road

Sample Deviations

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

Observations on receipt

A - No date of sampling provided W - No time of sampling provided

C - Received in inappropriate container

H - Contains headspace

T - Temperature on receipt exceeds storage temperature

R - Sample(s) received with less than 2 hours for testing to commence/complete, any result formally classed as deviating will be marked with an X against the applicable test (i.e. RX)

Observations whilst in laboratory

X - Exceeds sampling to extraction or analysis timescales

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
675378		TP01			MS - CL - pH in Soils	R X
675379		TP02			MS - CL - pH in Soils	R X
675380		TP06			MS - CL - pH in Soils	R X
675381		TP03			MS - CL - pH in Soils	R X
675382		TP04			MS - CL - pH in Soils	R X
675383		TP05			MS - CL - pH in Soils	R X
675384		TP08			MS - CL - pH in Soils	R X
675385		TP10			MS - CL - pH in Soils	R X
675386		TP07			MS - CL - pH in Soils	R X
675387		TP09			MS - CL - pH in Soils	R X

Testing performed at
7-11 Harding Street, Leicester, LE1 4DH

4161

Analytical Test Report	**E26/00900/PSL/26-03159**	**Tested on Behalf of**
Clients Project Reference	PSL26/0013 White Hart Road	Professional Soils Laboratory
Clients Order Number		5/7 Hexthorpe Road
Sample(s) Analysed	2	Hexthorpe
Sample(s) received / instructed	26/01/2026 / 26/01/2026	Doncaster
Sample(s) Tested	26/01/2026 to 28/01/2026	
Report issued	30/01/2026	DN4 0AR
Report issue number	1	

Signed



James Gane
Analytical Services Manager

Notes:

General

This report shall not be reproduce except in full

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

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

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

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E26/00900/PSL/26-03159

PSL26/0013 White Hart Road

Analytical Test Results - ENV Analysis Soils

Lab Reference				690929	690930
Client Sample ID				-	-
Client Sample Location				TP02	TP04
Client Sample Type				D	D&B
Client Sample Number				3	3
Depth - Top (m)				0.8	1.1
Depth - Bottom (m)				0.8	1.1
Date of Sampling				17/12/2025	17/12/2025
Time of Sampling				-	-
Sample Matrix				Clay	Clay
Determinant	**Units**	**LOD**	**Accreditation**		
pH	pH units	1	M	6.3	5.6

Date of Issue: 21.01.25
Issued by: J. Gane
Issue No: 1
Rev No: 9

Testing performed at
7-11 Harding Street, Leicester, LE1 4DH

UKAS TESTING
4161
mCERTS

E26/00900/PSL/26-03159

PSL26/0013 White Hart Road

Sample Descriptions

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)	Passing 2mm test sieve (%)
690929	-	TP02	SOIL	-	Brown sandy silty clay with rare mudstone	-	-	100
690930	-	TP04	SOIL	-	Brown sandy silty clay	-	-	100

Testing performed at
7-11 Harding Street, Leicester, LE1 4DH

4161

E26/00900/PSL/26-03159

PSL26/0013 White Hart Road

Analysis Methodologies - Please refer to sample comments page (if present) for any changes to methods Methods

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preperation	Test Details
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis

E26/00900/PSL/26-03159

PSL26/0013 White Hart Road

Sample Deviations

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H - Contains headspace
T - Temperature on receipt exceeds storage temperature
R - Sample(s) received with less than 2 hours for testing to commence/complete, any result formally classed as deviating will be marked with an X against the applicable test (i.e. RX)

Observations whilst in laboratory

X - Exceeds sampling to extraction or analysis timescales

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
690929		TP02			MS - CL - pH in Soils	R X
690930		TP04			MS - CL - pH in Soils	R X

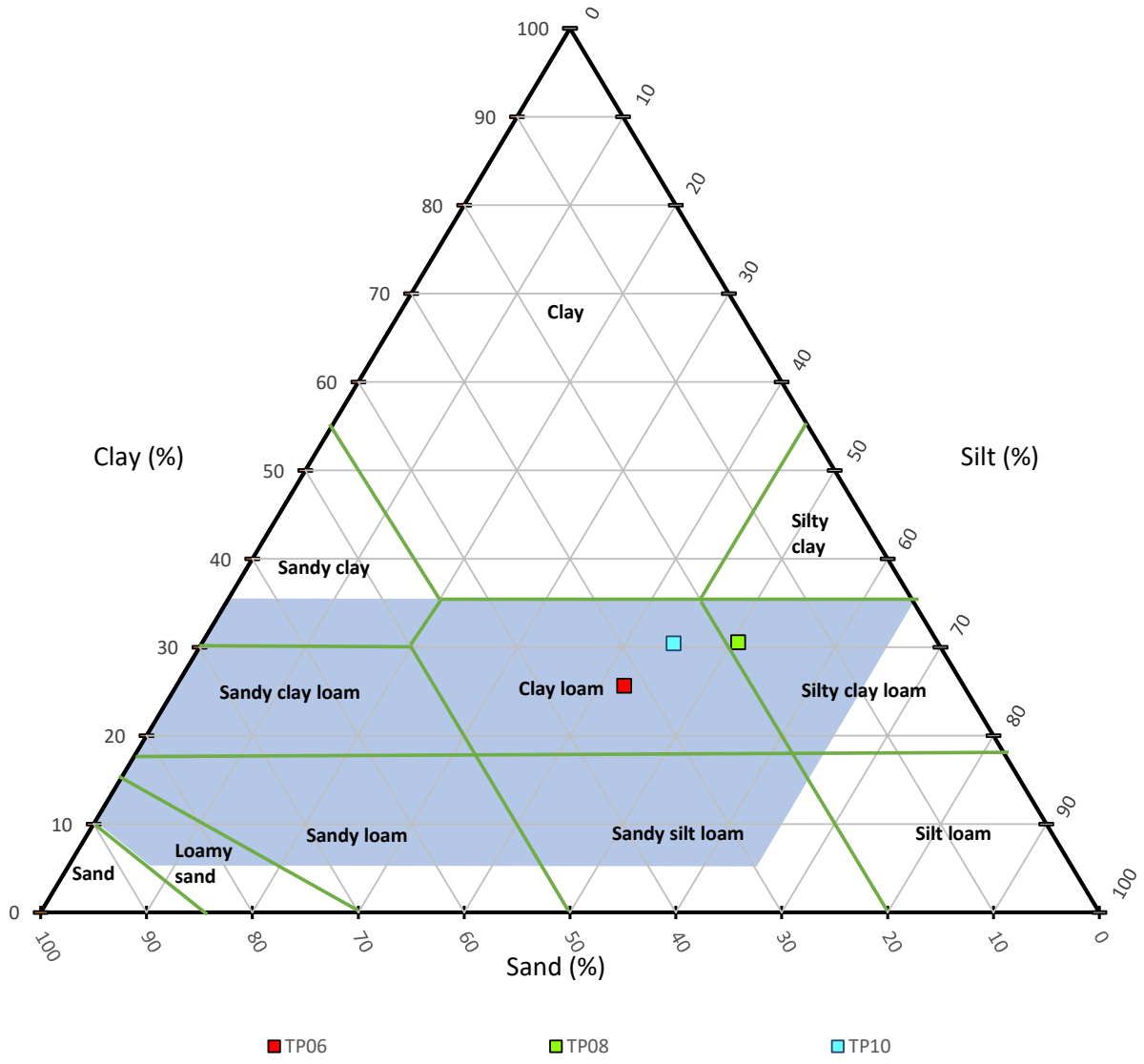
Testing performed at
7-11 Harding Street, Leicester, LE1 4DH

4161

Site:	White Hart Road, Penistone
Lithos Job Number:	5655
Client:	Bellway Homes Limited (Yorkshire)
Lab Results Rpt Ref.	PSL26/0013
Date Report Issued:	21/01/2026

Topsoil Classification

(Testing undertaken in accordance with BS3882:2015)



= Area within which the texture of Topsoil is required to fall

= Texture Group Boundary