SUMMIT
GEOTECHNICS

Mining Risk Assessment

Penistone Footbridge and Car Park

Client: Sable Leigh Consultancy Limited

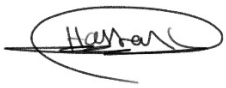
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Executive Summary

This Mining Risk Assessment has been prepared by Summit Geotechnics Ltd on behalf of Sable Leigh Consultancy Limited to assess the risk posed by historical and present-day mining to the proposed Penistone Footbridge and Car Park project, in accordance with NR/L2/CIV/191 Modules 1 and 5.

The site lies within a Mining Remediation Authority Development High Risk Area, underlain by the Pennine Lower Coal Measures. A site-specific ground investigation, undertaken on land in third party (Barnsley Metropolitan Borough Council) ownership, proved a 0.95m thick coal seam at 27.90m below ground level with no evidence of historical working. This is corroborated by the Arup Desk Study (Appendix B, Section 4) and by Network Rail's and the Mining Remediation Authority's own records, neither of which hold evidence of recorded underground workings within influencing distance of the site.

The Mining Risk Assessment has concluded that the preliminary mining risk is assessed as Very Low or Low. Further targeted ground investigation is required to confirm the assumptions adopted in the risk assessment. On this basis, the site is recommended to be treated as Eurocode 7 Geotechnical Category 2.

Following completion of the additional ground investigation, the Mining Risk Assessment shall be updated and a decision made on whether a Mining Risk Mitigation Remit is required.

Abbreviations

Table 1 lists the abbreviations used in this report.

Table 1: List of abbreviations

Abbreviation	Definition
AGS	Association of Geotechnical and Geo-environmental Specialists
BH	Borehole
BGS	British Geological Survey
BMBC	Barnsley Metropolitan Borough Council
c.	Circa
DHRA	Development High Risk Area
Defra	Department for Food and Rural Affairs
DSEAR	The Dangerous Substances and Explosive Atmospheric Atmospheres Regulations 2002
ELR	Engineer's Line Reference
GI	Ground Investigation
GIR	Ground Investigation Report
m bgl	Metres below ground level
m OD	Metres above Ordnance Datum
M.Yds	Miles and Yards
MRA	Mining Risk Assessment
MRMR	Mining Risk Mitigation Remit
NR	Network Rail
OS	Ordnance Survey
P1	Platform 1
P2	Platform 2
PACE	Project Acceleration in a Controlled Environment
PLCM	Pennine Lower Coal Measures
SLC	Sable Leigh Consultancy Limited
SPC	Penistone Station Crossing
Summit	Summit Geotechnics Ltd
SYMAS	South Yorkshire Mining Advisory Service
TP	Trial Pit

1. Introduction

1.1. Terms of Appointment & Purpose

Summit has been commissioned by Sable Leigh Consultancy Limited (the "Client") to prepare a Mining Risk Assessment (MRA) report for the Penistone Footbridge and Car Park project.

The purpose of this report is to provide the Client and Network Rail (NR), with information regarding the potential for historical abandoned mining below or in proximity to the site, and to provide an assessment proportionate to the outline design phase of its potential impact on the long-term condition and stability of the ground in respect to the proposed works.

1.2. Background

This report is the MRA for the Penistone Footbridge and Car Park project to satisfy NR Standard N2/L2/CIV/191 Module 1 [1] and 5 [2]. The project covers Engineer's Line Reference (ELR) PEH mileages from 13 miles 704 yards (13.0704 M.Yds) to 13 miles 858 yards (13.0858 M.Yds). Any reported mileages in this report are given in miles and yards (M.Yds) to the nearest 5 yards and are indicative only, unless stated otherwise.

The project aims to deliver:

- The design and construction of a new footbridge with lifts and stairs at the unstaffed Penistone Station;
- A car park on the east (Up) side of the station with vehicular and pedestrian access from Lairds Way. The car park will provide at-grade access to Platform 1, and lift access to the footbridge;
- Alterations to the existing forecourt on the west (Down) side of the station, and to the existing platforms to accommodate the construction of the bridge, lifts and stairs;
- The existing barrow crossing will be closed and removed once the lift and bridge interchange is in place on the platform;
- No changes to the track or signalling systems are proposed (except for minor relocation of one of the OFF indicators for signal BY1053); and
- The platform-train interface will not be affected.

The project is within Project Acceleration in a Controlled Environment (PACE) Milestone ES4 Approval in Principle [3] at the time of issue. The Client prepared a Preferred Option Scoring Report (POSR) [4] at ES3 that outlined the proposed works; these are summarised Table 2. A copy of the ES4 Proposed General Arrangement is included in Appendix A. It should be noted that the proposed works are subject to design development during ES4. Summit has not been provided any information relating to access routes, proposed site compounds/lay down areas and any third party land required to facilitate the construction work.

Table 2: Summary of proposed works

Proposed Work Package	Works Summary
Forecourt	• Installation of new SOD to new platform access point. • Installation of new station braille map. • Installation of designated crossing points. • Enlarged short-stay bay for pick-up/drop-off. • Cycle storage facilities.
Footbridge, Lift and Stairs	• Construction of new AVA-type footbridge with lift and stairs towards the northern part of the platforms, providing access to the proposed car park (see row below). • Closure of existing barrow crossing.
Car Park	• Construction of new at-grade car park. The car park will provide 101no. spaces, comprising 64no. standard, seven accessible, five enlarged, 12no. electric vehicle (plus 17no. passive provision), and three pick-up/drop-off.

The MRA covers the proposed interventions within the study area listed in Table 2 only. The MRA will require revision should significant changes be made to the proposed works.

A combined geotechnical and geo-environmental desk study was prepared by Arup in 2023 (Appendix B), covering the proposed car park site only. A Groundsure Geo+Enviro Insights Report and Map Insights Report, and Coal Authority Consultants Coal Mining Report was obtained as part of this report. Relevant information from these documents has been included throughout this MRA.

The Client appointed Summit to deliver the geotechnical scope for ES4. This comprised design of an intrusive ground investigation (GI) and production of a Ground Investigation Report (GIR). Summit was later asked to prepare an MRA, after completion of said GI. The findings of the GI has been used to inform the risk assessment.

1.3. Scope and Objectives

This report has been prepared in line with NR/L2/CIV/191 Module 1 [1] and 5 [2] and draws on guidance from the Mining Remediation Authority [5], CIRIA C758D [6] and various British Geological Survey (BGS) publications.

The purpose of this MRA is to:

- Present a desk-based review of all available information on the mining issues which are relevant to the site;
- Use the available information to identify legacy hazards and assess the risks they pose to the proposed development and existing railway infrastructure, including whether the proposed works could trigger or increase those risks and considering any cumulative effects;
- Determine the requirement for a Mining Risk Mitigation Remit (MRMR) and therefore if mitigation should be considered to reduce the risk to an acceptable level.

A NR internally produced Stage 2 Mining Report (Appendix C) has been provided with the recommendation that a MRA be carried out, in line with NR Standards. It must be noted that the Stage 2 Mining Report was provided by the Client/NR after completion of a site-specific GI. This departs from the process set out in Figure 1 of NR/L2/CIV/191 Module 5 [2].

Summit was appointed by the Client to design the intrusive GI under the ES4 geotechnical scope; Summit was not commissioned to prepare this MRA until after that GI had been completed and had no input into the decision to proceed with GI ahead of the Stage 2 Mining Report and MRA. Consequently, the GI scope was not informed by the mining-specific data deficiencies that an MRA would ordinarily identify under Clause 15 of Module 5, which is reflected in the recommendation for supplementary GI in Section 5.3.

1.4. Other Relevant Information

Information has been reviewed from various sources (listed in Section 7), most notably the Mining Remediation Authority, BGS and Groundsure. Key documents include:

- Arup (2023). Penistone Station Park and Ride, Geotechnical and Geo-environmental Desk Study (Appendix B), including the following appendices:
    - Groundsure (2023). Enviro+Geo Insight Report;
    - Groundsure (2023). Map Insights Report;
    - The Coal Authority (2023). Consultants Coal Mining Report;
- Network Rail (2023). Stage 2 Mining Report, Con 1437 (Appendix C);
- Network Rail (2026). Landfill Gas Report,LFill 01070 – Con 1437 Rev 1 – Penistone Footbridge & Car Park (Appendix E);
- Rogers Geotechnical Services (2026). Factual Report, Land adjacent to Penistone Station (Appendix F); and
- SLC (2026). Penistone Footbridge & Car Park, ES3 Preferred Option Scoping Report [4].

2. Site Setting

2.1. Site Location and Description

The site comprises land at and adjacent to Penistone Station, approximately 500m east of Penistone town centre, centred on approximate National Grid Reference SE251033. The station has two platforms:

- Platform 1 (P1): Located east of the tracks.
- Platform 2 (P2): Located west of the tracks, with primary access via the station forecourt and secondary, non-vehicular access from Trans Pennine Trail at the southern end of the platform.

Access between the platforms is provided by a barrow crossing at their southern end, as shown in Figure 1. The land immediately east of the railway, where the car park is proposed, comprises approximately equal areas of open grassland and dense vegetation. A derelict building and a substation are also present.

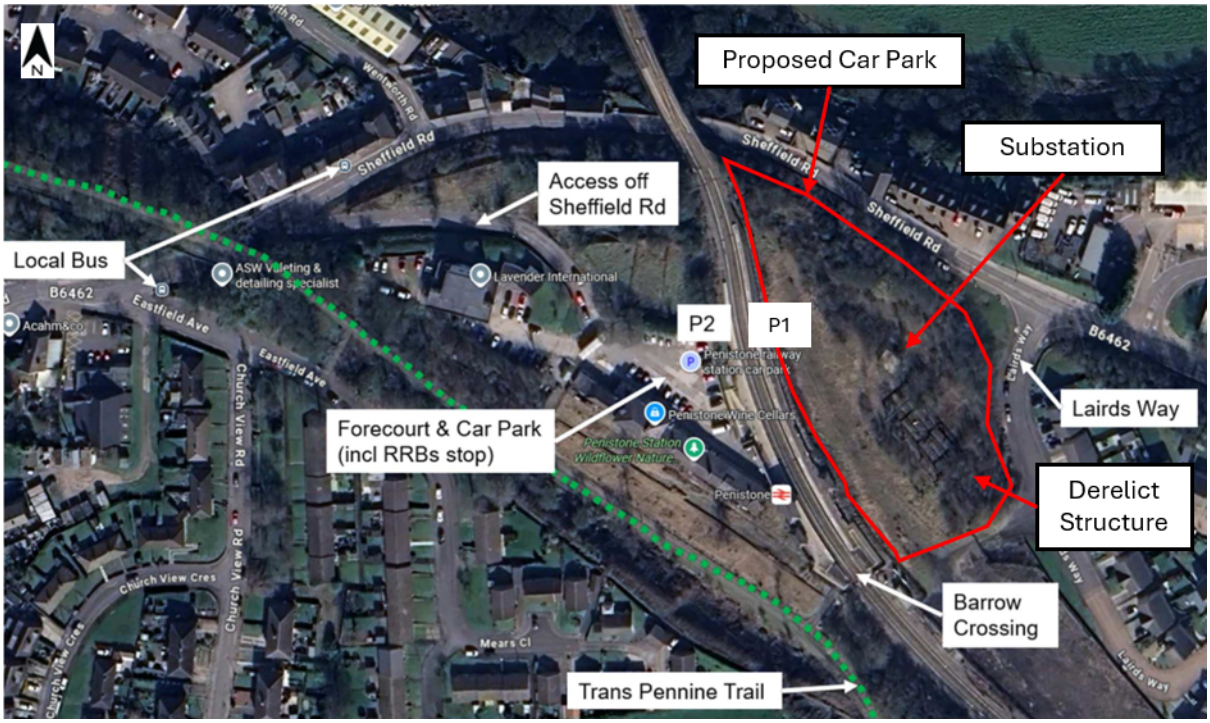


Figure 1: Site location overview (after Google [7], annotations by SLC (white arrows) [4] and Summit (red arrows))

A description of the site and existing railway infrastructure is included in Table 3 and Table 4, respectively.

Table 3: Site description

Extent (M.Yds)	Track Elevation (m OD)[1]	Route Description	Site Surrounds	Watercourses & Bodies
13.0704 to 13.0858	213.2 (low miles) to 214.2 (high miles)	North-north-west (low miles) to south-south-east (high miles). Gentle curve to the west on approach to Penistone Station.	North: Penistone Viaduct East: Residential housing. South: Playing fields and residential housing. West: Residential housing.	The Rover Don is situated c. 35m north of the site at its closest point.

Notes

[1] Estimated from Defra LiDAR data [8].

Table 4: Existing railway infrastructure

Track[1]	Stations & Buildings[1]	Structures & Crossings[1]	Earthworks[2]	Drainage[2]	Signalling
Double tracked, no electrification infrastructure.	13.0792: Penistone Station.	13.0858: Penistone Station Crossing (SPC).	Track appears to be sat on embankment.	Assumed to comprise track drainage only.	• BY1050: south end of Platform 2. • BY1052: south end of Platform 1. • BY1053: north end of Platform 2.

Notes

[1] Data obtained from Railway Data Centre [9].

[2] Based on visual assessment.

Consideration of access routes, proposed site compounds/lay down areas and any third party land required to facilitate the construction work has not been made as this information is not available at the time of issue. Any qualifying construction works that fall outside the extents of this MRA may require additional Stage 2 Mining Report(s) and MRA(s) to assess their risk.

2.2. Site History

A Groundsure Map Insights Report was obtained as part of the Arup Desk Study (Appendix B) for the proposed car park area as shown on Figure 2. This includes Ordnance Survey (OS) maps and aerial imagery dated from 1854 to 2023 (including partial and non-standard OS formats) and is included in Appendix B.



Figure 2: Area covered in Arup Desk Study (Appendix B)

A review of the mapping was undertaken for significant features and historical developments, focusing on those relating to historical mining activity, including water wells. Significant features within the site boundary have been considered, alongside the significant offsite features relevant to the understanding of the geological model or history of mining. These features are summarised in Table 5.

Table 5: Mining features identified on OS mapping

Feature (Name)	Position (Easting, Northing) [1]	Description	Years Noted / Active	Current Land Usage [2]
Sandstone Quarry (Signal Box)	120m north-west (424987, 403339)	Surface extraction of sandstone. Recorded in the BGS "Mines and quarries" dataset as reference 37964, ceased status.	1853	Commercial building and car park associated with Lavender International. Building mapped since 1959.
Sandstone Quarry (Peniston)	485m north-west (424631, 403435)	Surface extraction of sandstone. Recorded in the BGS "Mines and quarries" dataset as reference 37963, ceased status.	1853	Residential housing around Wentworth Crescent, first seen in
Sandstone Quarry (Green Beck)	475m east (425575, 403235)	Surface extraction of sandstone. Recorded in the BGS "Mines and quarries" dataset as reference 37961, ceased status.	1853	Industrial building associated with Bird Stainless.
Sandstone Quarry (Castle Green Quarry)	710m south-east (425307, 402620)	Surface extraction of sandstone. Recorded in the BGS "Mines and quarries" dataset as reference 37974, ceased status.	1853	Grass field.

Feature (Name)	Position (Easting, Northing) [1]	Description	Years Noted / Active	Current Land Usage [2]
Sandstone Quarry (Broadhill)	820m north-west (424680, 404050)	Surface extraction of sandstone. Recorded in the BGS "Mines and quarries" dataset as reference 37962, ceased status.	1853	Residential housing around Wellhouse Lane.
Yorkshire Steel & Iron Works	230m south-east (425300, 403190)	Steel and iron works building and associated infrastructure including two unnamed buildings and sidings. Evidence of worked ground can be seen immediately south-east.	1891 to 1921	Residential housing around West Acre, first seen in December 2002. All infrastructure associated with the works were removed by 1987.
Unnamed Stone Workings	85m north-west (425040, 403360)	Surface extraction for stone (unknown mineral). No indication of working extents. Not recorded in the BGS "Mines and quarries" dataset.	1906 to 2003	Allotment Gardens (mapped from 1984). Current aerial imagery shows the area has remained undeveloped but is adjacent to the north of the Penistone Station access road.

Notes:

[1] Position measured from National Grid Reference SE251033 and rounded to nearest 5m increment.

[2] Based on Google Earth imagery [7].

Research states Penistone railway station opened in 1874, replacing an earlier station on the Woodhead Line that first opened in 1845, and has largely remained unchanged since. The present-day land usage of the proposed car park site was mapped as being used for storage of unknown materials from 1999, including a building. The car park site had been cleared the building partially demolished by 2009. The main structure, steel frame and foundations, remain intact to present. Further discussion on non-mining related site history is presented in Section 3.1 of the Arup Desk Study (Appendix B).

2.3. Geology

Geological information from published BGS mapping of various scales [10] [11] [12], GeoIndex Onshore [13] and local memoirs [14] [15] have been reviewed. The general geological succession is anticipated to comprise limited made ground over Pennine Lower Coal Measures (PLCM). No superficial deposits are mapped at the site. The general geological succession is summarised in Table 6.

Table 6: General geological succession

Period	Type	Stratum	Summary Description
Quaternary	Artificial Ground	Made Ground	Variable made ground associated with site's former use.
Carboniferous	Superficial Deposits	Pennine Lower Coal Measures	Mudstone, siltstone and sandstone with subordinate coal, ironstone, seatearth and marine bands.
Carboniferous	Bedrock Geology	Grenoside Sandstone (PLCM)	Fine- to coarse grained, thickly cross-bedded micaceous SANDSTONE.

2.3.1. Structural Geology

A geological fault is shown parallel to the north-eastern side of the site, just within the site boundary, with strata downthrown to the south. PLCM are mapped to the south of the fault and its member Grenoside Sandstone to the north.

2.3.2. BGS Borehole Records and Previous Ground Investigations

The BGS "Borehole records" dataset [13] contains one record within 250m of the site (Reference: SE20SE19) and its location relative to the site is shown on Figure 3. However, the scan does not contain any useful information.



Figure 3: Location of BGS Borehole Record SE20SE19 relative to site (basemap: Ordance Survey ©)

A GI was carried out c. 16m east of the site, designed and completed by Arc Environmental Ltd [16]. The works comprised:

- Four cable percussive boreholes;
- Three rotary open hole boreholes;
- Seven mechanically excavated trial pits;
- Installation of three combined ground gas and groundwater monitoring wells.

The recorded ground conditions are summarised in Table 7. No coordinates or ground level data was captured during the GI.

Table 7: Recorded ground conditions – Arc Environmental Ltd GI

Stratum	Minimum Depth to Top (m bgl)	Maximum Depth to Base (m bgl)	Thickness (m)	Summary Description
Made Ground	0	6.70	2.50-6.70	Mixtures of clay, sand and gravel containing predominantly brick, concrete and slag rubbish, ash, cinder, clinker, coal and burnt siltstone.

Stratum	Minimum Depth to Top (m bgl)	Maximum Depth to Base (m bgl)	Thickness (m)	Summary Description
"Drift Geology"	2.50	4.10	1.60	Soft silty sandy gravelly clay and firm to stiff slightly sandy slightly gravelly clay. A relic topsoil later was recorded in one of the trial pits. No superficial ("drift") deposits are mapped and so it is likely that this unit refers to weathered PLCM, or placed fill as suggested by the relic topsoil layer.
PLCM	3.15	30.00	>26.85 Base not proven	Interbedded yellowish light brown siltstone and grey mudstone. No coal seams were encountered and no soft ground indicative of broken ground associated with historical mine workings was encountered across the site. Consistent drilling rates and between 50 and 100% of the flush medium was maintained during the drilling period.

The Arc Environmental Ltd GI recorded Made Ground overlying PLCM and did not identify broken ground indicative of mine workings. However, it encountered substantially thicker Made Ground and deeper rockhead than the 2026 GI (Section 2.3.3), and no coal seam was recorded to 30m below ground level (bgl). As coordinates and ground levels are unavailable, the Arc findings cannot be reliably correlated with the site-specific GI or used to confirm the elevation and continuity of the coal seam beneath the proposed development. This GI data is therefore treated as contextual offsite information only.

2.3.3. Summit 2026

A site-specific GI was carried out between 1st June and 12th August 2026, prior to undertaking of this MRA and the findings are presented in a GIR [17]. The works were carried out on land owned by Barnsley Metropolitan Borough Council (BMBC) only as NR did not give approval for works to be carried out on their land. The works comprised:

- PAS 128 Type B M2 survey at all exploratory hole locations;
- Three dynamic sampling rotary core follow-on boreholes (BH) to a maximum depth of 31m bgl and installation of groundwater monitoring wells;
- Eight machine-excavated trial pits (TP) to a maximum depth of 2.60m bgl;
- In situ and laboratory testing; and
- Groundwater level monitoring during and post-fieldwork.

The as-built location of the exploratory holes is shown on Drawing SGL-1002-SLC-DRG-RA-001 (Appendix A). A summary of the recorded ground conditions at the site from the recent GI is presented in Table 8.

Table 8: Recorded ground conditions

Stratum	Depth to Top (m bgl [m OD])	Depth to Base (m bgl [m OD])	Thickness Range (m)	Summary Description
Made Ground	0 [216.43-213.05]	0.20-0.75 [215.78-212.39]	0.20-0.75	Dark brown organic silty very sandy angular to subangular fine to coarse GRAVEL of various lithologies, brick, slag and concrete. Sand is fine to coarse.

Stratum	Depth to Top (m bgl [m OD])	Depth to Base (m bgl [m OD])	Thickness Range (m)	Summary Description
Penistone Flags	0.65 [215.78]	3.45 [212.98]	2.80	Orangish brown fine- to medium-grained SANDSTONE (BH102 only).
Weathered Pennine Lower Coal Measures	0.25 [212.80]	1.10 [211.95]	0.85	Weathered mudstone comprising yellowish brown very sandy silty angular and subangular fine to coarse GRAVEL of sandstone.
Pennine Lower Coal Measures	0.20-3.45 [214.24-211.95]	1.00-31.00 [212.04-182.05] Not proven	Not proven, investigation terminated at maximum 31.00m bgl	Interbedded MUDSTONE, SILTSTONE and SANDSTONE. Coal seam recorded from 27.90 to 28.85m (0.95m thick).

A 2D geological section in included as Drawing SGL-1002-SLC-DRG-RA-002, with an extract shown on Figure 4.

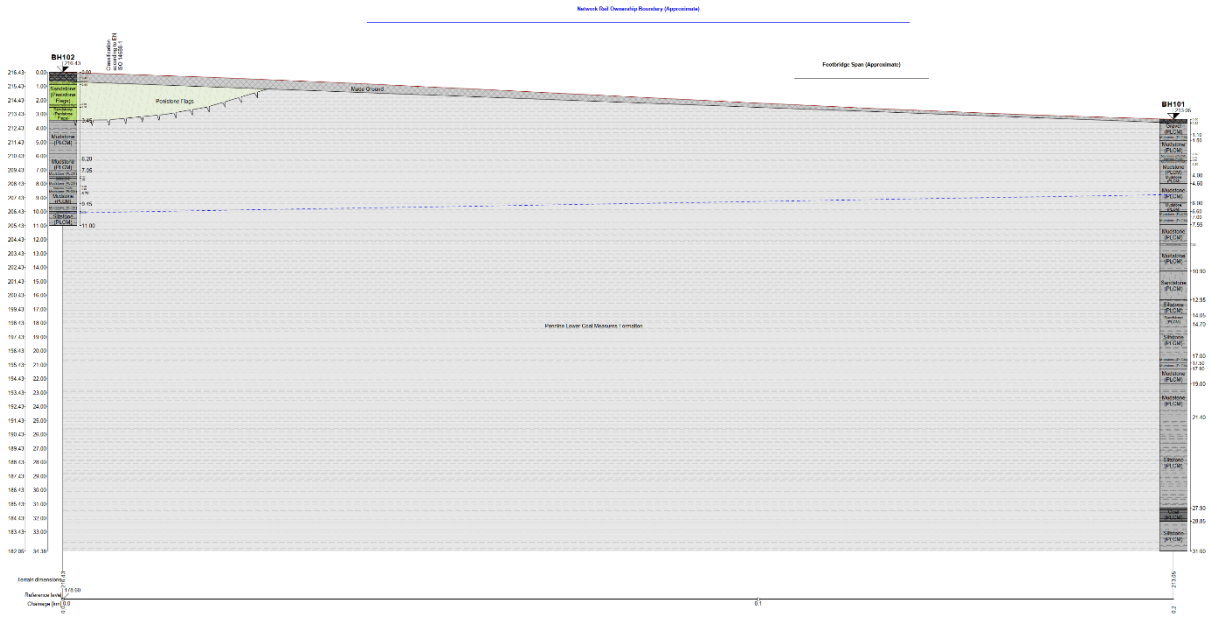


Figure 4: 2D geological section

It is noted that NR did not grant approval for GI works on its land at the time of the site-specific GI. Consequently, all exploratory holes are located on land in BMBC ownership. No intrusive GI has been undertaken beneath the existing platforms, forecourt or track (where the footbridge, lift and stairs are proposed). The findings of this MRA in respect of proven ground conditions apply directly to the investigated area only; ground conditions beneath the railway-side elements of the scheme have been assessed on the basis set out in Section 5.3.

2.3.3.1. Artificial Ground

Made ground was proven in all exploratory holes at ground level with a proven thickness between 0.20 and 0.75m. The made ground comprised granular soils with general construction/demolition waste.

2.3.3.2. Superficial Deposits

Superficial deposits are not mapped at the site and were not encountered during the GI.

2.3.3.3. Bedrock Geology

The bedrock geology comprises interbedded mudstone, siltstone and sandstone of the PLCM. Mudstone is encountered throughout with interbeds of siltstone and sandstone from 12.95m. Intact coal was encountered between 27.90 and 28.85m bgl (0.95m thick) with no evidence of soft ground indicative of broken ground associated with historical mine workings. The geology under track level has been inferred from borehole data and presented on Drawing SGL-1002-SLC-DRG-RA-002.

Grenoside Sandstone, a member of the PLCM, is mapped at the north-eastern portion of the site, north of a fault (Section 2.3.1). This geology was not encountered as this portion of the site was inaccessible during the GI due to dense vegetation cover.

Penistone Flags were recorded between 0.65 and 3.45m bgl in BH102. These deposits are not mapped under the proposed development site.

2.4. Hydrology and Hydrogeology

A review of hydrology and hydrogeology data from the Enviro+Geo Insight Report (Appendix B), the Department for Food and Rural Affairs' (Defra) online MAGiC Map Application [17], OS mapping and BGS hydrogeological mapping [13] has been carried out. Details of the hydrogeological features and surface water features within 100m of the site are summarised in Table 9 and Table 10, respectively.

Table 9: BGS hydrogeological classification

Rock Unit	Character	Summary
Pennine Lower Coal Measures	Moderately productive aquifer	Regional, cycle multi-layered aquifer with moderate yields from sandstones and many springs. Mine water quality poor but elsewhere reasonable.

Table 10: Relevant hydrology and hydrogeology features

Relevant Feature	Onsite	Offsite [1]
Bedrock aquifer designation	Secondary A	Secondary A
Groundwater vulnerability	Medium	Medium
Source protection zone(s)	None identified	None identified
Surface water features	None identified	River Don
Flood risk [2]	N/A	Zone 2 and 3
Other environmental considerations [3]	None identified	None identified
Mine water treatment scheme(s) [4]	None identified	None identified

Notes

[1] Offsite considered within 100m of the site. [2] Data from Enviro+Geo Insights Report [3] Statutory designations [17]. [3] Data from Consultants Coal Mining Report.

3. Identification of Site-Specific Mining Hazards

3.1. Local Mining History

The site is situated above PLCM geology that has a wide-ranging economic extractive value through history. The local mining history should be considered an initial indication of the type of workings and likely presence of unrecorded workings. Local memoirs, geological maps, NR "Evidence Files" and the Mineral Resource Information Sheet [18] indicate that the following geological units present at the site have been exploited in the local area:

- PLCM, including:
  - Mudstones for brick clay; and
  - Named seams (Table 11) for coal, fireclay and ironstone.

Further details of the working history and the potential methods are provided in Sections 3.1.1 and 3.1.2.

3.1.1. Underground Workings

The site lies within the Yorkshire coalfield that contains mine workings covering some 3000km^2 in over 20no. coal seams, mainly in the Lower and Middle Coal Measures [6]. The mining of coal in Yorkshire dates to Roman times but only became widespread in the 17th and 18th centuries with the use of coal for production of iron and steel. The named seams identified in the vicinity of the site are outlined in Table 11, and illustrated on Drawing SGL-1002-SLC-DRG-RA-004.

Table 11: Named worked seams

Seam Name	CA Code	Worked Material(s)	Notes
Lower Penistone Coal (Lower Penistone Green Coal)	NY398K	Coal	Not identified by the BGS 10k Linear Dataset or presented on modern BGS Mapping. The PLC is on the geological map illustrated 1:50,000 Sheet 86 Glossop [10] however is listed on the stratigraphical column towards the base of the Penistone Flags. It sub crops at PEH 13.01717 M.Yds. Note the BGS County Series Map "Yorkshire 273 SE" identifies the coal as the Lower Penistone Coal. An unknown source map within evidence file E-MISC-292 annotates the seam as "Fireclay".
Better Bed (Grenoside Sandstone)	Unknown	Coal	Identified in Consultants Coal Mining Report but not in Stage 2 Mining Report. Stratigraphically below Lower Penistone Coal (Figure 6). Estimated to be 0-0.30m thick [14].

Pre-industrial extraction of coal, and associated stratified ores such as ironstone and fireclay, was largely limited to bell pitting or short adits into exposures along natural topographical features such as river valleys. Waters et al. [14] note that the economics of underground mining are currently generally unfavourable, although underground coal workings continue on a small scale at Hay Royds Colliery at National Grid Reference SE250094 (c. 6km north of the site).

Workings in the 18th and 19th centuries were generally in the form of "pillar and stall" whereby a seam was partially extracted, leaving support pillars. Partial or complete collapse resulting from pillar failure or roof failure may subsequently occur and can lead to upward crown hole or void

migration. This can eventually cause ground subsidence and is the principal risk associated with such workings. The extracted seam thickness, and the competency and thickness of the rock strata above the workings will govern the assessment of the risk of void migration, and any assessment is therefore qualitative.

Pillar and stall workings were often reworked or "robbed" to extract further coal, further weakening the pillars or removing them completely (often referred to as "goaf"). Later methods involved working at an advancing face, with roof support provided by "packing".

Workings in the post-war years were almost universally of long-wall method, where the roof was allowed to collapse behind a working face supported by mobile hydraulic props that advanced as coal was extracted. Most of the ground subsidence associated with this type of working would occur within a few years of abandonment.

Abandoned mine entries typically accompany these workings. Dependent on the time and situation that they were abandoned, the condition of shafts and their infill can vary greatly. Older shafts are more likely to have inadequate treatment, with backfills of colliery spoil, and poor and deteriorating lining. Shafts may have also been left open to aid ventilation. There is a likelihood of unrecorded shafts being present in areas where mining pre-dates historical mapping and mining records.

Following the implementation of the 1850 Coal Mines Regulation Act, the keeping of records of mining activities was required by law, whilst it only became mandatory to deposit or register accurate plans of coal workings with the regulatory authorities after 1873 (after following the 1872 Coal Mines Regulation Act). In 1911, mine owners were required to maintain accurate plans of a specified scale and revise them every three months. Plans had to show the position of the mine workings in relation to surface features, including mine entries and faults. Plans had to show the position of the mine workings in relation to surface features, including mine entries and faults. The accuracy of the surveying of the earlier plans (certainly those pre-dating 1887) was often crude, with plans potentially illustrating plan views uncorrected to account for dip of strata, etc., and so may not truly reflect the actual plan position of the workings. These errors can be compounded when attempting to overlay these plans to the existing topography. Plans were also produced relative to magnetic north, which may differ significantly at the time of surveying from modern grid north.

Any interpretation of a coal mining records search must therefore be undertaken with these limitations in mind.

3.1.2. Surface Extraction

The PLCM has been indicated to have been extracted at the surface for a variety of building purposes. Extraction for these purposes is typically expected to be at the surface on a small, localised scale, including quarries or pits, with numerous historical examples included on the historical mapping (Table 5) and BGS "Mines and quarries" database [13]. Recorded surface mining within 150m of the site is illustrated on Drawing SGL-1002-SLC-DRG-RA-004.

3.2. Network Rail

NR provided a Stage 2 Mining Report covering ELR PEH and mileage extents 13.0700 to 13.0800 M.Yds (Appendix C).

The report concluded that there is a high mining risk and that a MRA is required due to:

- The Mining Remediation Authority (formerly "The Coal Authority") recorded coal outcrop beneath the site and designated area of development high risk area;
- The potential for unrecorded mine entries and mine workings for coal and fireclay to be present within influencing distance of the site; and
- The presence of workable coal at the site presents the risk of mining derived gases at the site.

A series of "Evidence Files" were provided along with the Stage 2 Mining Report. These records contain a multitude of files including plans, reports, letters and other correspondence detailing activities, events and the general mining history of the site. Summit has assumed this to be the complete archive of information held by the NR Mining Department in relation to the site extent.

The "Evidence Files" have been reviewed for information that may help characterise the hazards posed to NR assets by legacy mining (Appendix D).

3.2.1. Mining Records

Relevant information on NR held mining records (Section 4 of the Stage 2 Mining Report) is summarised in Table 12.

Table 12: Summary of NR mining records

Mine Record	Summary
Mine Entries	No records within 50m of NR assets.
Underground Mining	NR and the Mining Remediation Authority do not identify recorded underground workings within influencing distance of the site. Evidence file E-MISC-492 states that mining within the Lower Penistone Seam and fireclay from shallow pits and quarries cannot be ruled out.
Arup Mining	Indicates that the site lies within the South Yorkshire Coalfield that was mined for coal, fireclay, ganister and ironstone. The commodities were extracted from medieval time until at least 1991. Methods of extraction were bell pits and then later pillar and stall, and longwall methods.
Probable Underground Mining	NR and the Mining Remediation Authority do not hold records of probable mining with influencing distance of the site.
Mining Remediation Authority Development Risk	The site lies within a Development High Risk Area (DHRA), relating to the seam outcrop.

3.2.2. Surface Mining

The BGS "Mines and quarries" dataset [13] identifies one surface mining feature within 250m of the site boundary (Table 13). This relates to the sandstone quarry identified in Section 2.2.

Table 13: Summary of NR surface mining records

BGS Reference	Name	Grid Reference	Commodity Produced	Comments
37964	Signal Box	424987, 403339	Sandstone	Closed quarry

3.2.3. Landfill

NR identifies instances of landfill and unknown gas in the vicinity of the site. Records from the NR National Wastebook and EA Historic Waste Sites are summarised in Table 14 and Table 15, respectively. A copy of the NR Landfill Report is included as Appendix E.

Table 14: Relevant NR National Wastebook 2019 records

Site Name	ELR	Start-End (M.Yds)	Status	Landfill Gas	Remarks
Depot, Sheffield Road, Penistone	PEH	13.0484-13.0924	Closed	Unknown	Landraising with unknown wastes. Site has been built over.
Spring Vale, Sheffield Road, Penistone	PEH	13.0528-13.0924	Closed	Unknown	Tip of slag and work wastes. Site is currently being reworked as part of a reclamation project.
Churchfield Road, Penistone	PEH	13.0638-13.0924	Closed	Unknown	Foundry sand tip. Closed in 1991.
Depot, Sheffield Road, Penistone	PED1	28.0814-28.1012	Closed	Unknown	Landraising with unknown wastes. Site has been built over.
Churchfield Road, Penistone	PED1	28.0814-28.1144	Closed	Unknown	Foundry sand tip. Closed in 1991.
Spring Vale, Sheffield Road, Penistone	PED1	28.0814-28.1496	Closed	Unknown	Tip of slag and works wastes. Site is currently being reworked as part of a reclamation project.

Table 15: Relevant EA Historic Waste Sites records

Site Name	Easting	Northing	Waste Type	Landfill Gas
Penistone Church	425100	403100	Industrial, inert, licenced	Unknown

The NR Landfill Report states that a site-specific DSEAR (The Dangerous Substances and Explosive Atmospheric Atmospheres Regulations 2002) risk assessment should be completed if any proposed hot works or excavations into the ground beneath the ballast are proposed. The risk assessment should establish appropriate mitigation measures prior to the commencement of the works. Monitoring of landfill gas and air quality will be required.

3.3. Mining Remediation Authority

Part of the site is in an area identified as a DHRA [19].

A Consultants Coal Mining Report was purchased as part of the Arup Desk Study (Appendix B) for the proposed car park portion of the site. A summary of the held records on mining activity and geology is summarised in Table 16.

Table 16: Summary of mining activity and geology

Mining Activity and Geology	Summary
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 100m of the enquiry boundary
Abandoned mine plan catalogue numbers	None available
Geological faults, fissures and breaklines	No faults, fissures or breaklines recorded
Opencast mines	None recorded within 500m of the enquiry boundary
Coal Authority managed tips	None recorded within 500m of the enquiry boundary

3.3.1. Spontaneous Combustion

The Mining Remediation Authority upload a list of coal seams in the United Kingdom with a history of spontaneous combustion [20]. The list does not identify the Lower Penistone Coal or Better Bed seam as having a history a spontaneous combustion. However, the Mining Remediation Authority also state coal seams that are not listed should not be regarded as free from risk of spontaneous combustion as most coal seams could suffer from spontaneous combustion depending on the method of them being entered, worked or disturbed.

3.3.2. Mine Gas

The Consultants Coal Mining Report did not identify any recorded instances of mine gas within 500m of the site.

3.3.3. Investigative or Remedial Activity

No remediated sites were identified within 50m of the site. One site investigation, relating to the Arc Environmental Ltd GI (Section 2.3.2) was identified 15.8m east of the site.

3.4. British Geological Survey

3.4.1. Named Coal Seams

The Stage 2 Mining Report identified the Lower Penistone Coal seam as outcropping beneath the site and its location is shown on BGS mapping (Figure 5).

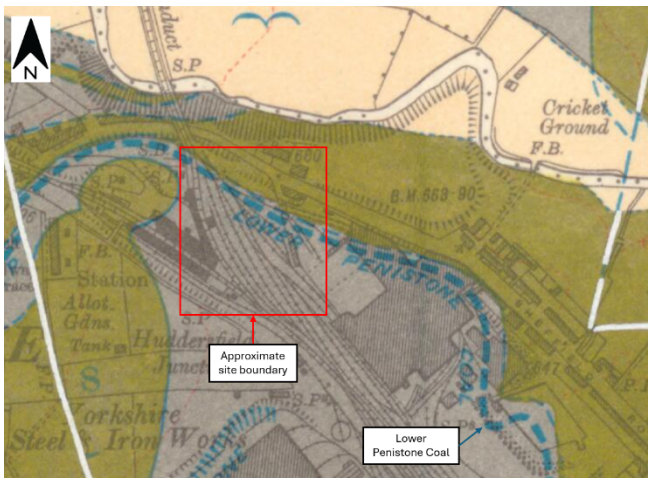


Figure 5: Location of Lower Penistone Coal seam in relation to site (after BGS [12])

The Consultants Coal Mining Report identifies the Better Bed seam as outcropping beneath the site, at roughly the same location. Due to the conflicting evidence, both the Lower Penistone Coal and Better Bed seams have collectively been considered as part of the mining evidence.

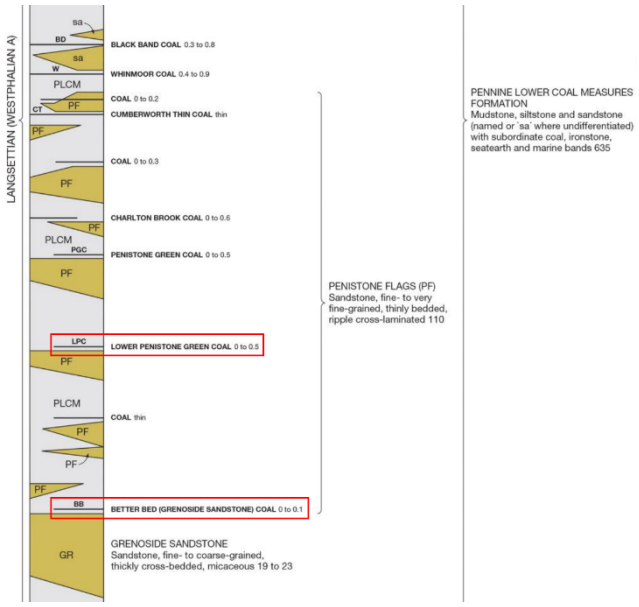


Figure 6: Stratigraphic location of Lower Penistone (Green) Coal and Better Bed coal seams (after BGS [11])

3.4.2. Surface Mining

Various BGS mapping sources have been consulted for recorded instances of mineral extraction in the vicinity of the site and NR assets. This includes the BGS "Mines and Quarries" dataset [13] and the accompanying NR "BritPits" plan (Appendix C), details included in the Groundsure reports and various scale BGS mapping.

Evidence of historical surface mining is discussed in Table 5 and references to the corresponding BGS "Mines and quarries" record included.

3.5. South Yorkshire Mining Advisory Service

An enquiry was made to the South Yorkshire Mining Advisory Service (SYMAS) via BMBC with respect to any known subsidence or voided ground identified within or in proximity to the site. A response was provided and a copy of the email response included as Figure 7.

Morning Jake

The station is located clear of deep coal mine workings.
The Mining Remediation Authority designate the station area as being within a High Risk Planning referral area and therefore this triggers the requirement to submit a coal mining risk assessment for planning purposes.
The referral area is largely based on old 1930's geological sheets which conjects the outcrop of the Lower Penistone coal through the development site.
The newer 1:10000 BGS map SE20SW and SE20SE do not show this outcrop.

The MRA do not categorise the area as "probable shallow workings" or "recorded shallow workings"

As far as SYMAS is aware the Lower Penistone coal is a thin and low economy seam.

We have no record of any mine workings or voided ground in the vicinity of the Station

Regards

Paul James BSc(Hons), MSc
Principal Mining Engineer
South Yorkshire Mining Advisory Service
Barnsley Metropolitan Borough Council

Figure 7: SYMAS email response

3.6. Surface Features

Freely available LiDAR-derived Digital Terrain Models [8] have been reviewed alongside aerial [7] for any surface features that may be evidence of historical mining, such as crown holes, spoil heaps and "pock mark" depressions amongst others. Excavated ground can be seen in the vicinity of the unnamed stone workings (Table 5) although this may also be associated with construction of the access road to Penistone Station. This is shown on Drawing SGL-1002-SLC-DRG-RA-004.

4. Mining Hazard Summary

4.1. Introduction

The information presented in Sections 2 and 3 has been reviewed in relation to the site and proposed works, and NR's Evidence of Mine Workings Categories (Appendix D). A preliminary ground model is provided in 2D cross-section format as Drawing SGL-1002-SLC-DRG-RA-002 and a summary of identified mining features as Drawing SGL-1002-SLC-DRG-RA-004.

4.2. Mine Entries

No recorded mine entries (or wells) were identified within 100m of the site. The site-specific GI proved presence of a 0.95m thick coal seam at 27.90m bgl (185.15m OD) with no evidence of broken ground associated with historical mine workings.

The qualitative risk of unrecorded shaft, bell pit or adit presence is low with reference to CIRIA C758D Table 14.1 [6]

4.3. Surface Mining and Tips

The reviewed evidence indicates the presence of recorded surface mining, the nearest of which is 85m north-west of the site and is illustrated on Drawing SGL-1002-SLC-DRG-RA-004. The evidence reviewed suggests that the extent and depth of workings are likely to be limited and therefore are unlikely to have an influence on the site.

4.4. Underground Mining

Neither NR nor the Mining Remediation Authority hold any records of recorded underground workings within influencing distance of the site. The site-specific GI proved the presence of an intact coal seam at 27.90m (185.15m OD) with no evidence of broken ground associated with historical mine workings. The risk from underground mining is therefore considered to be Low.

4.5. Mine Gases

A review of available information did not identify any known instances of mine gas or mine gas related incidents at the site. However, due to the potential for unrecorded coal mine workings to be present beneath the site, associated mine gases must be considered at the risk assessment stage.

5. Preliminary Risk Assessment

5.1. Assessment Approach and Risk Register

No recorded, probable with evidence or probable hazards relating to the working of PLCM for coal or fireclay has been identified within influencing distance of the site.

A preliminary risk register has been prepared and is presented as Table 17. Further information on how mining hazards have been assessed in presented in Appendix G.

Table 17: Preliminary risk register

Hazard	Preliminary Risk	Basis of Assessment	Remaining Uncertainty	Required Action
Underground workings	Low	No recorded workings; intact coal encountered; no voids or broken ground; sufficient cover indicated.	The project boreholes do not cover the proposed footbridge, lift and stairs foundation footprint.	Undertake targeted GI beneath the footbridge, lift and stairs foundations to confirm seam condition and absence of mining related disturbance.
Unrecorded mine entries	Low	Neither NR nor the Mining Remediation Authority hold any records of recorded underground workings within influencing distance of the site.		
Mine gas	Low			
Surface mining	Very Low	Two instances of surface mining (HAZ-02 and HAZ-03) have been identified within 120m of the site; further may have also occurred before the first OS map was published in 1853. The evidence reviewed suggests that the extent and depth of workings are likely to be limited and therefore are unlikely to have an influence on the site.	N/A	N/A
Landfill gas	Low	NR Landfill Report designates the track corridor as being landfilled and potentially containing unknown landfill gas.	The completed GI did not target the track corridor.	Undertake targeted GI beneath the footbridge, lift and stairs foundations to confirm presence of landfill and undertake ground gas monitoring.

Notes

[1] Hazard location shown on Drawing SGL-1002-SLC-DRG-RA-004.

5.2. Influence of Risks to Proposed Works

The MRA has identified a proven coal seam beneath the investigated (car park) area, together with the potential for unrecorded shallow workings and mine entries within the wider site. Based on the evidence reviewed, including a cover ratio of c. 27:1 to the proven seam, the absence of any evidence of historical working, the proximity (c. 30m) of the nearest proving exploratory hole to the track, and corroboration from the Arup Desk Study (Appendix B Section 4), the risk posed by these hazards to the proposed works is assessed as Negligible, Low or Possible.

The above findings should be regarded as preliminary pending the supplementary GI. On this basis, and subject to the limitations and recommendations set out in Section 5.3, the site is recommended to be treated as Eurocode 7 Geotechnical Category 2 [21].

During the construction phase, the works themselves, such as the movement of heavy plant machinery, vibrations, groundwater alterations and differential loading (e.g., earthworks and stockpiling), have the potential to trigger the collapse of unrecorded historical workings, entries or infilled ground. Collapse of workings could affect the safety of site staff and impact the construction programme and cost. GI and construction work (e.g., piling) have the potential to create pathways for mine gas migration to surface and provide sources of ignition. Currently, positions of site compounds or details of any specialist plant such as lifting equipment are not known. It is recommended that the MRA is reviewed by the contractor when detailed construction methods are known and that updates are made if necessary.

Post-construction phase, the proposed interventions may increase the risk of collapse, due to changes in ground loading and potential impact on hydrology or groundwater.

During the design's lifecycle, collapse of mine entries or shallow workings could result in ground subsidence or voiding at the surface, leading to potential damage to the scheme, threat to the safety of the public and the need for maintenance. The impact of ground subsidence could be significant with more sensitive structures such as the proposed footbridge, including damage leading to injuries to people and significant costs.

5.3. Further Investigation and Mitigation Measures

Based on the available records and intrusive investigation, the preliminary mining risk is assessed as Very Low or Low. However, the nearest boreholes are c. 30m from the proposed footbridge, lift and stair foundations. Targeted GI is therefore required at the proposed foundation locations to confirm that the assumptions adopted in this assessment are applicable beneath the proposed structures. The investigation will also provide the ground information required for foundation design. No further mining investigation is anticipated at the car park site. The MRA shall be confirmed or revised following review of the investigation results.

6. Conclusions

6.1. Key Findings

From the evidence reviewed it can be noted that the site:

- Falls within a DHRA;
- There are no recorded, probable with evidence or probable hazards relating to the working of PLCM for coal or fireclay identified within influencing distance of the site; and
- The possibility of unrecorded mine entries and mine workings for coal and fireclay cannot be ruled out.

The MRA has concluded that the preliminary mining risk is assessed as Very Low or Low. Further targeted GI is required to confirm the assumptions adopted in the risk assessment. On this basis, the site is recommended to be treated as Eurocode 7 Geotechnical Category 2 [21].

6.2. Next Steps

- GIR and associated Association of Geotechnical and Geo-environmental Specialists (AGS) file to be shared with NR;
- Undertake targeted intrusive GI beneath the proposed footbridge, lift and stairs foundation footprint once NR land access is granted, to confirm ground conditions locally ahead of detailed design. No further mining investigation is anticipated at the car park site; and
- Review the outstanding information and targeted GI findings to confirm the mining risk assessment and determine whether an MRMR is required.

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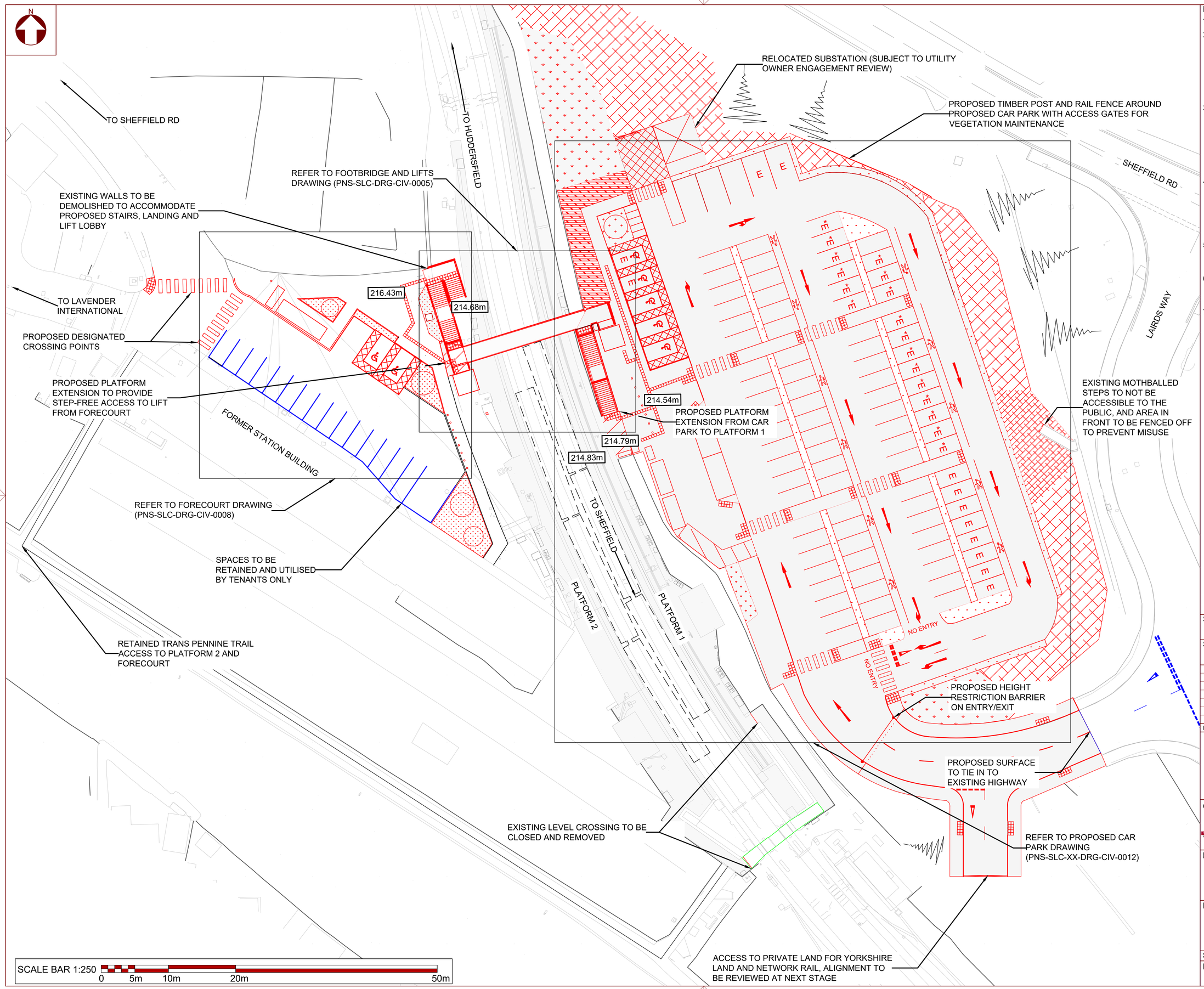
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Appendix A Drawings



Notes/Legend:

1. DO NOT SCALE FROM THIS DRAWING
2. TOPOGRAPHICAL INFORMATION OBTAINED FROM DRAWING 2207206_SKEYE_PENISTONE STATION_3D_FINAL_V2 BY SKEYE (22/07/2026) & P22-01501-MET-EXT-XX-TOP-M2-G-001-2 BY MET GEO ENVIRONMENTAL (07/12/2022)
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KEY

- EXISTING OR UNCHANGED
- MODIFIED OR TO BE MOVED
- OS/SURVEY DATA
- REDUNDANT OR TO BE REMOVED
- NEW, PROPOSED OR ADDITIONAL
- LANDSCAPING (REFER TO PNS-SLC-XX-DRG-CIV-0009 FOR DETAILS)

Stage: PACE 2 ES4

Status: S5 - FOR REVIEW

REV.	DATE	DESCRIPTION	DR.	CHK.	APVD.
P03	01/10/2026	ES4 ISSUE	KM	GZC	GZC
P02	28/09/2026	CLIENT ISSUE	KM	GZC	GZC
P01	28/08/2026	IDC/IDR SUBMISSION	KM	GZC	GZC

SLC

Client: BARNSLEY METROPOLITAN BOROUGH COUNCIL

Project Title: PENISTONE STATION FOOTBRIDGE & CAR PARK

Drawing Title: PROPOSED SITE-WIDE GENERAL ARRANGEMENT

Sheet Size: A1 | Scale: 1:250 | Sheet: 1 of 1

Drawing Number: PNS-SLC-XX-DRG-CIV-0002 | Rev.: P03



Legend

- Site Boundary
- Network Rail Track Centreline
- Borehole
- Trial Pit

Notes:

This drawing is to be read in conjunction with the Penistone Footbridge and Car Park Mining Risk Assessment.

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Coordinate System: British National Grid

0 20 40 m

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Revision: P02
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Project
Penistone Footbridge and Car Park - Mining Risk Assessment

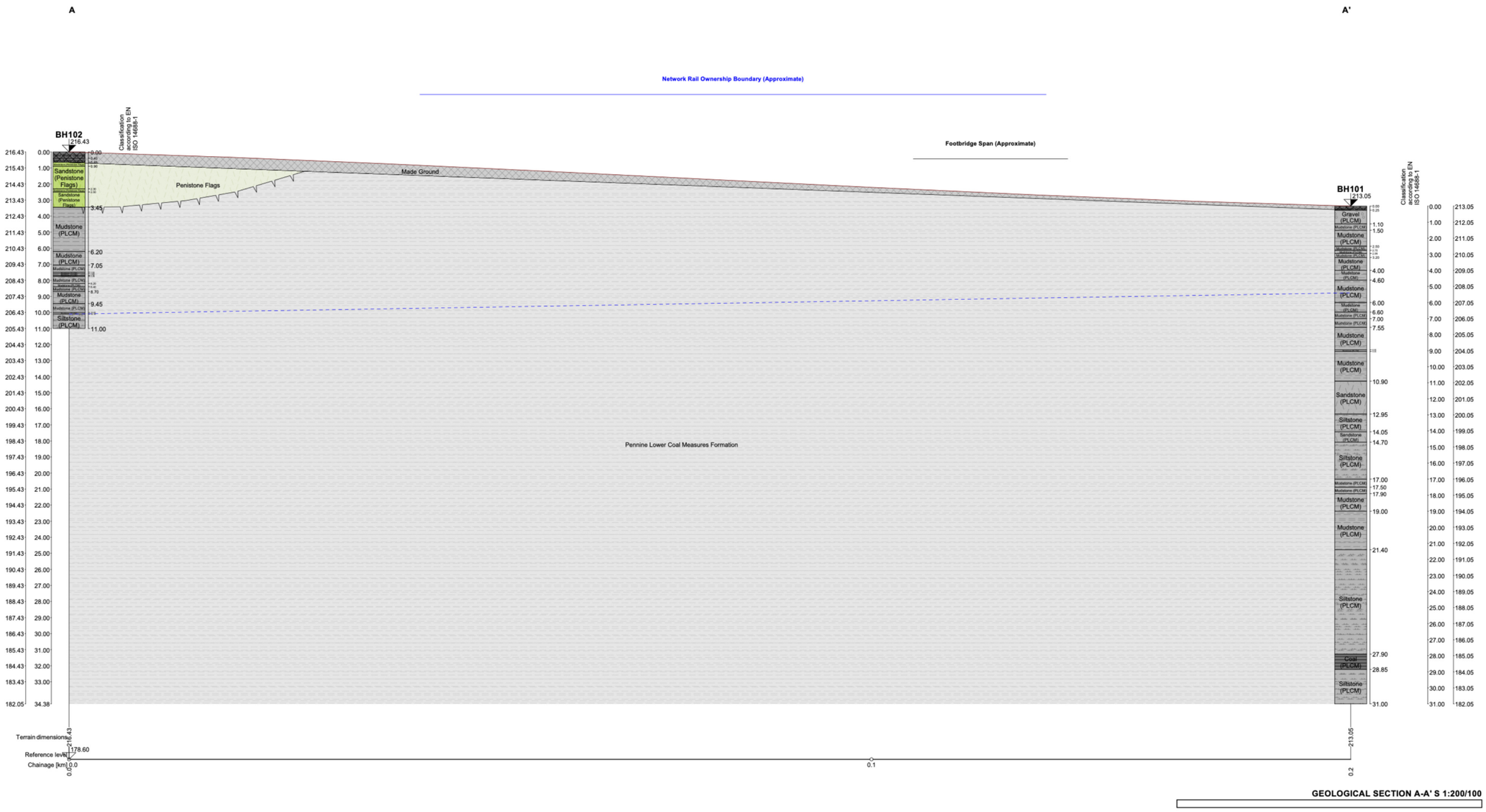
Drawing Title
As-Built Location Plan

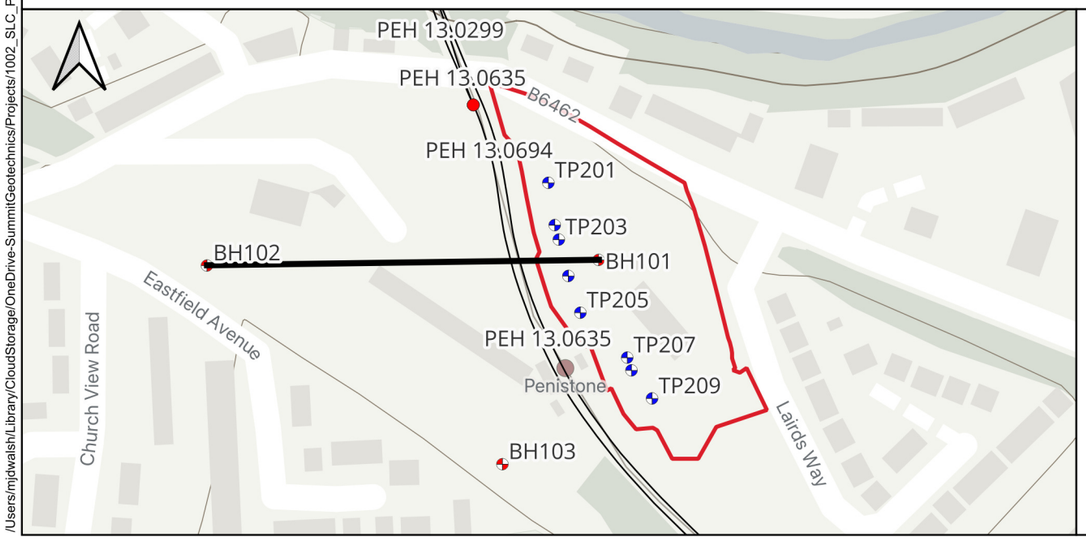
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Legend

A-A'

Soils

- Coal (PLCM)
- Gravel (PLCM)
- Siltstone (PLCM)
- Sandstone (Penistone Flags)
- Pennine Lower Coal Measures Formation
- Made Ground
- Sandstone (PLCM)
- Gravel (Made Ground)
- Mudstone (PLCM)
- Sand (Made Ground)
- Penistone Flags

Line types

- Subsoil
- Water

Notes:

This drawing is to be read in conjunction with the Penistone Footbridge and Car Park Mining Risk Assessment.

The relative position of Network Rail assets and the proposed footbridge are shown indicatively.

The groundwater table has been inferred from the minimum depth recorded during the monitoring programme and is subject to seasonal fluctuation.

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Coordinate System: British National Grid

0 60 120 m

1:2,500

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Author: MW

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Drawing Title
2D Geological Section

Suitability: For Issue

Job No.: 1002 | Revision: P02

Name
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PEH 13.0635

Wentworth Road

PEH 13.0299

B6462

GRENOSIDE SANDSTONE

HAZ-02

HAZ-03

PEH 13.0694

HAZ-01

PENISTONE FLAGS

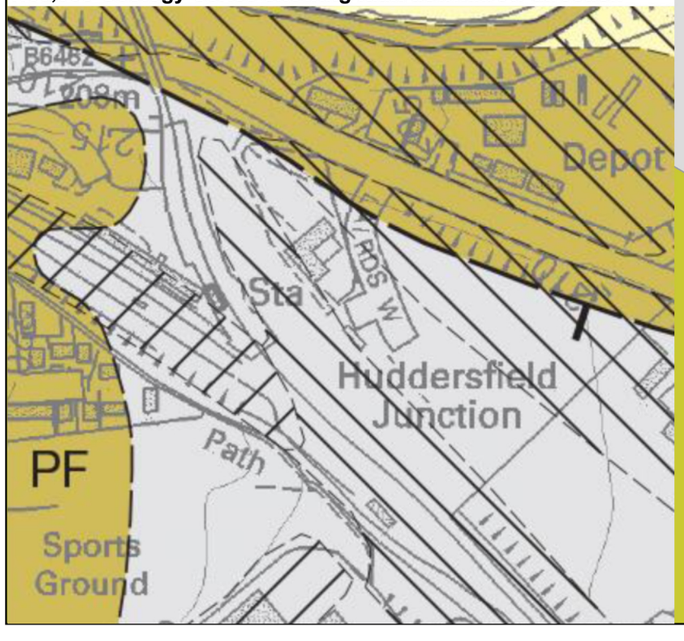
PENNINE LOWER COAL MEASURES FORMATION

PEH 13.0635

Penistone

Lairds Way

Extract of British Geological Survey Sheet SE20SE (Thurgoland) 1:10,000 Geology Series showing fault downthrow direction



Legend

- Site Boundary
- Underground Mining
- Surface Mining
- Network Rail Track Centreline

Notes:

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0 20 40 m

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Drawing Title
Bedrock Geology and Linear Features

Suitability: For Issue

Job No.: 1002 | Revision: P02

Name
SGL-1002-SLC-DRG-RA-003

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PEH 13.0635

PEH 13.0299

Wentworth Road

B6462

HAZ-02

HAZ-03

PEH 13.0694

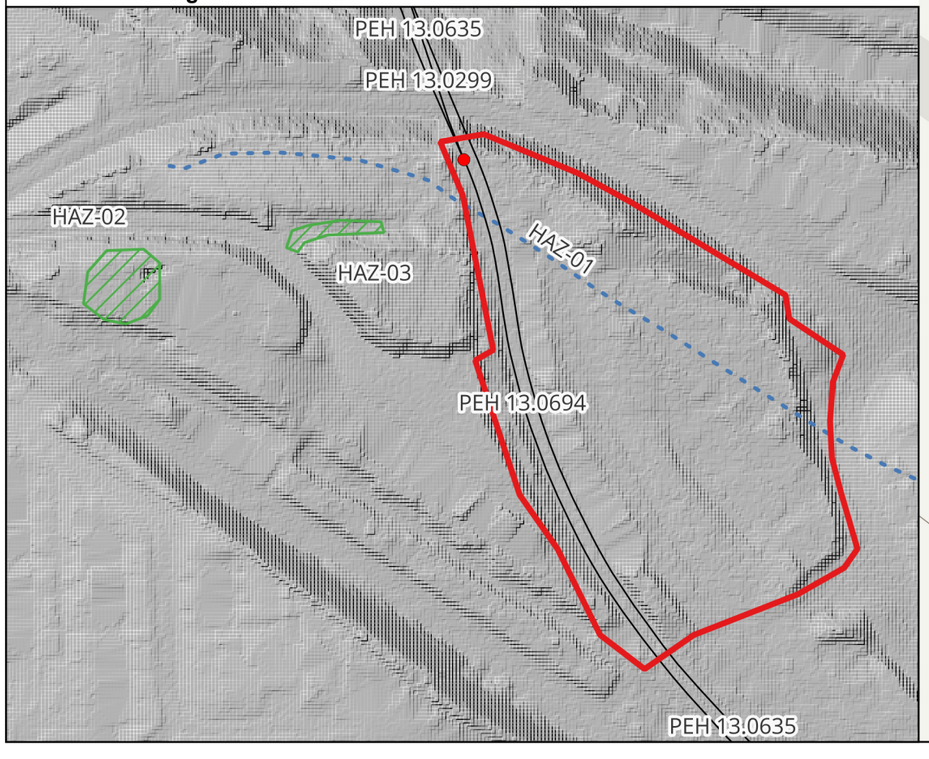
HAZ-01

PEH 13.0635

Penistone

Lairds Way

Identified Mining Hazards overlain on Department for Food and Rural Environment LiDAR-derived Digital Terrain Model



Legend

- Site Boundary
- Underground Mining
- Surface Mining
- Network Rail Track Centreline

Notes:

This drawing is to be read in conjunction with the Penistone Footbridge and Car Park Mining Risk Assessment.

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Coordinate System: British National Grid

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Drawing Title
Identified Mining Features

Suitability: For Issue

Job No.: 1002	Revision: P02

Name
SGL-1002-SLC-DRG-RA-004

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Appendix B Arup Desk Study

ARUP

South Yorkshire Mayoral Combined Authority (SYMCA)

Penistone Station Park and Ride

Geotechnical and Geoenvironmental Desk Study

Reference: PEN-ARUP-ZZ-XX-TN-GE-0001

P01 | 1 December 2023



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This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 287798-04

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Appendices

Appendix A - Groundsure Report
Appendix B – Consultants Coal Mining Report

Executive Summary

Ove Arup and Partners Ltd (Arup) has been commissioned by South Yorkshire Mayoral Combined Authority (SYMCA) to undertake a Geotechnical and Geoenvironmental Desk Study plus a Coal Mining Risk Assessment for the proposed Penistone Park and Ride (the site).

The site has a long industrial history with rail infrastructure, buildings and unknown materials previously present on site. Possible sources of contamination at the site include made ground associated with the historical uses of the site. Substructures associated with previous infrastructure and buildings on site are likely to be present.

Made ground is anticipated to be underlain by the Pennine Lower Coal Measures (PLCM), expected to comprise an interbedded sequence of mudstone, siltstone and sandstone. Grenoside Sandstone may also be encountered in the north/eastern part of the site. A geological fault is present along the northern side of the site.

Borehole evidence from the adjacent site to the east suggests that the coal seam identified to outcrop on the site by the Coal Authority is not present at shallow depth. Even if the coal seam is present, the Coal Authority do not consider it likely that there are possible unrecorded workings.

Ground investigation will be required to develop a better understanding of the geoenvironmental and geotechnical conditions at the site. The intrusive investigation is anticipated to comprise 8 No mechanically excavated trial pits with associated in-situ and laboratory testing.

1. Introduction

1.1 Commission and scope

Ove Arup and Partners Ltd (Arup) has been commissioned by the South Yorkshire Mayoral Combined Authority (SYMCA) to undertake a Geotechnical and Geoenvironmental Desk Study plus a Coal Mining Risk Assessment to inform a new park and ride development.

The objective of the Geotechnical and Geoenvironmental Desk Study is to review available historical, geotechnical and geoenvironmental information pertaining to the site and the nearby surrounding area, highlighting any potential ground related risks to the proposed development. The Desk Study also aims to inform the scope and preliminary design of a ground investigation and identify any constraints relating to the ground investigation.

The Coal Mining Risk Assessment is required because the proposed site lies within a Development High Risk Area as defined by the Coal Authority.

It is intended that this document can also be submitted to the Barnsley Metropolitan Borough Council to support the planning application.

1.2 Sources of information

The following sources of data and information have been reviewed as part of this desk study:

- Groundsure Geo and Enviro Insight reports (September 2023) [1][2];
- Groundsure Map Insights report (September 2023) [3];
- Consultants Coal Mining Report (September 2023) [4];
- British Geological Survey (BGS) geological mapping available via the online GeoIndex viewer [5];
- BGS 1:10,000 geological map SE20SE [6].

Details of the sources used are indicated in subsequent sections and are provided in the references section. Supporting information has been included in the appendices where appropriate.

1.3 Report structure

This report has the following structure:

- Section 2: Provides a description of the site in its current condition
- Section 3: Documents the known site history, mining history and the geological and geoenvironmental setting
- Section 4: Provides a summary of the key coal or coal mining constraints identified in relation to the proposed development
- Section 5: Provides a summary of the key geoenvironmental constraints identified in relation to the proposed development
- Section 6: Provides a summary of the key geotechnical constraints identified in relation to the proposed development
- Section 7: Presents the geotechnical and geoenvironmental risk register
- Section 8: Presents conclusions of this assessment and recommendations for ground investigation.

1.4 Use and limitations of the report

This report was prepared by Arup on behalf of South Yorkshire Mayoral Combined Authority (SYMCA) for the Penistone Park and Ride development. It considers our client's instructions and requirements and addresses their priorities at the time. This report is not intended for, and should not be relied on by, any third party and no responsibility is undertaken to any third party in relation to it.

All reasonable skill, care and diligence have been exercised within the timescale available and in accordance with the technical requirements of the brief. Notwithstanding the efforts made by the professional team in preparing the report it is possible that other ground contamination or conditions as yet undetected may exist and consequently reliance on this report must be limited accordingly.

2. Site description

2.1 Site location and extent

The site is in Penistone, a town located in South Yorkshire. The site covers an area of approximately 0.82 ha, and it is centred at National Grid reference SE 25160 03286.

The site is bounded to the west by railway tracks and the Penistone train station. Lairds Way bounds the site to the east and Sheffield Road bounds the site to the north. The approximate site boundary is presented in Figure 1 below.



Figure 1 Site location

2.2 Topography

The topography of the site has been interpreted from Google Earth Pro. The site generally presents a flat terrain with an average elevation of 213 mOD. There is a change in level at the site boundary to Lairds Way and Sheffield Road with elevation here reaching 209 mOD. A mapped spot level of 207.6mOD is provided on the road near the junction of Lairds Way and Sheffield Road. The eastern side of the site appears to be a raised platform, retained by a brick and stone wall (estimated up to 2.5m high) with a vegetated slope in front down to the footway of the highways.

A site inspection has not yet been conducted. Aerial and street view imagery suggests the site is occupied by rough vegetation, including semi-mature trees along the east side, and two partially demolished buildings.

A site inspection including topographical survey will be needed to progress the design. A condition survey of existing walls will be required if they are to be retained as part of the proposed development.

2.3 Utilities and drainage

Information on buried utilities and existing drainage infrastructure is not available. A utility survey will need to be conducted before any intrusive investigations are undertaken.

2.4 Proposed development

The proposed development is a park and ride serving the Penistone train station. The development will comprise surface parking with capacity for 89 parking spaces (2.5m x 5m), 5 enlarged parking bays (3.6m x 6.0m) and 6 blue badge bays. A new retaining wall is proposed north and east of the parking area. Refer to Appendix C for a drawing of this proposal.

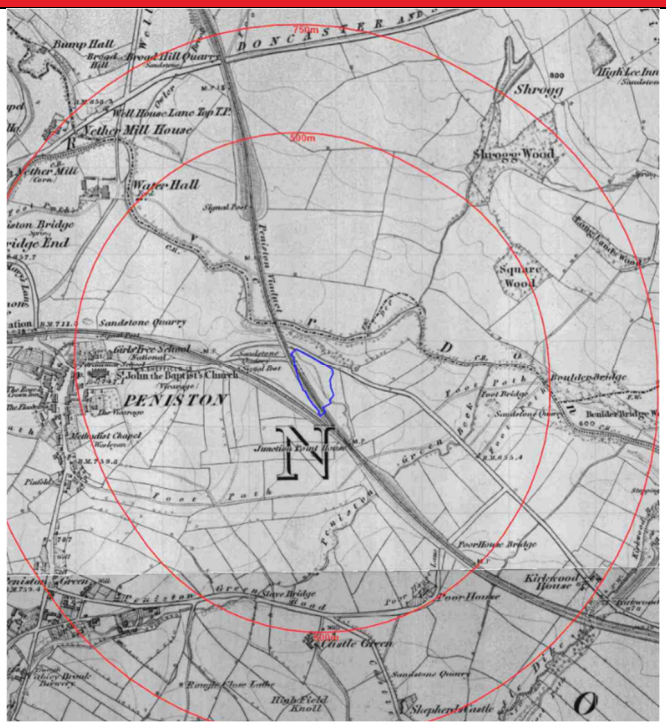
3. Site history and environmental setting

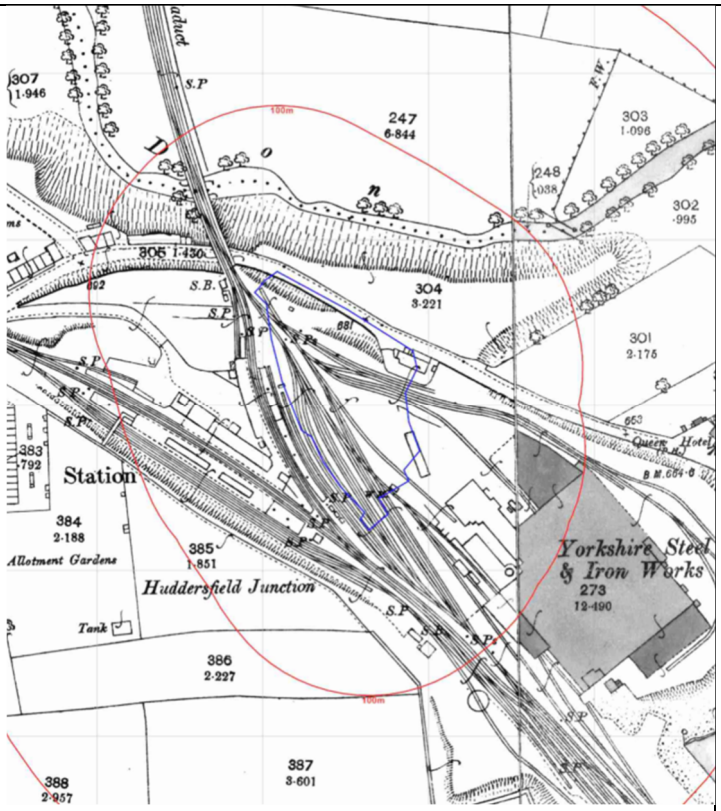
3.1 Development history

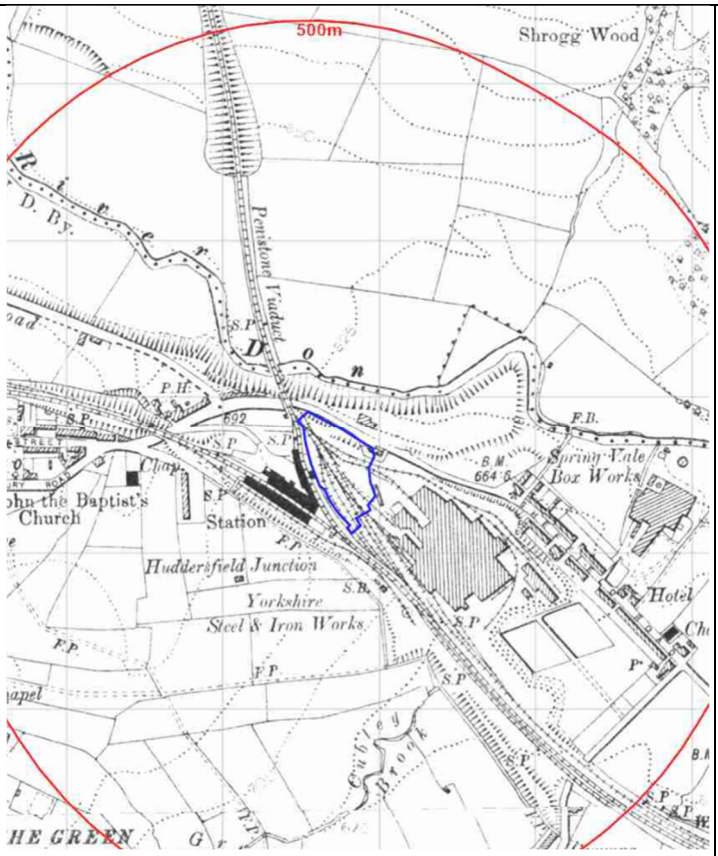
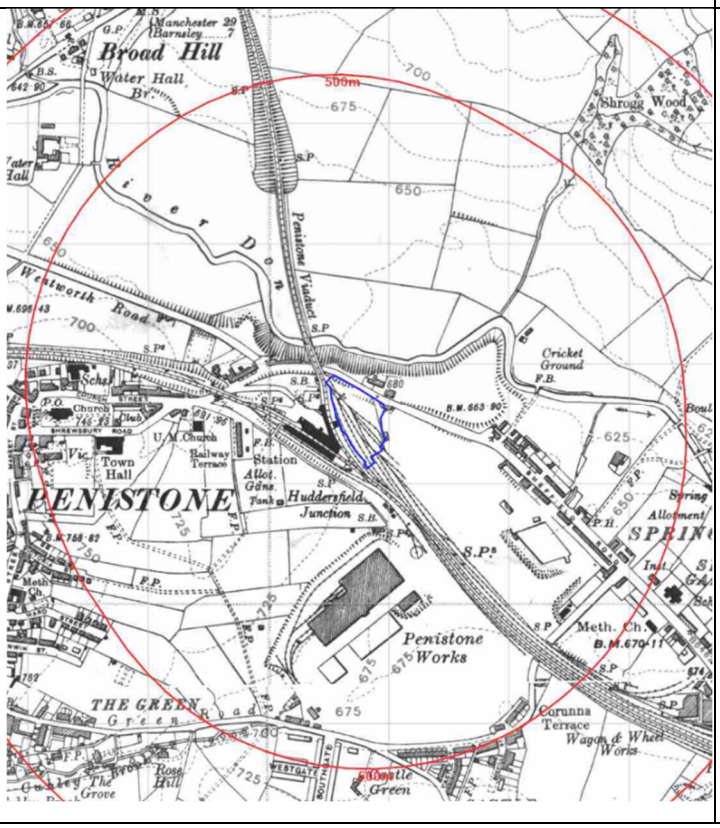
The history of the site has been summarised below based on historical mapping and aerial photography (from Groundsure and Google Earth Pro) The following information has been reviewed:

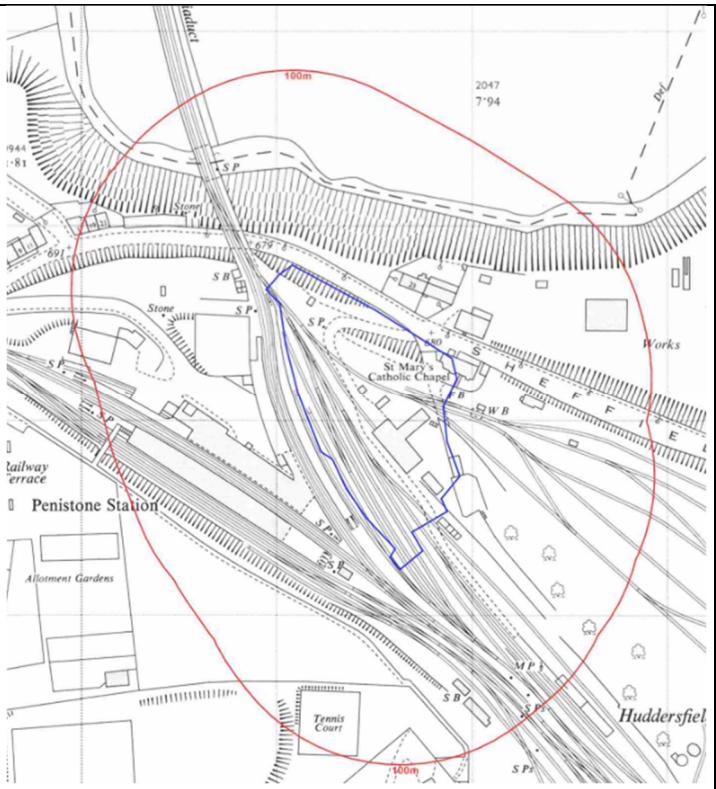
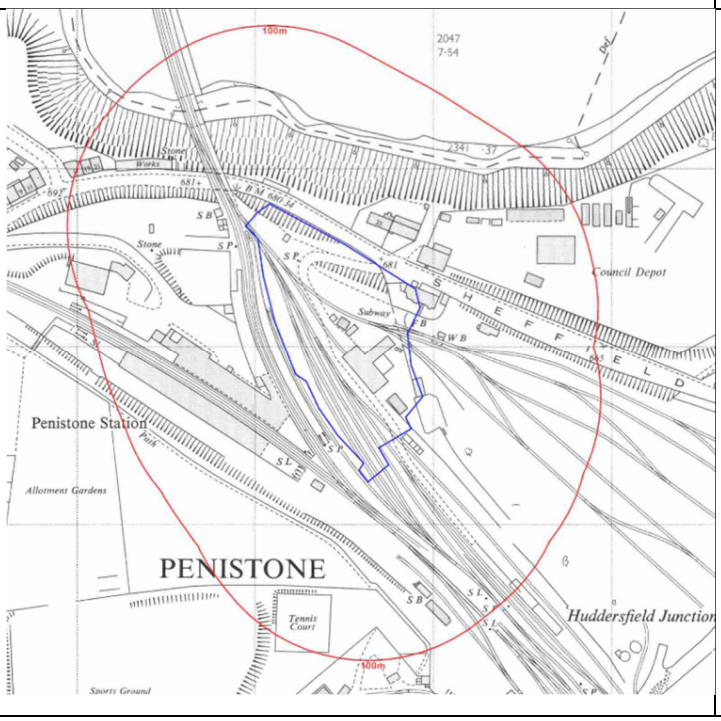
- Published Ordnance Survey (OS) mapping dating from 1854 to 2023 obtained from Groundsure [3];
- Reports prepared for this site: Groundsure [1][2][3];
- National Library of Scotland Town Plans of England and Wales / Scotland [7];
- Google Earth imagery dating from 1999 to 2023;

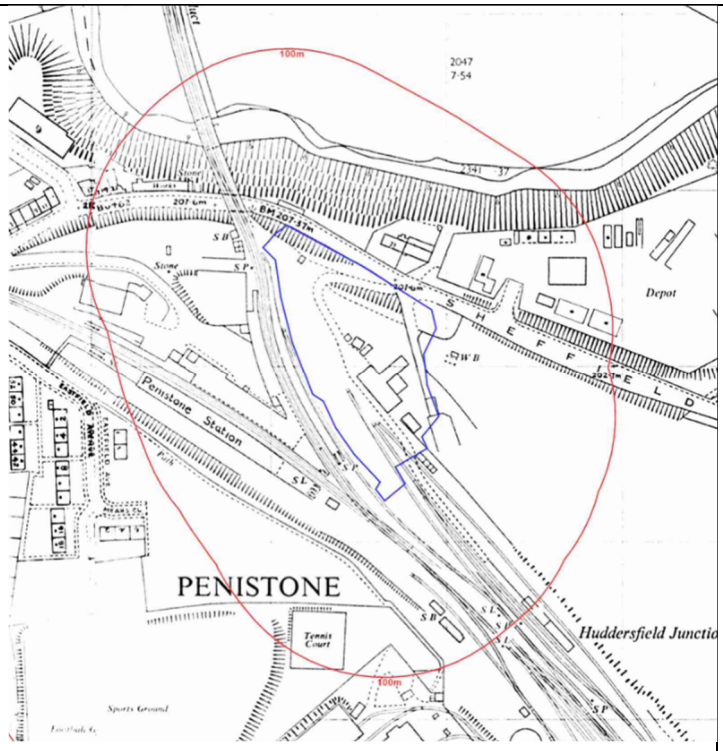
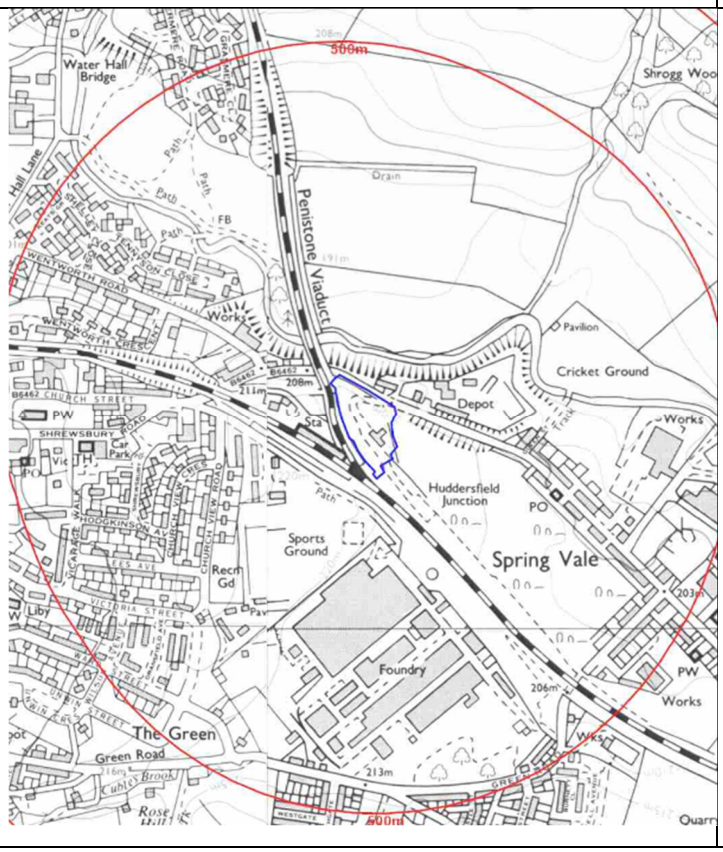
Table 1: Summary of site history

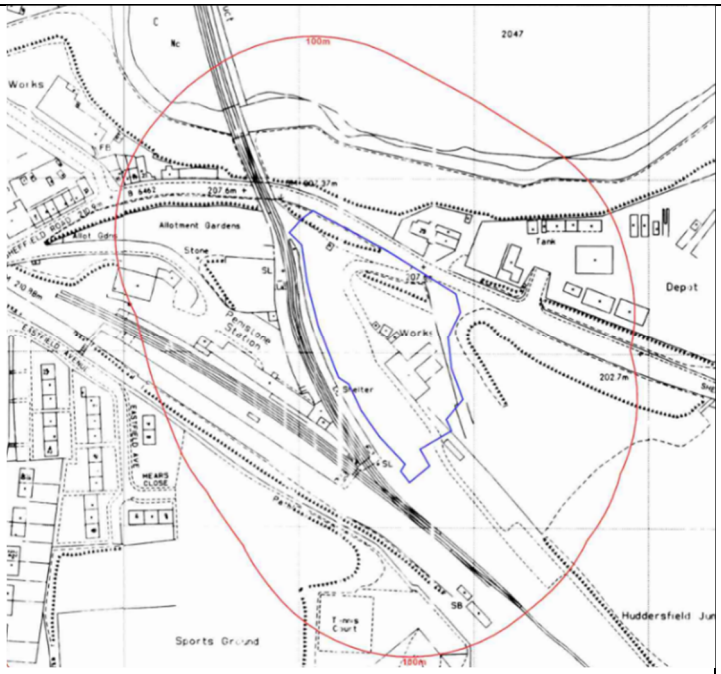
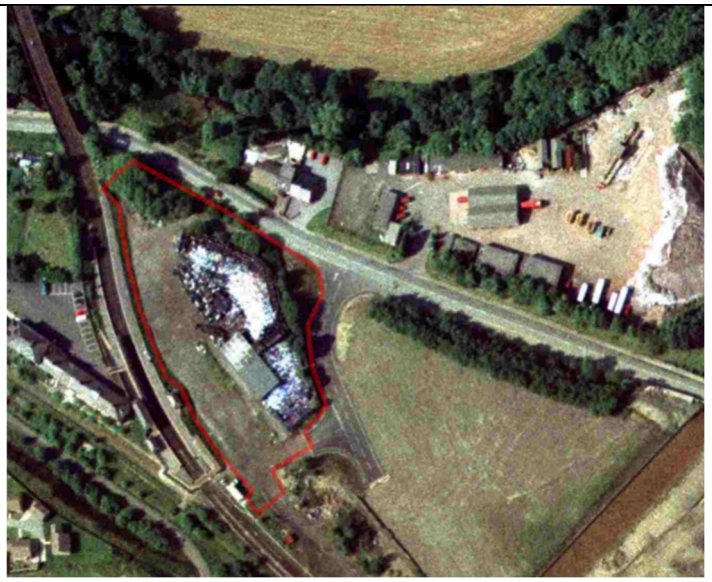
Year	Map/aerial image extract	Observations
1854 County Series 1:10,560		Railway tracks are present on the site. Penistone station is located approximately 750m west of the site, on a separate branch line. Sandstone quarries are located west of the site (100m and 450m), south of the site (650m), east of the site (500m) and northwest of the site (750m).

1893 County Series 1:2,500		The main railway line appears to have been diverted around the site, with the original tracks being one of several sets of sidings serving an 'Iron Works'. A small building that appears related to the sidings is shown in the eastern corner of the site. Another building is shown in the northeast corner, separated from the sidings. Earthworks in the north of the site may be partly cuttings and partly tipped material. Buildings relating to the 'Iron Works' are located approximately 50m southeast of the site. This is later annotated as 'Yorkshire Steel & Iron Works' in subsequent maps. A train station is now located adjacent to the western site boundary. A tank is located approximately 150m southwest of the site.

1903-1904 County Series 1:10,560		The train station has undergone development.
1938 County Series 1:10,560		The building annotated as 'Yorkshire Steel and Iron Works' appears to have been demolished. A building annotated as 'Penistone Works' is located approximately 200m south of the site.

1959 National Grid 1:2,500		Buildings have been built within the site and the layout of sidings has been changed. A subway is shown to run beneath sidings on the eastern edge of the site. The building in the northeast corner is now labelled St Mary's Catholic Chapel.
1967-1970 National Grid 1:2,500		The building on site has been extended and an additional small structure is present.

1978-1983 National Grid 1: 2,500		Most of the sidings have been removed from the site. St Mary's Catholic Chapel present on the eastern corner of the site has been demolished.
1987 National Grid 1:10,000		All the railway tracks have been removed from the site. The railway line heading towards the west from the site is disused.

1988-1993 National Grid 1:2,500		The buildings remaining on the site are now labelled as Works.
1999 Google Earth Imagery		The site is being used as storage for unknown materials. Lairds Way has been constructed along the eastern boundary.
2003 Google Earth Imagery		The unknown materials are still being stored on the site.

2009 Google Earth Imagery		The site has been cleared and the existing building has been partially demolished. It appears that roof and cladding have been removed but main structure remains intact.
2021 Google Earth Imagery		From 2009 to recent, no significant changes have occurred on site. Area appears to have naturally revegetated.

3.2 Mining History

The Groundsure consultant's coal mining report indicates no recorded mining activity on site and in the surrounding area however, a workable coal seam (named 'Better Bed') outcrops on the site. It is noted that the 'Development High Risk Area' is limited to the assumed coal outcrop position only, and not to any possibility of unrecorded workings.

The mining report indicates a site immediately to the east has been investigated, possibly for the recent (2017) housing development. The summary of findings from the consultant's coal mining report is presented in Figure 2 below.

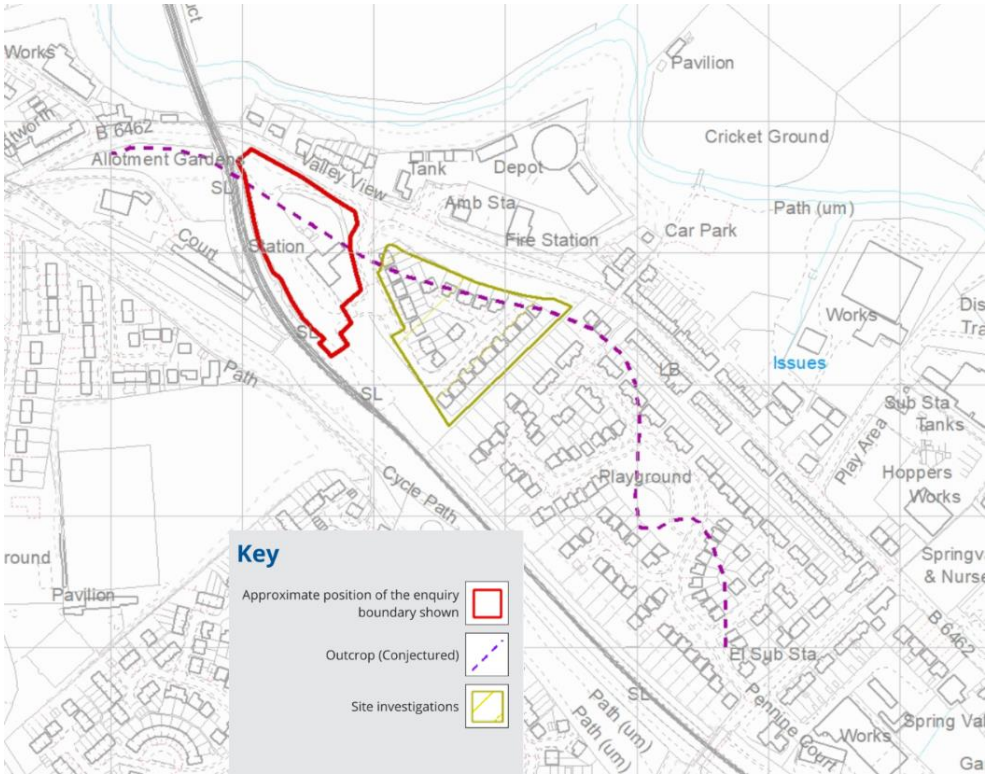


Figure 2 Summary of findings from consultant's coal mining report

3.3 Geology

The following sources of information have been reviewed:

- British Geological Survey (BGS) GeoIndex online viewer [5];
- BGS 1:10,000 geological map SE20SE [6];
- Groundsure GeoInsight report which includes 1:10,000 and 1:50,000 geological maps [1];
- BGS Memoirs for Geological Map Sheet 86 [8]

3.3.1 Made ground

The geological mapping confirms the presence of Made Ground (Undivided) on site.

3.3.2 Superficial geology

There are no superficial deposits mapped within the site. Alluvial deposits associated with the River Don are mapped to the north east of the site.

3.3.3 Solid geology

A geological fault is shown to run parallel to the northeastern side of the site, just within the site boundary, with strata downthrown to the south.

To the south of the geological fault are shown Pennine Lower Coal Measures (PLCM) formation expected to comprise of an interbedded sequence of mudstone, siltstone and sandstone. Grenoside Sandstone is shown to the north of the site.

No coal outcrops are shown in the vicinity of the site, but the Coal Authority report shows the 'Better Bed' coal seam to outcrop on the site, to the south and parallel to the fault, and is inferred to dip to the south. The geological memoir attributes a maximum thickness of 0.3m for the Better Bed coal seam [8].

3.4 Existing ground investigation data

3.4.1 BGS borehole records

There are no available historical borehole records held by the BGS on site or within 250m. However some confidential boreholes are indicated which may be obtainable on request.

3.4.2 Historical investigations

There are no records of previous investigations conducted onsite.

The ground investigation referenced by the Coal Authority on the site immediately to the east is likely to be the one that is available on the Barnsley MBC planning portal (application number 2016/0954). The report describes a ground investigation carried out by Arc Environmental on the site of the former iron and steel works. The investigation encountered 3.15m to 6.7m of made ground, which included ash and fused slag. The underlying natural strata typically comprised sandstone, siltstone or mudstone, but in some areas this was overlain by 1 or 2m of clay. Boreholes were extended to 30mbgl and did not encounter any evidence of coal or coal workings.

The contamination risk assessment was based on a residential end-use and concluded elevated concentrations of arsenic, lead and PAH compounds that could pose a risk to end-users. Clean soil cover was required in residential garden areas. No significant risk was identified from hazardous ground gas.

3.5 Radon

The Groundsure Report indicates that there is a low risk from radon at the site, with less than 1% of properties exceeding the Radon Action Level. As such, no radon protective measures are deemed necessary for the site.

3.6 Hydrology and hydrogeology

The site is located within the catchment of the River Don, which is located 45m north of the site.

A superficial ‘Secondary A’ aquifer is present approximately 45m north of the site, associated with River Don alluvial deposits. The bedrock aquifer underlying the site is classified as a Secondary A aquifer. These are permeable layers capable of supplying groundwater at a local scale. They also support base flow to rivers.

The nearest historical licensed groundwater abstraction is located approximately 350m south of the site. There are no Source Protection Zones nearby.

3.7 Flooding

The site is not at risk of flooding from rivers and the sea however approximately 50m north of site, there is high risk of flooding from the River Don. There have been historical flood events in the surrounding area with the nearest occurring 46m north of the site due to the channel capacity of the River Don being exceeded. The risk of flooding from groundwater is reported as negligible.

3.8 Environmental permits and incidents

Data on environmental permits, waste exemptions, licensed industrial activities and reported pollution incidents are included in the Groundsure report. West of the site at approximately 40 and 100m, waste exemptions for the treatment of waste aerosol cans is recorded.

A pollution incident was reported approximately 13m east of the site and it was described as specific waste materials (containers). The impact to water and land was assessed to be Category 4 (no impact) and Category 2 (significant) respectively. It is likely that this incident could have detrimentally impacted the site due to proximity and impact on land. Another incident occurred approximately 28m north of the site and it was related to sewage materials. The impact to water and land was assessed to be Category 3 (minor) and Category 4 (no impact) respectively. Given its location, this incident is unlikely to have detrimentally impacted the site.

3.9 Landfills

An historical landfill is recorded approximately 45m south of the site. Historical waste sites have also been recorded 425m southeast and 450 east of the site. Given their locations, the off-site landfill and waste activities are not likely to have a detrimental impact on the site.

3.10 Unexploded ordnance (UXO)

The Zetica UXO/UXB risk mapping has been consulted. The general area has been assessed by Zetica to have a low bomb risk [9].

4. Coal Mining Risk Assessment

4.1 Summary of coal and coal mining risks

The following table provides a summary of the perceived risks relating to coal workings.

Table 2 Perceived coal workings risks

Source	Location	Hazard	Risk
Unrecorded opencast or shallow workings on the workable 'Better Bed' coal seam	Onsite	Local collapse/ subsidence.	The Coal Authority have no records of workings, nor do they suggest that workings are possible. The site to the east appears to be a stratigraphically similar position, and ground investigation on that site did not encounter any evidence of shallow coal. Risk based on current information: **Low**
Hazardous ground gas emissions	Potentially anywhere above coal deposits	Hazardous gas migration into car park	No significant risk determined on site immediately to the east. End use has a low sensitivity. Based on proposed site use: **Low**
Geological faulting	A fault is shown to cross the site on the geological map.	Locally weakened rock mass leading to differential ground movement	**Low**
Coal combustion	The Better Bed Coal Seam is shown to outcrop on the site by the Coal Authority.	Underground fire caused by introduction of air.	No evidence of coal on adjacent site. Unlikely to expose coal during excavations. **Low**

4.2 Risk Mitigation

4.2.1 Unrecorded shallow and deep workings

No significant risk has been identified. This should be reassessed if coal is encountered during any future ground investigations or enabling works.

4.2.2 Hazardous ground gas

A hazardous ground gas risk assessment is undertaken in the preliminary geoenvironmental risk assessment presented in Section 5. Suitable precaution will need to be taken during any intrusive activities that intercept the coal seams beneath the site.

4.2.3 Coal Combustion

Risk considered to be low based on current information. To be reviewed following intrusive ground investigation.

4.3 Coal Authority Approval

The Coal Authority will be contacted for advice on permit requirements prior to commencement of development.

5. Preliminary geoenvironmental assessment

5.1 Approach

This preliminary geoenvironmental risk assessment has been prepared to inform decisions related to possible sources of contamination identified at the site. The risk assessment follows the UK approach to assessing contaminated land as outlined in the Land Contamination: Risk Management guidance [10].

The risk-based approach is underpinned by a conceptual model (CSM) which describes the scenario in which the risks to environment and human health may occur as a result of contaminated land. The CSM describes the ground and surface conditions, the proposed ground works and the final form of the development and identifies potential pollutant linkages. The plausible pollutant linkages (for human health and the environment) have been considered in the context of a conceptual Source-Pathway-Receptor (SPR) model of the site, identifying:

- The principal pollutant hazards associated with the site (the source);
- The principal receptors at risk from the identified hazards; and
- The existence, or absence, of plausible pathways which may exist between the identified hazards and receptor.

For risks to be present at the site, all three elements (source-pathway-receptor) of a plausible pollutant linkage must be present. Possible SPR linkage are described below based on the proposed site end-uses.

5.2 Potential sources

Railway tracks were present on the site from 1854 to 1987 and the site has also housed unspecified buildings associated with the railway use. A steel and iron works has historically been located adjacent to the site and a foundry plus several works within 500m. Made ground on the adjacent site contained ash and fused slag, and was also found to have elevated concentrations of both heavy metals and PAH compounds.

Google Earth aerial imaging shows material of unknown origin was placed on the site (dates unclear but indicated on photographs from pre 1999 until removed post 2003 and pre 2009) and there is a possibility that the material may contain elevated levels of contaminants.

Where available, the Department of Environment (DoE) Industry Profiles [11] were used to identify possible contaminants associated with historical land uses and are summarised in Table 3.

Table 3: Potential sources of contamination

Potential Source	Potential contaminants	Comments
Made ground beneath site associated with historical development	Asbestos Heavy metals Extremes of pH Hydrocarbons Polycyclic aromatic hydrocarbons (PAHs) Polychlorinated biphenyls (PCBs) Solvents Ethylene glycol Ground gas (methane, carbon dioxide, hydrogen sulphide)	Based on the historical site uses made ground beneath the site may contain significant contamination. A derelict structure is present on site and there is possibility for contamination to be present from this.
Underlying geology	Gas associated with coal seams	Evidence from adjacent site suggests that shallow coal will not be present and concentrations of hazardous ground gas are not significantly elevated.

Surrounding land (steel and iron works, foundry, and several unspecified works)	Heavy metals Inorganics Asbestos Fuels and Oils Polycyclic aromatic hydrocarbons (PAHs) Polychlorinated biphenyls (PCBs)	Low potential for migration of contamination from adjacent land, although waste ash and slag may have been used during the initial development of the sidings.

5.3 Receptors

The proposed development involves the construction of surface parking to serve the Penistone train station. Potential receptors both during construction and after completion of the development include:

- Construction workers, site neighbours and rail commuters during development;
- Future site users and maintenance/ ground workers of the new development; and
- Groundwater within the PLCM formation and Grenoside Sandstone (Secondary A aquifer).

5.4 Pathways

Potential pathways that may be present during construction and operational phases of development include:

- Human health – ingestion of soils or dust;
- Human health – inhalation of dust or ground gas;
- Human health – dermal contact with soils and groundwater;
- Controlled waters – leaching of contaminants from soils into groundwater;
- Controlled waters – migration of dissolved phase contamination within groundwater; and
- Ground gas – potential migration to surface via pile bores (if piled foundations used).

5.5 Contamination assessment

5.5.1 Soil human health risks

The proposed development is expected to occupy most of the site, with limited areas of soft landscaping. The proposed site use as a car park means there is little potential that future site users will come into contact with the soils on site, with the exception of areas of soft landscaping.

Where made ground is present at shallow depth beneath any soft landscaping there is a risk that site users could come into contact with contamination via dermal contact, inhalation and ingestion pathways. However, if required, this could be mitigated by the provision of clean cover system in all landscaped areas and therefore risks to future site users are considered to be low.

The biggest risk from interaction with soil on site arises during the construction works. There is a possibility that, if contaminated, the made ground may pose a short-term risk to human health for the construction workforce via potential exposure pathways including dermal contact, dust/fibre inhalation and ingestion pathways outdoors, and inhalation of gases. There is also a possible risk to site neighbours and rail commuters during construction via dust/fibre inhalation exposure pathways. Such risks can be mitigated by the contractor following standard good practice during construction and adoption of adequate health and safety procedures.

5.5.2 Controlled waters risks

Any contamination present in made ground may pose a risk to controlled waters through leaching and transport in groundwater. The nearest surface water receptor is the River Don 45m west of the site.

The proposed development will occupy most of the site and the introduction of hardstanding, compared with the existing situation, will reduce infiltration and generation of leachate in the underlying soils.

The risks to controlled waters is therefore considered to be low and further assessment is not required unless significant soil contamination is identified beneath the site during ground investigation.

5.5.3 Ground gas risk

Made ground is generally only a significant source of ground gases if it has a high proportion of organic degradable materials. Given the site's past use as rail sidings, the presence of degradable material is unlikely. Another potential source of ground gas is coal and associated workings, but the existing data indicates that neither are likely to be present. The proposed development for surface parking limits the presence of confined spaces hence the risks to the proposed development from ground gas is considered to be very low.

Further assessment is not required.

5.5.4 Summary of conceptual site model

The conceptual model, which illustrates the potential pollutant linkages that may be present for the proposed development A summary of the plausible pollutant linkages requiring assessment in relation to the site is presented in Table 4 below.

Table 4: Summary of conceptual model (post-development)

Sources		Pathways		Receptors	Comment
Contaminants in made ground	→	Dermal contact with soils	→	Site workers during construction Maintenance workers Users of future site (only in soft landscaping areas),	Ground investigation is recommended to assess whether contaminated soils are present. Appropriate site management protocols to be adopted during construction and maintenance works. A clean cover system to be installed in soft landscaping areas underlain by contaminated made ground.
		Ingestion of soil, fibres or dust	→		
		Inhalation of soil vapours and ground gases	→	Site workers during construction, commuters accessing train station and site neighbours Maintenance workers Users of future site (only in soft landscaping areas),	
		Inhalation of soil dust	→		
Leachable contaminants in the made ground	X	Vertical migration of dissolved phase contamination	→	Groundwater within the Pennine Lower Coal Measures Formation and Grenoside Sandstone (Secondary A aquifer)	Infiltration and potential for vertical migration will be limited by hardstanding. No further assessment unless ground investigation identifies significant soil contamination.
Ground gases	X	Accumulation of gases in confined spaces producing asphyxiation and explosion risk	→	Users of future site	No significant source identified. Site use for surface parking limits the presence of confined spaces. No further assessment.

6. Engineering considerations

6.1 Ground conditions

The ground conditions are expected to comprise made ground overlying Pennine Lower Coal Measures (PLCM), and Grenoside Sandstone.

The 'Better Bed' coal seam could potentially outcrop within the site and a fault runs across the northern edge of the site.

6.2 Buried obstructions

Railway tracks were in operation on site for more than 100 years, until 1987. A building and several smaller structures have also been present on the site. It is likely obstructions, such as railway sidings, sleepers, a subway structure and foundations associated with the buildings are present below ground level. Two buildings remain partially erected and foundations to these can be investigated at their known positions.

Elsewhere the location and extent of potential obstructions are to be further investigated during a recommended programme of ground investigation.

Buried obstructions may impact on the proposed earthworks and retaining wall solutions required as part of the development.

6.3 Coal and coal workings

There is no specific evidence of coal or workings below the site, although the Coal Authority suspect the presence of a coal seam but do not appear to believe that it is likely to have been worked. Given the low sensitivity of the proposed development to local subsidence that could occur over unrecorded workings, it is not considered necessary to carry out investigation into the presence of coal/workings at depth.

6.4 Groundwater

There is no information available on the presence of groundwater within the site. Given the history of the site and likely presence of made ground, localised perched groundwater is expected.

6.5 Voids and soft ground

Historical poor backfilling of former substructures may lead to the presence of soft spots or voids. An intrusive ground investigation should be undertaken to allow the risks to be evaluated.

A subway feature is indicated on some of the historical mapping. The presence and condition of this should be investigated further.

If areas of voiding are widely encountered during the ground investigation, a period of enabling works preceding the main construction works may be required.

6.6 Material re-use

An assessment of the properties of the shallow made ground in terms of earthworks characteristics should be conducted as part of the site-specific intrusive ground investigation.

6.7 Earthworks and retaining walls

Significant earthworks are not anticipated to be required. The new development will require a retaining wall with a height of up to around 2m to accommodate level changes north of the site.

The potential to investigate and reuse the existing masonry walls as well as regrading safe earthwork slopes up to the edge of the development should be considered.

Where new earth retention is needed that cannot be accommodated by a natural earth regrade (approx. 1v:2.5h slope), options to consider during design include:

- Steepened/reinforced earth slope (up to 1:1)
- Reinforced concrete cast in situ cantilever wall.
- Modular gravity wall – Gabion/Permacrib.

However, with any steepened engineered slope or wall system, consideration of drainage, fall protection (i.e. requirement for handrail parapet) and future maintenance would be needed. A natural vegetated slope would likely present the lowest cost overall if the geometry is compatible.

6.8 UXO

No site-specific UXO risk assessment has been completed for the site although it is considered likely that the site is at low risk of UXO. The Zetica mapping does indicate a potential industrial target about 1km to the south west of site. Although the iron and steel works adjacent to the site were demolished pre-WW2 in 1936, the station and other industrial works in the locality could have presented an opportunistic target during WW2.

It is recommended that a site-specific assessment is completed, which may result in mitigation measures being proposed during construction.

6.9 Roads and surface car parking

The site is expected to be underlain by variable made ground. However, the site has not changed levels since it was formerly used for rail siding and therefore the ground is expected to be generally compact and with minimal potential for significant settlement.

Some soft spots and voids may be locally present, associated with former structures, but these can be dealt with by excavation and replacement with engineered fill. The made ground may also contain steel slag. Certain slags can be susceptible to expansion, however slag within the shallow made ground is likely to have become fully hydrated due to water infiltration from surface over the last century and hence the risk from future expansion is likely to be very low.

After removal of surface turf and debris, the underlying made ground is likely to have a reasonable stiffness and thus act as a good subgrade for pavements.

The subgrade modulus should be confirmed during ground investigation to ensure an efficient design can be developed.

6.10 Infiltration drainage

The site is likely to be underlain by mixed made ground that may contain leachable contaminants. Ground investigation is required to determine the suitability of the shallow soils for infiltration drainage.

7. Geotechnical and geoenvironmental risk register

Register reference – Penistone Park and Ride Risk Register

Project	Penistone Park and Ride	**Job number**	287798-04
Package/ topic		**Design stage**	Desk Study – For Information

Remember: Avoid – Reduce – Control and communicate relevant information to others

Date (+ initials)	Area/location of risk exposure	Description of hazard and risk exposure	Mitigation of risk (potential or achieved)	A	R	C	Further action	By	Status Active/closed
24/10/23 ZO	Site wide	Buried obstructions or voids impacting time and cost of ground investigation and construction activities.	Ground investigation to assess extent of buried obstructions on site.		✓	✓	Once risk established during the GI, potential enabling works to remove obstructions in advance of construction e.	Arup/ Contractor	Active
24/10/23 ZO	Site wide	Risk of damaging utility services during ground investigation and construction works.	Obtain utility plans in advance of works. Include buried services survey.			✓	Designer to avoid known services where possible. Contractor to take appropriate precautions during works.	Client/ Contractor	Active
24/10/23 ZO	Site wide	Contamination causing risk to human health of workers during construction and future site users during operation.	Undertake ground investigation to collect soil samples for geoenvironmental testing.			✓		Arup/ Contractor	Active
24/10/23 ZO	Site wide	Ground gases affecting any construction workers within excavations during ground investigation or construction works.	Significant excavations are not expected on the site. Trial pits will not be entered during ground investigation.			✓			Closed
03/10/23 ZO	Western site boundary	Risk of interfering with railway operations	Precautions must be taken when undertaking works. Include procedures in RAMS.		✓	✓		Contractor	Active

8. Conclusions and recommendations

8.1 Conclusions

Based on a review of the available data, ground conditions on site are expected to consist of made ground associated with historical site development overlying shallow bedrock comprising mudstone, siltstone and sandstone of the Pennine Lower Coal Measures Formation. Grenoside Sandstone may also be encountered in the north/east of the site. A geological fault runs across the northern edge of the site.

Borehole evidence from the adjacent site to the east suggests that the coal seam identified to outcrop on the site by the Coal Authority is not present at shallow depth. Even if the coal seam is present, the Coal Authority do not consider it likely that there are possible unrecorded workings.

The site has a long industrial history with rail infrastructure, buildings and unknown stored materials previously present on site. Possible sources of contamination at the site include made ground associated with the historical uses of the site. Intrusive ground investigation is required to establish the extent and nature of chemical contamination, inform risk assessments and, if necessary, a remediation strategy.

Substructures associated with previous infrastructure and buildings on site and a mapped subway feature, as well as buried services may pose a constraint to future development. Further investigation will be required to identify these obstructions and the most appropriate methods of dealing with them.

8.2 Recommended outline scope of ground investigation

It is recommended that a development specific intrusive ground investigation is undertaken. The objective of this work is to determine the general ground stratigraphy as well as investigate specific ground related constraints.

The ground investigation objectives include the following:

- Characterise thickness and nature of made ground
- Investigate the underlying soil and rock for retaining wall design
- Investigate the nature, extent and depths of the existing structures and potential voids (subway) on site
- Assess soil contamination to inform contamination risk assessment and soil re-use or disposal routes.

A minimum of eight trial pits are recommended to investigate the general ground conditions and existing structures and possible voids across the site. The trial pits could incorporate soakaway and surface modulus testing for pavement design. The trial pitting should be carried out with a large tracked excavator to maximise the potential for confirming the full depth of the made ground, in case less stable materials are found at depth. In the event that the made ground is found to be deeper than around 5m and excessively variable, supplementary borehole investigation may be proposed.

Horizontal coring of the existing retaining structures may be required to allow their capacity and reuse potential to be established if this option is to be considered following an assessment of level changes.

Geoenvironmental and geotechnical sampling, in-situ geotechnical testing and laboratory testing will also be included.

References

[1] Groundsure Geo Insight report (2023) Report reference: GS-DKC-JQA-Y32-SME

[2] Groundsure Enviro Insight report (2023) Report reference: GS-DKC-JQA-Y32-SME

[3] Groundsure Map Insight report (2023) Report reference: GS-9YX-MDU-21M-RYG

[4] Consultants Coal Mining Report (2023) Report reference: 51003380715001. Report date: 29 September 2023

[5] British Geological Society (2023) GeoIndex Onshore Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.64844399.1578069677.1653300064-786435129.1653300064 [Accessed 20 October 2023]

[6] British Geological Survey (2005) SE20SE Solid and Drift 1: 10,000 Map Sheet SE20SE

[7] National Library of Scotland (2023) Ordnance Survey Towns Plans of England and Wales / Scotland 1840s-1890s. Available at: https://maps.nls.uk/geo/explore/side-by-side/#zoom=18.1&lat=53.82243&lon=-3.04809&layers=117746211&right=ESRIWorld [Accessed 19 October 2023]

[8] Waters, C N, Chisholm, J I, Hough, E, And Evans, D J. 2012. Geology of the Glossop district — a brief explanation of the geological map. Sheet Explanation of the British Geological Survey. 1:50 000 Sheet 86 Glossop (England and Wales).

[9] Zetica (2023). Zetica UXO risk maps. www.zeticauxo.com [Accessed 23 October 2023].

[10] Environment Agency (2020) Land Contamination: Risk Management [online]. Available at: https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks [Accessed 23 October 2023]

[11] CL:AIRE(2018) DoE Industry Profiles [online]. Available at: https://www.claire.co.uk/useful-government-legislation-and-guidance-by-country/198-doe-industry-profiles [Accessed 23 October 2023]

Appendix A

Groundsure Report

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

425179,403284,

Order Details

Date: 29/09/2023

Your ref: 287798-00

Our Ref: GS-DKC-JQA-Y32-SME

Site Details

Location: 425149 403308

Area: 0.82 ha

Authority: Barnsley Metropolitan Borough Council ↗



Summary of findings p. 2 >

Aerial image p. 9 >

OS MasterMap site plan p.14 >

groundsure.com/insightuserguide ↗

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 >	9	15	42	31	-
19 >	1.2 >	Historical tanks >	0	0	7	8	-
20 >	1.3 >	Historical energy features >	0	0	2	10	-
21	1.4	Historical petrol stations	0	0	0	0	-
21 >	1.5 >	Historical garages >	0	0	0	3	-
22	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
23 >	2.1 >	Historical industrial land uses >	10	17	52	35	-
28 >	2.2 >	Historical tanks >	0	0	11	16	-
29 >	2.3 >	Historical energy features >	0	0	8	18	-
30	2.4	Historical petrol stations	0	0	0	0	-
30 >	2.5 >	Historical garages >	0	0	0	8	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
32	3.1	Active or recent landfill	0	0	0	0	-
32	3.2	Historical landfill (BGS records)	0	0	0	0	-
33	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
33 >	3.4 >	Historical landfill (EA/NRW records) >	0	1	0	0	-
33 >	3.5 >	Historical waste sites >	0	0	0	3	-
34 >	3.6 >	Licensed waste sites >	0	0	0	6	-
36 >	3.7 >	Waste exemptions >	0	1	1	10	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
38 >	4.1 >	Recent industrial land uses >	0	1	8	-	-
39 >	4.2 >	Current or recent petrol stations >	0	1	0	0	-
39	4.3	Electricity cables	0	0	0	0	-
40	4.4	Gas pipelines	0	0	0	0	-
40	4.5	Sites determined as Contaminated Land	0	0	0	0	-

40	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
40	4.7	Regulated explosive sites	0	0	0	0	-
40	4.8	Hazardous substance storage/usage	0	0	0	0	-
41 >	4.9 >	Historical licensed industrial activities (IPC) >	0	0	0	3	-
41 >	4.10 >	Licensed industrial activities (Part A(1)) >	0	0	0	4	-
42 >	4.11 >	Licensed pollutant release (Part A(2)/B) >	0	0	1	1	-
43	4.12	Radioactive Substance Authorisations	0	0	0	0	-
43 >	4.13 >	Licensed Discharges to controlled waters >	0	0	0	7	-
44	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
44	4.15	Pollutant release to public sewer	0	0	0	0	-
44	4.16	List 1 Dangerous Substances	0	0	0	0	-
45 >	4.17 >	List 2 Dangerous Substances >	0	0	0	1	-
45 >	4.18 >	Pollution Incidents (EA/NRW) >	0	2	1	0	-
46	4.19	Pollution inventory substances	0	0	0	0	-
46	4.20	Pollution inventory waste transfers	0	0	0	0	-
46	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology >	On site	0-50m	50-250m	250-500m	500-2000m
47 >	5.1 >	Superficial aquifer >	Identified (within 500m)				
49 >	5.2 >	Bedrock aquifer >	Identified (within 500m)				
51 >	5.3 >	Groundwater vulnerability >	Identified (within 50m)				
52	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
52	5.5	Groundwater vulnerability- local information	None (within 0m)				
53 >	5.6 >	Groundwater abstractions >	0	0	0	2	3
55 >	5.7 >	Surface water abstractions >	0	0	0	0	2
55	5.8	Potable abstractions	0	0	0	0	0
56	5.9	Source Protection Zones	0	0	0	0	-
56	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology >	On site	0-50m	50-250m	250-500m	500-2000m
57 >	6.1 >	Water Network (OS MasterMap) >	0	1	4	-	-

58 >	6.2 >	Surface water features >	0	1	2	-	-
58 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
59 >	6.4 >	WFD Surface water bodies >	0	1	0	-	-
59 >	6.5 >	WFD Groundwater bodies >	1	-	-	-	-
Page	Section	River and coastal flooding >	On site	0-50m	50-250m	250-500m	500-2000m
60 >	7.1 >	Risk of flooding from rivers and the sea >	High (within 50m)				
61 >	7.2 >	Historical Flood Events >	0	1	4	-	-
61	7.3	Flood Defences	0	0	0	-	-
62	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
62	7.5	Flood Storage Areas	0	0	0	-	-
63 >	7.6 >	Flood Zone 2 >	Identified (within 50m)				
64 >	7.7 >	Flood Zone 3 >	Identified (within 50m)				
Page	Section	Surface water flooding >					
65 >	8.1 >	Surface water flooding >	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	Groundwater flooding >					
67 >	9.1 >	Groundwater flooding >	Negligible (within 50m)				
Page	Section	Environmental designations >	On site	0-50m	50-250m	250-500m	500-2000m
68	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
69	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
69	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
69	10.4	Special Protection Areas (SPA)	0	0	0	0	0
69	10.5	National Nature Reserves (NNR)	0	0	0	0	0
70	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
70 >	10.7 >	Designated Ancient Woodland >	0	0	0	0	7
70	10.8	Biosphere Reserves	0	0	0	0	0
71	10.9	Forest Parks	0	0	0	0	0
71	10.10	Marine Conservation Zones	0	0	0	0	0
71 >	10.11 >	Green Belt >	0	1	0	0	0
71	10.12	Proposed Ramsar sites	0	0	0	0	0

72	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
72	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
72	10.15	Nitrate Sensitive Areas	0	0	0	0	0
72 >	10.16 >	Nitrate Vulnerable Zones >	0	0	0	0	2
74 >	10.17 >	SSSI Impact Risk Zones >	1	-	-	-	-
75	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
76	11.1	World Heritage Sites	0	0	0	-	-
77	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
77	11.3	National Parks	0	0	0	-	-
77 >	11.4 >	Listed Buildings >	0	0	1	-	-
78 >	11.5 >	Conservation Areas >	0	1	0	-	-
78	11.6	Scheduled Ancient Monuments	0	0	0	-	-
78	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	**Agricultural designations >**	On site	0-50m	50-250m	250-500m	500-2000m
79 >	12.1 >	Agricultural Land Classification >	Grade 4 (within 250m)				
80	12.2	Open Access Land	0	0	0	-	-
80	12.3	Tree Felling Licences	0	0	0	-	-
80	12.4	Environmental Stewardship Schemes	0	0	0	-	-
81 >	12.5 >	Countryside Stewardship Schemes >	0	0	1	-	-
Page	Section	**Habitat designations >**	On site	0-50m	50-250m	250-500m	500-2000m
82 >	13.1 >	Priority Habitat Inventory >	0	5	9	-	-
83	13.2	Habitat Networks	0	0	0	-	-
83 >	13.3 >	Open Mosaic Habitat >	1	0	0	-	-
84	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
85 >	14.1 >	10k Availability >	Identified (within 500m)				
86 >	14.2 >	Artificial and made ground (10k) >	2	2	3	5	-
88 >	14.3 >	Superficial geology (10k) >	0	0	4	1	-

89	14.4	Landslip (10k)	0	0	0	0	-
90 >	14.5 >	Bedrock geology (10k) >	2	1	10	24	-
92 >	14.6 >	Bedrock faults and other linear features (10k) >	1	0	3	8	-
Page	Section	**Geology 1:50,000 scale** >	On site	0-50m	50-250m	250-500m	500-2000m
94 >	15.1 >	50k Availability >	Identified (within 500m)				
95 >	15.2 >	Artificial and made ground (50k) >	1	0	0	2	-
96 >	15.3 >	Artificial ground permeability (50k) >	1	0	-	-	-
97 >	15.4 >	Superficial geology (50k) >	0	1	1	0	-
98 >	15.5 >	Superficial permeability (50k) >	Identified (within 50m)				
98	15.6	Landslip (50k)	0	0	0	0	-
98	15.7	Landslip permeability (50k)	None (within 50m)				
99 >	15.8 >	Bedrock geology (50k) >	2	1	6	15	-
101 >	15.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
101 >	15.10 >	Bedrock faults and other linear features (50k) >	1	0	3	7	-
Page	Section	**Boreholes** >	On site	0-50m	50-250m	250-500m	500-2000m
102 >	16.1 >	BGS Boreholes >	0	1	3	-	-
Page	Section	**Natural ground subsidence** >					
104 >	17.1 >	Shrink swell clays >	Low (within 50m)				
106 >	17.2 >	Running sands >	Low (within 50m)				
108 >	17.3 >	Compressible deposits >	Moderate (within 50m)				
110 >	17.4 >	Collapsible deposits >	Very low (within 50m)				
111 >	17.5 >	Landslides >	Moderate (within 50m)				
113 >	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
115 >	18.1 >	BritPits >	0	0	1	2	-
116 >	18.2 >	Surface ground workings >	0	2	25	-	-
117	18.3	Underground workings	0	0	0	0	0
118	18.4	Underground mining extents	0	0	0	0	-
118	18.5	Historical Mineral Planning Areas	0	0	0	0	-

118	18.6	Non-coal mining	0	0	0	0	0
118	18.7	JPB mining areas	None (within 0m)				
118	18.8	The Coal Authority non-coal mining	0	0	0	0	-
119	18.9	Researched mining	0	0	0	0	-
119	18.10	Mining record office plans	0	0	0	0	-
119	18.11	BGS mine plans	0	0	0	0	-
119 >	**18.12 >**	**Coal mining >**	Identified (within 0m)				
120	18.13	Brine areas	None (within 0m)				
120	18.14	Gypsum areas	None (within 0m)				
120	18.15	Tin mining	None (within 0m)				
120	18.16	Clay mining	None (within 0m)				
Page	Section	Ground cavities and sinkholes	On site	0-50m	50-250m	250-500m	500-2000m
121	19.1	Natural cavities	0	0	0	0	-
121	19.2	Mining cavities	0	0	0	0	0
121	19.3	Reported recent incidents	0	0	0	0	-
121	19.4	Historical incidents	0	0	0	0	-
122	19.5	National karst database	0	0	0	0	-
Page	Section	**Radon >**					
123 >	**20.1 >**	**Radon >**	Less than 1% (within 0m)				
Page	Section	**Soil chemistry >**	On site	0-50m	50-250m	250-500m	500-2000m
125 >	**21.1 >**	**BGS Estimated Background Soil Chemistry >**	3	1	-	-	-
125	21.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
126	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
127	22.1	Underground railways (London)	0	0	0	-	-
127	22.2	Underground railways (Non-London)	0	0	0	-	-
128	22.3	Railway tunnels	0	0	0	-	-
128 >	**22.4 >**	**Historical railway and tunnel features >**	13	8	25	-	-
130	22.5	Royal Mail tunnels	0	0	0	-	-

130 >	22.6 >	Historical railways >	0	1	1	-	-
130 >	22.7 >	Railways >	0	14	8	-	-
131	22.8	Crossrail 1	0	0	0	0	-
132	22.9	Crossrail 2	0	0	0	0	-
132	22.10	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 30/05/2021

Site Area: 0.82ha

Recent site history - 2018 aerial photograph



Capture Date: 27/06/2018

Site Area: 0.82ha

Recent site history - 2012 aerial photograph



Capture Date: 26/03/2012

Site Area: 0.82ha

Recent site history - 2009 aerial photograph



Capture Date: 11/09/2009

Site Area: 0.82ha

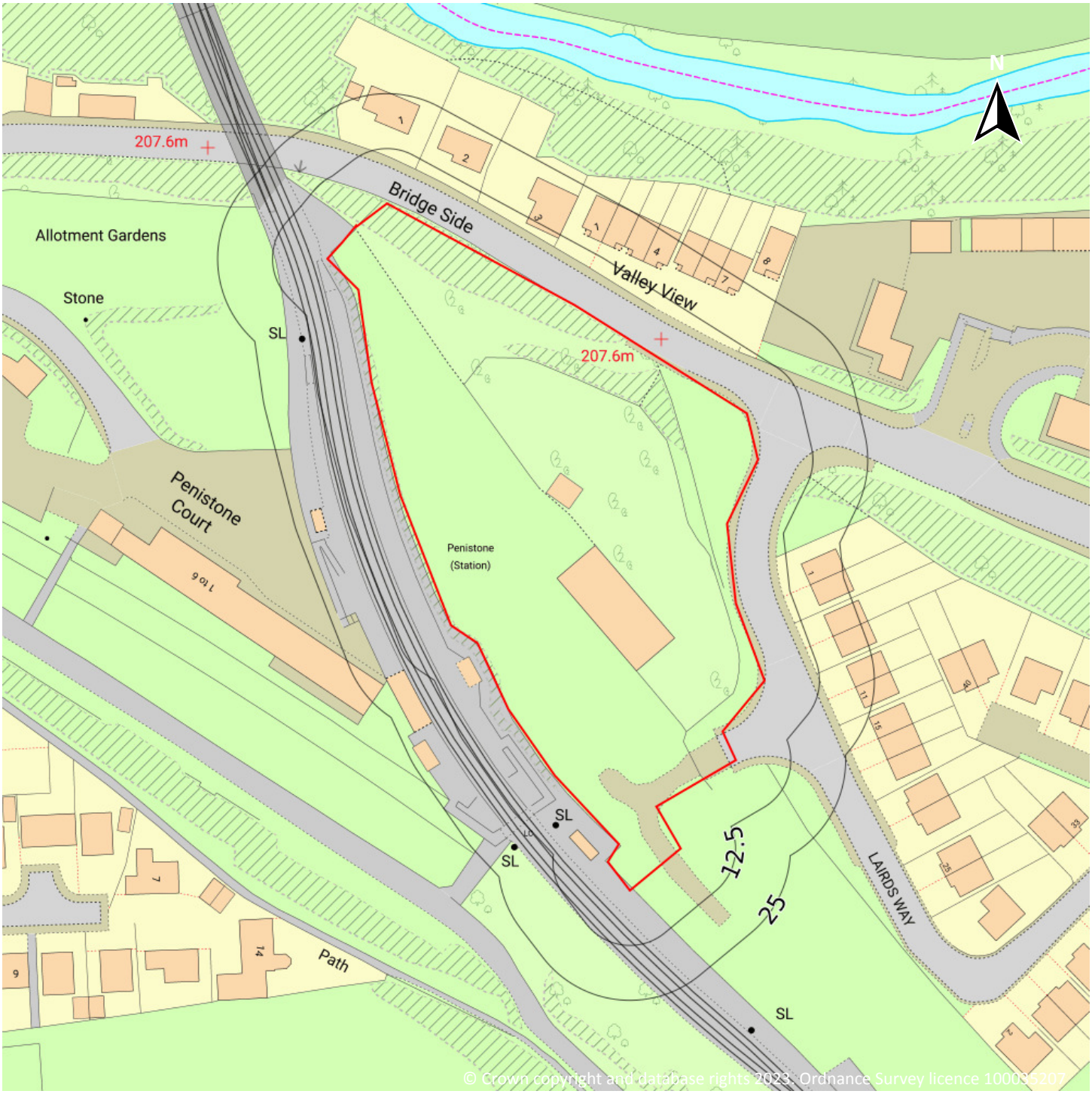
Recent site history - 1999 aerial photograph



Capture Date: 10/07/1999

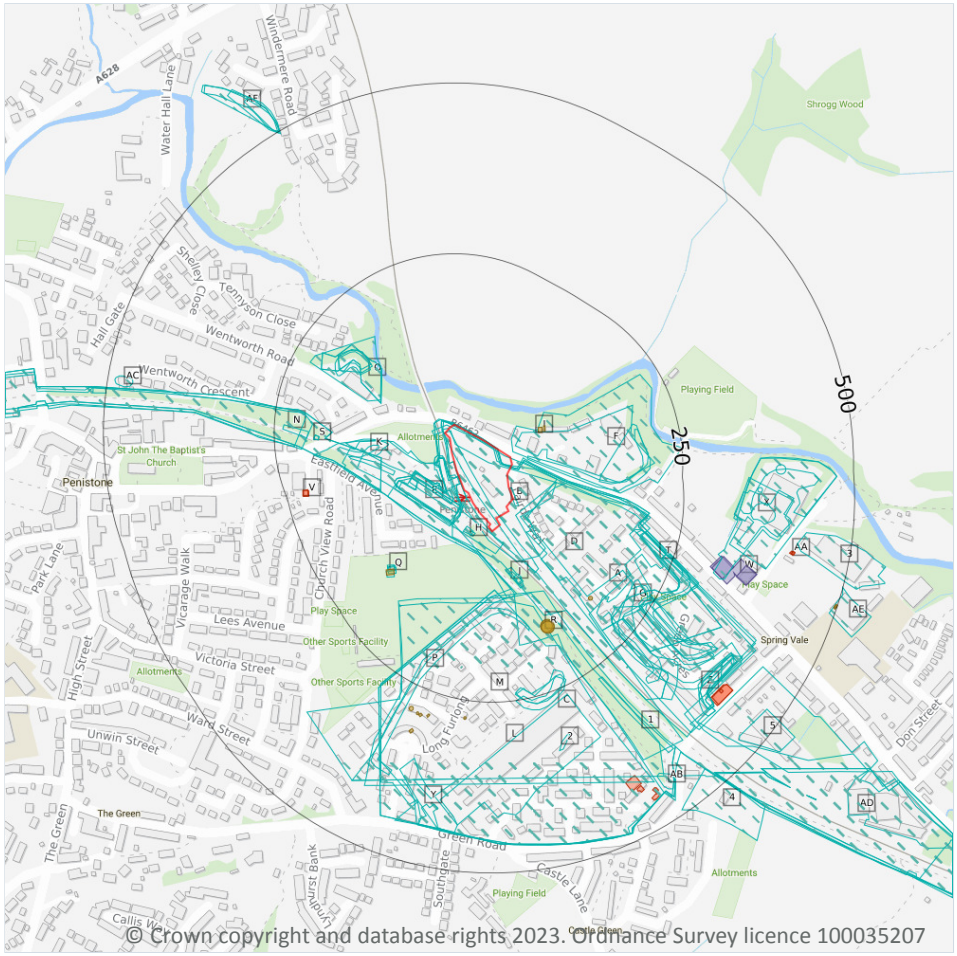
Site Area: 0.82ha

OS MasterMap site plan



Site Area: 0.82ha

1 Past land use



1.1 Historical industrial land uses

Records within 500m	97

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**	**Steel and Iron Works**	**1903**	**1450077**

ID	Location	Land use	Dates present	Group ID
B	**On site**	**Railway Building**	**1891**	**1429058**
B	**On site**	**Railway Sidings**	**1929**	**1498493**
B	**On site**	**Railway Sidings**	**1850**	**1553465**
C	**On site**	**Railway Sidings**	**1951**	**1457988**
C	**On site**	**Railway Sidings**	**1929 - 1948**	**1467008**
C	**On site**	**Railway Sidings**	**1965**	**1508586**
D	**On site**	**Railway Sidings**	**1903**	**1547320**
D	**On site**	**Railway Sidings**	**1891**	**1550450**
E	1m W	Railway Station	1903 - 1929	1481842
E	1m W	Railway Station	1948 - 1951	1537955
E	3m W	Railway Station	1938	1528207
E	4m S	Cuttings	1850	1409789
F	9m NE	Unspecified Works	1965	1438215
G	12m SE	Unspecified Commercial/Industrial	1929	1411016
E	13m SW	Railway Building	1891	1429044
F	18m NE	Unspecified Depot	1987	1428485
E	19m SW	Railway Station	1987	1516853
E	19m SW	Railway Station	1965	1495596
E	20m SW	Railway Station	1891	1556711
H	22m S	Railway Building	1938	1501494
H	23m S	Railway Building	1951	1483651
F	24m E	Unspecified Ground Workings	1929	1414421
A	25m SE	Iron Works	1891	1432957
J	60m S	Railway Buildings	1948 - 1951	1495528
J	66m S	Junction Station	1938	1423470
J	73m S	Railway Building	1891 - 1903	1555956
K	84m W	Sandstone Quarry	1850	1451591
L	86m S	Unspecified Foundry	1987	1421021

ID	Location	Land use	Dates present	Group ID
K	88m W	Railway Sidings	1929	1482932
L	95m S	Unspecified Works	1951	1467657
M	98m S	Unspecified Works	1938 - 1948	1508724
K	99m W	Unspecified Ground Workings	1929	1414418
N	100m W	Railway Sidings	1967	1503938
N	100m W	Railway Sidings	1951	1539309
O	103m NW	Unspecified Ground Workings	1967 - 1987	1472470
O	103m NW	Refuse Heap	1951	1515965
M	104m S	Steel and Iron Works	1929	1450076
O	106m NW	Unspecified Works	1987	1438216
P	112m S	Unspecified Ground Workings	1929	1414419
F	129m E	Unspecified Heap	1951	1417602
O	143m NW	Refuse Heap	1929	1545754
O	145m NW	Gravel Pit	1938	1418787
Q	146m SW	Unspecified Tank	1891	1491783
Q	147m SW	Unspecified Tank	1951	1464471
Q	147m SW	Unspecified Tank	1938 - 1948	1515781
O	148m NW	Refuse Heap	1948	1499160
Q	151m SW	Unspecified Tank	1929	1523127
G	178m E	Railway Sidings	1929	1500368
S	184m W	Railway Building	1948	1490424
S	184m W	Railway Building	1903	1534282
T	188m E	Unspecified Heap	1951	1417603
T	194m E	Unspecified Ground Workings	1948	1414420
U	194m W	Railway Sidings	1938 - 1948	1467960
S	200m W	Railway Sidings	1929	1486781
U	205m W	Railway Sidings	1903	1509811
G	206m SE	Refuse Heap	1891	1491800

ID	Location	Land use	Dates present	Group ID
G	213m SE	Refuse Heap	1903	1524330
C	222m S	Gravel Pit	1948 - 1951	1554678
C	231m S	Unspecified Ground Workings	1938	1484378
C	232m S	Unspecified Ground Workings and Heap	1929	1418538
G	234m SE	Refuse Heap	1929	1504906
G	234m SE	Gravel Pit	1951	1490400
G	237m SE	Gravel Pit	1938	1513551
G	239m SE	Refuse Heap	1948	1485712
G	244m SE	Refuse Heap	1965	1467154
L	263m S	Unspecified Works	1965	1527527
1	267m SE	Railway Sidings	1929	1502274
X	311m E	Box Works	1903	1435859
2	316m S	Railway Sidings	1929	1546139
X	324m E	Unspecified Works	1987	1438214
X	325m E	Unspecified Mills	1891	1419282
X	333m E	Refuse Heap	1965	1436623
X	349m E	Sandstone Quarry	1850	1451602
Y	351m S	Railway Sidings	1987	1513411
X	359m E	Unspecified Tank	1903	1433387
Z	373m SE	Gravel Pit	1951	1544616
Z	375m SE	Refuse Heap	1948	1513046
Z	376m SE	Gravel Pit	1938	1539154
Z	379m SE	Refuse Heap	1929	1524351
Z	382m SE	Refuse Heap	1965	1544250
X	387m E	Unspecified Tank	1903	1433388
Y	408m S	Railway Buildings	1948	1442112
3	421m E	Unspecified Works	1987	1438213
AB	430m SE	Unspecified Heap	1891	1417604

ID	Location	Land use	Dates present	Group ID
AC	463m W	Sandstone Quarry	1850	1451592
4	466m SE	Unspecified Works	1965 - 1987	1494473
5	468m SE	Unspecified Works	1987	1438210
AD	480m SE	Railway Sidings	1891	1475910
AD	480m SE	Railway Sidings	1904	1508663
AD	482m SE	Wagon and Wheel Works	1938 - 1948	1464625
AE	492m E	Unspecified Works	1987	1438211
AF	496m NW	Unspecified Ground Workings	1903	1524573
AF	498m NW	Unspecified Ground Workings	1891	1508531
AF	499m NW	Unspecified Ground Workings	1948	1467104
AC	499m W	Railway Building	1903	1429045
AF	500m NW	Unspecified Pit	1938	1509198

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	**15**

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
I	55m NE	Unspecified Tank	1984	223465
I	62m NE	Unspecified Tank	1995	239086
Q	151m SW	Unspecified Tank	1892	223466
R	151m SE	Unspecified Tank	1967 - 1984	246328
R	151m SE	Unspecified Tank	1983	242332
R	153m SE	Unspecified Tank	1995	241814

ID	Location	Land use	Dates present	Group ID
A	168m SE	Unspecified Tank	1959 - 1967	244826
M	274m S	Unspecified Tank	1970 - 1996	234309
P	282m S	Unspecified Tank	1988 - 1996	238236
P	283m S	Unspecified Tank	1970 - 1988	241851
P	286m S	Unspecified Tank	1970 - 1996	243905
P	286m S	Unspecified Tank	1970	223467
P	311m S	Unspecified Tank	1970 - 1988	248699
AE	496m E	Unspecified Tank	1995	236957
AE	496m E	Unspecified Tank	1984	244119

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	**12**

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'.

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

ID	Location	Land use	Dates present	Group ID
V	217m W	Electricity Substation	1959 - 1999	137939
V	218m W	Electricity Substation	1967 - 1984	143244
Z	399m SE	Electricity Substation	1988	144021
Z	400m SE	Electricity Substation	1996 - 1999	137109
Z	403m SE	Electricity Substation	1970	133796
AA	412m E	Electricity Substation	1983	132650
AB	414m SE	Electricity Substation	1988 - 1999	138403
AA	415m E	Electricity Substation	1995	142000
AA	415m E	Electricity Substation	1984	136526

ID	Location	Land use	Dates present	Group ID
AB	431m SE	Electricity Substation	1996 - 1999	143712
AB	444m SE	Gas Governor	1988 - 1999	140593
AB	452m SE	Electricity Substation	1970 - 1988	140649

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	3

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'.

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

ID	Location	Land use	Dates present	Group ID
W	305m E	Garage	1983 - 1984	45352
W	308m E	Garage	1967 - 1995	46306
W	346m E	Garage	1995	44452

This data is sourced from Ordnance Survey / Groundsure.

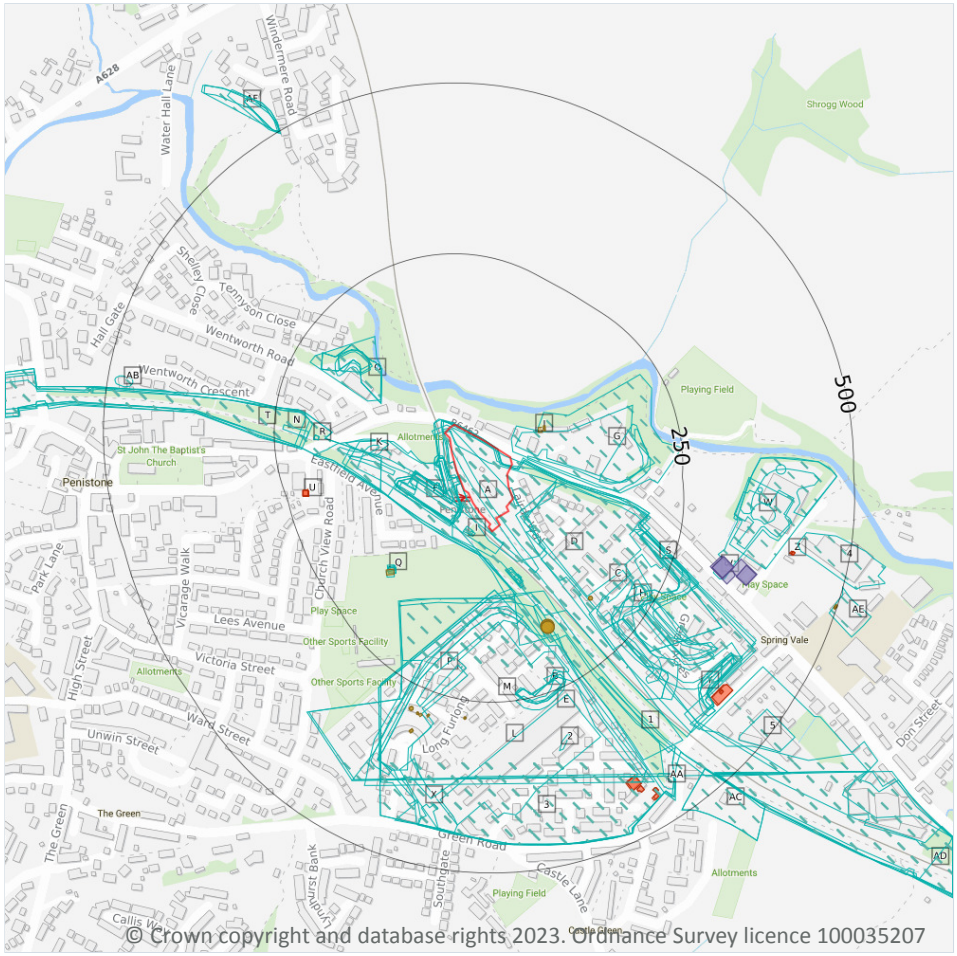
1.6 Historical military land

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



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2.1 Historical industrial land uses

Records within 500m	114

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 23 >**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Railway Sidings**	**1850**	**1553465**
A	**On site**	**Railway Sidings**	**1929**	**1498493**
A	**On site**	**Railway Building**	**1891**	**1429058**

ID	Location	Land Use	Date	Group ID
B	**On site**	**Railway Sidings**	**1948**	**1467008**
B	**On site**	**Railway Sidings**	**1938**	**1467008**
C	**On site**	**Steel and Iron Works**	**1903**	**1450077**
D	**On site**	**Railway Sidings**	**1903**	**1547320**
D	**On site**	**Railway Sidings**	**1891**	**1550450**
E	**On site**	**Railway Sidings**	**1951**	**1457988**
E	**On site**	**Railway Sidings**	**1965**	**1508586**
F	1m W	Railway Station	1948	1537955
F	1m W	Railway Station	1903	1481842
F	3m W	Railway Station	1938	1528207
F	4m S	Cuttings	1850	1409789
F	4m W	Railway Station	1951	1537955
G	9m NE	Unspecified Works	1965	1438215
H	12m SE	Unspecified Commercial/Industrial	1929	1411016
F	13m SW	Railway Building	1891	1429044
F	17m W	Railway Station	1929	1481842
G	18m NE	Unspecified Depot	1987	1428485
F	19m SW	Railway Station	1987	1516853
F	19m SW	Railway Station	1965	1495596
F	20m SW	Railway Station	1891	1556711
I	22m S	Railway Building	1938	1501494
I	23m S	Railway Building	1951	1483651
G	24m E	Unspecified Ground Workings	1929	1414421
C	25m SE	Iron Works	1891	1432957
B	60m S	Railway Buildings	1951	1495528
B	62m S	Railway Buildings	1948	1495528
B	66m S	Junction Station	1938	1423470
B	73m S	Railway Building	1891	1555956

ID	Location	Land Use	Date	Group ID
B	78m S	Railway Building	1903	1555956
K	84m W	Sandstone Quarry	1850	1451591
L	86m S	Unspecified Foundry	1987	1421021
K	88m W	Railway Sidings	1929	1482932
L	95m S	Unspecified Works	1951	1467657
M	98m S	Unspecified Works	1948	1508724
M	98m S	Unspecified Works	1938	1508724
K	99m W	Unspecified Ground Workings	1929	1414418
N	100m W	Railway Sidings	1967	1503938
N	100m W	Railway Sidings	1951	1539309
O	103m NW	Unspecified Ground Workings	1967	1472470
O	103m NW	Unspecified Ground Workings	1987	1472470
O	103m NW	Refuse Heap	1951	1515965
M	104m S	Steel and Iron Works	1929	1450076
O	106m NW	Unspecified Works	1987	1438216
P	111m S	Railway Sidings	1938	1467008
P	112m S	Unspecified Ground Workings	1929	1414419
M	119m S	Railway Sidings	1929	1467008
G	129m E	Unspecified Heap	1951	1417602
O	143m NW	Refuse Heap	1929	1545754
O	145m NW	Gravel Pit	1938	1418787
Q	146m SW	Unspecified Tank	1891	1491783
Q	147m SW	Unspecified Tank	1951	1464471
Q	147m SW	Unspecified Tank	1938	1515781
Q	147m SW	Unspecified Tank	1948	1515781
O	148m NW	Refuse Heap	1948	1499160
Q	151m SW	Unspecified Tank	1929	1523127
H	178m E	Railway Sidings	1929	1500368

ID	Location	Land Use	Date	Group ID
R	184m W	Railway Building	1948	1490424
R	184m W	Railway Building	1903	1534282
S	188m E	Unspecified Heap	1951	1417603
S	194m E	Unspecified Ground Workings	1948	1414420
T	194m W	Railway Sidings	1938	1467960
T	199m W	Railway Sidings	1948	1467960
R	200m W	Railway Sidings	1929	1486781
T	205m W	Railway Sidings	1903	1509811
H	206m SE	Refuse Heap	1891	1491800
H	213m SE	Refuse Heap	1903	1524330
E	222m S	Gravel Pit	1951	1554678
E	231m S	Unspecified Ground Workings	1938	1484378
E	231m S	Unspecified Ground Workings	1938	1484378
E	232m S	Unspecified Ground Workings and Heap	1929	1418538
H	234m SE	Refuse Heap	1929	1504906
H	234m SE	Gravel Pit	1951	1490400
E	234m S	Gravel Pit	1948	1554678
H	237m SE	Gravel Pit	1938	1513551
H	239m SE	Refuse Heap	1948	1485712
H	244m SE	Refuse Heap	1965	1467154
L	263m S	Unspecified Works	1965	1527527
1	267m SE	Railway Sidings	1929	1502274
W	311m E	Box Works	1903	1435859
2	316m S	Railway Sidings	1929	1546139
W	324m E	Unspecified Works	1987	1438214
W	325m E	Unspecified Mills	1891	1419282
W	333m E	Refuse Heap	1965	1436623
W	349m E	Sandstone Quarry	1850	1451602

ID	Location	Land Use	Date	Group ID
X	351m S	Railway Sidings	1987	1513411
W	359m E	Unspecified Tank	1903	1433387
3	359m S	Railway Sidings	1948	1467008
Y	373m SE	Gravel Pit	1951	1544616
Y	375m SE	Refuse Heap	1948	1513046
Y	376m SE	Gravel Pit	1938	1539154
Y	379m SE	Refuse Heap	1929	1524351
Y	382m SE	Refuse Heap	1965	1544250
W	387m E	Unspecified Tank	1903	1433388
X	408m S	Railway Buildings	1948	1442112
4	421m E	Unspecified Works	1987	1438213
AA	430m SE	Unspecified Heap	1891	1417604
AB	463m W	Sandstone Quarry	1850	1451592
AC	466m SE	Unspecified Works	1987	1494473
AC	466m SE	Unspecified Works	1965	1494473
5	468m SE	Unspecified Works	1987	1438210
AD	480m SE	Railway Sidings	1891	1475910
AD	482m SE	Wagon and Wheel Works	1938	1464625
AD	482m SE	Railway Sidings	1938	1467008
AD	482m SE	Railway Sidings	1948	1467008
AE	492m E	Unspecified Works	1987	1438211
AF	496m NW	Unspecified Ground Workings	1903	1524573
AF	498m NW	Unspecified Ground Workings	1891	1508531
AF	499m NW	Unspecified Ground Workings	1948	1467104
AB	499m W	Railway Building	1903	1429045
AF	500m NW	Unspecified Pit	1938	1509198
AF	500m NW	Unspecified Pit	1938	1509198

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	27

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 23 >**

ID	Location	Land Use	Date	Group ID
J	55m NE	Unspecified Tank	1984	223465
J	62m NE	Unspecified Tank	1995	239086
J	62m NE	Unspecified Tank	1995	239086
Q	151m SW	Unspecified Tank	1892	223466
B	151m SE	Unspecified Tank	1984	246328
B	151m SE	Unspecified Tank	1967	246328
B	151m SE	Unspecified Tank	1983	242332
B	153m SE	Unspecified Tank	1995	241814
B	153m SE	Unspecified Tank	1995	241814
C	168m SE	Unspecified Tank	1959	244826
C	168m SE	Unspecified Tank	1967	244826
M	274m S	Unspecified Tank	1996	234309
M	275m S	Unspecified Tank	1970	234309
M	276m S	Unspecified Tank	1988	234309
P	282m S	Unspecified Tank	1996	238236
P	282m S	Unspecified Tank	1988	238236
P	283m S	Unspecified Tank	1970	241851
P	284m S	Unspecified Tank	1988	241851
P	286m S	Unspecified Tank	1970	243905
P	286m S	Unspecified Tank	1970	223467
P	286m S	Unspecified Tank	1996	243905
P	286m S	Unspecified Tank	1988	243905
P	311m S	Unspecified Tank	1970	248699

ID	Location	Land Use	Date	Group ID
P	313m S	Unspecified Tank	1988	248699
AE	496m E	Unspecified Tank	1995	236957
AE	496m E	Unspecified Tank	1995	236957
AE	496m E	Unspecified Tank	1984	244119

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	**26**

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'.

Features are displayed on the Past land use - un-grouped map on **page 23 >**

ID	Location	Land Use	Date	Group ID
U	217m W	Electricity Substation	1959	137939
U	217m W	Electricity Substation	1983	137939
U	217m W	Electricity Substation	1959	137939
U	217m W	Electricity Substation	1993	137939
U	217m W	Electricity Substation	1998	137939
U	217m W	Electricity Substation	1999	137939
U	218m W	Electricity Substation	1984	143244
U	218m W	Electricity Substation	1967	143244
Y	399m SE	Electricity Substation	1988	144021
Y	400m SE	Electricity Substation	1996	137109
Y	403m SE	Electricity Substation	1970	133796
Y	404m SE	Electricity Substation	1999	137109
Z	412m E	Electricity Substation	1983	132650
AA	414m SE	Electricity Substation	1988	138403
AA	414m SE	Electricity Substation	1996	138403
AA	414m SE	Electricity Substation	1999	138403

ID	Location	Land Use	Date	Group ID
Z	415m E	Electricity Substation	1995	142000
Z	415m E	Electricity Substation	1995	142000
Z	415m E	Electricity Substation	1984	136526
AA	431m SE	Electricity Substation	1996	143712
AA	431m SE	Electricity Substation	1999	143712
AA	444m SE	Gas Governor	1988	140593
AA	445m SE	Gas Governor	1996	140593
AA	445m SE	Gas Governor	1999	140593
AA	452m SE	Electricity Substation	1988	140649
AA	453m SE	Electricity Substation	1970	140649

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	**8**

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'.

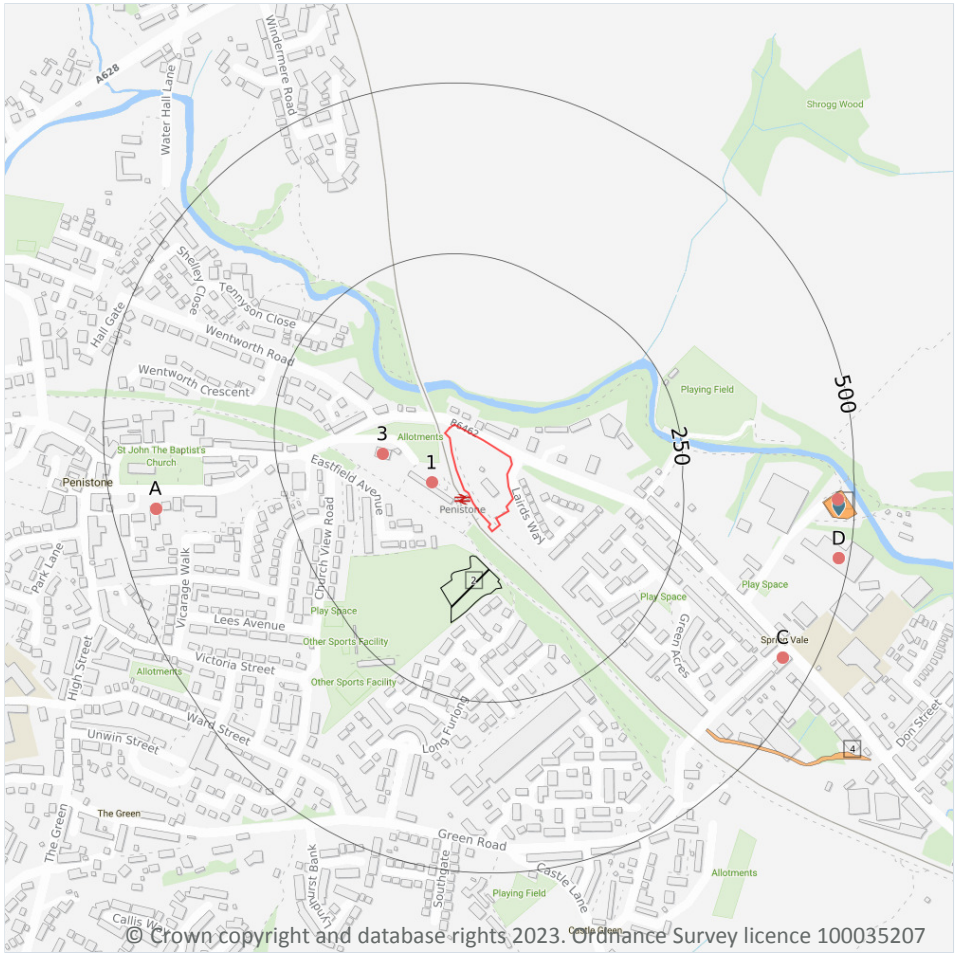
Features are displayed on the Past land use - un-grouped map on **page 23 >**

ID	Location	Land Use	Date	Group ID
V	305m E	Garage	1983	45352
V	308m E	Garage	1995	46306
V	308m E	Garage	1995	46306

ID	Location	Land Use	Date	Group ID
V	308m E	Garage	1984	46306
V	308m E	Garage	1967	46306
V	336m E	Garage	1984	45352
V	346m E	Garage	1995	44452
V	346m E	Garage	1995	44452

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



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	1

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.

Features are displayed on the Waste and landfill map on **page 32 >**

ID	Location	Details		
2	43m S	Site Address: Penistone Church, Churchfield Road, Penistone Licence Holder Address: Foundries Fabrication Divisions, Penistone, Sheffield	Waste Licence: Yes Site Reference: WD20 B546, 4400/B546, 20B546(104) Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 02/02/1987 Licence Surrender: 28/09/1993	Operator: David Brown Gear Industries Limited Licence Holder: David Brown Gear Industries First Recorded 02/02/1987 Last Recorded: 31/12/1991

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

3.5 Historical waste sites

Records within 500m	3

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 32 >**

ID	Location	Address	Further Details	Date
4	425m SE	Site Address: N/A	Type of Site: Ground Workings and Refuse Heap Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1959

ID	Location	Address	Further Details	Date
B	453m E	Site Address: N/A	Type of Site: Waste Disposal Compound Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1983
B	454m E	Site Address: N/A	Type of Site: Waste Disposal Compound Planning application reference: N/A Description: N/A Data source: Historic Mapping Data Type: Polygon	1984

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

3.6 Licensed waste sites

Records within 500m	**6**

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

Features are displayed on the Waste and landfill map on **page 32 >**

ID	Location	Details		
B	475m E	Site Name: Springvale Civic Amenity Site Site Address: Springvale, Penistone, Barnsley, S Yorks Correspondence Address: 48, Cardigan Road, Stanion, Northants, NN14 1BY	Type of Site: Household, Commercial & Industrial Waste T Stn Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BDR011 EPR reference: - Operator: South Herts Waste Management Ltd Waste Management licence No: 60607 Annual Tonnage: 0	Issue Date: 14/06/1993 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued

ID	Location	Details		
B	475m E	Site Name: Springvale Civic Amenity Site Site Address: Springvale, Penistone, Barnsley, S Yorks Correspondence Address: 2 Cecil Court, 49-55, London Road, Enfield, Middlesex, EN2 6DE	Type of Site: Household, Commercial & Industrial Waste T Stn Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: REG005 EPR reference: - Operator: Regional Waste Recycling Plc Waste Management licence No: 60607 Annual Tonnage: 5000	Issue Date: 14/06/1993 Effective Date: 08/12/2006 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred
B	475m E	Site Name: Springvale H W R C Site Site Address: Sheffield Road, Springvale, Penistone, Barnsley, South Yorkshire, S36 6HJ Correspondence Address: -	Type of Site: Household Waste Amenity Site Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAS068 EPR reference: EA/EPR/DP3992ST/T001 Operator: Waste Recycling Ltd Waste Management licence No: 60607 Annual Tonnage: 24999	Issue Date: 14/06/1993 Effective Date: 26/01/2009 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred
B	475m E	Site Name: Penistone Household Waste Recycling Centre Site Address: Penistone H W R C, Sheffield Road, Springvale, Penistone, Barnsley, South Yorkshire, S36 6HJ Correspondence Address: -	Type of Site: Household Waste Amenity Site Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAS068 EPR reference: EA/EPR/DP3992ST/V002 Operator: F C C Recycing (U K) Limited Waste Management licence No: 60607 Annual Tonnage: 24999	Issue Date: 14/06/1993 Effective Date: 26/01/2009 Modified: 23/11/2012 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified

ID	Location	Details		
B	475m E	Site Name: Springvale H W R C Site Site Address: Sheffield Road, Springvale, Penistone, Barnsley, South Yorkshire, S36 6HJ Correspondence Address: Ground Floor West, 900, Pavilion Drive, Northampton Business Park, Northampton, NN4 7RG	Type of Site: Household, Commercial & Industrial Waste T Stn Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAS068 EPR reference: EA/EPR/DP3992ST/T001 Operator: Waste Recycling Ltd Waste Management licence No: 60607 Annual Tonnage: 24999	Issue Date: 14/06/1993 Effective Date: 26/01/2009 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred
B	475m E	Site Name: Penistone Household Waste Recycling Centre Site Address: Fcc Recycling (Uk) Limited, Penistone H W R C, Sheffield Road, Springvale, Penistone, Barnsley, South Yorkshire, S36 6HJ Correspondence Address: -	Type of Site: Household Waste Amenity Site Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 645336 EPR reference: EA/EPR/DP3992ST Operator: Fcc Recycling (Uk) Limited Waste Management licence No: 60607 Annual Tonnage: 24999	Issue Date: 14/06/1993 Effective Date: 14/06/1993 Modified: 14/06/1993 Surrendered Date: - Expiry Date: - Cancelled Date: 14/06/1993 Status: Issued

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

3.7 Waste exemptions

Records within 500m **12**

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.

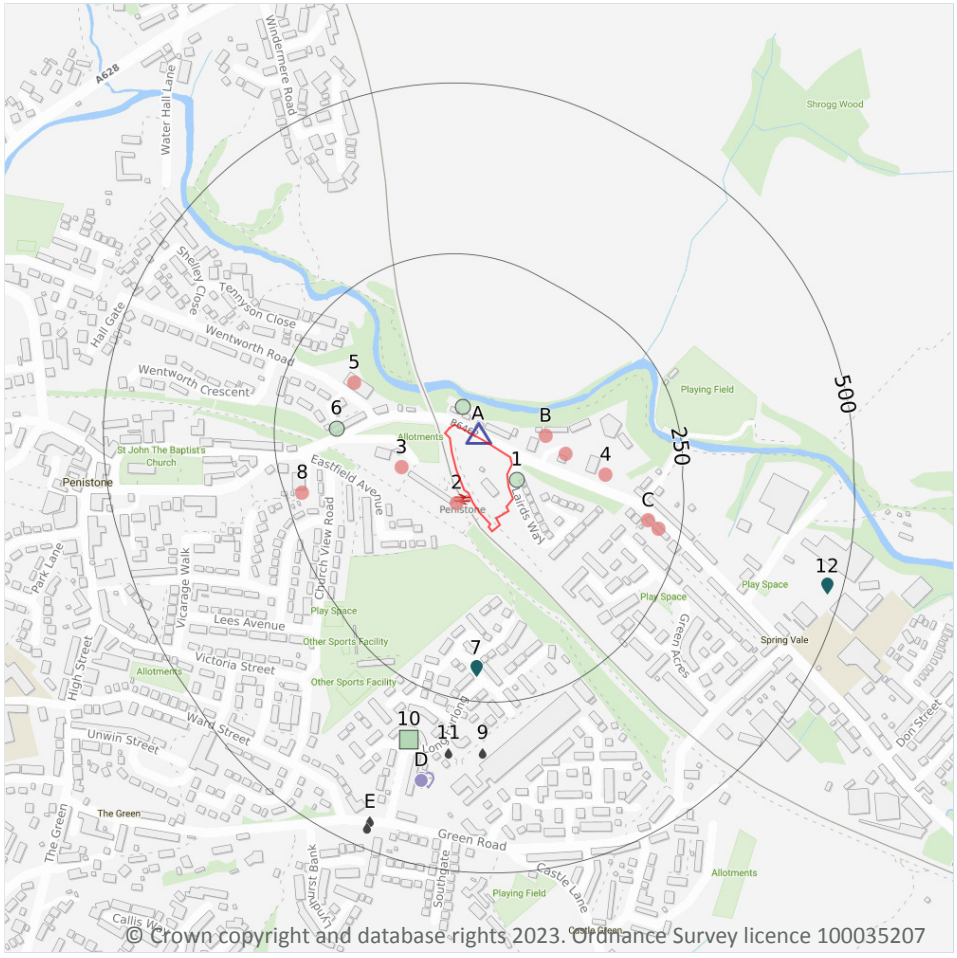
Features are displayed on the Waste and landfill map on **page 32 >**

ID	Location	Site	Reference	Category	Sub-Category	Description
1	41m W	Penistone Court Unit 7 Sheffield Road SHEFFIELD S36 6HP	EPR/VF0902VJ/A001	Treating waste exemption	Non-Agricultural Waste Only	Treatment of waste aerosol cans
3	97m W	Penistone Court Unit 7 Sheffield Road SHEFFIELD S36 6HP	EPR/EH0811RS/A001	Treating waste exemption	Non-Agricultural Waste Only	Treatment of waste aerosol cans

ID	Location	Site	Reference	Category	Sub-Category	Description
A	438m W	Kingswell Surgery, 40 SHREWSBURY ROAD, PENISTONE, SHEFFIELD, S36 6DY	WEX159985	Treating waste exemption	Not on a Farm	Sorting and de-naturing of controlled drugs for disposal
A	438m W	40, SHREWSBURY ROAD, PENISTONE, SHEFFIELD, S36 6DY	WEX077422	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
A	438m W	40, SHREWSBURY ROAD, PENISTONE, SHEFFIELD, S36 6DY	WEX295365	Treating waste exemption	Not on a Farm	Sorting and de-naturing of controlled drugs for disposal
C	455m SE	Springvale Community Garden, Off Sheffield Road, Penistone, SHEFFIELD, S36 6HF	WEX242609	Disposing of waste exemption	Not on a farm	Burning waste in the open
C	455m SE	Springvale Community Garden, Off Sheffield Road, Penistone, SHEFFIELD, S36 6HF	WEX242609	Treating waste exemption	Not on a farm	Aerobic composting and associated prior treatment
B	475m E	-	WEX307790	Storing waste exemption	Not on a farm	Storage of waste in a secure place
D	485m E	SHEFFIELD ROAD, PENISTONE, SHEFFIELD, S36 6HH	WEX132424	Treating waste exemption	Not on a farm	Sorting mixed waste
D	485m E	SHEFFIELD ROAD, PENISTONE, SHEFFIELD, S36 6HH	WEX132424	Using waste exemption	Not on a farm	Use of waste to manufacture finished goods
D	485m E	SHEFFIELD ROAD, PENISTONE, SHEFFIELD, S36 6HH	WEX272212	Using waste exemption	Not on a farm	Use of waste to manufacture finished goods
D	485m E	SHEFFIELD ROAD, PENISTONE, SHEFFIELD, S36 6HH	WEX272212	Treating waste exemption	Not on a farm	Sorting mixed waste

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
- Current or recent petrol stations
- Historical licensed industrial activities
- Part A(1) industrial activities
- Licensed pollutant release (Part A(2)/B)
- Licensed Discharges to controlled waters
- List 2 Dangerous Substances
- Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m	9

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 38 >**

ID	Location	Company	Address	Activity	Category
2	22m SW	Penistone Rail Station	South Yorkshire, S36	Railway Stations, Junctions and Halts	Public Transport, Stations and Infrastructure
B	60m NE	Tank	South Yorkshire, S36	Tanks (Generic)	Industrial Features

ID	Location	Company	Address	Activity	Category
3	77m W	Mast (Telecommunication)	South Yorkshire, S36	Telecommunications Features	Infrastructure and Facilities
B	80m E	Penistone Ambulance Station	South Yorkshire, S36	Ambulance and Medical Transportation Services	Health Support Services
4	138m E	Pylon	South Yorkshire, S36	Electrical Features	Infrastructure and Facilities
5	152m NW	Works	South Yorkshire, S36	Unspecified Works Or Factories	Industrial Features
C	200m E	Simply Signs of Penistone Ltd	2a, Sheffield Road, Spring Vale, Barnsley, South Yorkshire, S36 6HE	Signs	Industrial Products
C	217m E	H & H Vehicle Services Ltd	8, Sheffield Road, Spring Vale, Barnsley, South Yorkshire, S36 6HE	Vehicle Repair, Testing and Servicing	Repair and Servicing
8	226m W	Electricity Sub Station	South Yorkshire, S36	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m **1**

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 38 >**

ID	Location	Company	Address	LPG	Status
A	4m N	UNBRANDED	Sheffield Road, Penistone, Sheffield, South Yorkshire, S36 6HF	No	Open

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m **0**

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 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.

4.6 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.

4.7 Regulated explosive sites

Records within 500m	0

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.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

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.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	3

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.

Features are displayed on the Current industrial land use map on **page 38 >**

ID	Location	Details	
D	378m S	Operator: Hi-tec Integrity Castings Ltd (dissolved) Address: Green Road, Penistone, Sheffield, South Yorkshire, S36 6BU Process: Iron And Steel Permit Number: AR2619	Original Permit Number: IPCAIRAPP Date Approved: 26-1-1996 Effective Date: 12-2-1996 Status: Superseded By Variation
D	378m S	Operator: Hi-tec Integrity Castings Ltd (dissolved) Address: Green Road, Penistone, Sheffield, South Yorkshire, S36 6BU Process: Iron And Steel Permit Number: BD1466	Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Superseded By Variation
D	378m S	Operator: Hi-tec Integrity Castings Ltd (dissolved) Address: Green Road, Penistone, Sheffield, South Yorkshire, S36 6BU Process: Iron And Steel Permit Number: BI0122	Original Permit Number: IPCMINVAR Date Approved: 4-4-2000 Effective Date: 10-4-2000 Status: Revoked - Now Ippc

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

4.10 Licensed industrial activities (Part A(1))

Records within 500m	4

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

Features are displayed on the Current industrial land use map on **page 38 >**

ID	Location	Details	
D	376m S	Operator: HI TEC INTEGRITY CASTINGS LIMITED Installation Name: FOUNDRY, PENISTONE Process: FERROUS METALS; CASTING > 20T/DAY Permit Number: BK6700IY Original Permit Number: BK6700IY	EPR Reference: EPR/BK6700IY Issue Date: 01/03/2007 Effective Date: 01/03/2007 Last date noted as effective: 25/05/2023 Status: Revoked

ID	Location	Details	
D	376m S	Operator: HI TEC INTEGRITY CASTINGS LIMITED Installation Name: FOUNDRY, PENISTONE Process: FERROUS METALS; PRODUCING, MELTING OR REFINING Permit Number: BK6700IY Original Permit Number: BK6700IY	EPR Reference: EPR/BK6700IY Issue Date: 01/03/2007 Effective Date: 01/03/2007 Last date noted as effective: 25/05/2023 Status: Revoked
D	378m S	Operator: HI TEC INTEGRITY CASTINGS LTD Installation Name: - Process: FERROUS METALS; PRODUCING, MELTING OR REFINING Permit Number: BK6700 Original Permit Number: BK6700	EPR Reference: - Issue Date: 30/08/2002 Effective Date: 30/08/2002 Last date noted as effective: 01/10/2004 Status: SUPERSEDED BY PAS
D	378m S	Operator: HI TEC INTEGRITY CASTINGS LTD Installation Name: - Process: FERROUS METALS; CASTING > 20T/DAY Permit Number: BK6700 Original Permit Number: BK6700	EPR Reference: - Issue Date: 30/08/2002 Effective Date: 30/08/2002 Last date noted as effective: 01/10/2004 Status: SUPERSEDED BY PAS

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

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

Records within 500m **2**

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.

Features are displayed on the Current industrial land use map on **page 38 >**

ID	Location	Address	Details	
7	201m S	Cecil Penney, Sheffield Rd Garage, Sheffield Rd, Penistone, S36 6HF	Process: Petrol Vapour Recovery Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
12	477m E	Readymix (Huddersfield) Ltd, Sheffield Road, Penistone, Sheffield, S36 6HH	Process: Use of Bulk Cement Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

This data is sourced from Local Authority records.

4.12 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.

4.13 Licensed Discharges to controlled waters

Records within 500m	7

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

Features are displayed on the Current industrial land use map on **page 38 >**

ID	Location	Address	Details	
9	324m S	FOUNDRY SITE, GREEN ROAD, SOUTH YORKSHIRE	Effluent Type: TRADE DISCHARGES - COOLING WATER Permit Number: WRA7008 Permit Version: 1 Receiving Water: CUBLEY BROOK	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 23/12/1993 Effective Date: 23/12/1993 Revocation Date: 10/11/2003
11	330m S	CLYDE UNION DB LIMITED, CLYDE UNION PUMPS, AN SPX BRAND, GREEN ROAD, PENISTONE, SHEFFIELD, S36 6BJ	Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - NOT WATER COMPANY Permit Number: C4380 Permit Version: 1 Receiving Water: CUBLEY BROOK	Status: TRANSFERRED FROM COPA 1974 Issue date: 05/09/1986 Effective Date: 05/09/1986 Revocation Date: -
E	461m S	GREEN ROAD CSO, GREEN ROAD, PENISTONE, BARNSLEY, SOUTH YORKSHIRE	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: YWUCD2/76 Permit Version: 1 Receiving Water: CUBLEY BROOK	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 12/11/1997 Effective Date: 12/11/1997 Revocation Date: 30/03/2008
E	461m S	GREEN BROOK PLACE CSO, R/O GREEN BROOK PLACE, OFF GREEN ROAD, PENISTONE, SHEFFIELD, SOUTH YORKSHIRE, S36 6EQ	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: EPREP3225XP Permit Version: 3 Receiving Water: CUBLEY BROOK	Status: VARIED UNDER EPR 2010 Issue date: 15/11/2017 Effective Date: 15/11/2017 Revocation Date: -
E	471m S	GREEN BROOK PLACE CSO, R/O GREEN BROOK PLACE, OFF GREEN ROAD, PENISTONE, SHEFFIELD, SOUTH YORKSHIRE, S36 6EQ	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: EPREP3225XP Permit Version: 2 Receiving Water: CUBLEY BROOK	Status: VARIED UNDER EPR 2010 Issue date: 06/09/2010 Effective Date: 06/09/2010 Revocation Date: 14/11/2017

ID	Location	Address	Details	
E	471m S	GREEN BROOK PLACE CSO, R/O GREEN BROOK PLACE, OFF GREEN ROAD, PENISTONE, SHEFFIELD, SOUTH YORKSHIRE, S36 6EQ	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: WRA9310 Permit Version: 1 Receiving Water: CUBLEY BROOK	Status: REVOKED UNDER EPR 2010 Issue date: 31/03/2008 Effective Date: 31/03/2008 Revocation Date: 05/09/2010
E	471m S	GREEN BROOK PLACE CSO, R/O GREEN BROOK PLACE, OFF GREEN ROAD, PENISTONE, SHEFFIELD, SOUTH YORKSHIRE, S36 6EQ	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: EPREP3225XP Permit Version: 1 Receiving Water: CUBLEY BROOK	Status: MODIFIED - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 31/03/2008 Effective Date: 31/03/2008 Revocation Date: 05/09/2010

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

4.14 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.

4.15 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.

4.16 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.

4.17 List 2 Dangerous Substances

Records within 500m	1

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.

Features are displayed on the Current industrial land use map on **page 38 >**

ID	Location	Name	Status	Receiving Water	Authorised Substances
10	328m S	William Cook Ndt Penistone Sheffield S36 6be	Not Active	Unknown	Silver, Zinc

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

4.18 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 38 >**

ID	Location	Details	
1	13m E	Incident Date: 04/11/2002 Incident Identification: 118645 Pollutant: Specific Waste Materials Pollutant Description: Containers	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
A	28m N	Incident Date: 26/03/2002 Incident Identification: 66826 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
6	159m W	Incident Date: 25/10/2001 Incident Identification: 39145 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	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.

4.19 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.

4.20 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.

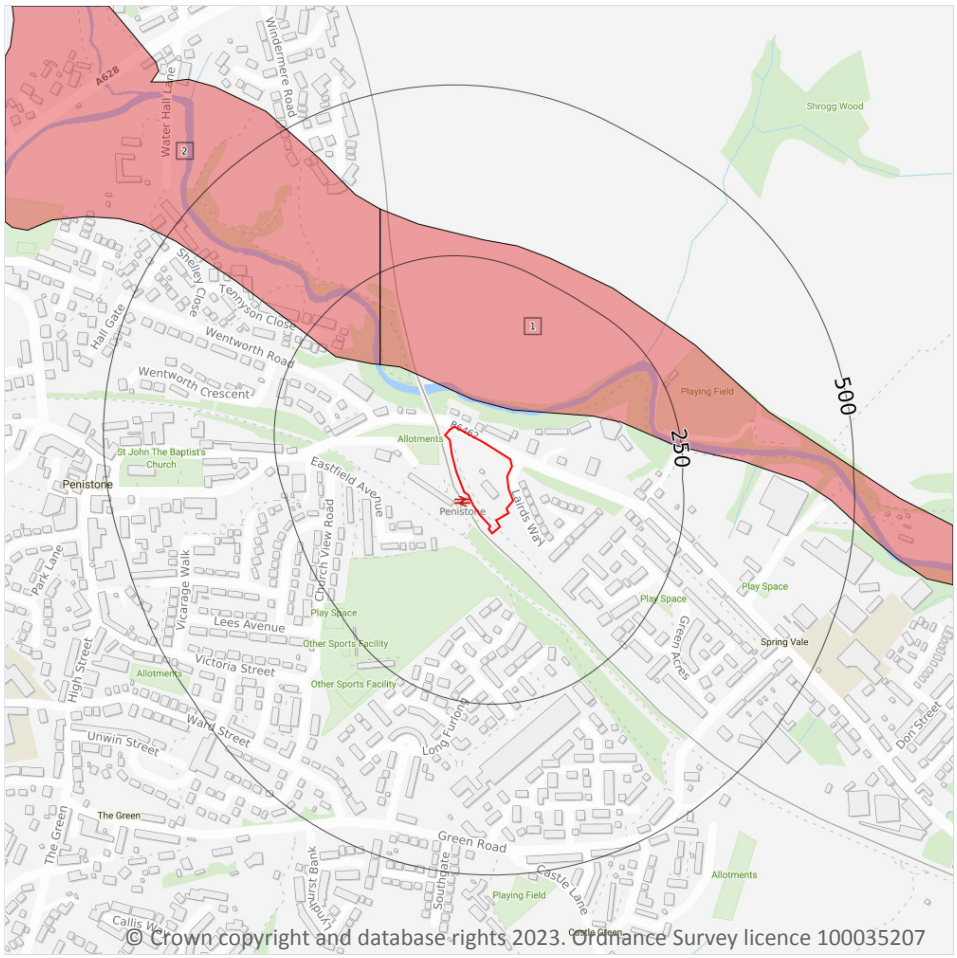
4.21 Pollution inventory radioactive waste

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



5.1 Superficial aquifer

Records within 500m	2

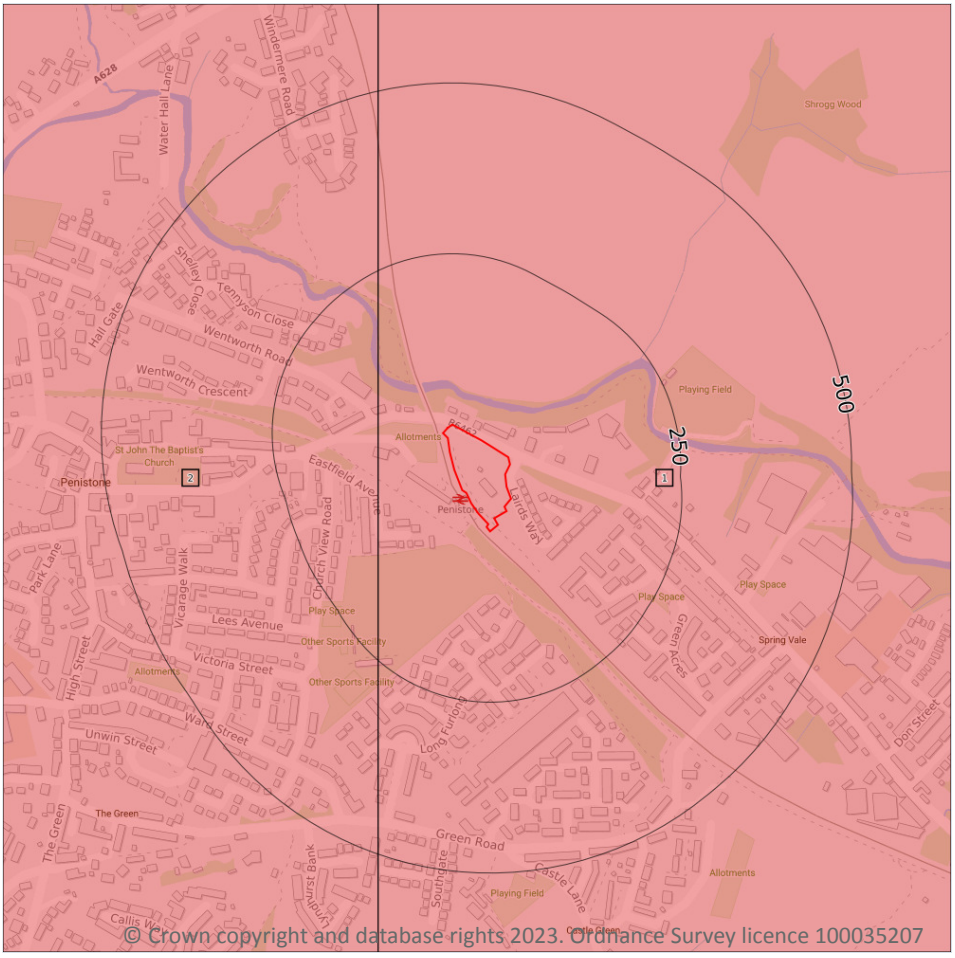
Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 47 >**

ID	Location	Designation	Description
1	47m 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
2	140m NW	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

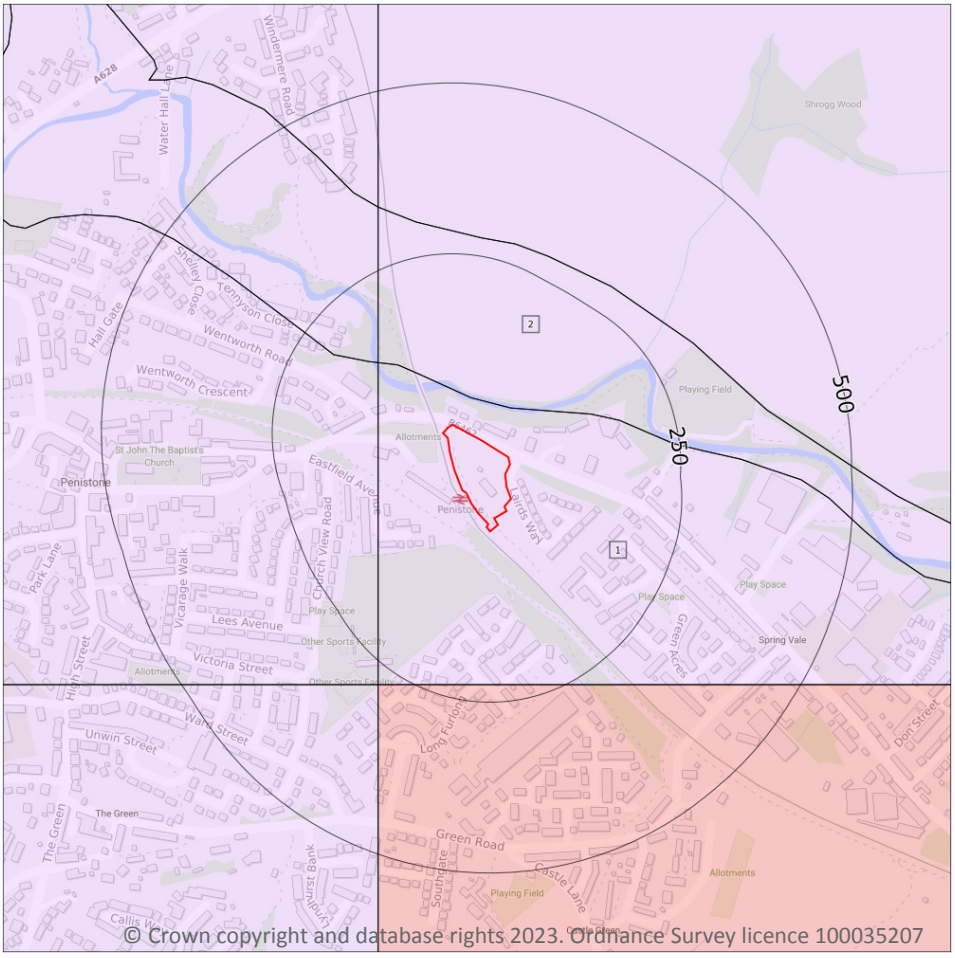
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 49 >**

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	95m W	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	2

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 51 >**

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**
2	47m N	Summary Classification: Secondary bedrock aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: 300-550mm/year	Vulnerability: Low Aquifer type: Secondary 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.

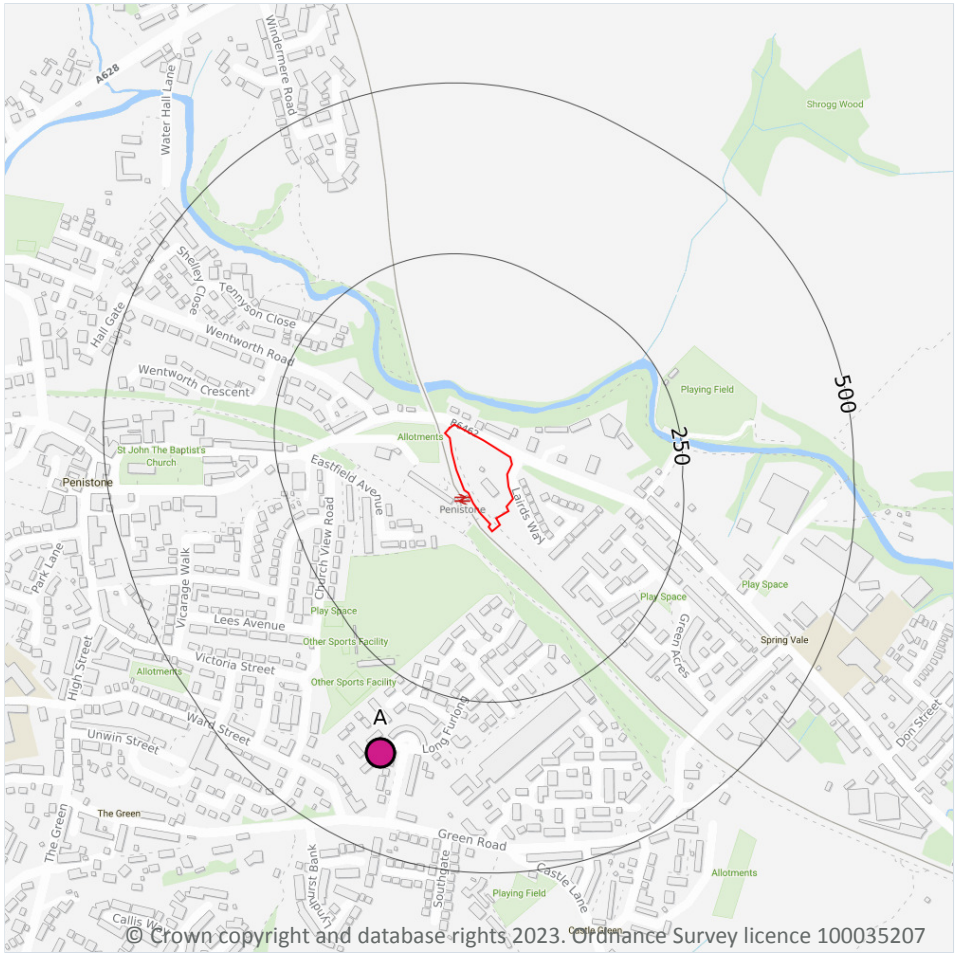
5.5 Groundwater vulnerability- local information

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



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- 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	5

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 53 >**

ID	Location	Details	
A	363m 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: -
A	363m 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: -
-	1938m N	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: -
-	1962m N	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: -
-	1962m N	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: -

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

5.7 Surface water abstractions

Records within 2000m	**2**

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 53 >**

ID	Location	Details	
-	1242m SE	Status: Historical Licence No: 2/27/05/104 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: RIVER DON -- PUMP Data Type: Point Name: WINTERBOTTOM (WIREDRAWERS) LTD Easting: 426300 Northing: 402700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 17/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/03/1966 Version End Date: -
-	1242m SE	Status: Historical Licence No: 2/27/05/104 Details: General use relating to Secondary Category (Medium Loss) Direct Source: SURFACE WATER Point: RIVER DON Data Type: Point Name: WINTERBOTTOM (WIREDRAWERS) LTD Easting: 426300 Northing: 402700	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 17/03/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/03/1966 Version End Date: -

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

5.8 Potable abstractions

Records within 2000m	**0**

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.

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.

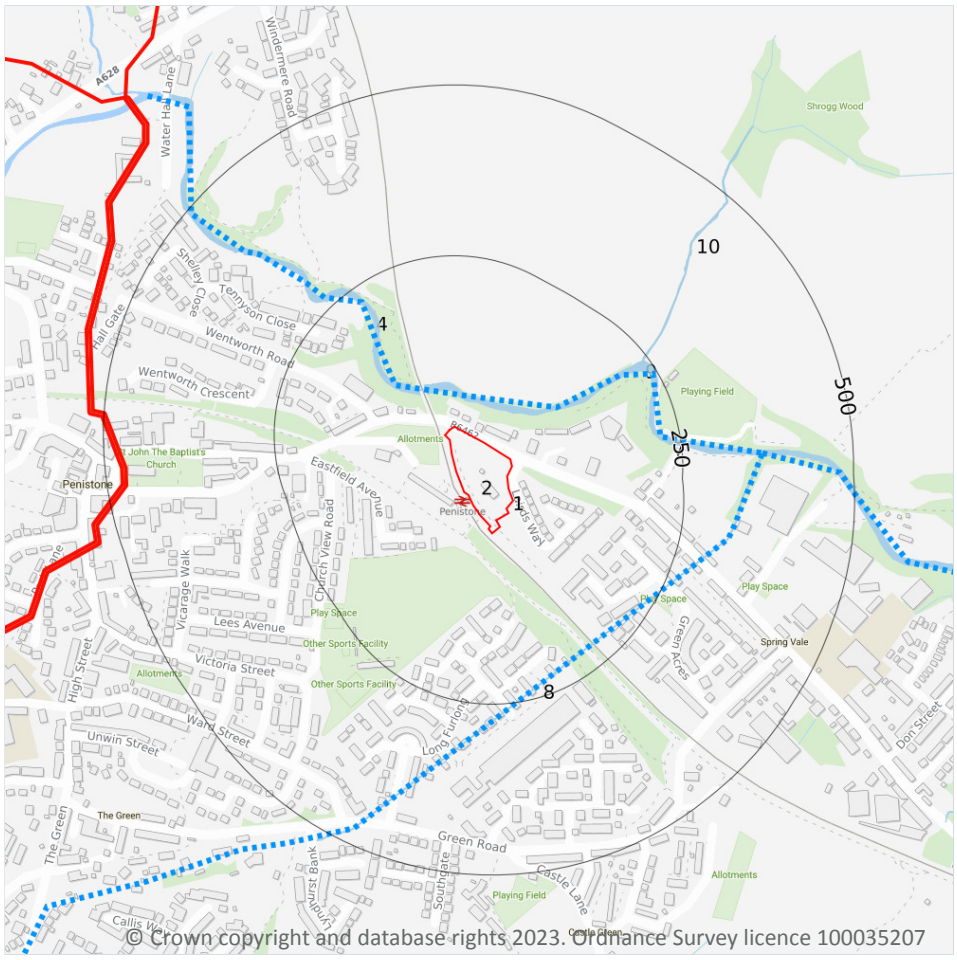
5.10 Source Protection Zones (confined aquifer)

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	5

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 57 >**

ID	Location	Type of water feature	Ground level	Permanence	Name
4	45m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Don

ID	Location	Type of water feature	Ground level	Permanence	Name
7	213m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Don
8	217m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Cubley Brook
9	238m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
10	242m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

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 57 >**

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 57 >**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
1	**On site**	**River**	**Don from Scout Dyke to the Little Don**	**GB104027057490**	**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 57 >**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
5	47m N	River	Don from Scout Dyke to the Little Don	GB104027057490 ↗	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

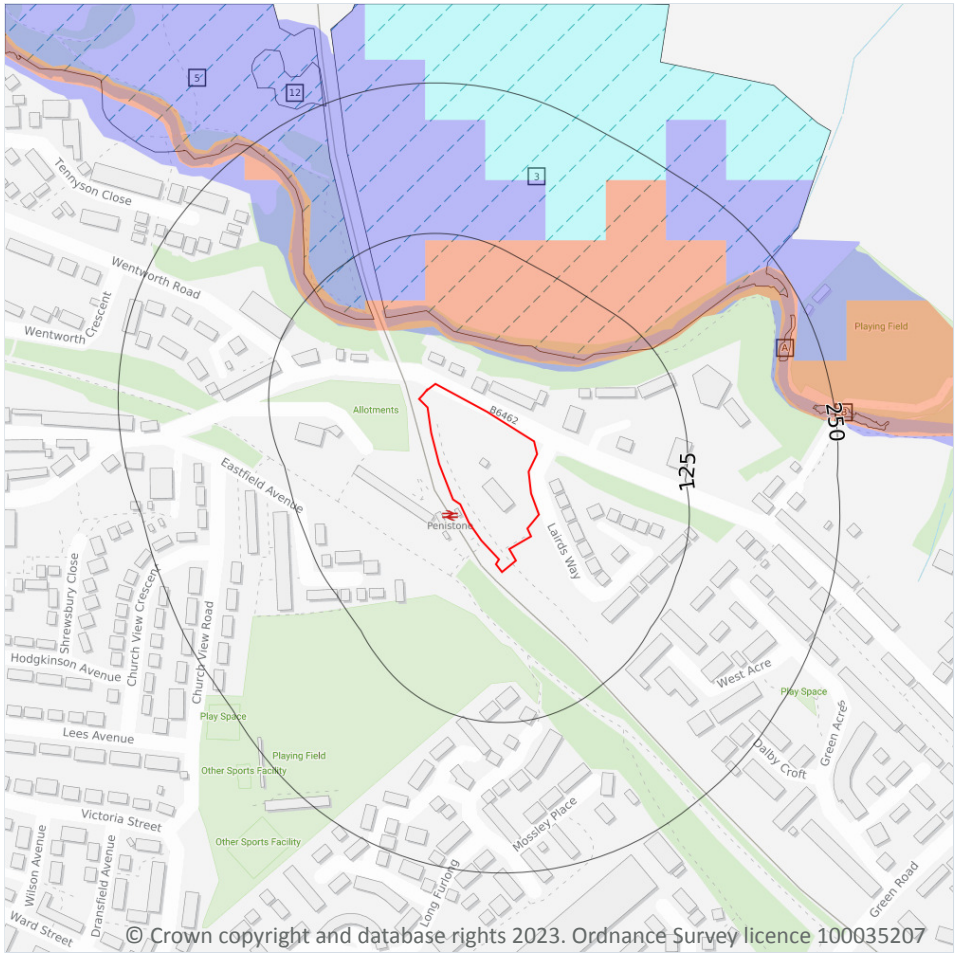
Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 57 >**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
2	**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



Site Outline

Search buffers in metres (m)

River and coastal flooding:

- High
- Medium
- Low
- Very Low
- Historical Flood Events
- Areas Used for Flood Storage
- Areas Benefiting from Flood Defences
- Flood Defences

7.1 Risk of flooding from rivers and the sea

Records within 50m	2

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).

Features are displayed on the River and coastal flooding map on **page 60 >**

Distance	Flood risk category
On site	**N/A**
0 - 50m	High

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

7.2 Historical Flood Events

Records within 250m	**5**

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.

Features are displayed on the River and coastal flooding map on **page 60 >**

ID	Location	Event name	Date of flood	Flood source	Flood cause	Type of flood
3	46m N	2007 River Don Penistone	2007-06-15 2007-06-30	Main river	Channel capacity exceeded (no raised defences)	Fluvial
5	73m NW	2007 River Don Penistone	2007-06-15 2007-06-30	Main river	Channel capacity exceeded (no raised defences)	Fluvial
A	215m E	2007 River Don Penistone	2007-06-15 2007-06-30	Main river	Channel capacity exceeded (no raised defences)	Fluvial
B	232m E	2007 River Don Penistone	2007-06-15 2007-06-30	Main river	Channel capacity exceeded (no raised defences)	Fluvial
12	248m NW	123 Autumn 2000	2000-11-07 2000-12-04	Main river	Unknown	No data

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.

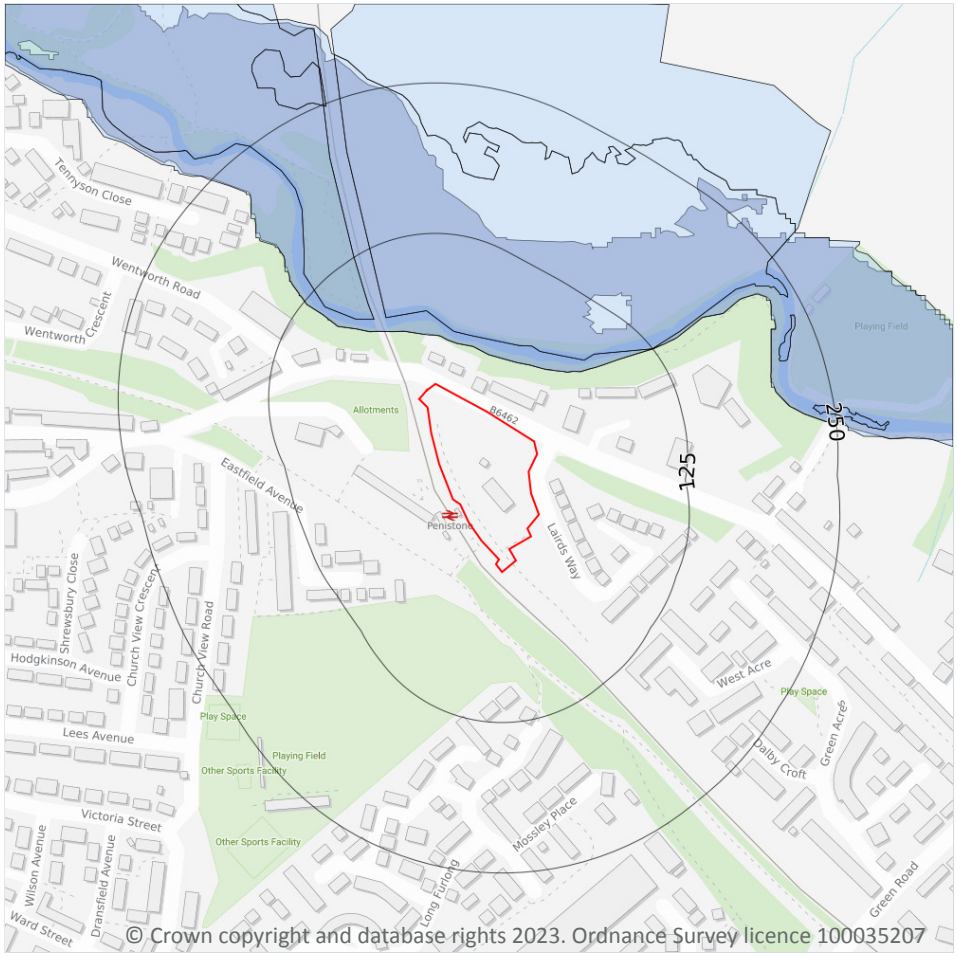
7.5 Flood Storage Areas

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



Site Outline

Search buffers in metres (m)

Flood zone 2

Flood zone 3

7.6 Flood Zone 2

Records within 50m	1

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.

Features are displayed on the River and coastal flooding map on **page 60 >**

Location	Type
38m N	Zone 2 - (Fluvial /Tidal Models)

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

7.7 Flood Zone 3

Records within 50m	1

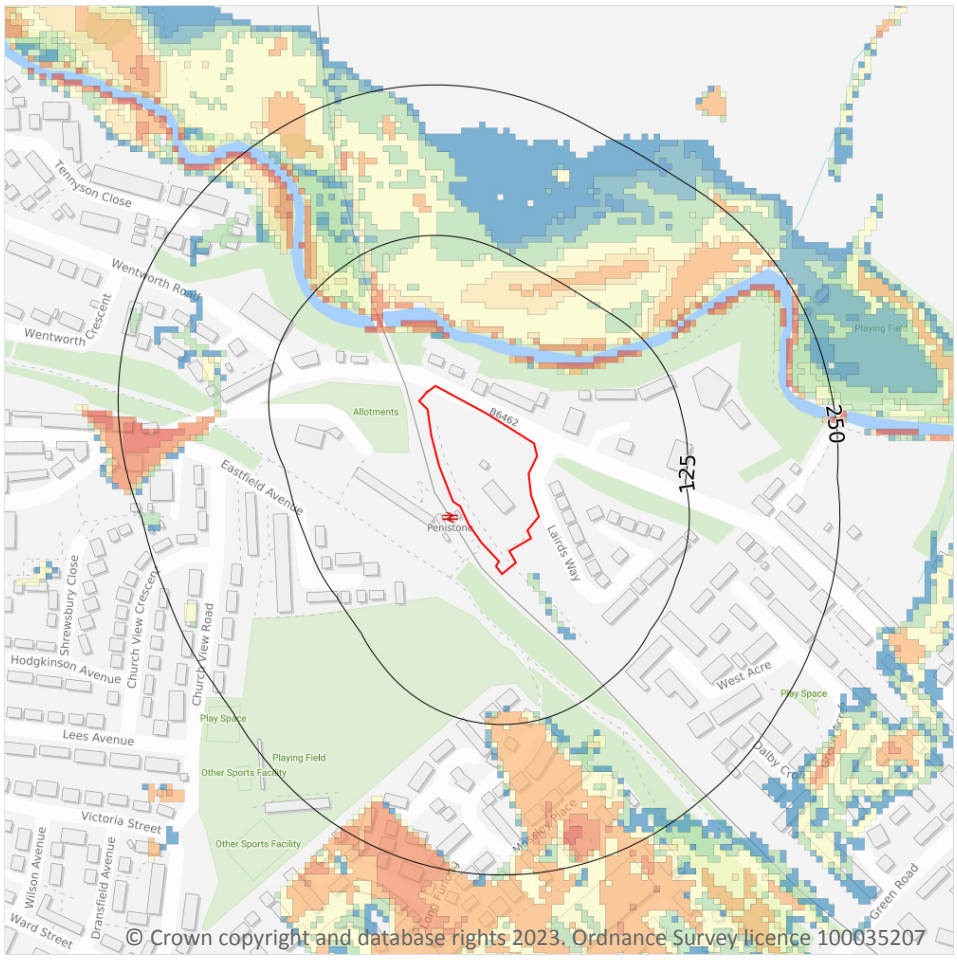
Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 60 >**

Location	Type
38m N	Zone 3 - (Fluvial Models)

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	**1 in 30 year, Greater than 1.0m**

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.

Features are displayed on the Surface water flooding map on **page 65 >**

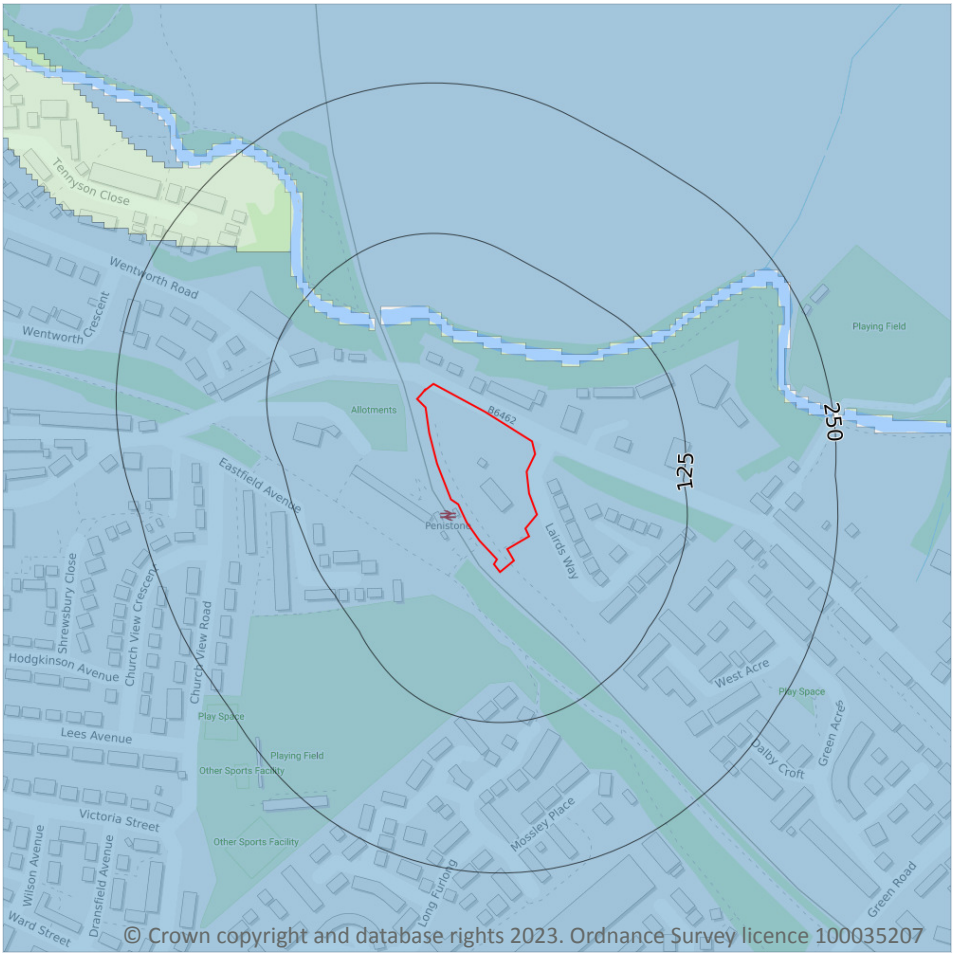
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

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



9.1 Groundwater flooding

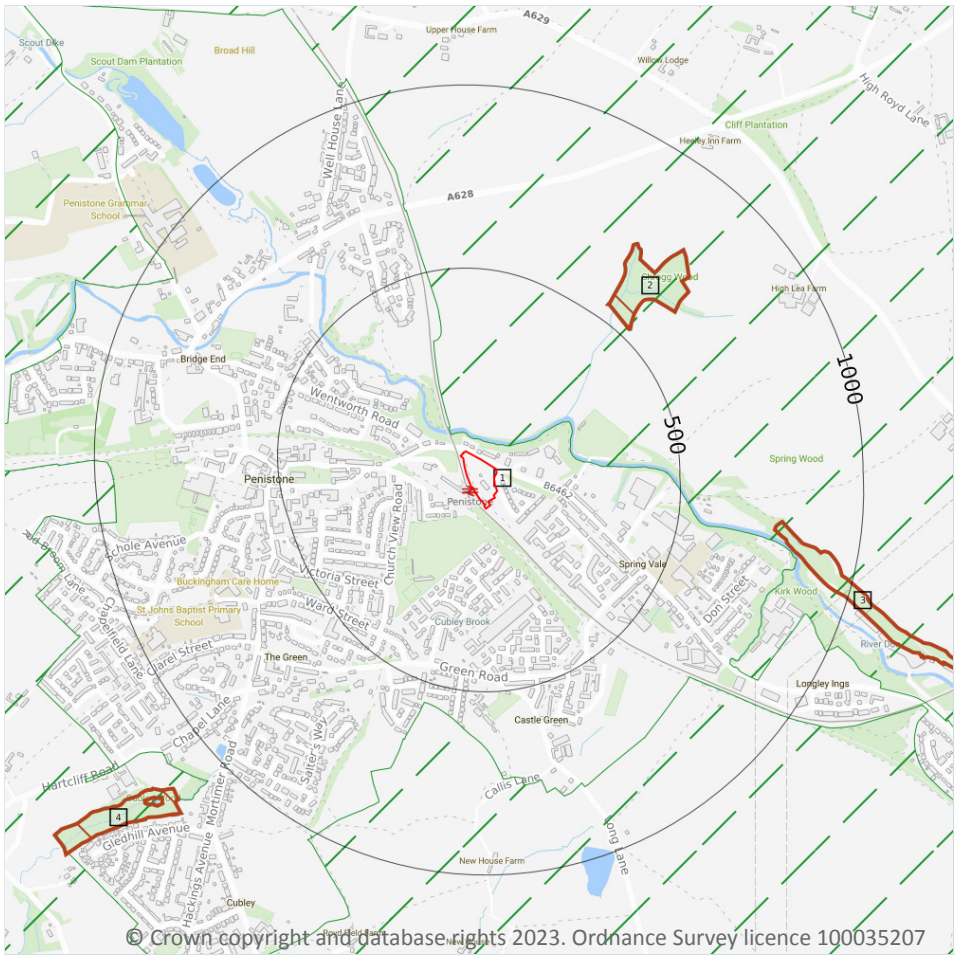
Highest risk on site	**Negligible**
Highest risk within 50m	**Negligible**

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 67 >**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



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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	7

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 68 >**

ID	Location	Name	Woodland Type
2	527m NE	Shrogg Wood	Ancient & Semi-Natural Woodland
3	765m E	Spring Vale Wood	Ancient & Semi-Natural Woodland
4	1146m SW	Unknown	Ancient Replanted Woodland
-	1419m E	Coates Great Wood	Ancient Replanted Woodland
-	1632m E	Unknown	Ancient & Semi-Natural Woodland
-	1783m N	Cat Hill Clough Wood	Ancient Replanted Woodland
-	1939m E	Coates Great 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 68 >**

ID	Location	Name	Local Authority name
1	40m N	South and West Yorkshire	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	2

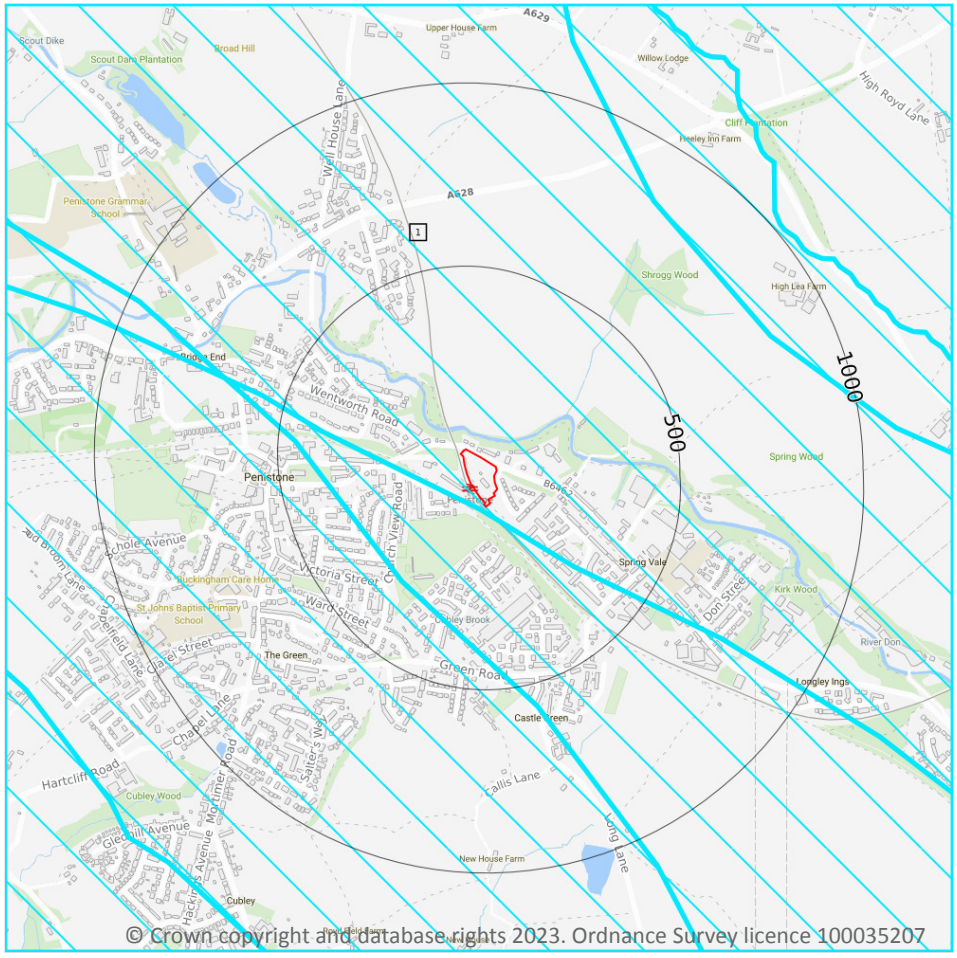
Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
1093m NE	River Dearne NVZ	Surface Water	278	Existing

Location	Name	Type	NVZ ID	Status
1875m NW	River Dearne NVZ	Surface Water	278	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



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10.17 SSSI Impact Risk Zones

Records on site	1

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.

Features are displayed on the SSSI Impact Zones and Units map on **page 74 >**

ID	Location	Type of developments requiring consultation
1	**On site**	**Infrastructure - Airports, helipads and other aviation proposals.** **Minerals, Oil and Gas - Oil & gas exploration/extraction.** **Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 750m², manure stores > 3500t.** **Combustion - General combustion processes >50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion**

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



Site Outline

Search buffers in metres (m)

Listed buildings

Conservation areas

Conservation areas - no data

National Parks

Areas of Outstanding Natural Beauty

Registered parks and gardens

Scheduled Monuments

World Heritage Sites

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	1

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.

Features are displayed on the Visual and cultural designations map on **page 76 >**

ID	Location	Name	Grade	Reference Number	Listed date
2	241m NW	Penistone Railway Viaduct On Penistone And Denby Dale Line	II	1286798	27/04/1988

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	1

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.

Features are displayed on the Visual and cultural designations map on **page 76 >**

ID	Location	Name	District	Date of designation
1	12m NW	Penistone	Barnsley	1974

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.

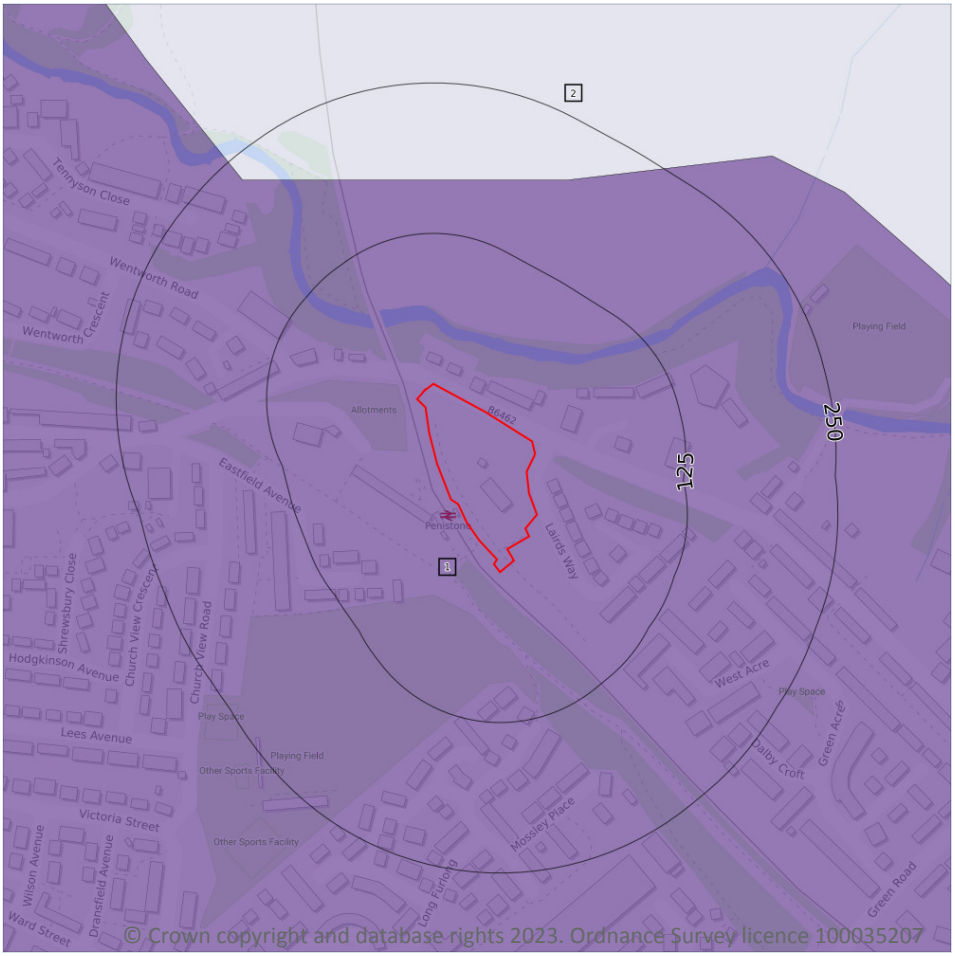
11.7 Registered Parks and Gardens

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 79 >**

ID	Location	Classification	Description
1	**On site**	**Urban**	-

ID	Location	Classification	Description
2	169m N	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.

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
54m N	492496	Countryside Stewardship (Middle Tier)	01/01/2018	31/12/2022

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	14

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 82 >**

ID	Location	Main Habitat	Other habitats
2	10m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	22m S	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
3	24m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	36m S	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

ID	Location	Main Habitat	Other habitats
4	38m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
5	50m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
B	67m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
B	95m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
6	129m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
7	138m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
8	167m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
9	178m SE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
10	196m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
11	214m W	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	**1**

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.

Features are displayed on the Habitat designations map on **page 82 >**

ID	Location	Site reference	Identification confidence	Primary source	Secondary source	Tertiary source
1	**On site**	**NLUD Ref: 440800218**	**Low**	**National Land Use Database - Previously Developed Land**	**UK Perspectives Aerial Photography**	**-**

This data is sourced from Natural England.

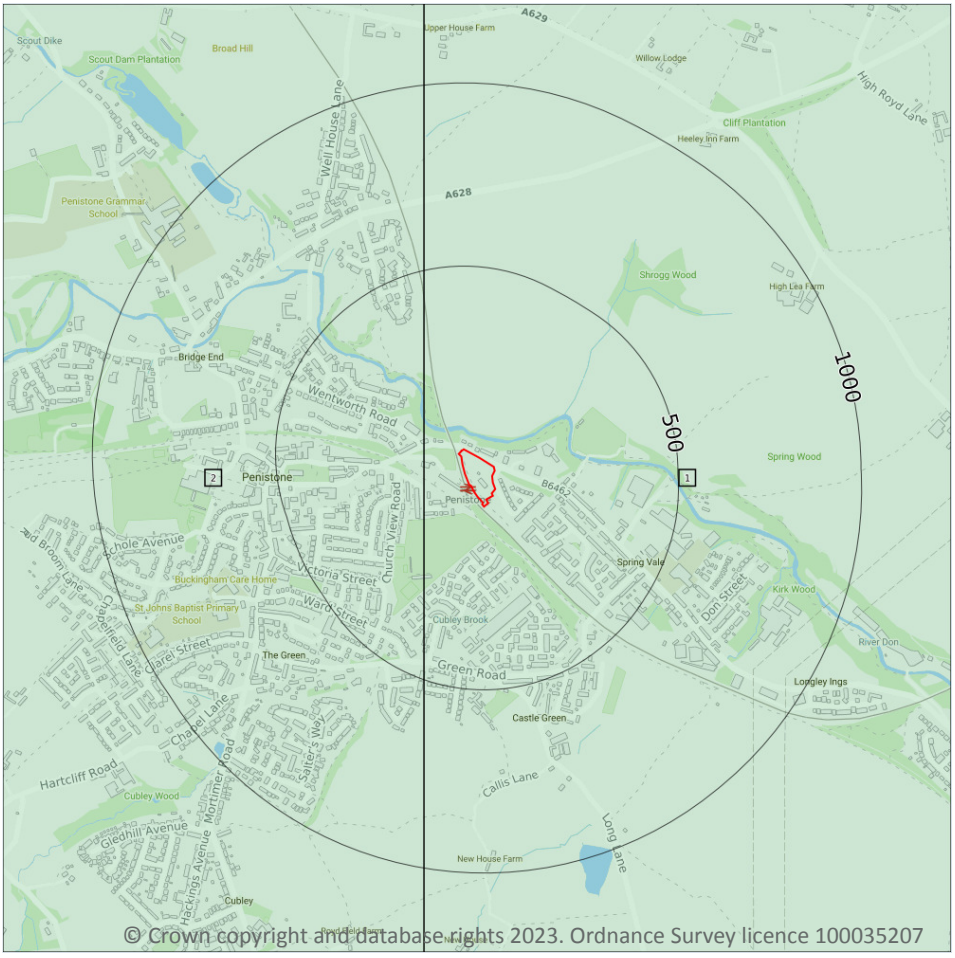
13.4 Limestone Pavement Orders

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

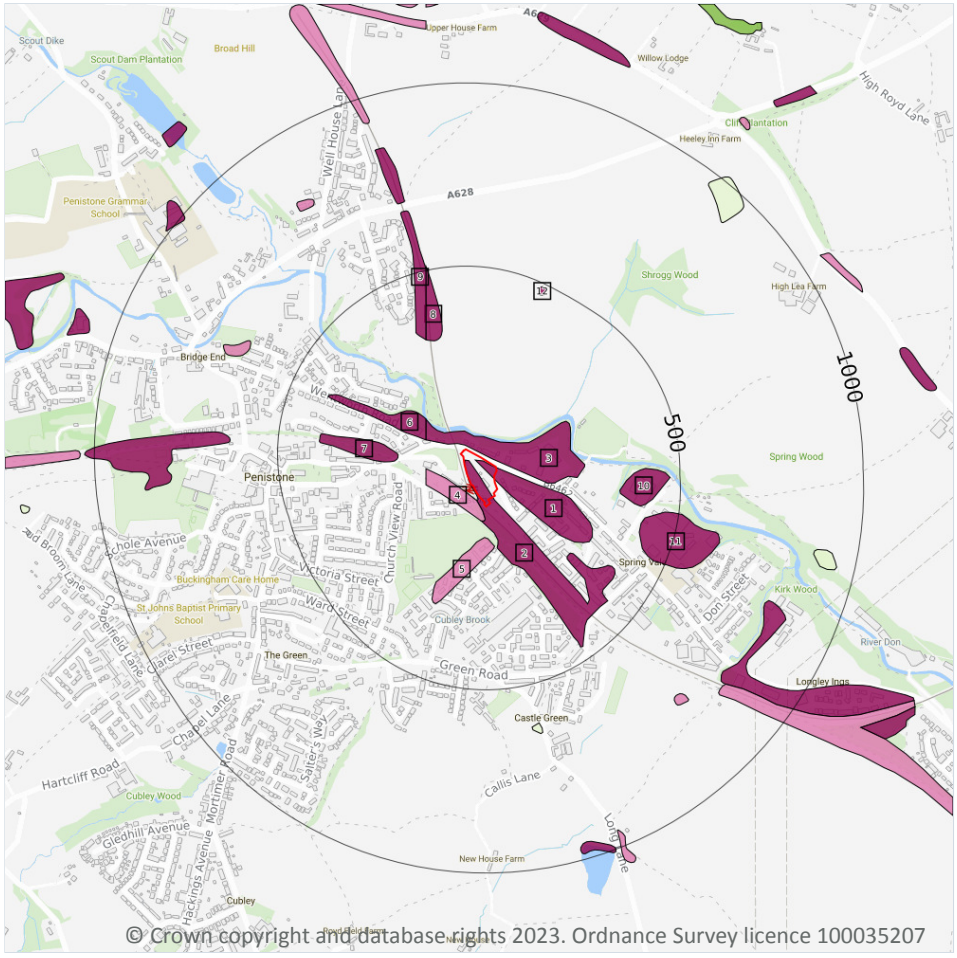
An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 85 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**SE20SE**
2	95m W	Full	Full	Full	Full	SE20SW

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	12

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.

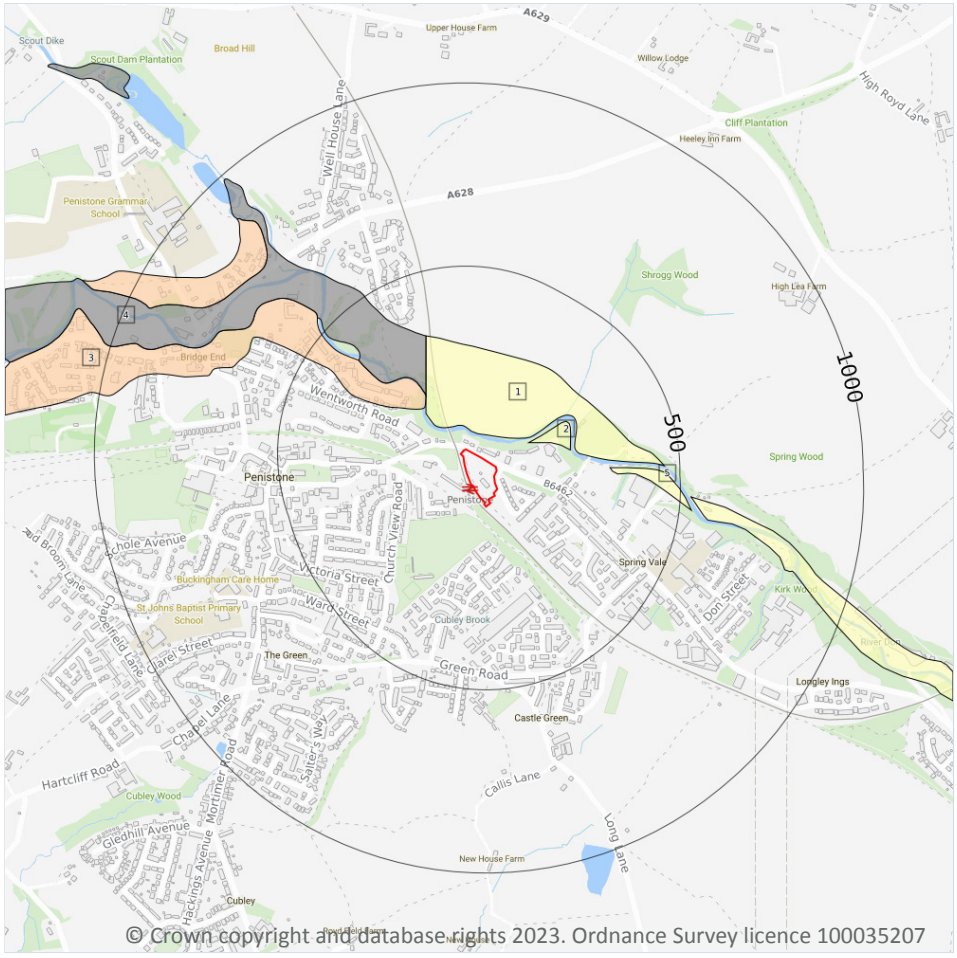
Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 86 >**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**MGR-ARTDP**	**Made Ground (Undivided)**	**Artificial Deposit**
2	**On site**	**MGR-ARTDP**	**Made Ground (Undivided)**	**Artificial Deposit**
3	9m NW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
4	13m S	WGR-VOID	Worked Ground (Undivided)	Void

ID	Location	LEX Code	Description	Rock description
5	84m S	WGR-VOID	Worked Ground (Undivided)	Void
6	102m NW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
7	171m W	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
8	308m N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
9	318m N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
10	335m E	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
11	404m E	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
12	468m N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



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	5

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 88 >**

ID	Location	LEX Code	Description	Rock description
1	52m N	ALV-XCZ	Alluvium - Clay And Silt	Clay And Silt
2	112m NE	ALV-XCZ	Alluvium - Clay And Silt	Clay And Silt
3	159m NW	RTD1-XSV	River Terrace Deposits, 1 - Sand And Gravel	Sand And Gravel
4	182m NW	ALV-CZ	Alluvium - Silty Clay	Clay, Silty

ID	Location	LEX Code	Description	Rock description
5	309m E	ALV-XCZ	Alluvium - Clay And Silt	Clay And Silt

This data is sourced from the British Geological Survey.

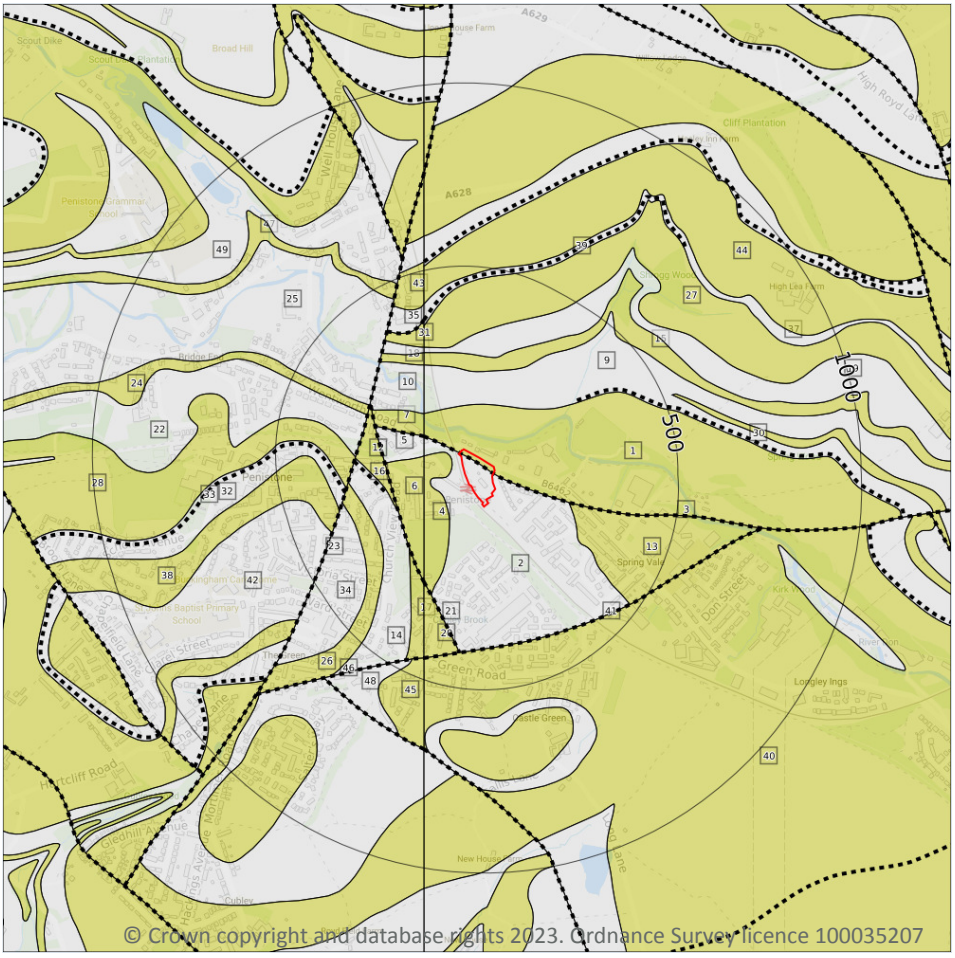
14.4 Landslip (10k)

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



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 **37**

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 90 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**GR-SDST**	**Grenoside Sandstone - Sandstone**	**Langsettian Sub-age**
2	**On site**	**PLCM-MDSS**	**Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone**	**Langsettian Sub-age**
4	24m NW	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age

ID	Location	LEX Code	Description	Rock age
5	95m W	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age
6	95m W	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
7	107m NW	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
9	118m N	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
10	145m NW	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age
12	201m W	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
13	205m E	GR-SDST	Grenoside Sandstone - Sandstone	Langsettian Sub-age
14	207m SW	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age
15	214m N	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
17	231m SW	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
18	255m NW	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
19	260m N	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
20	263m SW	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
22	267m W	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age
24	271m NW	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
25	277m NW	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age
26	280m SW	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
27	281m N	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
28	282m W	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
29	286m NW	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age
31	299m NW	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
32	321m W	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age
34	330m W	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age

ID	Location	LEX Code	Description	Rock age
35	352m NW	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age
37	354m N	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
38	358m W	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
40	383m S	GR-SDST	Grenoside Sandstone - Sandstone	Langsettian Sub-age
42	396m W	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age
43	404m N	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
44	411m N	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
45	445m S	GR-SDST	Grenoside Sandstone - Sandstone	Langsettian Sub-age
47	452m NW	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
48	460m S	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age
49	486m NW	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m **12**

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.

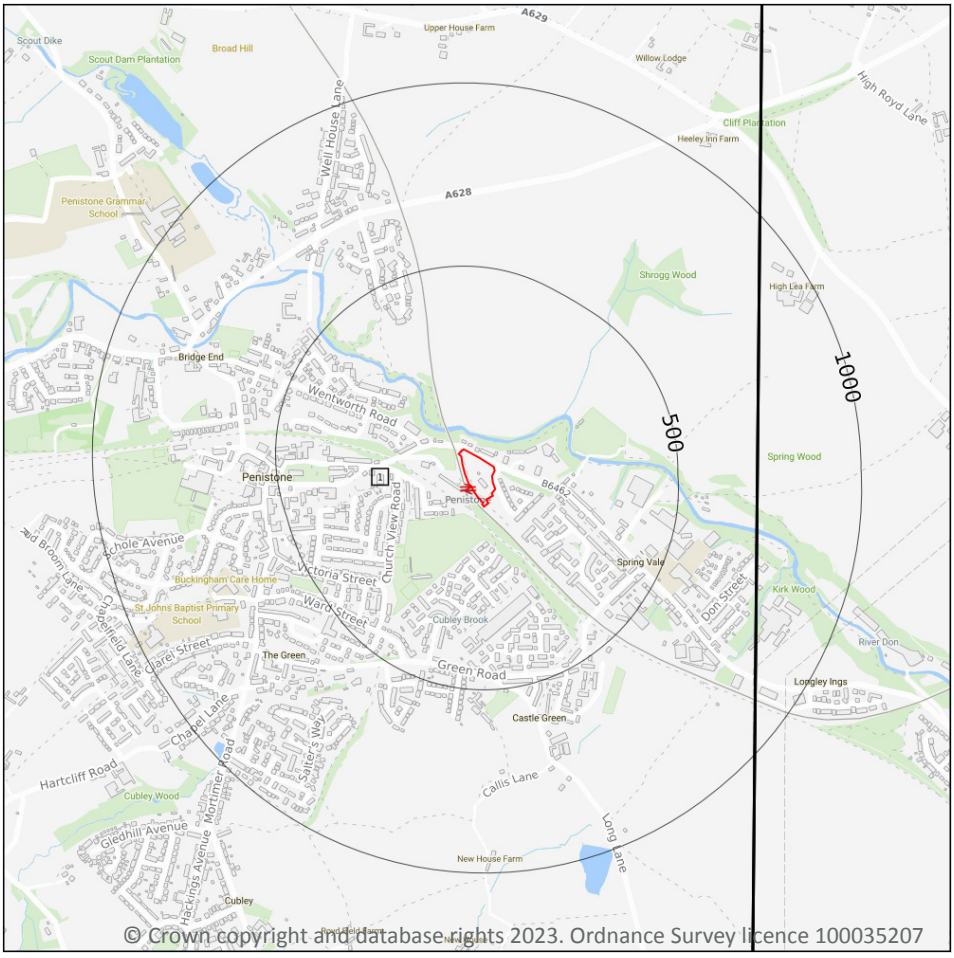
Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 90 >**

ID	Location	Category	Description
3	**On site**	**FAULT**	**Normal fault, inferred**
8	107m NW	FAULT	Normal fault, inferred; crossmarks on downthrow side
11	201m W	FAULT	Normal fault, inferred; crossmarks on downthrow side
16	221m W	ROCK	Coal seam, inferred ()
21	263m SW	FAULT	Normal fault, inferred
23	267m W	FAULT	Normal fault, inferred; crossmarks on downthrow side

ID	Location	Category	Description
30	291m NE	ROCK	Coal seam, inferred
33	327m W	ROCK	Coal seam, inferred ()
36	352m NW	ROCK	Coal seam, inferred ()
39	369m N	ROCK	Coal seam, inferred
41	383m S	FAULT	Normal fault, inferred
46	445m S	FAULT	Normal fault, inferred; crossmarks on downthrow side

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

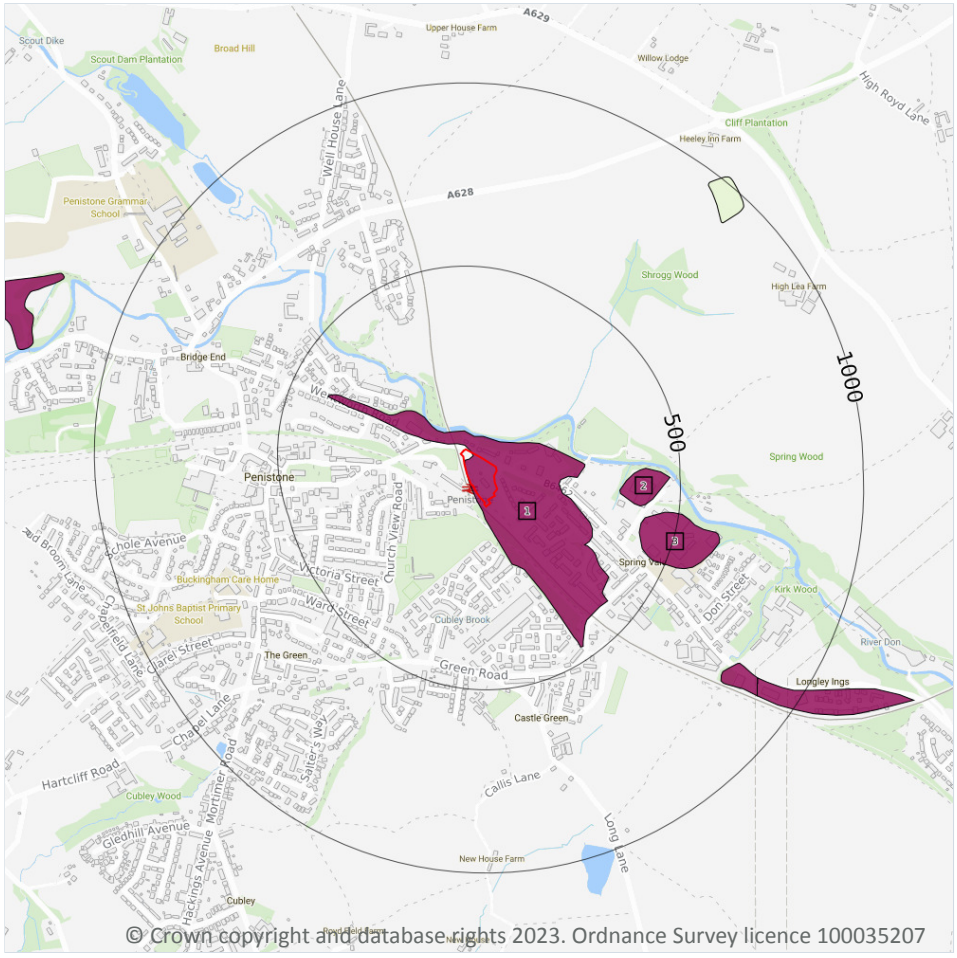
An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 94 >**

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



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Site Outline

Search buffers in metres (m)

- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

15.2 Artificial and made ground (50k)

Records within 500m	3

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.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on **page 95 >**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**MGR-ARTDP**	**MADE GROUND (UNDIVIDED)**	**ARTIFICIAL DEPOSIT**
2	335m E	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
3	403m E	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

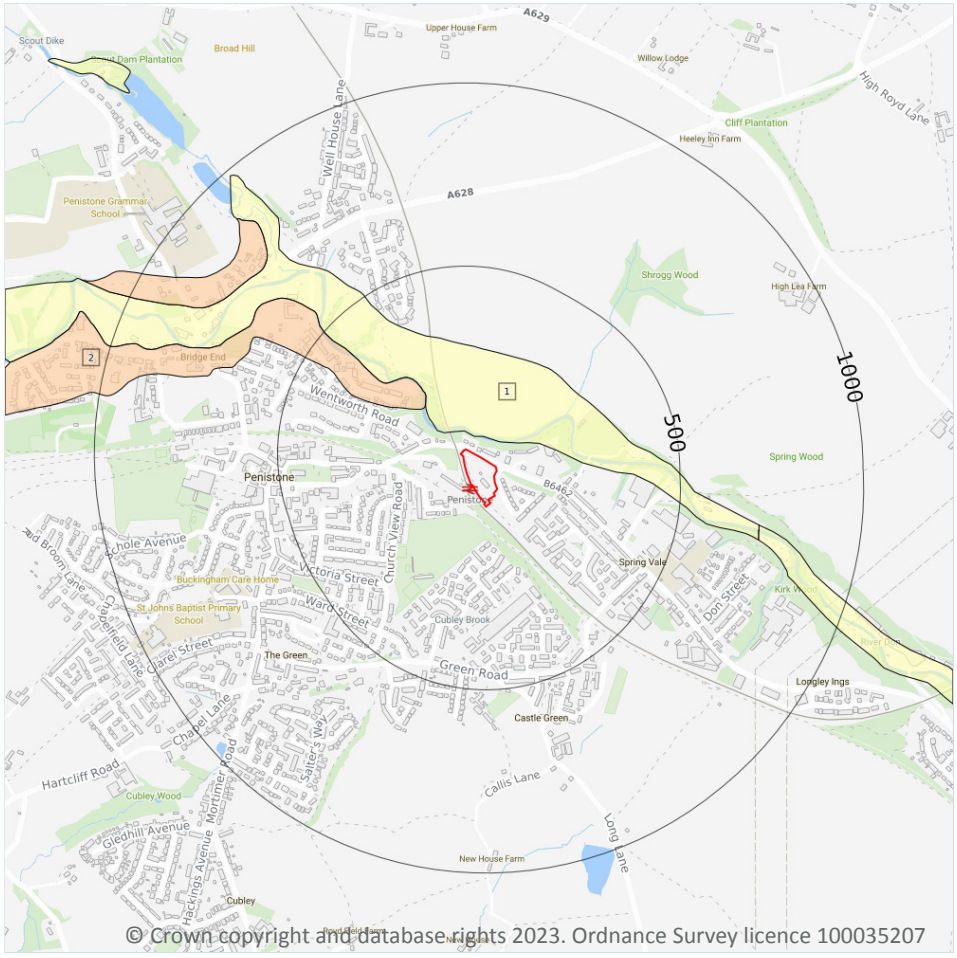
Records within 50m	1

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).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Mixed**	**Very High**	**Low**

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	2

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 97 >**

ID	Location	LEX Code	Description	Rock description
1	42m N	ALV-XCZ	ALLUVIUM	CLAY AND SILT
2	159m NW	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	1

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).

Location	Flow type	Maximum permeability	Minimum permeability
42m N	Intergranular	Low	Very Low

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.

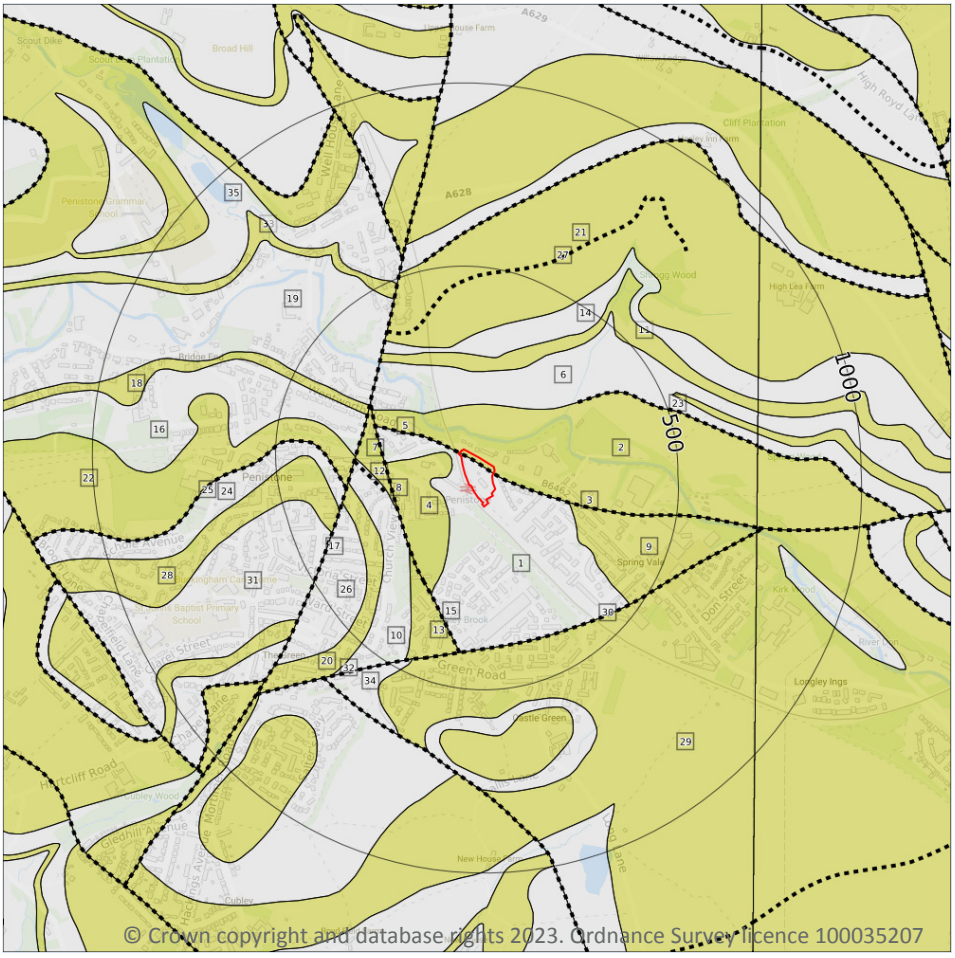
15.7 Landslip permeability (50k)

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 **24**

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 99 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**PLCM-MDSS**	**PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE**	**WESTPHALIAN**
2	**On site**	**GR-SDST**	**GRENOSIDE SANDSTONE - SANDSTONE**	**WESTPHALIAN**
4	24m NW	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN

ID	Location	LEX Code	Description	Rock age
6	118m N	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
7	201m W	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
9	205m E	GR-SDST	GRENOSIDE SANDSTONE - SANDSTONE	WESTPHALIAN
10	207m SW	PLCM-MDSI	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE AND SILTSTONE	WESTPHALIAN
11	214m N	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
13	231m SW	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
14	259m N	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
16	267m W	PLCM-MDSI	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE AND SILTSTONE	WESTPHALIAN
18	271m NW	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
19	277m NW	PLCM-MDSI	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE AND SILTSTONE	WESTPHALIAN
20	280m SW	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
21	281m N	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
22	282m W	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
24	321m W	PLCM-MDSI	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE AND SILTSTONE	WESTPHALIAN
26	329m W	PLCM-MDSI	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE AND SILTSTONE	WESTPHALIAN
28	358m W	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
29	383m S	GR-SDST	GRENOSIDE SANDSTONE - SANDSTONE	WESTPHALIAN
31	396m W	PLCM-MDSI	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE AND SILTSTONE	WESTPHALIAN
33	452m NW	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
34	459m S	PLCM-MDSI	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE AND SILTSTONE	WESTPHALIAN
35	487m NW	PLCM-MDSI	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE AND SILTSTONE	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**
24m NW	Fracture	High	Moderate

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	11

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 99 >**

ID	Location	Category	Description
3	**On site**	**FAULT**	**Fault, inferred**
5	106m NW	FAULT	Fault, inferred
8	201m W	FAULT	Fault, inferred
12	221m W	ROCK	Coal seam, inferred
15	263m SW	FAULT	Fault, inferred
17	267m W	FAULT	Fault, inferred
23	289m NE	ROCK	Coal seam, observed
25	321m W	ROCK	Coal seam, inferred
27	352m NW	ROCK	Coal seam, inferred
30	383m S	FAULT	Fault, inferred
32	445m S	FAULT	Fault, inferred

This data is sourced from the British Geological Survey.

16 Boreholes



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16.1 BGS Boreholes

Records within 250m	4

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.

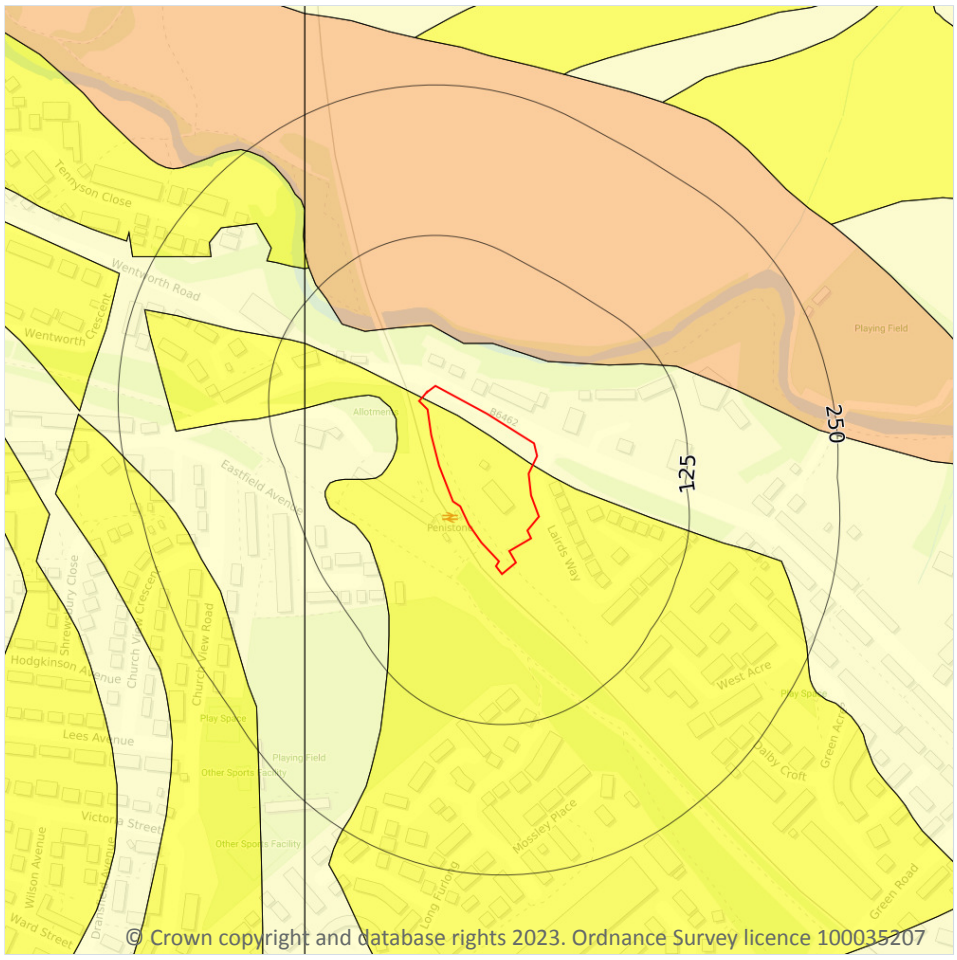
Features are displayed on the Boreholes map on **page 102 >**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	49m NE	425236 403351	SITE INVESTIGATION SYCC HIGHWAYS DEPOT PENISTONE 4	4.9	N	56304 ↗
2	177m SE	425295 403104	GREEN ROAD PENISTONE 4	-	Y	N/A

ID	Location	Grid reference	Name	Length	Confidential	Web link
3	198m SE	425349 403139	GREEN ROAD PENISTONE 6	-	Y	N/A
4	249m SE	425419 403161	GREEN ROAD PENISTONE 7	-	Y	N/A

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

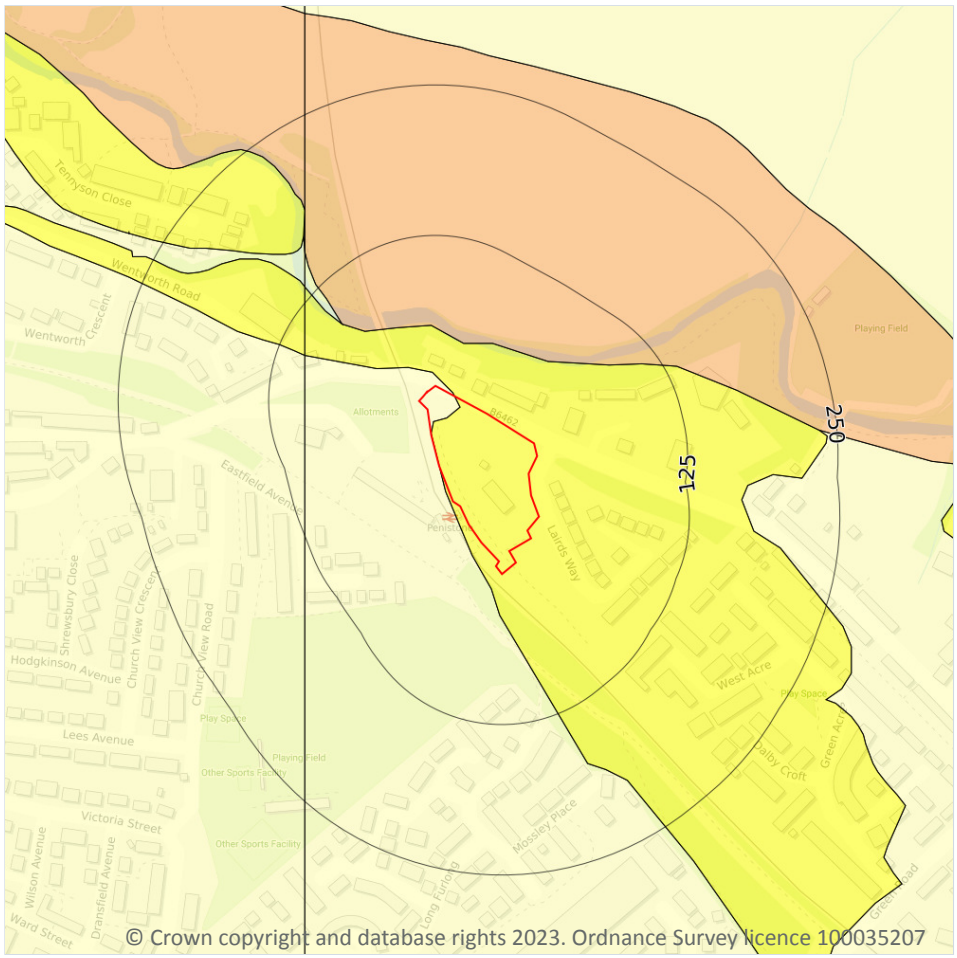
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 104 >**

Location	Hazard rating	Details
On site	**Negligible**	**Ground conditions predominantly non-plastic.**
On site	**Very low**	**Ground conditions predominantly low plasticity.**
42m N	Low	Ground conditions predominantly medium 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	3

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.

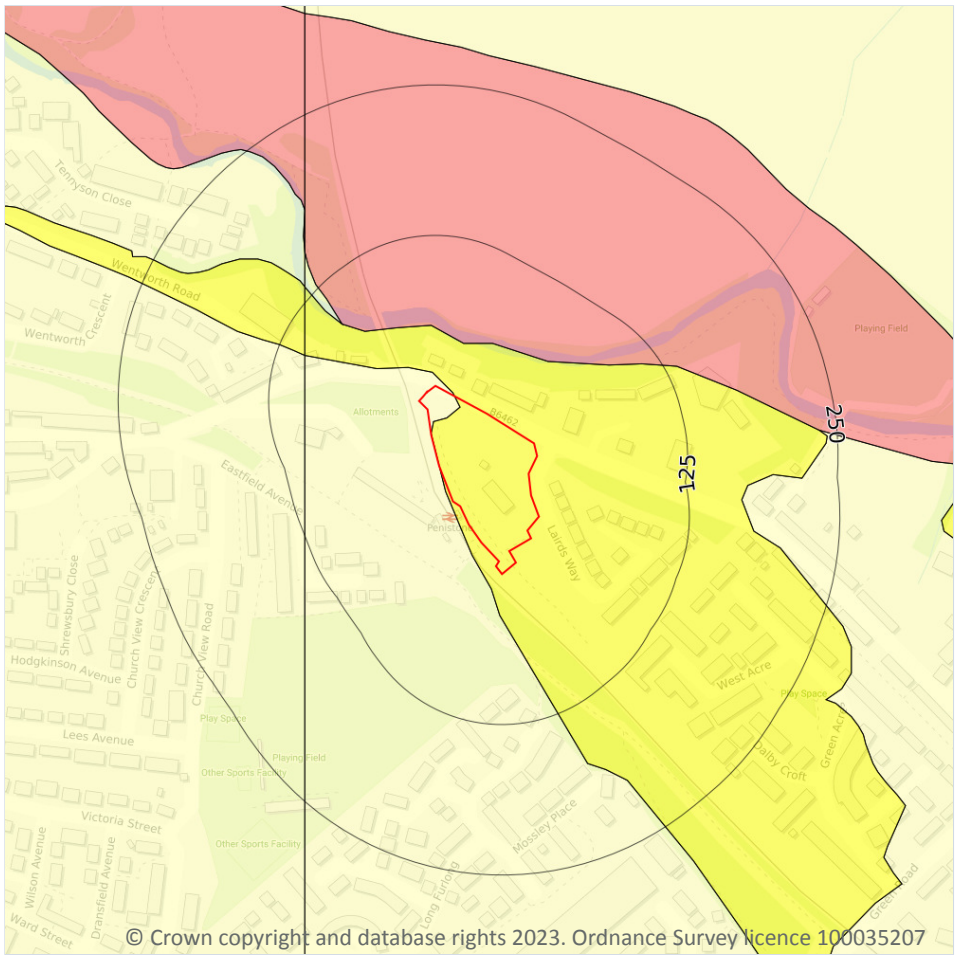
Features are displayed on the Natural ground subsidence - Running sands map on **page 106 >**

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.**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**
42m N	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	3

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.

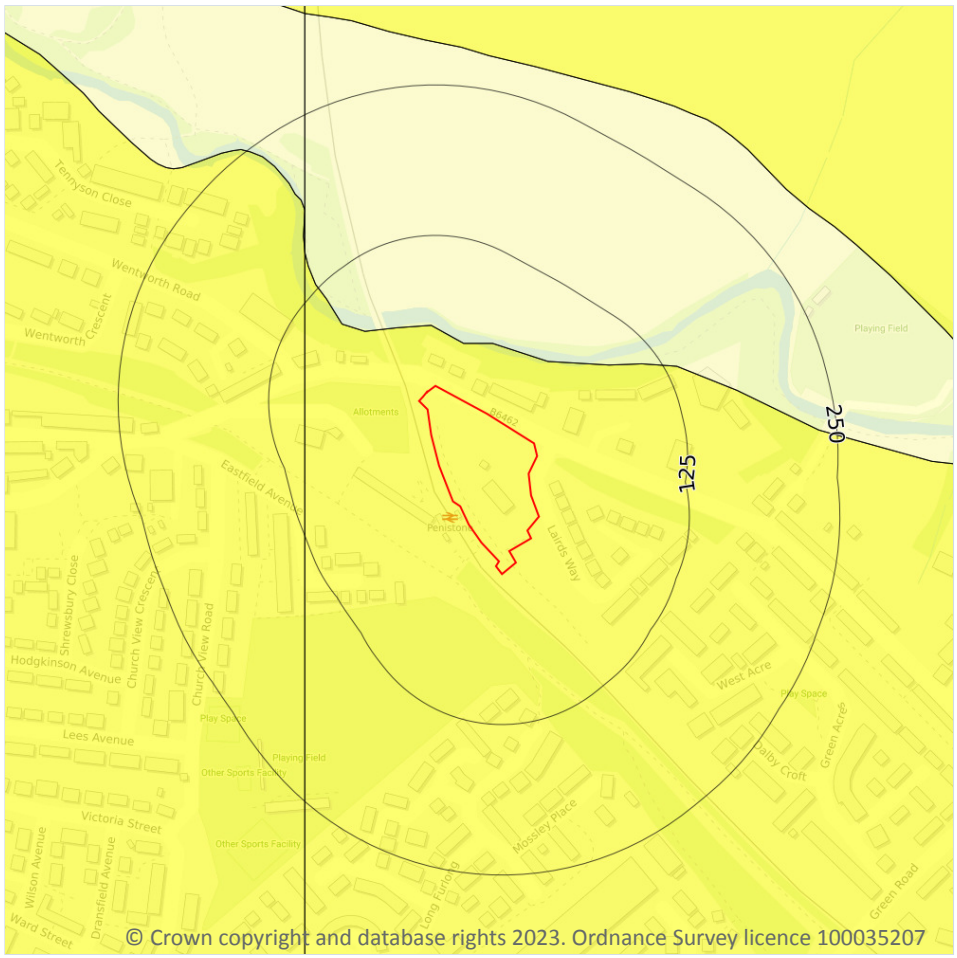
Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 108 >**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**
On site	**Very low**	**Compressibility and uneven settlement problems are not likely to be significant on the site for most land uses.**

Location	Hazard rating	Details
42m N	Moderate	Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.

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	2

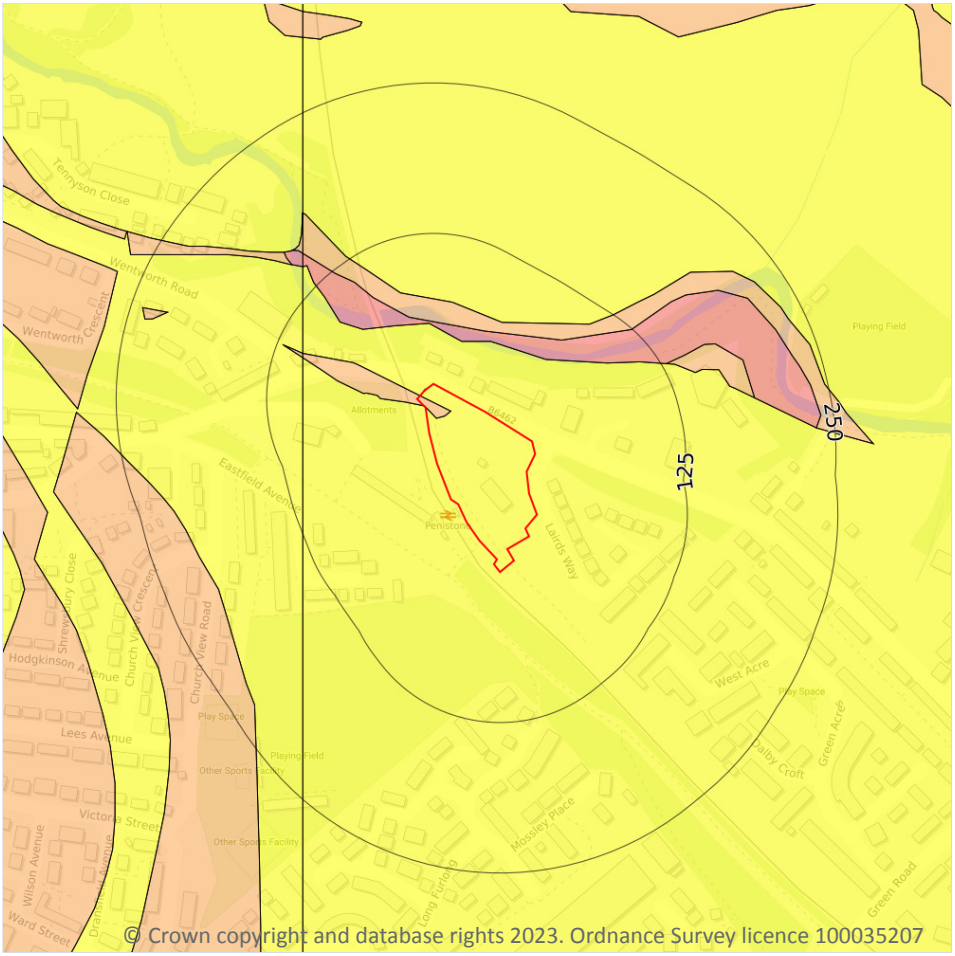
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 110 >**

Location	Hazard rating	Details
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**
42m N	Negligible	Deposits with potential to collapse when loaded and saturated are believed not 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.

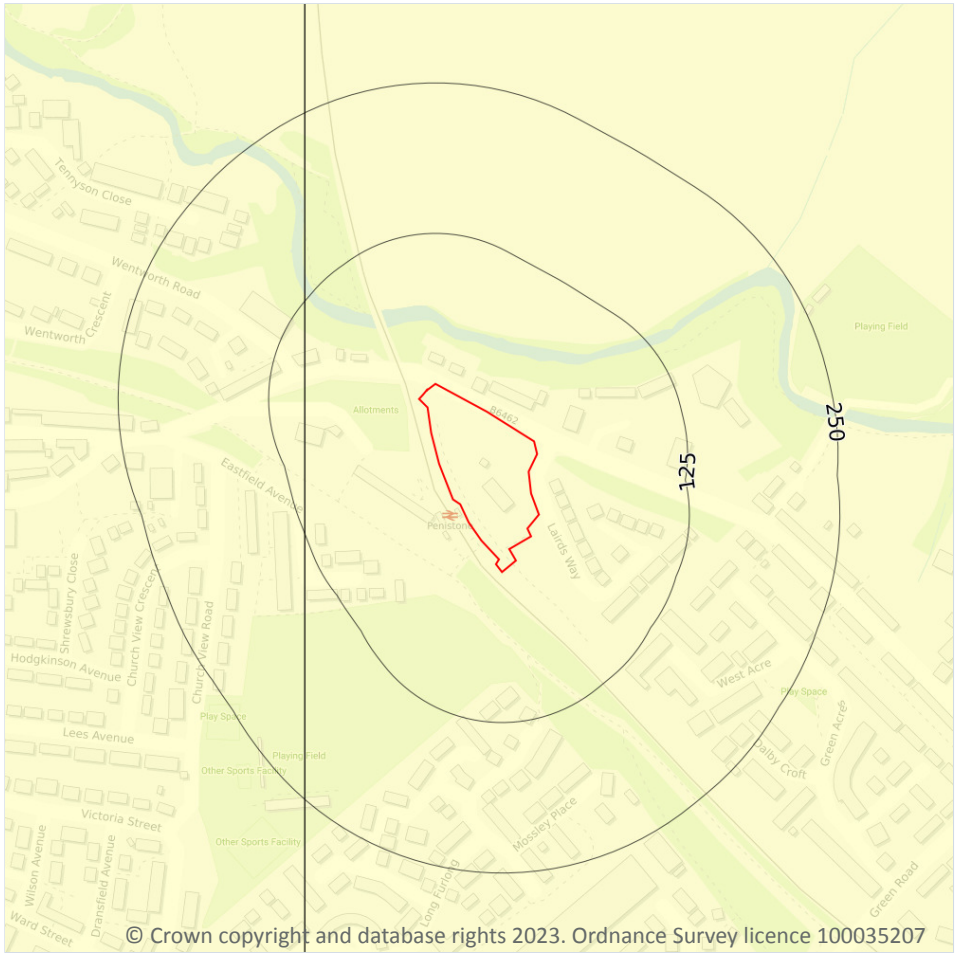
Features are displayed on the Natural ground subsidence - Landslides map on **page 111 >**

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.**
42m N	Moderate	Slope instability problems are probably present or have occurred in the past. Land use should consider specifically the stability of the site.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



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

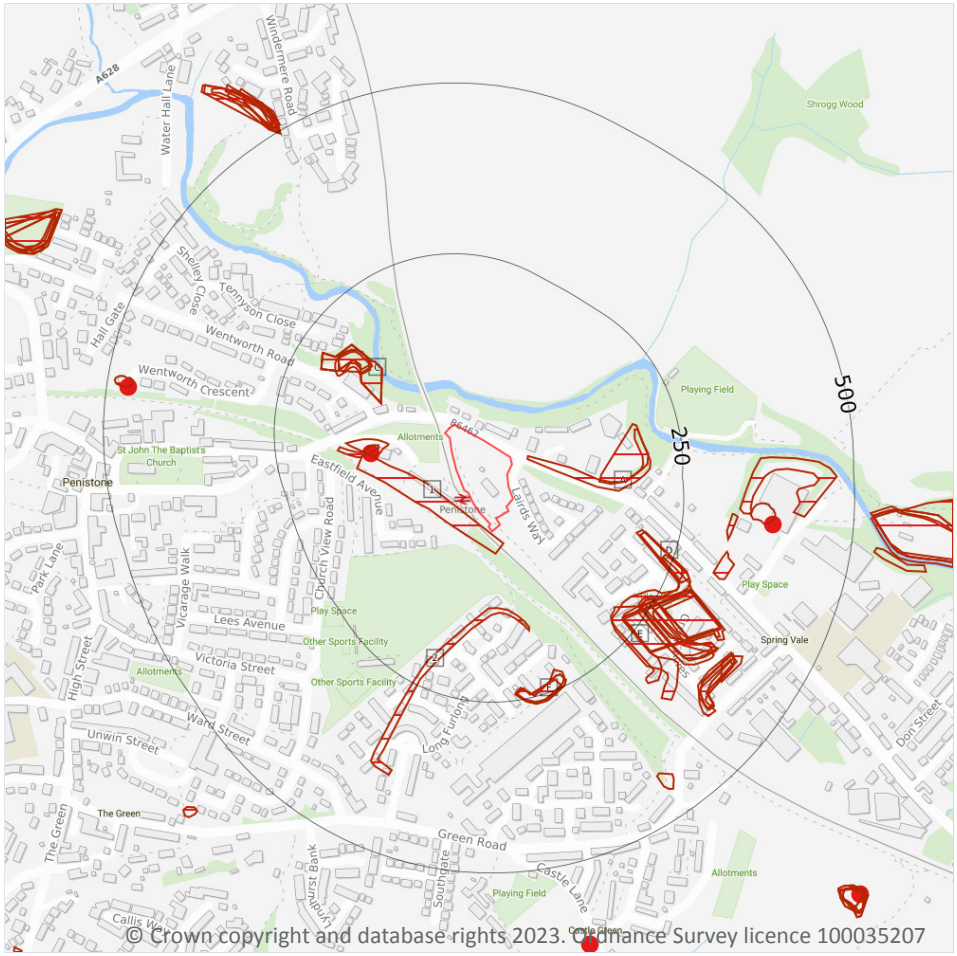
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 113 >**

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



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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	3

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 115 >**

ID	Location	Details	Description
B	111m W	Name: Signal Box Address: PENISTONE, South Yorkshire Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
G	382m E	Name: Green Beck Address: Spring Vale, PENISTONE, South Yorkshire Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
I	468m W	Name: Peniston Address: PENISTONE, South Yorkshire Commodity: Sandstone Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

This data is sourced from the British Geological Survey.

18.2 Surface ground workings

Records within 250m	**27**

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 115 >**

ID	Location	Land Use	Year of mapping	Mapping scale
1	4m S	Cuttings	1850	1:10560
A	24m E	Unspecified Ground Workings	1929	1:10560
B	84m W	Sandstone Quarry	1850	1:10560
B	99m W	Unspecified Ground Workings	1929	1:10560
C	103m NW	Unspecified Ground Workings	1987	1:10000
C	103m NW	Refuse Heap	1951	1:10560
C	103m NW	Unspecified Ground Workings	1967	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
2	112m S	Unspecified Ground Workings	1929	1:10560
A	129m E	Unspecified Heap	1951	1:10560
C	143m NW	Refuse Heap	1929	1:10560
C	145m NW	Gravel Pit	1938	1:10560
C	148m NW	Refuse Heap	1948	1:10560
D	188m E	Unspecified Heap	1951	1:10560
D	194m E	Unspecified Ground Workings	1948	1:10560
E	206m SE	Refuse Heap	1891	1:10560
E	213m SE	Refuse Heap	1903	1:10560
F	222m S	Gravel Pit	1951	1:10560
E	225m SE	Ponds	1891	1:10560
E	227m SE	Ponds	1903	1:10560
F	231m S	Unspecified Ground Workings	1938	1:10560
F	231m S	Unspecified Ground Workings	1938	1:10560
E	234m SE	Refuse Heap	1929	1:10560
E	234m SE	Gravel Pit	1951	1:10560
F	234m S	Gravel Pit	1948	1:10560
E	237m SE	Gravel Pit	1938	1:10560
E	239m SE	Refuse Heap	1948	1:10560
E	244m SE	Refuse Heap	1965	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.3 Underground workings

Records within 1000m	**0**

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

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.

19.5 National karst database

Records within 500m	0

This is a comprehensive database of national karst information gathered from a wide range of sources. BGS have collected data on five main types of karst feature: Sinkholes, stream links, caves, springs, and incidences of associated damage to buildings, roads, bridges and other engineered works.

Since the database was set up in 2002 data covering most of the evaporite karst areas of the UK have now been added, along with data covering about 60% of the Chalk, and 35% of the Carboniferous Limestone outcrops. Many of the classic upland karst areas have yet to be included. Recorded so far are: Over 800 caves, 1300 stream sinks, 5600 springs, 10,000 sinkholes.

The database is not yet complete, and not all records have been verified. The absence of data does not mean that karst features are not present at a site. A reliability rating is included with each record.

This data is sourced from the British Geological Survey.

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 123 >**

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 - 25 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 - 25 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**90 - 120 mg/kg**	**15 - 30 mg/kg**
On site	**15 - 25 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
47m N	25 - 35 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	120 - 180 mg/kg	30 - 45 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.

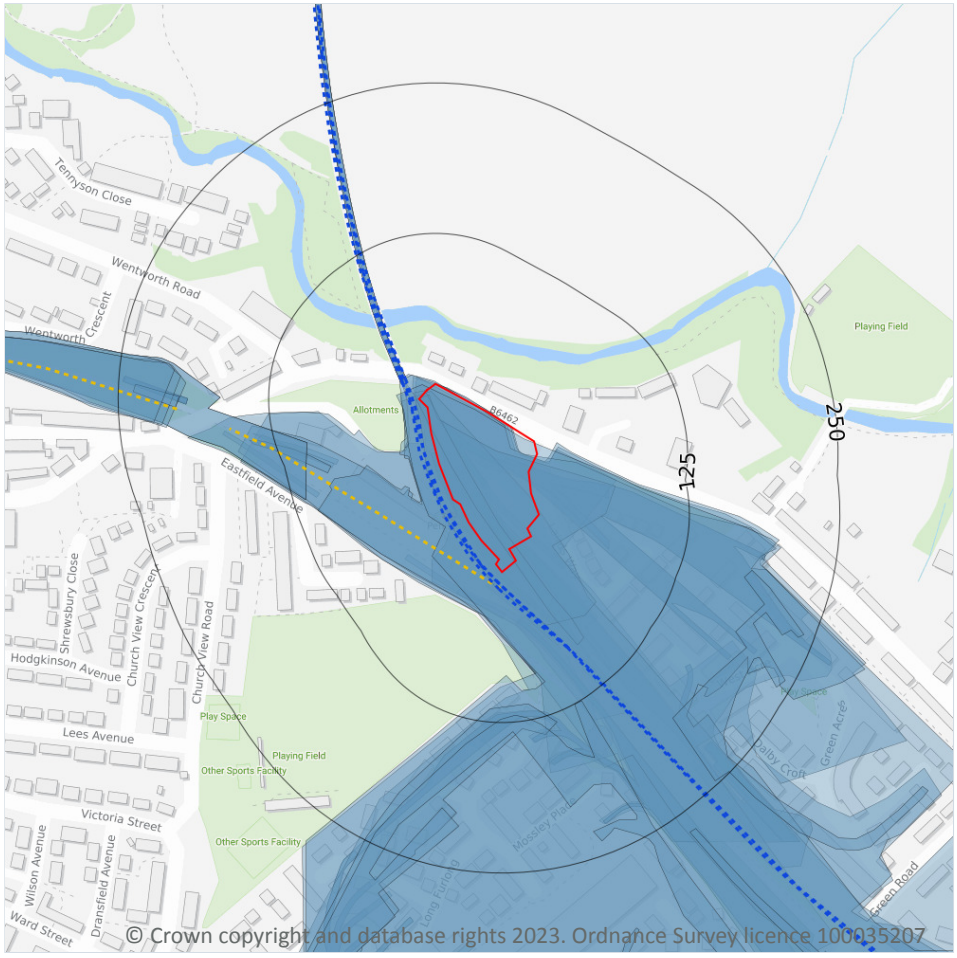
21.3 BGS Measured Urban Soil Chemistry

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 1 Stations
- Crossrail 1 Route
- 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	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

22.4 Historical railway and tunnel features

Records within 250m	46

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 127 >**

Location	Land Use	Year of mapping	Mapping scale
On site	**Railway Sidings**	**1983**	**2500**
On site	**Railway Sidings**	**1959**	**2500**
On site	**Railway Sidings**	**1967**	**2500**
On site	**Railway Sidings**	**1984**	**2500**
On site	**Railway Sidings**	**1892**	**2500**
On site	**Railway Sidings**	**1948**	**10560**
On site	**Railway Sidings**	**1903**	**10560**
On site	**Railway Sidings**	**1891**	**10560**
On site	**Railway Sidings**	**1938**	**10560**
On site	**Railway Sidings**	**1929**	**10560**
On site	**Railway Sidings**	**1850**	**10560**
On site	**Railway Sidings**	**1951**	**10560**
On site	**Railway Sidings**	**1965**	**10560**
11m NW	Railway Sidings	1892	2500
16m NW	Railway Sidings	1984	2500
16m NW	Railway Sidings	1995	2500
26m S	Railway Sidings	1959	2500

Location	Land Use	Year of mapping	Mapping scale
29m S	Railway Sidings	1892	2500
43m S	Railway Sidings	1967	2500
43m S	Railway Sidings	1984	2500
44m S	Railway Sidings	1995	2500
80m W	Railway Sidings	1959	2500
85m W	Railway Sidings	1892	2500
88m W	Railway Sidings	1929	10560
100m W	Railway Sidings	1967	10560
100m W	Railway Sidings	1951	10560
101m SE	Railway Sidings	1984	2500
102m W	Railway Sidings	1959	2500
105m W	Railway Sidings	1993	2500
111m S	Railway Sidings	1938	10560
119m S	Railway Sidings	1929	10560
166m SE	Railway Sidings	1959	2500
166m SE	Railway Sidings	1967	2500
178m E	Railway Sidings	1929	10560
192m W	Railway Sidings	1959	2500
192m W	Railway Sidings	1967	2500
192m W	Railway Sidings	1984	2500
192m W	Railway Sidings	1983	2500
192m W	Railway Sidings	1959	2500
194m W	Railway Sidings	1938	10560
199m W	Railway Sidings	1948	10560
200m W	Railway Sidings	1929	10560
205m W	Railway Sidings	1903	10560
221m SE	Railway Sidings	1959	2500
221m SE	Railway Sidings	1967	2500

Location	Land Use	Year of mapping	Mapping scale
248m S	Railway Sidings	1959	2500

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	2

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

Features are displayed on the Railway infrastructure and projects map on **page 127 >**

Location	Description
13m S	Abandoned
200m W	Abandoned

This data is sourced from OpenStreetMap.

22.7 Railways

Records within 250m	22

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 127 >**

Location	Name	Type
5m NW	Penistone Line	rail
8m NW	Not given	Multi Track
8m S	Penistone Line	rail

Location	Name	Type
8m NW	Penistone Line	rail
9m S	Not given	Multi Track
9m S	Not given	Multi Track
12m S	Penistone Line	rail
14m S	Penistone Line	rail
17m NW	Not given	Multi Track
18m NW		rail
18m NW	Penistone Line	rail
20m NW	Penistone Line	rail
21m NW	Penistone Line	rail
21m NW	Penistone Line	rail
51m NW	Penistone Line	rail
80m SE	Not given	Single Track
83m SE	Penistone Line	rail
92m NW	Not given	Multi Track
97m NW	Not given	Multi Track
109m SE	Not given	Single Track
111m NW	Not given	Multi Track
230m SE	Not given	Single Track

This data is sourced from Ordnance Survey and OpenStreetMap.

22.8 Crossrail 1

Records within 500m	**0**

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

22.9 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.

22.10 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.

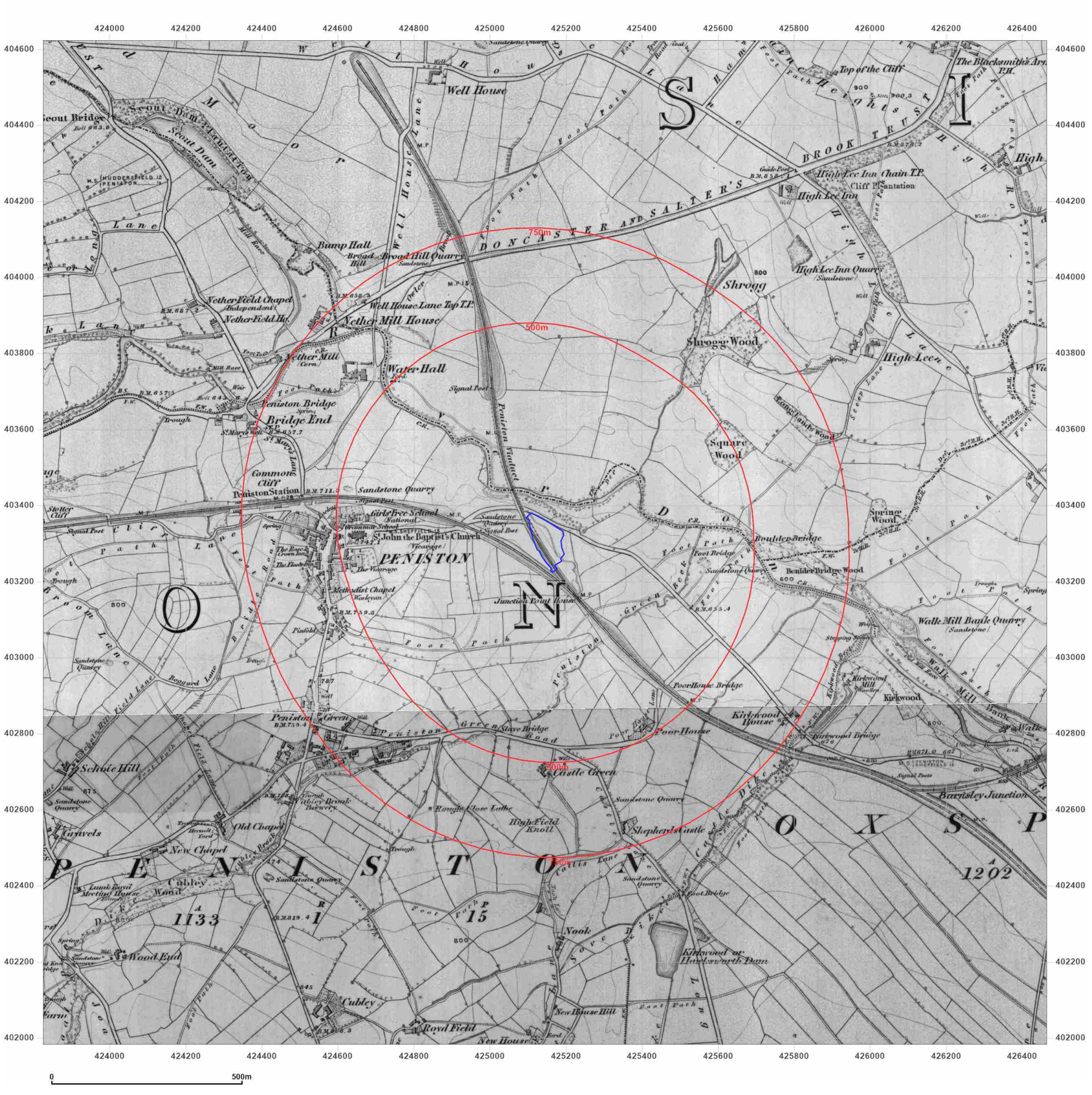
This data is sourced from HS2 ltd.

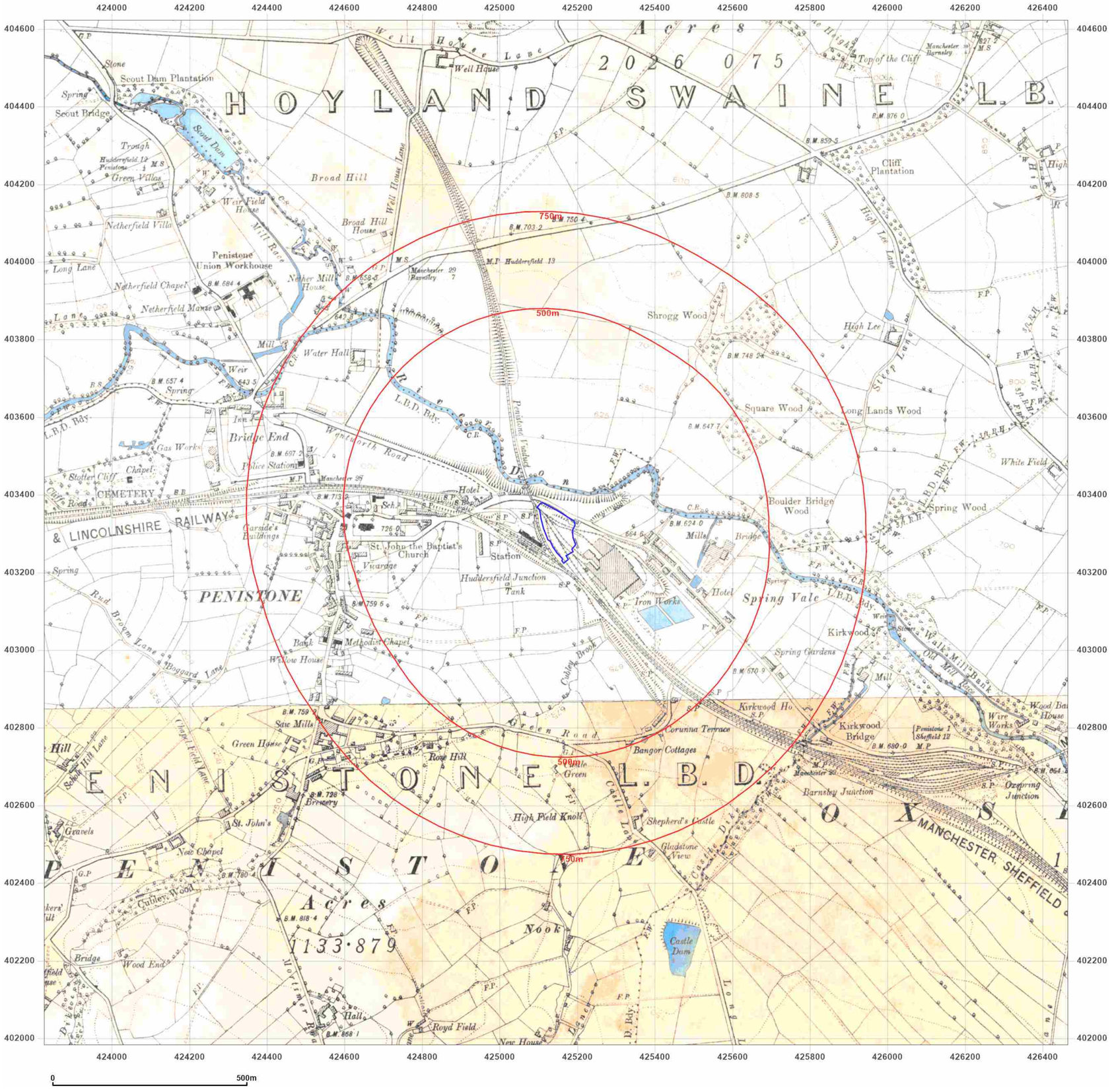
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750m
500m
250m
PENISTON
Bridge End
Well House
Well House Lane
Penistone Viaduct
Penistone Station
Penistone Green
Shrogg
Shrogg Wood
High Lee Inn
High Lee Inn Quarry
Square Wood
Spring Wood
Boulder Bridge
Boulder Bridge Wood
Walk Mill Bank Quarry
Kirkwood
Kirkwood House
Poor House
Poor House Bridge
Castle Green
Shepherds Castle
Barnsley Junction
Nether Mill House
Nether Mill
Water Hall
Bump Hall
Broad Hill Quarry
Nether Field Chapel
Old Chapel
New Chapel
Common Cliff
Girls Free School
St John the Baptist's Church
Methodist Chapel
Sandstone Quarry
Cubley
Cubley Wood
Wood End
Royd Field
Schole Hill
Gravels
Scout Dam
Scout Bridge
Top of the Cliff
The Blacksmiths Arms P.H.
High Lee Inn Chain T.P.
Cliff Plantation
Well House Lane Top T.P.
Walk Mill
Kirkwood Bridge
Barnsley Junction
Nook
Kirkwood or Hoyle Mill Dam
New House Hill
Junction Point House
Sandstone Quarry
Sandstone Quarries
Pinfold
Bongard Lane
Stocks Hill
Field Lane
Cubley Brook
Brewery
Tenter Field
Penistone Road
Steep Lane
Spring Wood
Square Wood
Shrogg Wood
Boulder Bridge Wood
Kirkwood Mill
Wheelers
Stepping Stones
Signal Post
Foot Bridge
Ford
Trough
Well
Spring
Pond
Quarry
Sandstone Quarry
Sandstone Quarries
Sandstone Quarry Disused
Sandstone Quarry Signal Post
Sandstone Quarry Signal Post
Sandstone Quarry Signal Post



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Grid Ref: 425144, 403302

Map Name: County Series

Map date: **1891**

Scale: 1:10,560

Printed at: 1:10,560

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Edition N/A
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Revised 1891
Edition N/A
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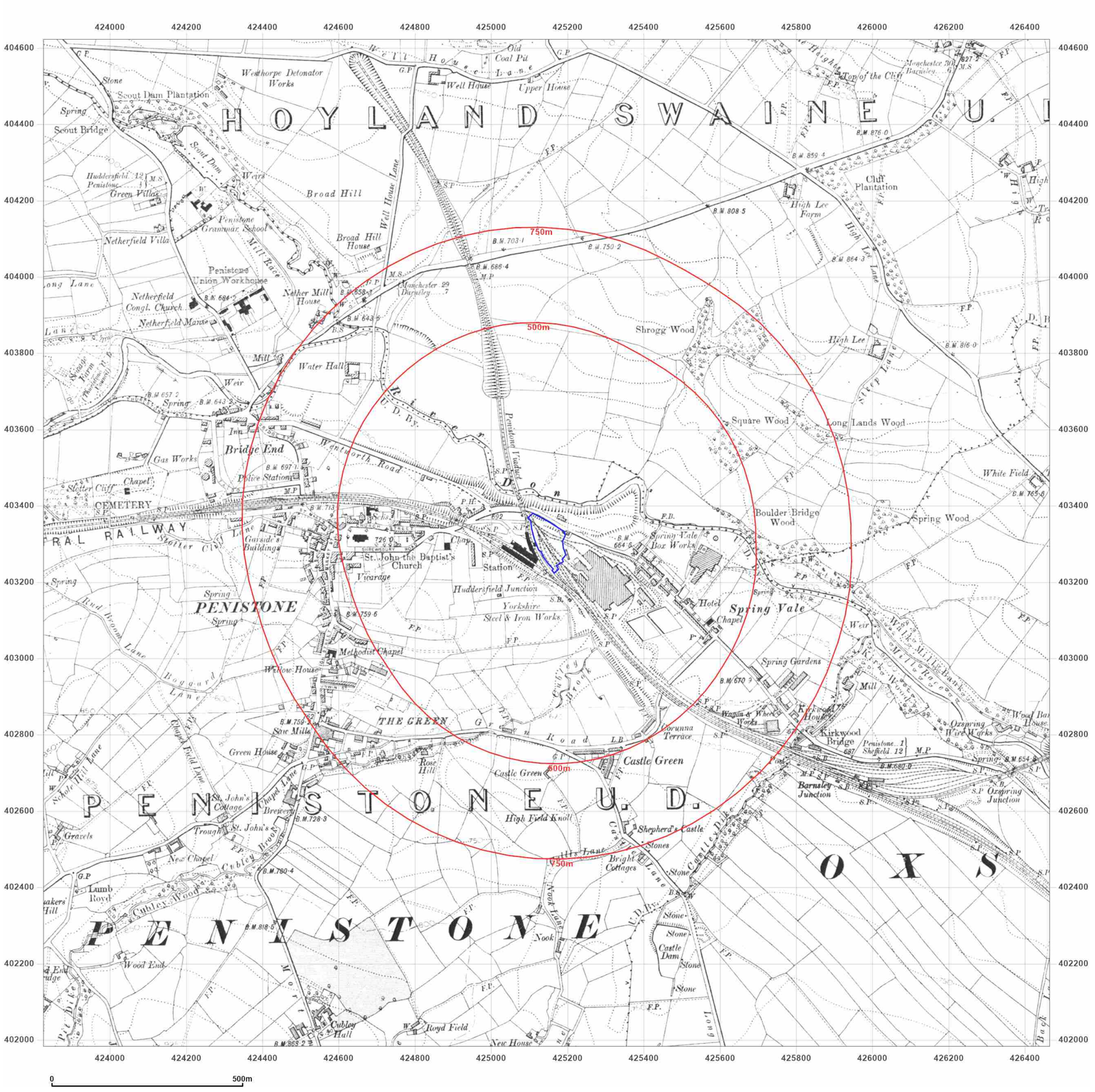
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Map Name: County Series

Map date: **1903-1904**

Scale: 1:10,560

Printed at: 1:10,560

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Map Name: County Series

Map date: **1929**

Scale: 1:10,560

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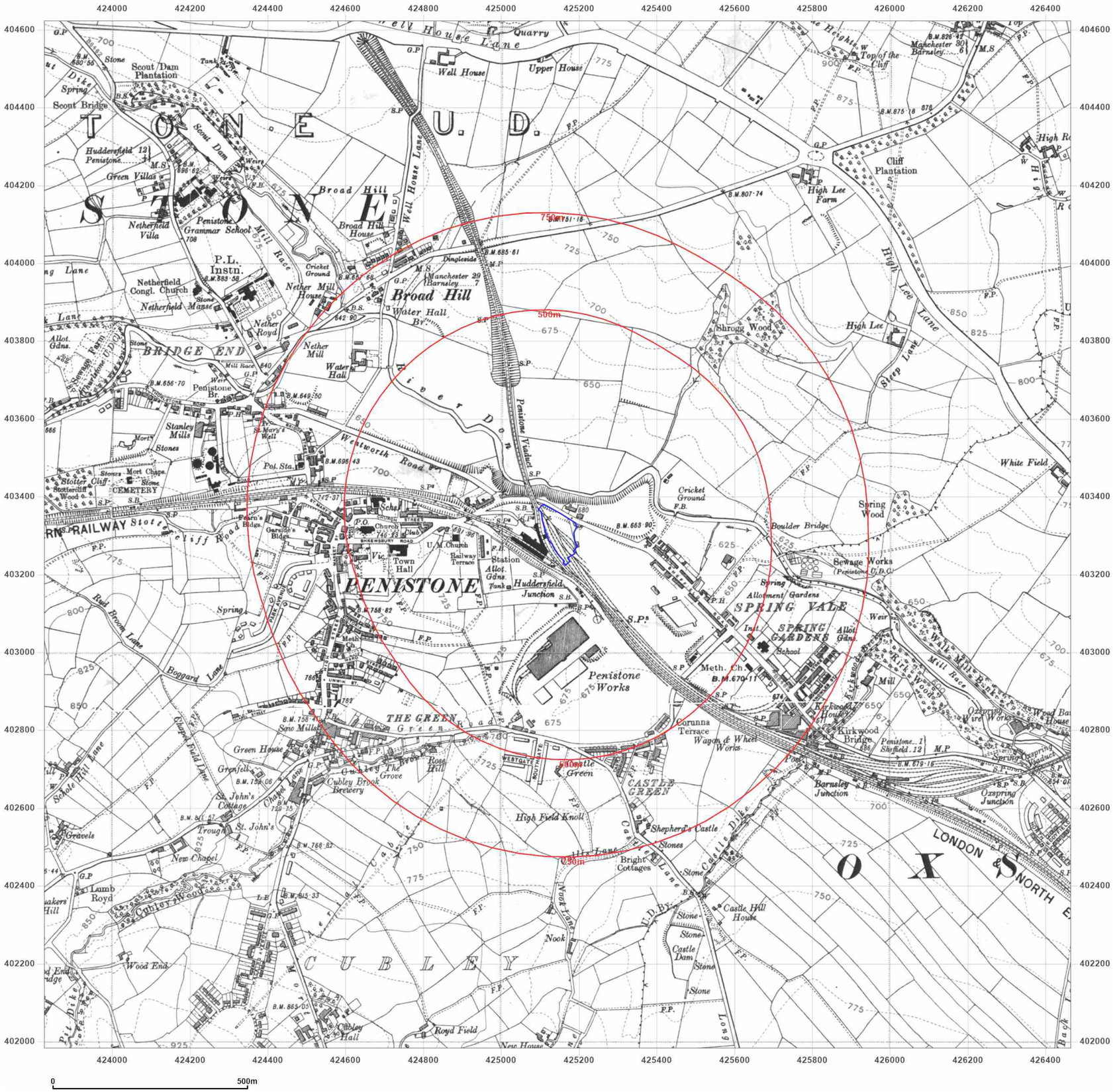
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Map Name: County Series

Map date: **1938**

Scale: 1:10,560

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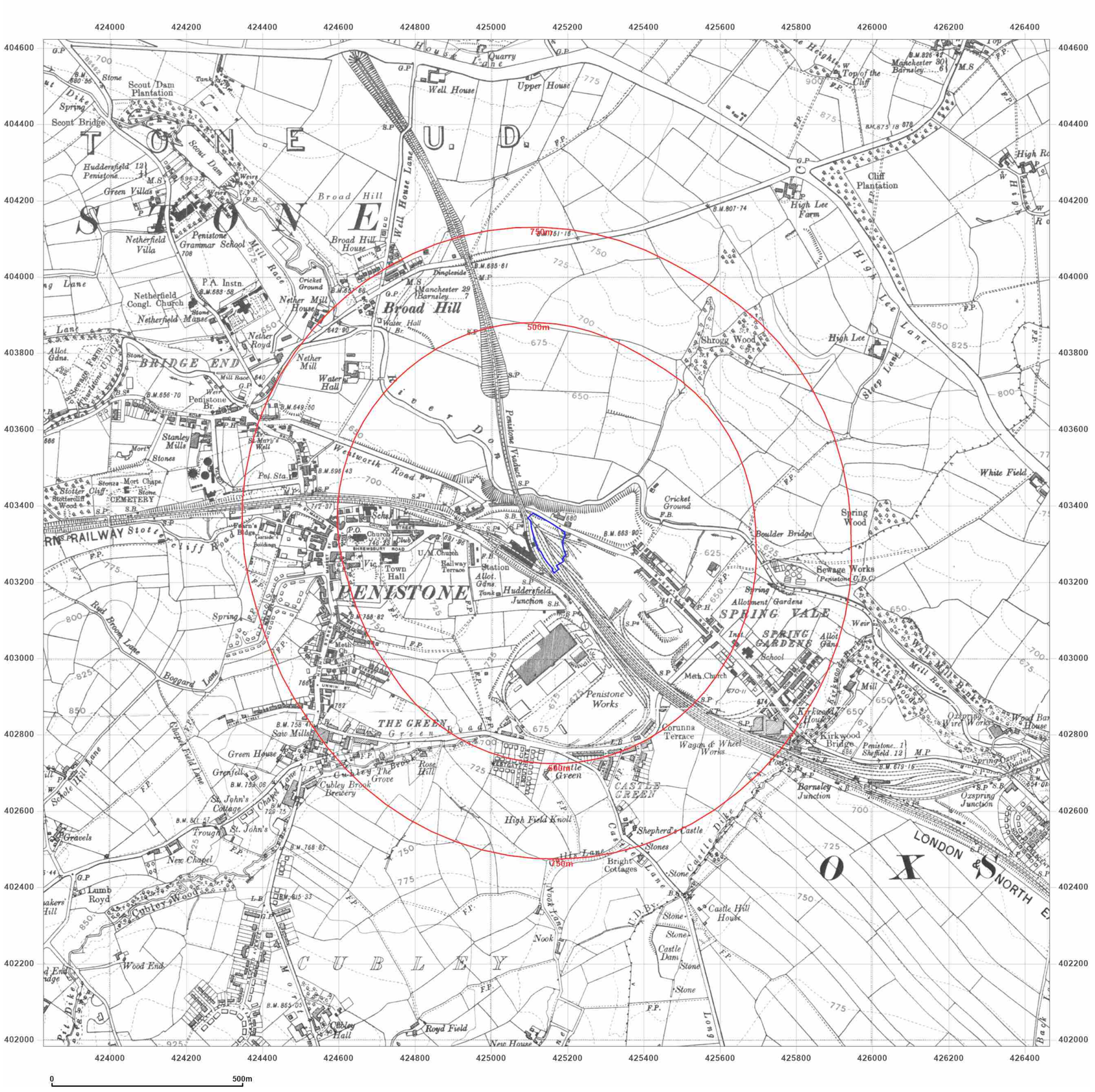
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Grid Ref: 425144, 403302

Map Name: County Series

Map date: **1948**

Scale: 1:10,560

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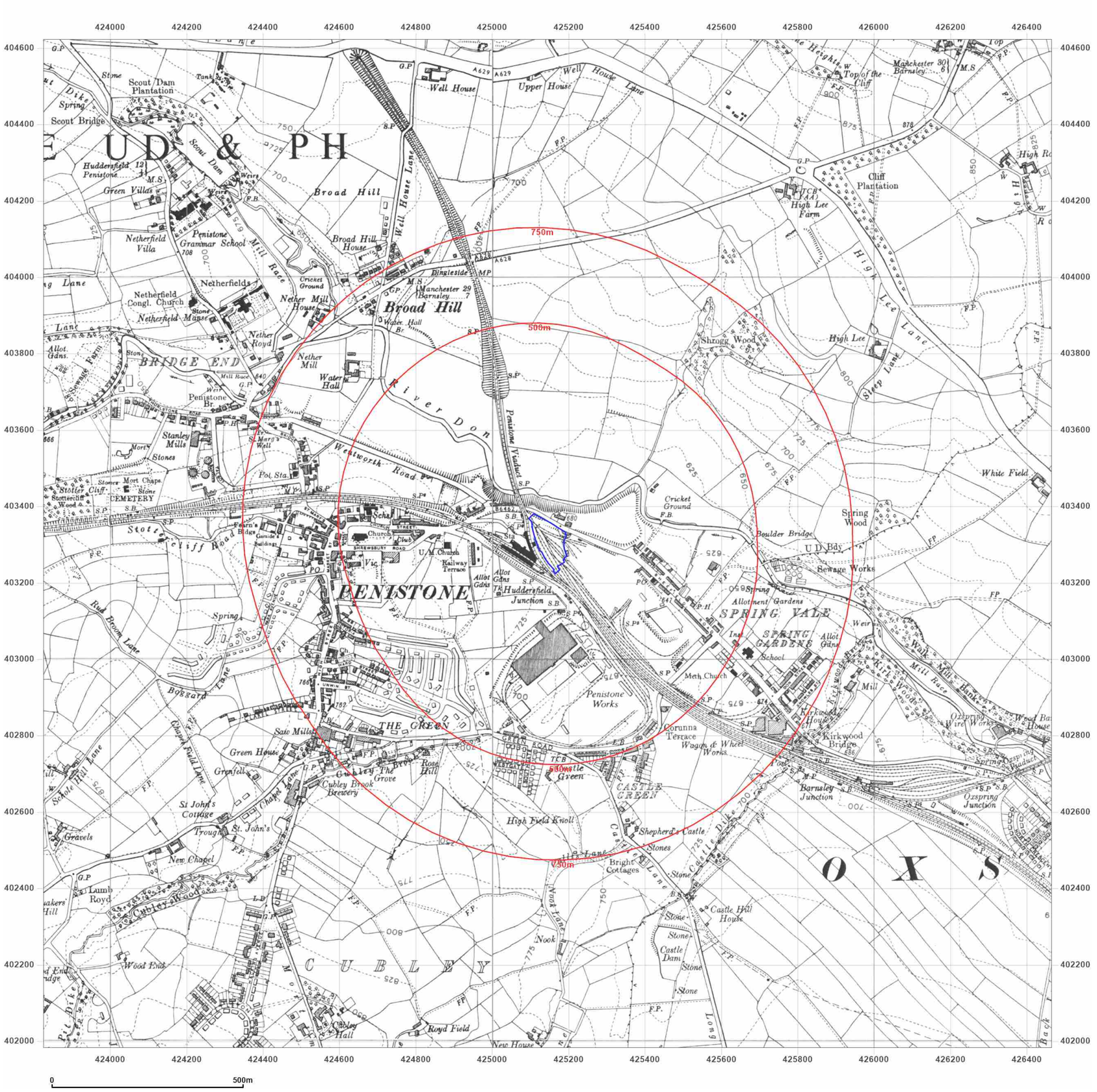
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Map Name: Provisional
Map date: **1951**
Scale: 1:10,560
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Revised 1951
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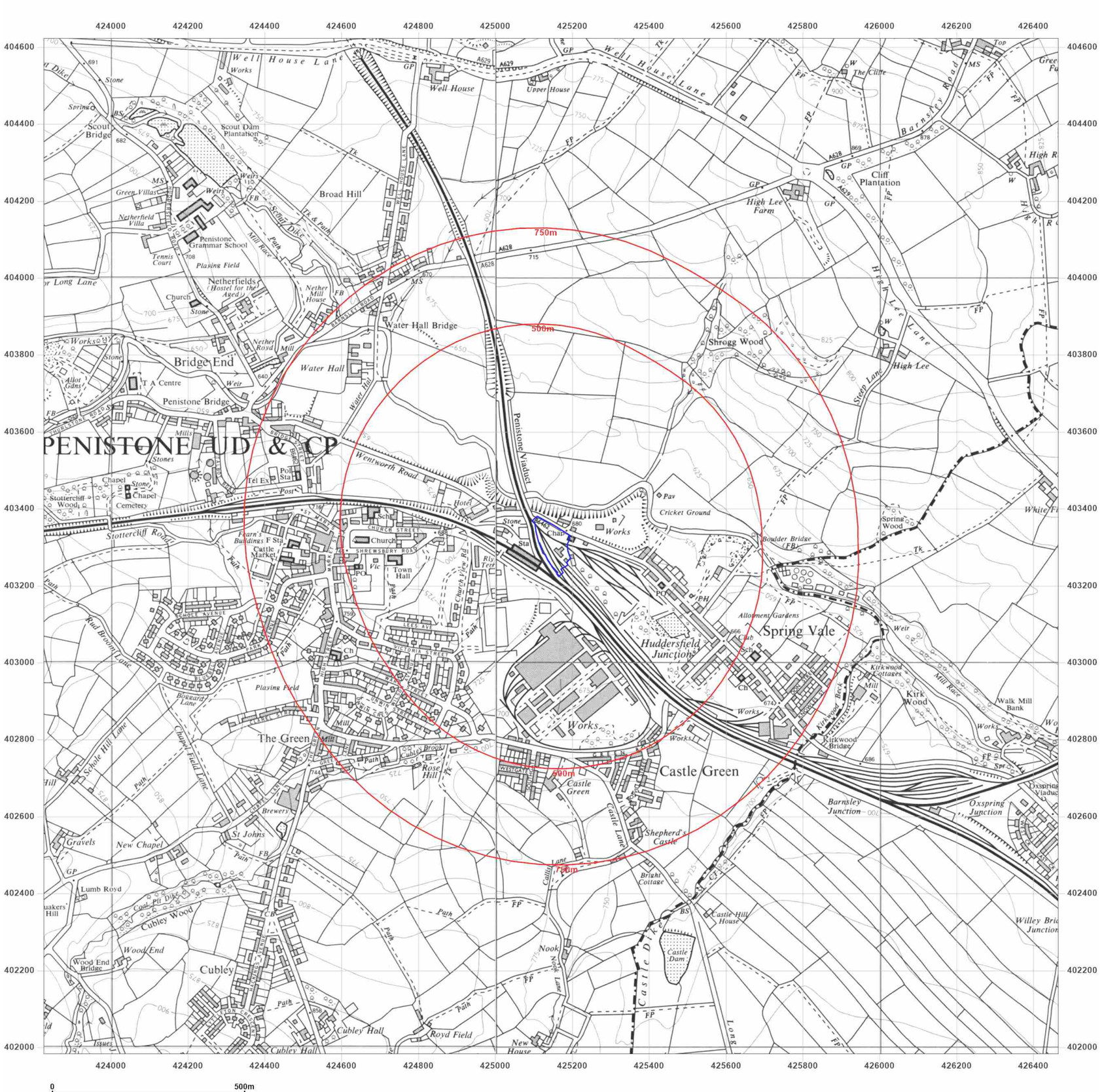
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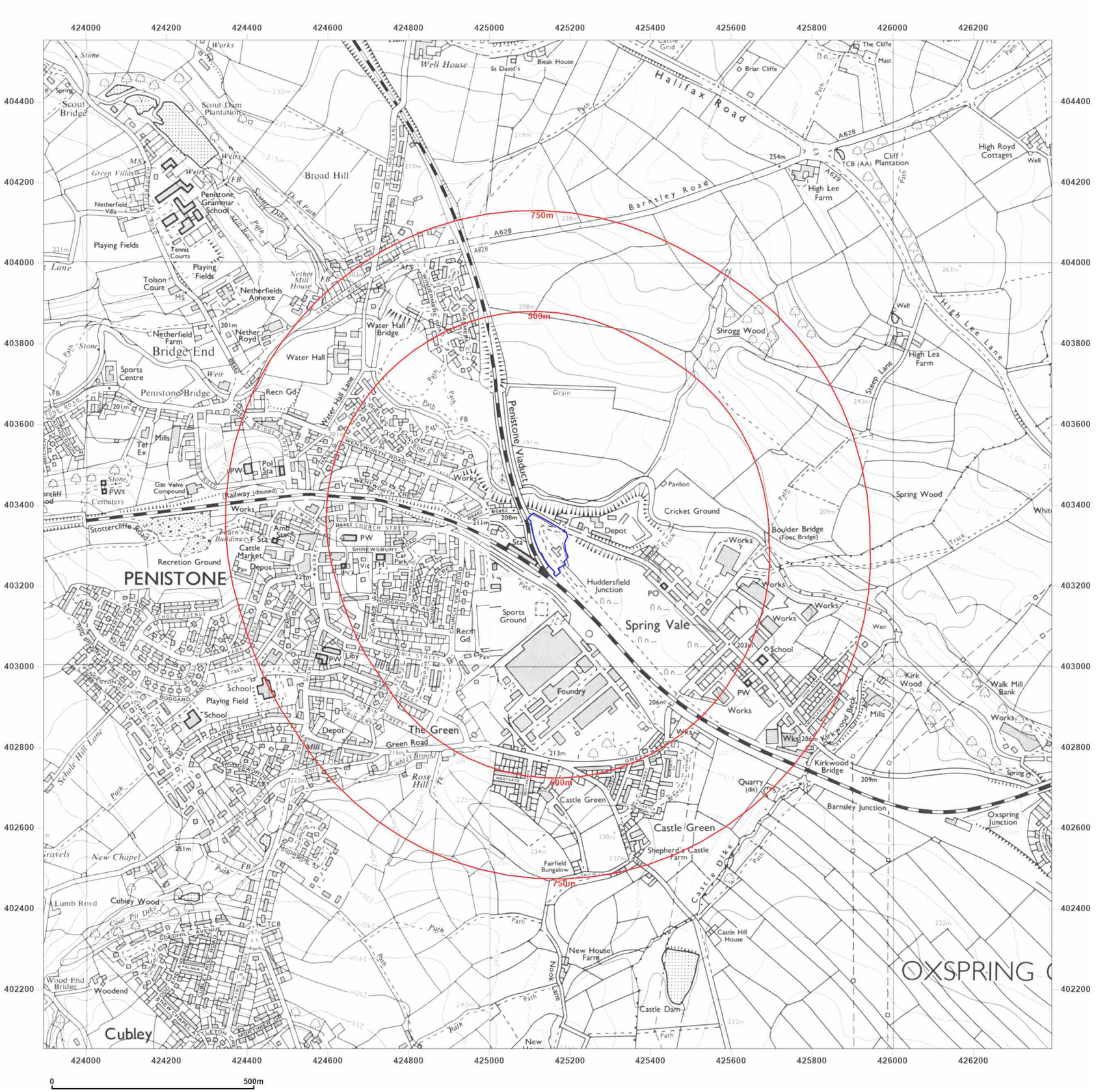
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750m
500m
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750m
PENISTONE UD & CP
Penistone
Bridge End
Penistone Grammar School
Penistone Bridge
Penistone Viaduct
Water Hall
Water Hall Bridge
Broad Hill
Well House Lane
Well House
Upper House
Scout Bridge
Scout Dam Plantation
Scout Dike
Netherfield Villa
Green Villas
Netherfields (Hostel for the Aged)
Nether Mill House
Nether Royd
Mill Race
Playing Field
Tennis Court
Church
Stone
Wentworth Road
Stottercliff Road
Stottercliff Wood
Chapel
Cemetery
Fearn's Buildings
Cattle Market
Town Hall
Shrewsbury Road
Church Street
Broward Lane
Rad Broom Lane
Scholes Hill Lane
Chapel Field Lane
The Green
Rose Hill
Cubley Brook
Brewery
St Johns
New Chapel
Gravels
Lumb Royd
Cubley Wood
Wood End
Wood End Bridge
Cubley
Cubley Hall
Royd Field
New House
Cliff Plantation
High Lee Farm
High Lee
High Lee Lane
Steep Lane
Shrogg Wood
The Cliffe
Barnsley Road
Cricket Ground
Boulder Bridge
Spring Wood
Spring Vale
Allotment Gardens
Huddersfield Junction
Barnsley Junction
Oxspring Junction
Kirk Wood
Kirkwood Cottages
Kirkwood Bridge
Walk Mill Bank
Mill Race
Castle Green
Castle Lane
Shepherd's Castle
Bright Cottage
Castle Hill House
Castle Dam
Castle Dike
Nook
Nook Lane
Cubley Hall
Willey Bridge Junction
Cuckoo Nest Lane
Cuckoo Nest
Cuckoo Nest Farm
Cuckoo Nest Bridge
Cuckoo Nest Viaduct
Lodge
Lodge Lane
Lodge Farm
Lodge Bridge
Lodge Viaduct
Lodge Hill
Lodge Hill Farm
Lodge Hill Bridge
Lodge Hill Viaduct
Lodge Hill Lane
Lodge Hill Cottages
Lodge Hill Mill
Lodge Hill Mill Race
Lodge Hill Mill Bridge
Lodge Hill Mill Viaduct
Lodge Hill Mill Lane
Lodge Hill Mill Cottages
Lodge Hill Mill Farm



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Grid Ref: 425144, 403302

Map Name: National Grid

Map date: **1987**

Scale: 1:10,000

Printed at: 1:10,000

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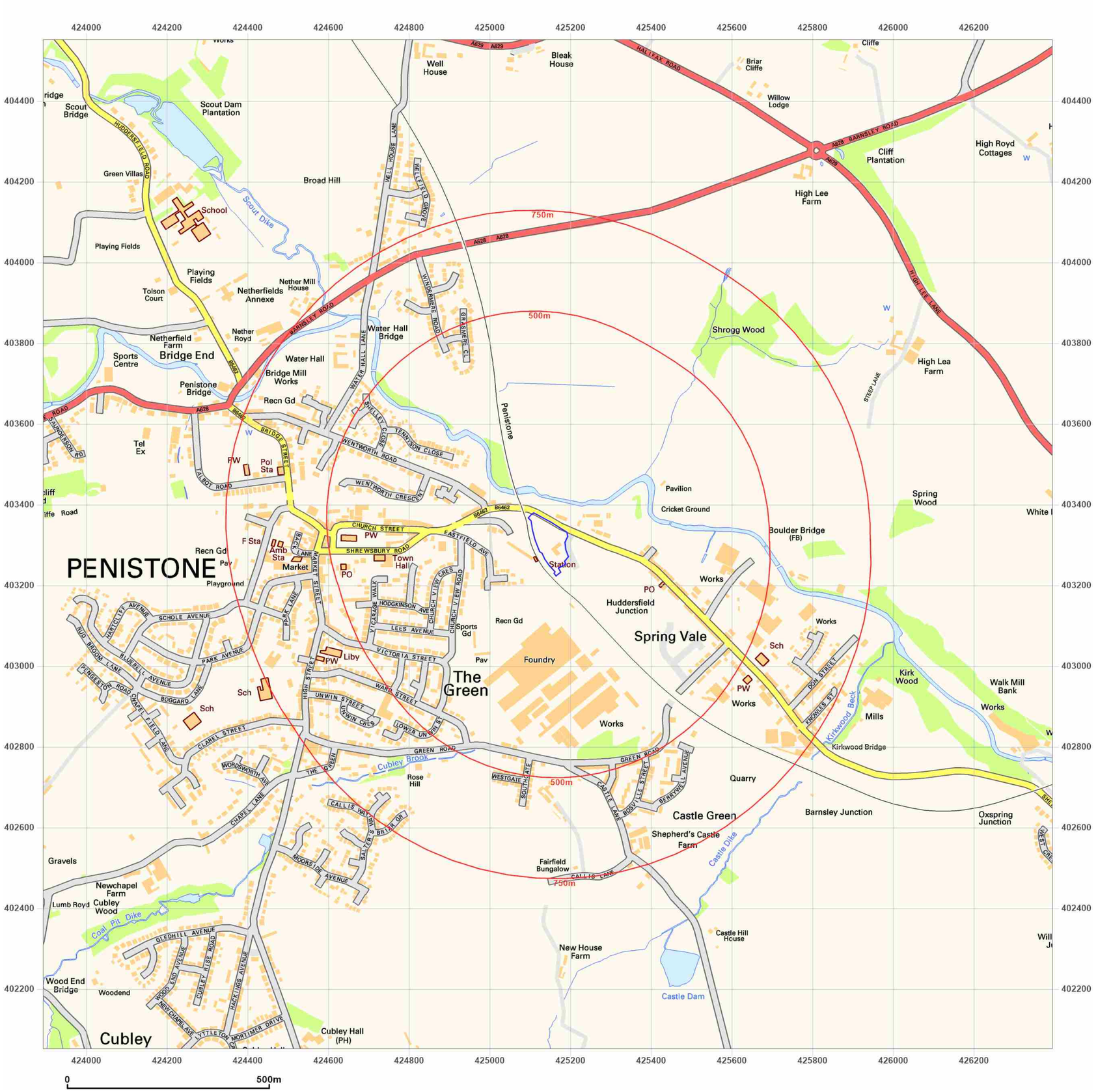
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Grid Ref: 425144, 403302

Map Name: National Grid
Map date: **2001**
Scale: 1:10,000
Printed at: 1:10,000

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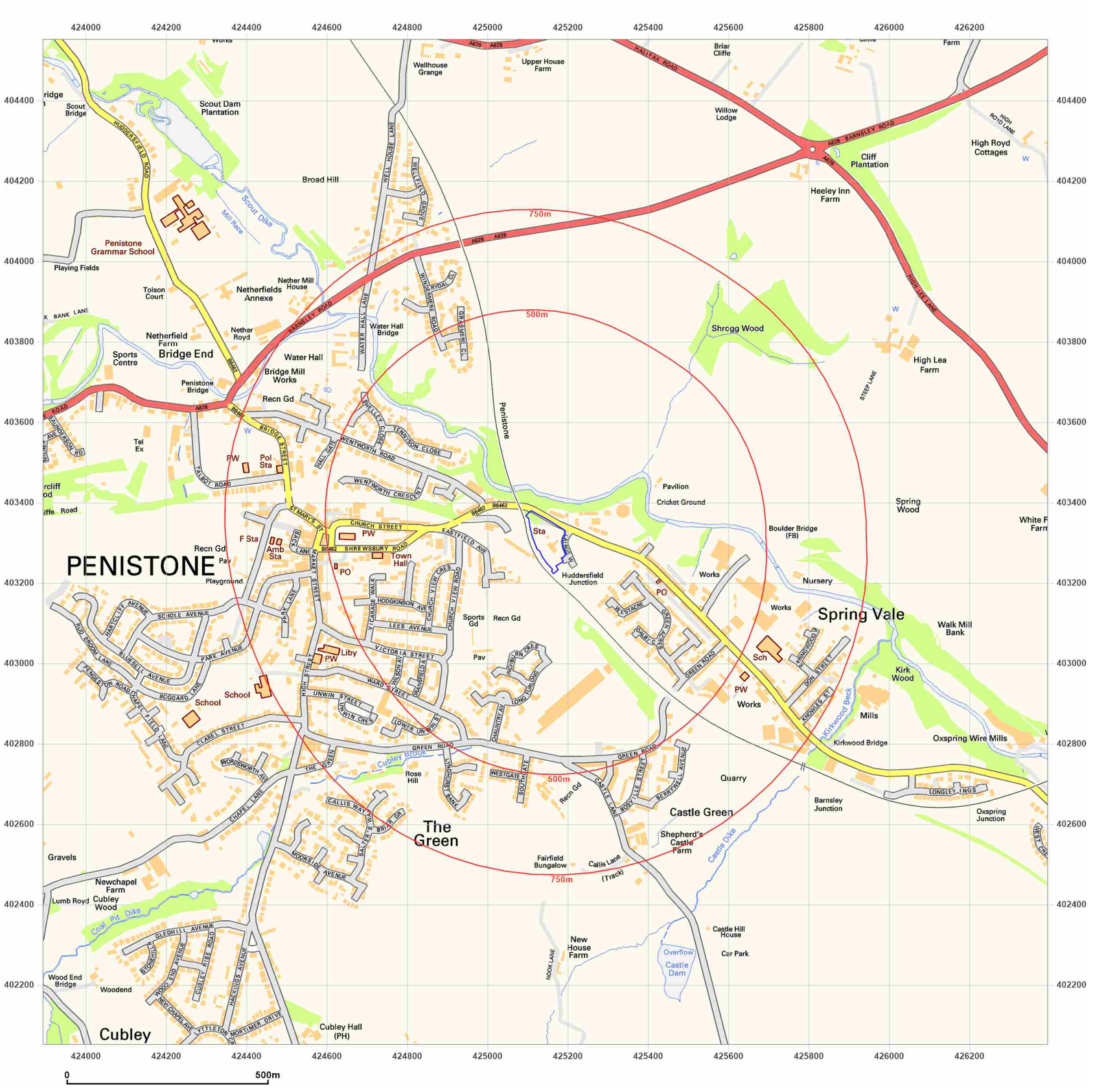
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Grid Ref: 425144, 403302

Map Name: National Grid
Map date: **2010**
Scale: 1:10,000
Printed at: 1:10,000

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2010

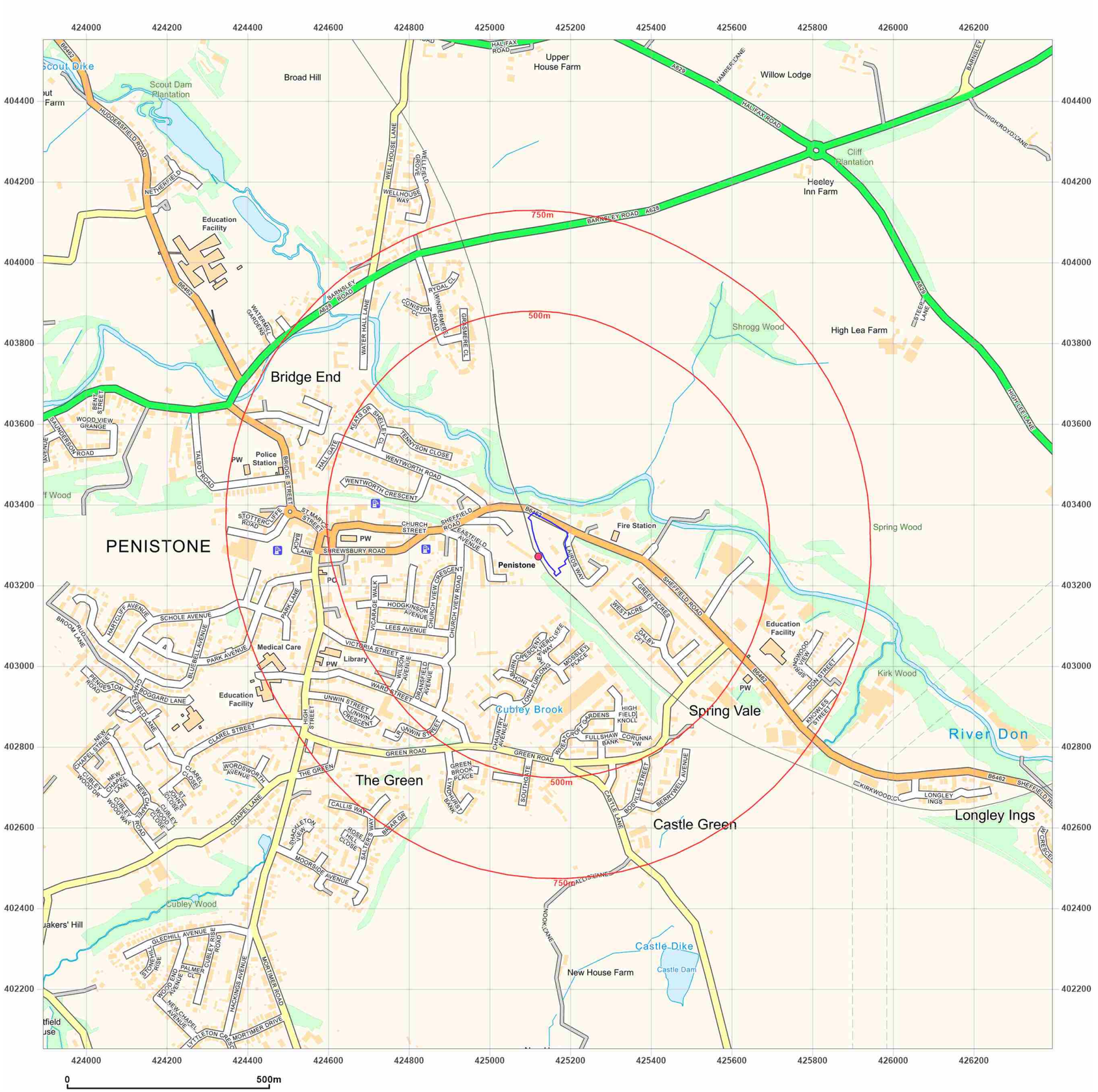
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Client Ref: 287798-00
Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: National Grid

Map date: **2023**

Scale: 1:10,000

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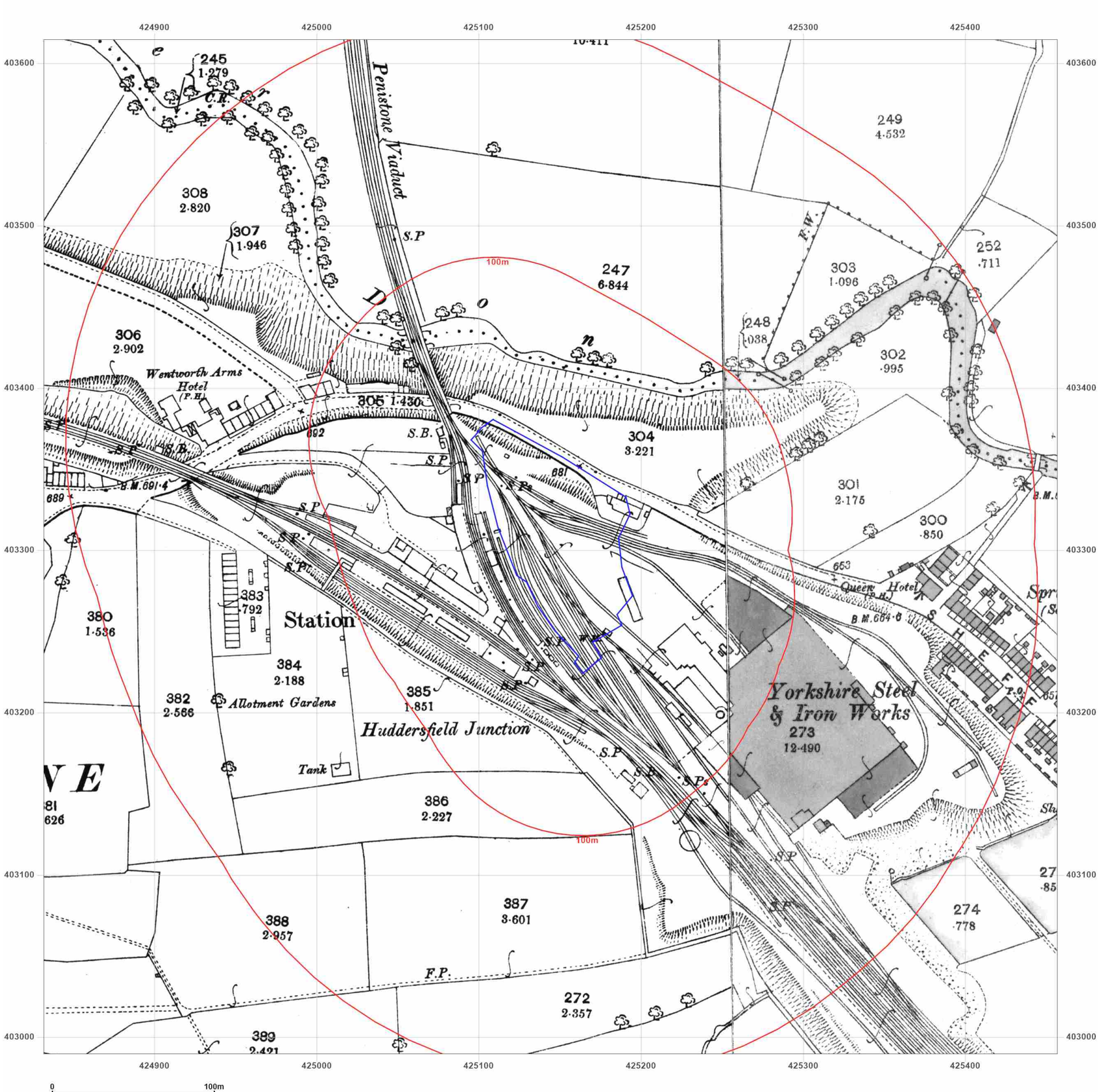
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Site Details:

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Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: County Series

Map date: **1893**

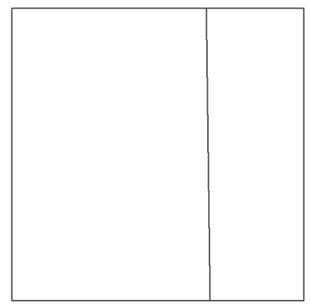
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Revised N/A
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Levelled N/A

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



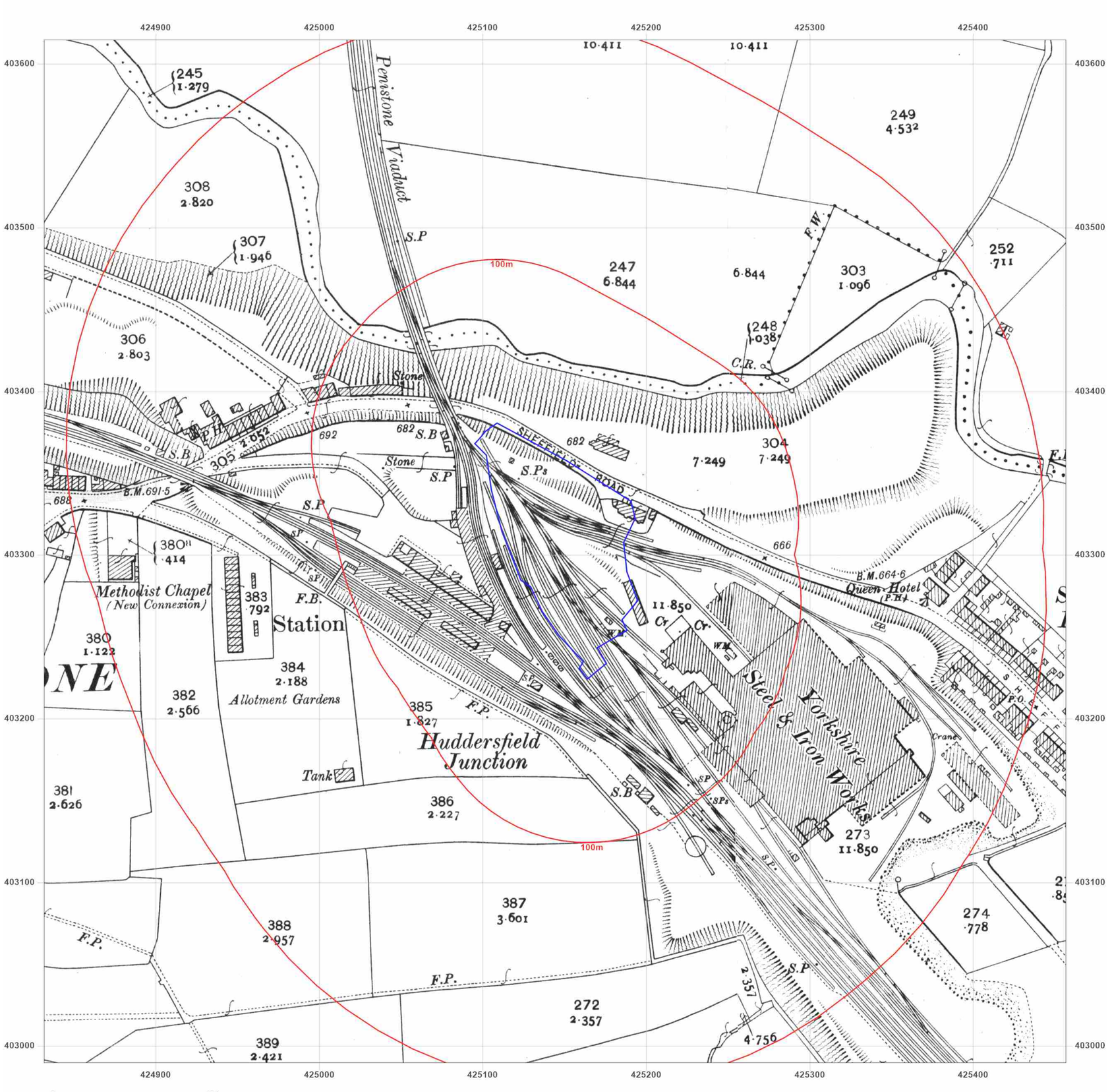
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Site Details:

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Client Ref: 287798-00
Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: County Series

Map date: **1906**

Scale: 1:2,500

Printed at: 1:2,500

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Edition N/A
Copyright N/A
Levelled N/A

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Revised 1906
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Copyright N/A
Levelled N/A

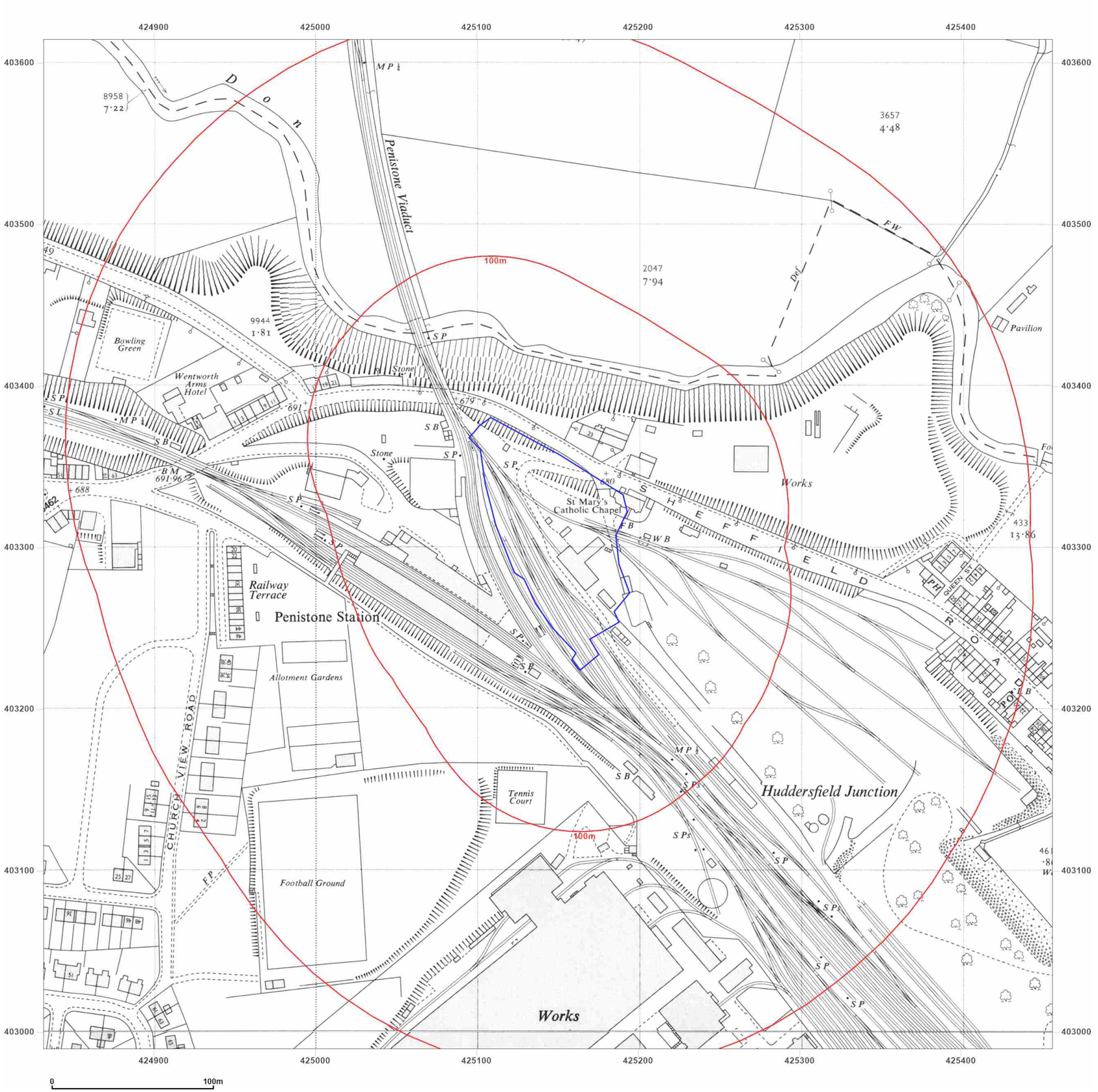
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Client Ref: 287798-00
Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: National Grid

Map date: **1959**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1959
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Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: National Grid

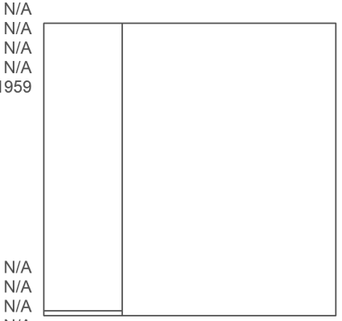
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Scale: 1:2,500

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Site Details:

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Client Ref: 287798-00
Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: National Grid

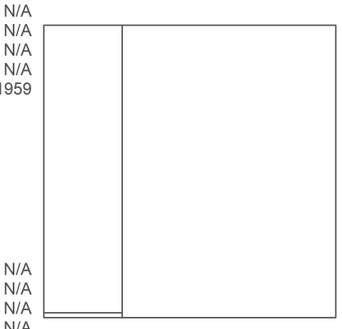
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Scale: 1:2,500

Printed at: 1:2,500

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Copyright N/A
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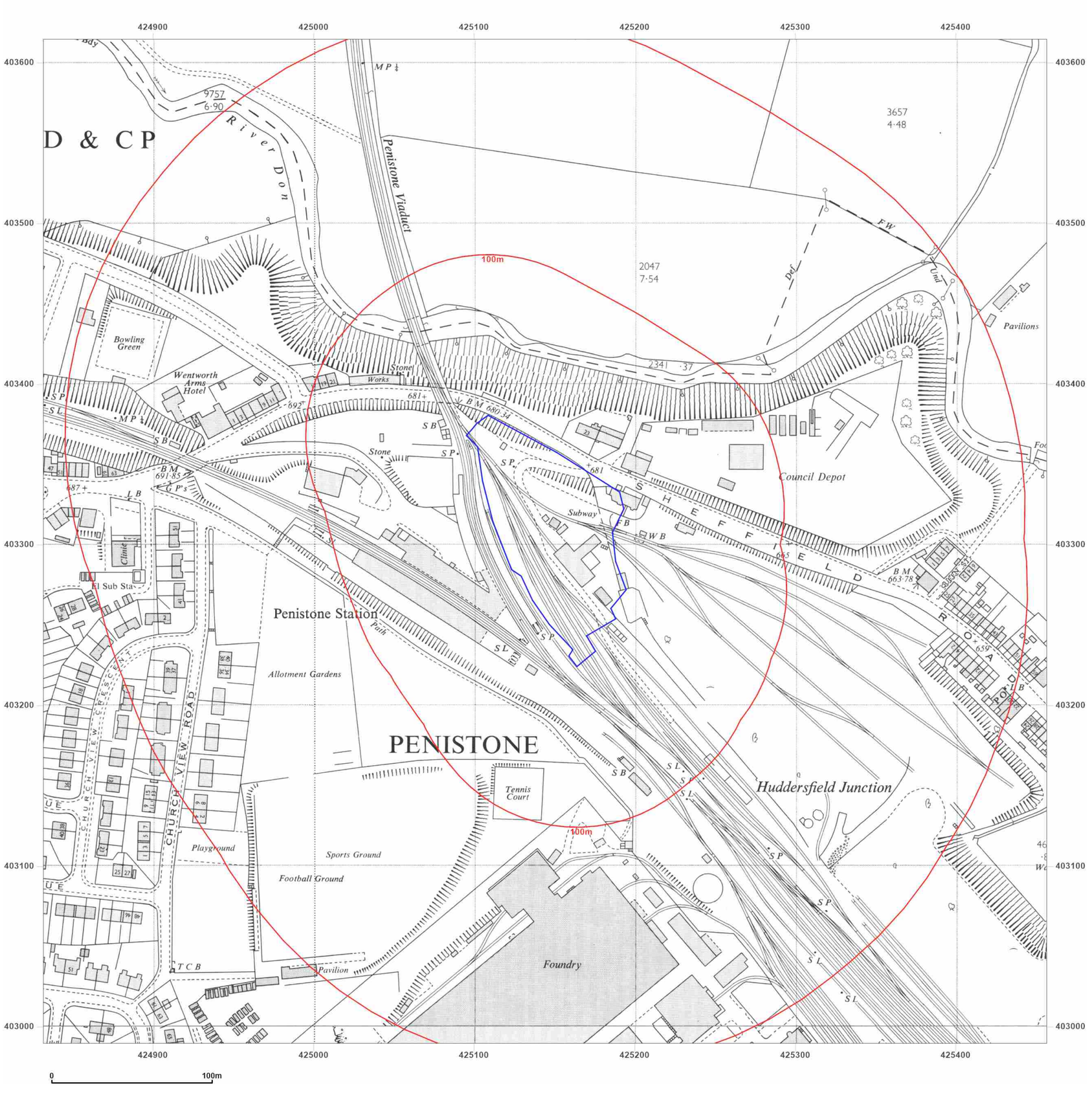
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Site Details:

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Client Ref: 287798-00
Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: National Grid

Map date: **1967-1970**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
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Surveyed 1970
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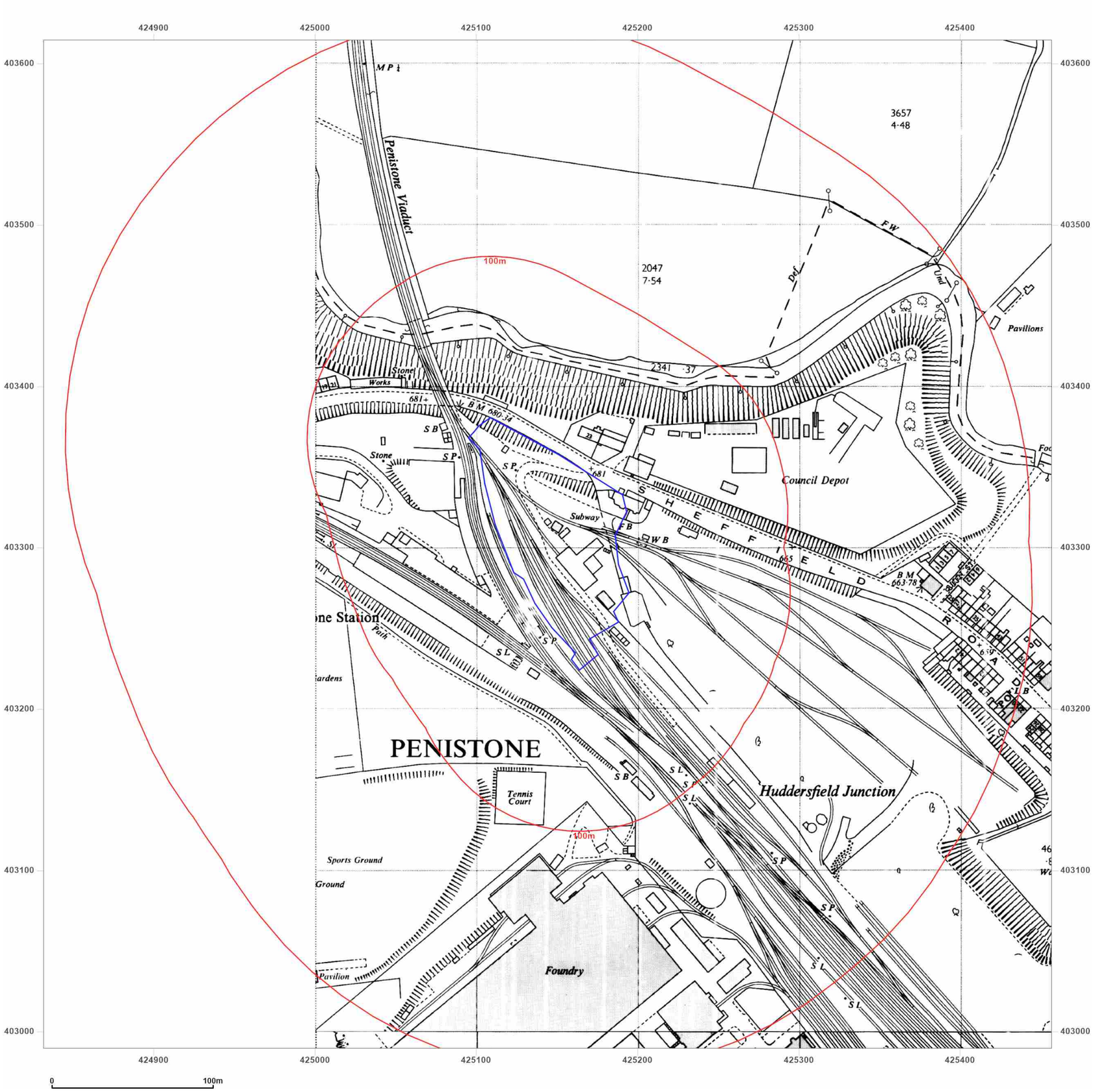
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Site Details:

425179,403284

Client Ref: 287798-00
Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: National Grid

Map date: **1968-1971**

Scale: 1:2,500

Printed at: 1:2,500

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Edition N/A
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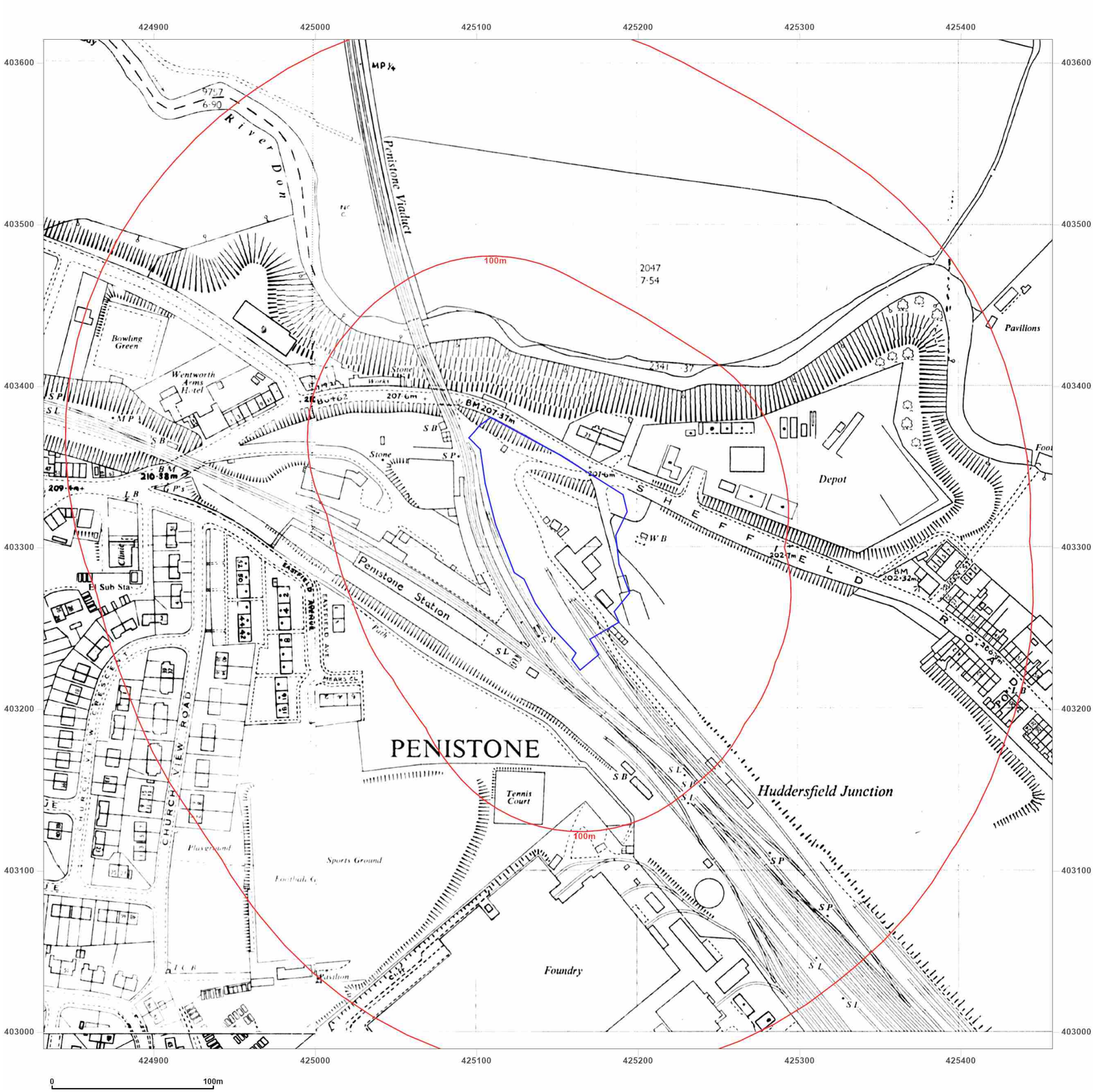
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Site Details:

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Client Ref: 287798-00
Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: National Grid

Map date: **1978-1983**

Scale: 1:2,500

Printed at: 1:2,500

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Revised N/A
Edition N/A
Copyright 1978
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Site Details:

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Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: National Grid

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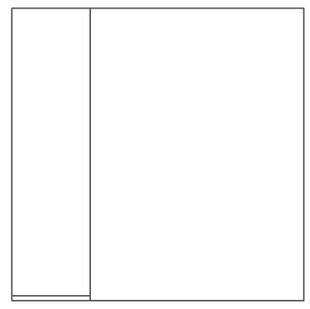
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Copyright 1983
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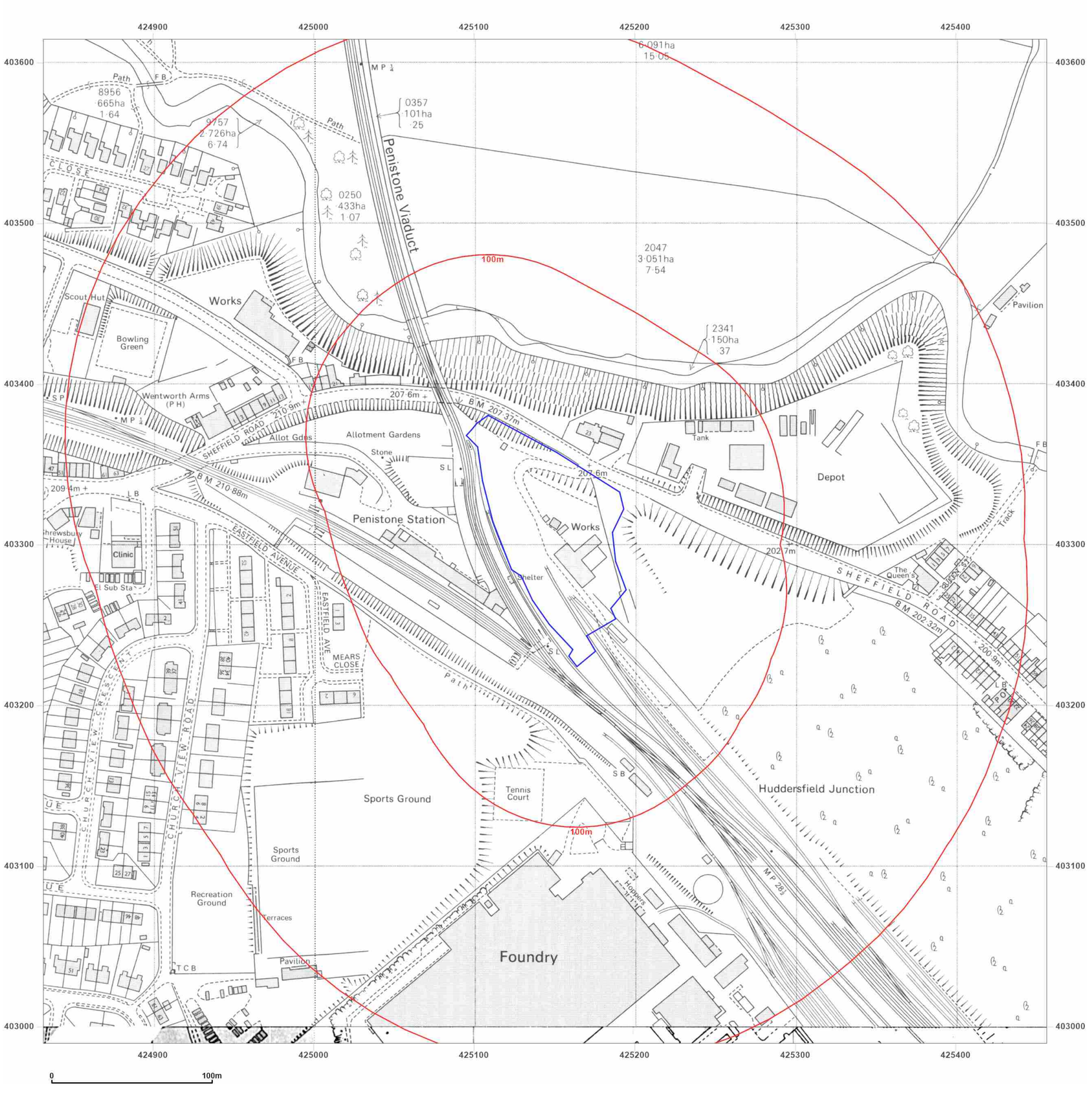
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Site Details:

425179,403284

Client Ref: 287798-00
Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: National Grid

Map date: **1984-1988**

Scale: 1:2,500

Printed at: 1:2,500

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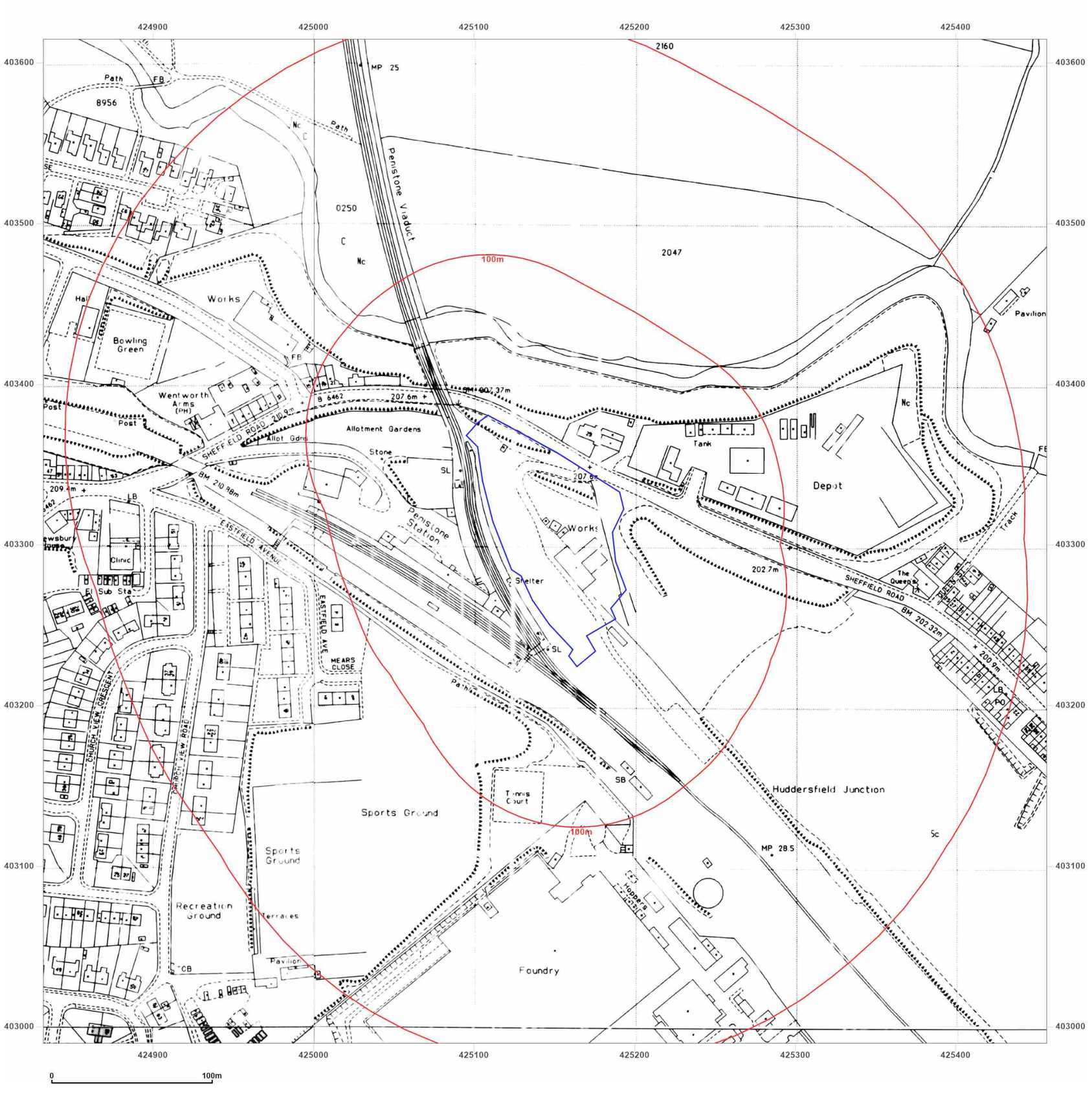
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Site Details:

425179,403284

Client Ref: 287798-00
Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: National Grid

Map date: **1988-1993**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1959 Revised 1988 Edition N/A Copyright 1988 Levelled 1959	Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A

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Site Details:

425179,403284

Client Ref: 287798-00
Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: National Grid

Map date: **1992-1995**

Scale: 1:2,500

Printed at: 1:2,500

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Edition N/A
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Site Details:

425179,403284

Client Ref: 287798-00
Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: National Grid

Map date: **1993-1995**

Scale: 1:2,500

Printed at: 1:2,500

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Revised 1993
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Copyright 1993
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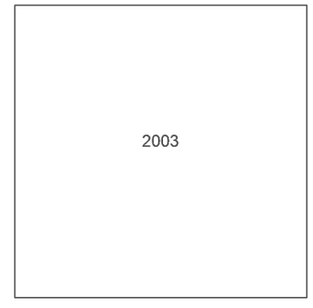
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Client Ref: 287798-00
Report Ref: GS-9YX-MDU-21M-RYG
Grid Ref: 425144, 403302

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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Appendix B

Consultants Coal Mining Report

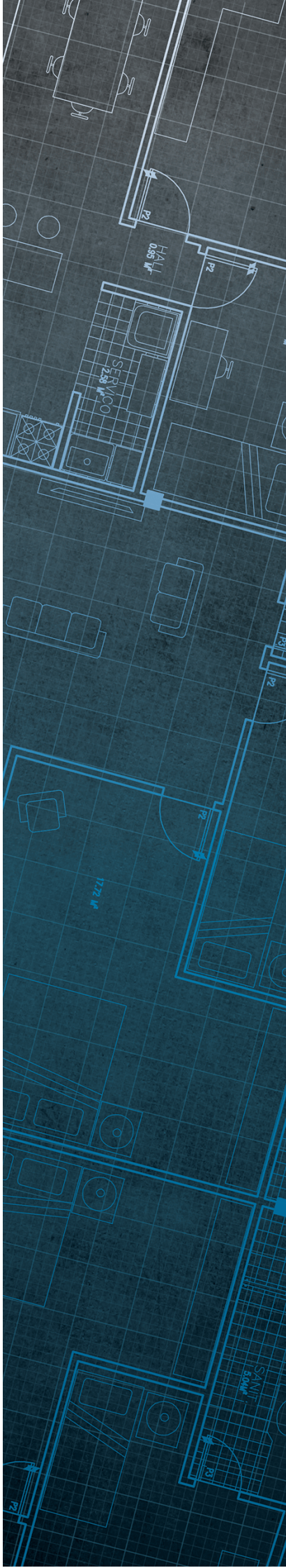
The Coal Authority

Consultants

Coal Mining Report

1, Lairds Way, Springvale, Penistone,
Hoylandswaine, Barnsley, South
South Yorkshire
S36 6JB

Date of enquiry:	**29 September 2023**
Date enquiry received:	**29 September 2023**
Issue date:	**29 September 2023**
Our reference:	**51003380715001**
Your reference:	**GS-ERD-H4E-IIN-E19**



Consultants

Coal Mining Report

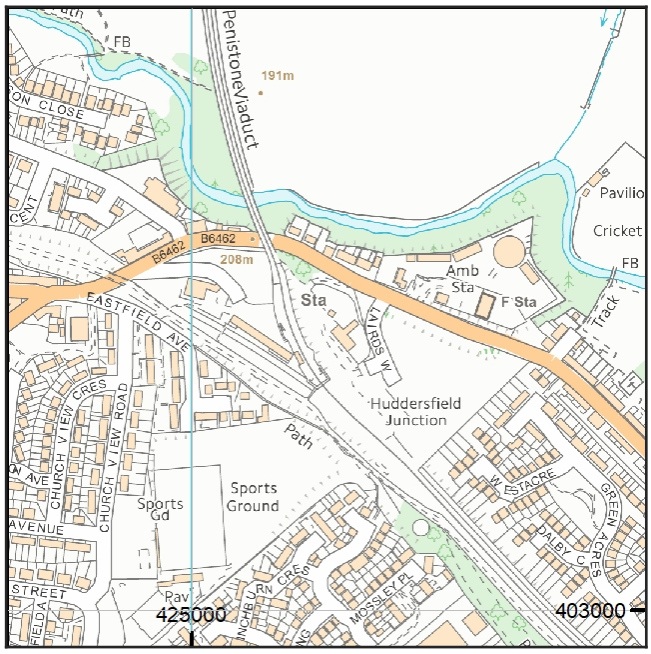
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

GROUNDSURE LIMITED

Enquiry address

1, Lairds Way, Springvale, Penistone, Hoylandswaine, Barnsley, South South Yorkshire
S36 6JB



Approximate position of property

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0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

@coalauthority
/company/the-coal-authority
/thecoalauthority
/thecoalauthority

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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

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
BETTER BED	Coal	Yes	Within	N/A	304

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
15.8	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 call us on 0345 762 6848 or email us at groundstability@coal.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 **call us on 0345 762 6848** or **email us at groundstability@coal.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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The Coal Authority

Summary of findings

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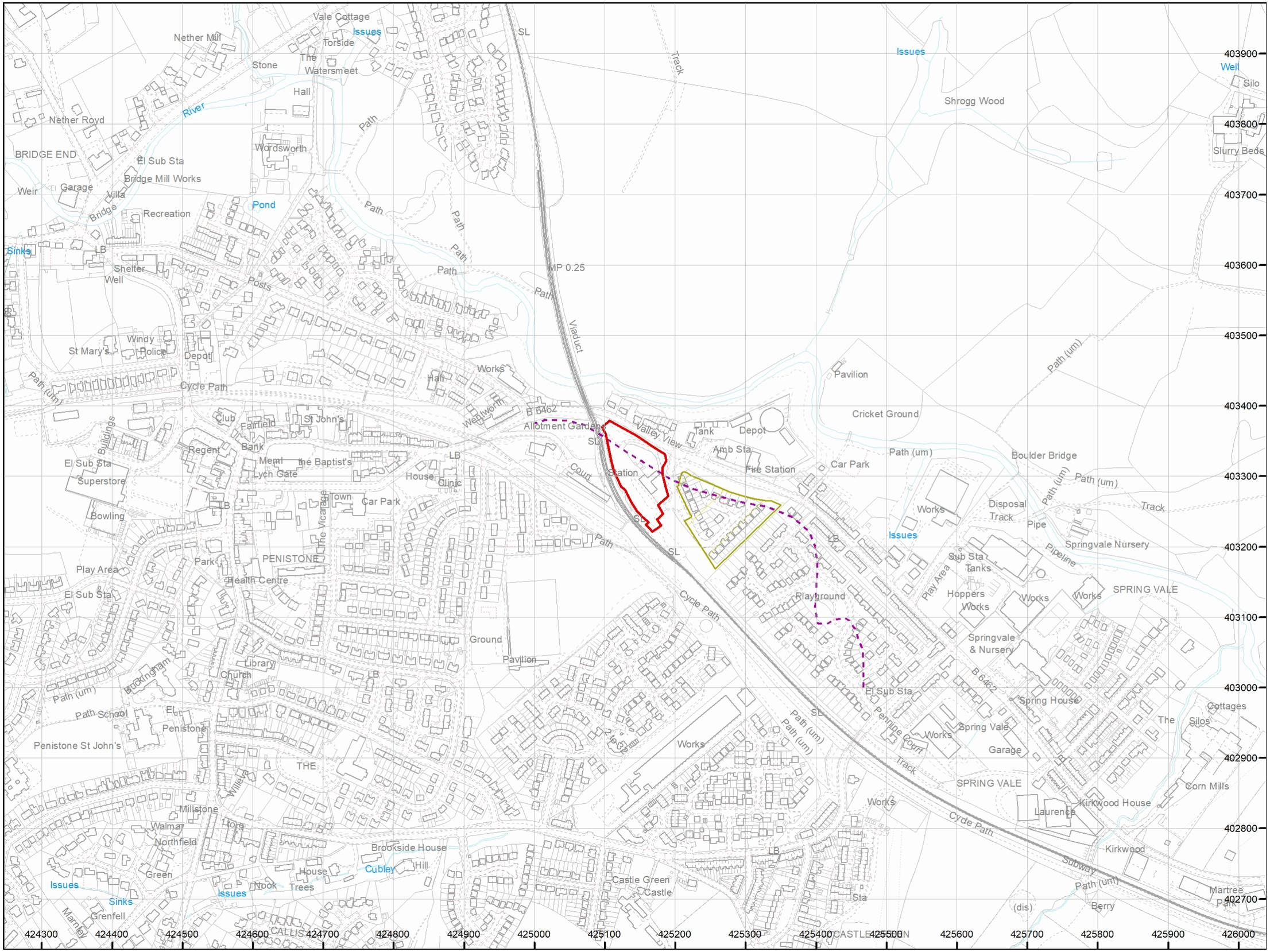
The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

Approximate position of the enquiry boundary shown

Outcrop (Conjectured)

Site investigations



How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com

Appendix C Stage 2 Mining Report

C.1 Report

Sent Via Email to -

Recipient:
suzanne.page@slcrail.com

Project Engineer:
jonny.walls@networkrail.co.uk

Requester:
jonny.walls@networkrail.co.uk

Date: 22/06/2026
Project Code: 178715
Task Line: 269285

Zone E, Floor 3
Furzton Building
The Quadrant
Elder Gate
Milton Keynes
MK9 1EN

Tel:
Email: nationalminingengineer@networkrail.co.uk
Author: Edd Edmondson (Please use the above email address for any correspondence)
Our Ref: Con 1437 Rev 1

Stage 2 Mining Report

1 Introduction

Further to your request for a Stage 2 Mining Report, which we understand is required to facilitate the design and construction of a new footbridge for the Penistone Park and Ride project. It is understood the project will involve permanent changes to ground loading, excavations, the removal of support from the track bed, installation of foundations (shallow pad and driven piles), and the use of non-track plant.

This report discharges Network Rail's obligation to share mining information under the Construction, Design and Management Regulations 2015. This report covers the following Network Rail ELR and mileage extents:

ELR	Mileage From (M.Yds)	Mileage To (M.Yds)
PEH	13.0700	13.0800

Table 1, ELR and mileage extents covered by this report

The search area for this report has been depicted on the attached plan and should include all temporary and enabling work areas. Where this is not the case, please send us the location details of all temporary and enabling work areas using the following email address: nationalminingengineer@networkrail.co.uk.

2 Topography (1) (2) (3)

The study length is orientated north (low miles) to south (high miles) within the town of Penistone, South Yorkshire. The site is located at Penistone Station and Huddersfield Junction which lies in reclaimed greenspace land. The greenspace was historically railway sidings and the Yorkshire Steel and Iron Works. A railway line historically ran to the west of the site and was orientated northwest to southeast, the route of the former railway line now forms part of the Trans Pennine Trail. The River Don is situated 35m north of the site

at its closest point. The low mileage end of site is situated on the Penistone Viaduct (Bridge ID 60) and, Sheffield Road passes beneath the site and viaduct. The PEH line becomes the PED1 line immediately south of the site.

The OS Terrain 5m Contour dataset indicates ground elevations adjacent to site vary between 205m OD and 215m OD. GeoRINM indicates the track elevation is 213m OD at the low and high mileage end of site.

The worksite boundary and terrain are presented on Plan No.1.

3 Geological Summary

The site is located on BGS 1:10,000 Sheet SE20SE, 2005 (Solid and Drift) and BGS 1:50,000 Sheet 86 Glossop, 2012 (Bedrock and Superficial). From herein the maps shall be referred to as 'BGS mapping' unless otherwise stated.

3.1 Superficial Geology (4) (5) (6) (7)

The BGS 10k Superficial dataset and the BGS mapping indicate the site is absent of natural superficial deposits. Alluvium associated with the River Don is located 50m north of the site boundary as presented on Plan No.2.

Deposits of Made Ground and Worked Ground are present within the site boundary. BGS 1:10,000 Sheet SE20SE describes the Worked Ground as 'disused quarries, clay pits, cuttings and unfilled', the Made Ground is described as 'embankments and quarry/colliery spoil'.

Some artificial ground associated with the railway infrastructure is anticipated.

The locations of artificial ground at the site and in the wider vicinity are shown on Plan No..3.

3.2 Solid Geology (7) (8) (9) (10) (11) (12) (13)

The BGS 10k Bedrock dataset and BGS mapping indicate the site is underlain by the bedrock presented in Table 2. Descriptions are taken from the BGS Lexicon of Named Rock Units and BGS 1:50,000 Sheet 86 Glossop (Bedrock and Superficial). **Error! Reference source not found.**. Descriptions are taken from the BGS Lexicon of Named Rock Units.

Bedrock	Description
Pennine Lower Coal Measures Formation	Interbedded mudstone, siltstone and sandstone with coal, ironstone, seatearth and marine bands. Unit is up to 635m thickness.
Penistone Flags	Fine-grained thinly bedded and cross bedded sandstone. Named unit within the Pennine Lower Coal Measures. Up to 110m thick.
Grenoside Sandstone	Fine to coarse grained cross bedded micaceous sandstone from 19m to 23m in thickness. Named unit within the Pennine Lower Coal Measures.

Table 2, Underlying geology

The BGS mapping indicate the dip and dip direction of the bedrock varies between the northeast and west due to faulting within the area.

The Coal Authority (CA) Outcrops dataset identifies one coal seam beneath the site as presented in Table 3. The BGS 10k Linear dataset and BGS mapping do not identify any coal seam outcrops beneath the site.

CA code	CA Description (BGS Description)	Thickness Range on BGS Mapping (m)	Comments
NY398K	Lower Penistone Coal (Lower Penistone Green Coal)	0.0 – 0.5	Not identified by the BGS 10k Linear Dataset or presented on modern BGS Mapping. The LPC is on the geological map illustrated 1:50,000 Sheet 86 Glossop (2012) however is listed in the stratigraphical column towards the base of the Penistone Flags. It sub crops at PEH 13.0717y Note the BGS County Series Map 'Yorkshire 273SE' identifies the coal as the **Lower Penistone Coal**. An unknown source map within evidence file E-MISC-292 (page 6) annotates the seam as '**Fireclay'**.

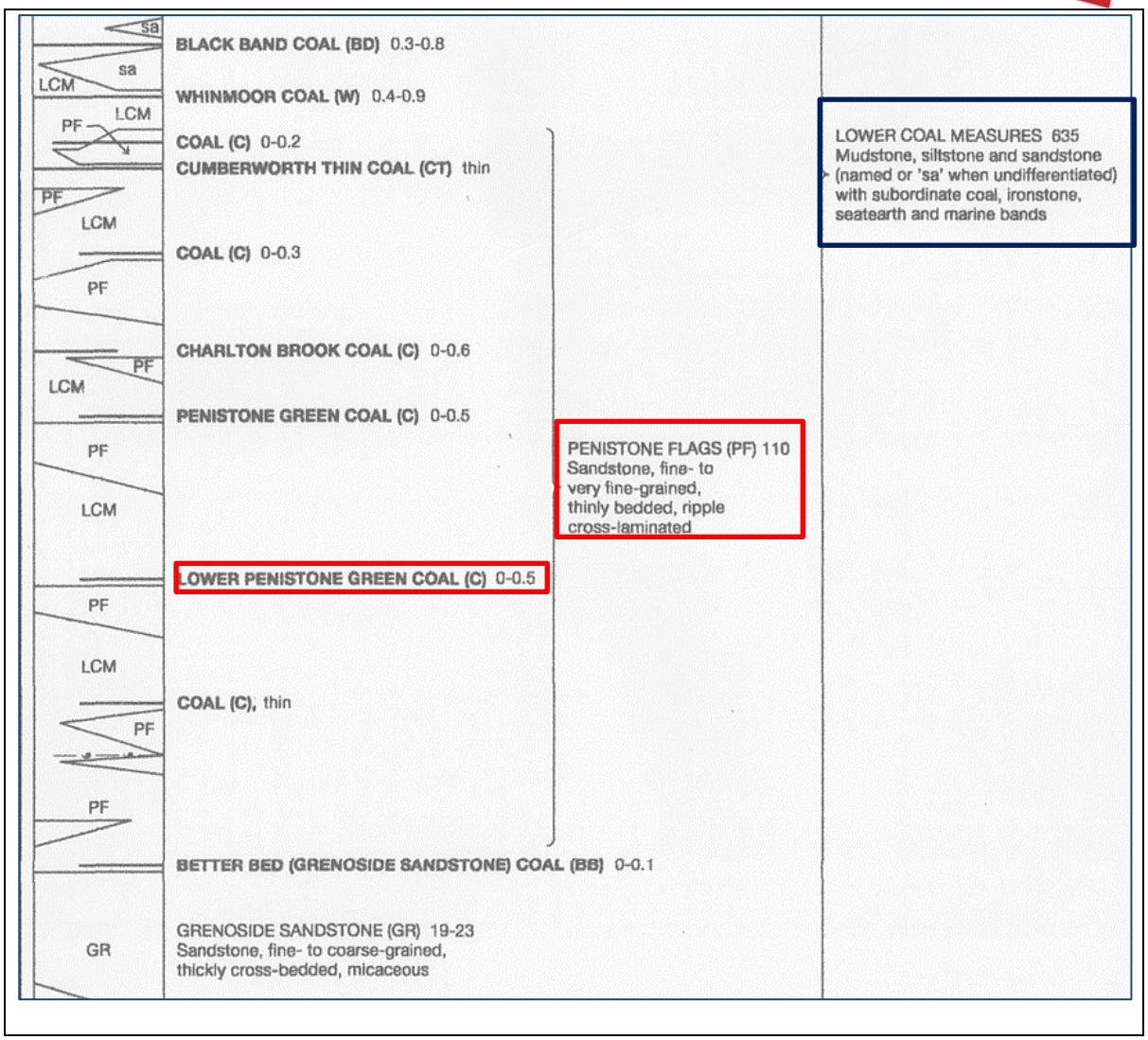
Table 3, Coal seam outcrops

Note there is discrepancy between the BGS and CA with respect to the naming of the NY398K seam.

An extract taken from BGS 1:10,000 Sheet SE20SE (2005) is presented below, illustrating the bedrock beneath the site.

Legend Symbol	Description
	= Coal/Commodity outcrops recorded as within influencing distance of the site
	= Coal/Commodity seam recorded as worked within influencing distance of the site
	= Bedrock recorded underlying the site

Table 4, Stratigraphical column legend



Extract taken from BGS 1:10,000 Sheet SE20SE (2001) (see Geology evidence file)

The solid geology is presented on Plan No.4.

3.2.1 Geological Faults (10) (13)

The BGS 10k Linear dataset and BGS mapping identify one fault within 100m of the site boundary. The faulting is presented on Plan No.4.

Object ID	Plan Location intersecting track or closest point to track on plan (M. Yds)	Alignment	Downthrow Direction (Throw)	Comments
35985	13.0700	NW/SE	SE	Conjectured

Table 5, Summary of geological faults

3.3 Boreholes (14)

The BGS Boreholes dataset identifies 2 boreholes within 250m of the site boundary however they do not provide sufficient information due to confidentiality and poor records.

Borehole locations are shown on Plan No.5 and logs can be accessed via the following webpage:

https://mapapps2.bgs.ac.uk/geoindex/home.html

3.4 BGS Landslides (15)

The BGS landslides dataset identifies areas at risk of slope instability (Class C) within 100m of the site. The location of landslides is shown on Plan No.6.

Further information regarding landslide risk can be found at:

https://www.bgs.ac.uk/datasets/bgs-geosure-landslides/landslides-property-hazard-information/

3.5 Soluble Strata (16)

The BGS Soluble Rock Dataset does not indicate that dissolution hazards are present at the site.

4 Mining Records

4.1 Mine Entries (17) (18)

NR has no records of mine entries within 50 metres of NR assets. However, it is possible that unrecorded mine entries are present in the vicinity of the site.

4.2 Underground Mining

4.2.1 Recorded Underground Mining (18) (19) (20) (21)

The NR and CA do not identify recorded underground workings within influencing distance of the site.

Evidence file E-MISC-492 does not record mining within 500m of the site however states the mining within the Lower Penistone Seam and Fireclay from shallow pits and quarries cannot be ruled out.

4.2.2 Arup Mining (22) (23)

The Arup dataset, Regional Report for Yorkshire and Humberside and the accompanying desk study plan (V400017251 - South Yorkshire, West Yorkshire 77, 79.jpg) have been reviewed for mining information pertaining to the site. The evidence indicates the site lies within the South Yorkshire Coalfield which was mined for coal, fireclay, ganister and ironstone. The commodities were extracted from medieval times until ‘present’, note the time of Report publication is 1991). Methods of extraction began using bell pits before progressing into pillar and stall, and longwall methods.

The Arup mining is presented on Plan No.7.

4.2.3 Probable Underground Mining (18) (24)

The CA and NR datasets do not hold records of probable mining within influencing distance of the site.

4.2.4 CA Development Risk

The site **DOES** lie within an area that the Coal Authority have identified as "Development High Risk Area", (DHRA), this relates to the CA seam outcrop.

http://mapapps2.bgs.ac.uk/coalauthority/home.html

Where the site works will involve the disturbance of coal or coal mining features are identified during the works, The Coal Authority and the Network Rail mining team shall be notified without delay.

* From November 2024, The Coal Authority changed its name to The Mining Remediation Authority. The Mining Remediation Authority is the new trading name of the Coal Authority and all enquiries regarding coal mining for a site should now be directed to the Mining Remediation Authority. The Coal Authority remains the legal name of the Authority and for the purposes of this report the Coal Authority (CA) will still be referenced.

5 Surface Mining (25)

The BGS Britpits dataset identifies one surface mining feature within 250m of the site boundary as presented on Plan No.8 and discussed in Table 6 below.

BGS Reference	Name	Grid Reference	Commodity Produced	Comments
37964	Signal Box	424987, 403339	Sandstone	Closed quarry.

Table 6, Surface mining

6 Landfill (26)

Records exist relating to landfilling operations within 250m of the site, please submit a request for a Landfill Report to 'nationalminingengineer@networkrail.co.uk'. quoting the '*Project Name*' and '*ELR: Start Mileage/End Mileage*' when submitting request for landfill report.

Note: The presence of landfill in close proximity to confined spaces should be included in the Designers Risk Assessment.

7 Cost and Programme Risk

Based on the information provided in the request form relating to both the nature and location of the works and the appended records, there is a **HIGH** risk to the project cost and programme.

8 Next Steps

HIGH mining risk:

The project has been designated as high risk due to:

- *The CA recorded coal outcrop beneath the site and the CA designated area of development high risk area.*
- *The potential for unrecorded mine entries and mine workings for coal and fireclay to be present within influencing distance of the site. The removal of underground*

commodities will affect the structural properties of the overlying bedrock which may cause subsidence related issues at surface.

- *The presence of workable coal at the site also presents the risk of mining derived gases at the site.*

Coal seams are anticipated within the site. Please contact PME should any excavations into earthworks be required as coal extraction will require a Coal Authority License. Moreover, the coal seams and colliery spoil exposed at surface may be at risk of spontaneous combustion.

The project manager shall appoint a competent consultant to undertake a review of this report and prepare a Mining Risk Assessment. A copy of the Mining Risk Assessment shall be provided to the PME, RAM(G), Principal Designer and Principal Contractor.

Guidance on the content and structure of a Mining Risk Assessment (MRA) can be found in **NR CIV 191 Mod 5, Appendix B**, a copy of which has also been provided in as part of the evidence files transferred with this report.

The MRA should be updated throughout the life of the project to incorporate any new information such as ground investigation and mitigation. The issue number on the cover sheet of the MRA should be kept up to date.

The MRA should reflect the actual proposals for the scheme.

Spontaneous Combustion

Moreover, the coal seams and colliery spoil exposed at surface (e.g within earthworks) may be at risk of spontaneous combustion. It is recommended that the Subsurface Soil Fires Engineering Advice Note (EAN), EAN 01/2023 (associated with NR/L2/CIV/903) be consulted during preparation of the MRA. This EAN is provided within the evidence files. The risk should be highlighted within the designers' risk assessment.

Ground Investigation

It is recommended that the Mining Remediation Authority Permit Applications follow the guidance in EAN 01/2025. This is for any intrusive investigations when coal is intersected (e.g drilling, piling or ground treatment) on NR land or NR sponsored project.

Ground Investigation Data

It is recommended that the AGS Data is obtained from any ground investigation in accordance with NR/L2/CIV/071 (Mod01) 10.1

[Amber Clause] states that "Factual ground investigation data shall be supplied in AGS format with the submission of the Ground Investigation Report. The Contractor's Engineering Manager (or CRE (Design) or equivalent) shall provide a copy of all factual

information in AGS format to the British Geological Survey". This applies to ALL ground investigation regardless of project status

Please review the Network Rail AGS Data Guidance Sheet.

The project team shall be aware of and comply with the requirements set out in the Network Rail Standard NR/L2/CIV/191 The Mining Manual Modules 1 & 5, which can be downloaded by following the below links:

Module / Title
NR/L2/CIV/191/01 [Issue: 2] Managing the risk from abandoned underground mines to existing infrastructure
NR/L2/CIV/191 [Issue: 4] Mining Manual

Table 7, Mining Manual modules 1 and 5

According to NR CIV 191 Mod 5, Cl 22 Records

PM shall supply the PME and RAM(G) or Region equivalent with electronic copies of all MRAs, GIRs, GDRs and the As-built information pertaining to the mitigation of mining risk.

The provision of as-built information for the treatment of mining hazards is of paramount importance to the successful completion of projects. As-built records also inform the ongoing management of mining risk as well as any future enhancements or maintenance work.

9 Limitations

This report has been compiled from archive information held by Network Rail's Mining Team; there can be no guarantee of completeness, reliability or accuracy of the supplied records. Network Rail mining team cannot be held responsible for any omissions or errors in the information provided. In particular, it should be noted that the Coal Authority Data Set consulted during the preparation of this report only extends 50m beyond the Network Rail ownership boundary, as a consequence of this sites that have been subject to historic ground movement due to deep mining may not be identified.

Records appended should only be used in connection with the delivery of this project. The Client must satisfy themselves as to the appropriateness of releasing this report and appended documents to third parties outside of Network Rail. Whilst previous mining reports might be included as part of the evidence files released in association with this project they should be treated with caution as they may not include information currently available and may not accord with NR's current position with respect to mining risk. Any concerns regarding the content of this Stage 2 Mining Report should be discussed with the PME.

We are aware that additional records pertinent to this site may be available from other sources, including those summarised in the table below:

Resource	Records Available
British Geological Survey (BGS)	A wealth of resources including geological maps and site investigation boreholes are available from the Onshore GeoIndex available at the following link: http://mapapps2.bgs.ac.uk/geoindex/home.html
The Coal Authority (CA) or The Mining Remediation Authority (TMRA)	Records of past coal mining activity The following interactive map viewer provides useful information on risks associated with past coal mining activity: https://datamine-cauk.hub.arcgis.com/
The Local Planning Authority	Details of land developments under local planning control. Such may include records associated the design and construction of new developments adjacent to the railway line including desk study, ground investigation and remediation reports.
Network Rail (NR)	Subsurface Fires Engineering Advice Note (EAN), published under NR/L2/CIV/903
Network Rail (NR) National Records Group (NRG)	The NR National Records Group may have potential additional records from recent NR delivered projects in this area. For Civils Projects records please complete a request: QF1822.doc (sharepoint.com) . If you are a 3rd party project, you must speak to your contact in the Asset Protection Team (ASPRO).

Table 4, Other potential sources of mining records

10 References

1. **OS.** *Terrain 5 (dataset).*
2. **NR.** Route Viewer.
3. —. Geo-RINM.
4. **BGS.** *DiGMap10_GB10kSuperficial (Dataset).*
5. —. *Advanced Superficial Thickness Model (Dataset).*
6. —. *BGS 10k Artifical Dataset.*
7. —. BGS 1:10,000 Sheet SE20SE Solid and Drift. *BGS Maps Portal.* [Online] 2005. https://webapps.bgs.ac.uk/data/MapsPortal/map.html?id=115955720135955720.
8. —. *GeoIndex Interactive Viewer*
9. **Coal Authority.** *CA Outcrops. data set*
10. **BGS.** *DiGMap10_GB10kLinear dataset*
11. —. BGS 1:50,000 Sheet 86 Glossop, Bedrock and Superficial. *BGS Maps Portal.* [Online] 2012. https://webapps.bgs.ac.uk/data/MapsPortal/map.html?id=16610300016610.
12. —. BGS Lexicon of Named Rock Units. [Online] https://webapps.bgs.ac.uk/lexicon.
13. **Coal Authority.** *CA Faults. data set*
14. **BGS.** *BGS Boreholes (Dataset).*
15. —. *GeoSureV8 Landslides (Dataset). .*
16. —. *GeoSureV8_SolubleRocks (Dataset).*
17. **CA.** *CA. Mine Entries (Dataset).*
18. **NR.** *NR MRRS Hazards Dataset.*
19. **CA.** *Underground Workings (Dataset).*
20. —. *Seam Contours (Dataset).*
21. **Coal Authority.** *CA Seam Levels..*
22. **Arup.** *Arup Mining Area Dataset.*
23. —. Review of Mining Instability in Great Britain. *Regional Report for Yorkshire and Humberside.* 1991. Vol. 1.
24. **CA.** *Probable Mining (Dataset).*
25. **BGS.** *BGS Britpits (Dataset).*
26. **NR.** *Landfill and wastebook (Dataset).*
27. **BGS.** BGS 1:10,560 Sheet Yorkshire 273 SE. *BGS Maps Portal.* [Online] 1933. https://webapps.bgs.ac.uk/data/MapsPortal/map.html?id=10011495111010114951.

Acronym	Meaning
ASTM	Advanced Superficial Thickness Model
BGS	British Geological Survey
CA	Coal Authority
ELR	Engineers Line Reference
m BGL	Metres Below Ground Level
m OD	Metres Ordnance Datum
M. Yds.	Miles. Yards.
MRRS	Mining Risk Ranking System
NR	Network Rail
OS	Ordnance Survey
TMRA	The Mining Remediation Authority

Table 5, Acronyms

File/Folder Name	Record/File Type	Description
Plans	8 JPEG	Plan Nos 1 to 8.
NR CIV 191	1 PDF	NR CIV 191 Mod 5 Appendix B.
AGS	1 PDF	Network Rail AGS Guidance Note
EAN	2 PDF	EAN 01/2023: Subsurface Soil Fires Engineering Advice Note. EAN 01/2025: Mining Remediation Authority Permit Applications
Geology	3 JPEG	BGS Maps 1:10,000 Sheet SE20SE (2001) Solid and Drift Edition; 1:50,000 Sheet 86 Glossop (1980) Solid and Drift Edition; 1:63,360 Sheet 86 Glossop (1932) Solid and Drift Edition.
Arup	2 PDF, 1 JPEG	Extracts taken from Arup Regional Report for Yorkshire and Humberside, 1991.
E-MISC-492	1 PDF	Mining stability report for the PED1 line immediately south of the site.

Table 6, Inventory of attached records

Signatories	
Prepared by: Rev 0	G E Bath
Prepared by: Rev 1	Edd Edmondson
	Mining Engineer
Prepared for and on behalf of:	R N Rushton
	Principal Mining Engineer

C.2 Plans and Evidence Files

Available on request.

Appendix D Review of NR Evidence Files

D.1 AGS GI Data Guidance Note

File Description

NR document on the importance of data sharing within ground engineering, specifically AGS data.

Summit Review

The Project shall share the factual GI data from site-specific GI in AGS format once available.

D.2 77C02

File Description

Extract from Arup's Review of Mining Instability in Great Britain – Mining Area Schedule for South Yorkshire Coalfield.

Summit Review

The schedule indicates that Coal Measures in this region were worked for coal, fireclay, ganister and ironstone, accessed via shafts and drifts and worked via bell pits, pillar and stall, and longwall methods. The workings are thought to have taken place from the 19th century to the present day. Drainage was via pumping.

D.3 Coal Mining Text

File Description

Extract from Arup's Review of Mining Instability in Great Britain.

Summit Review

The site is located within Barnsley District of South Yorkshire Coalfield. Documentary evidence of coal workings dates to around the 13th century when the main method of extraction was by bell pits and "picking" along the coal outcrops.

93no. subsidence incidents relating to old shallow workings in the Yorkshire Coalfield have been collected in this report. 19no. were shaft collapses, 11no. crownholes and 53no. undefined subsidence events. Several buildings have been damaged by these subsidence incidents. Damage has been particularly severe where further movement along fault lines has taken place.

D.4 V400017251 - South Yorkshire, West Yorkshire 77, 79

File Description

Extract from Arup's Review of Mining Instability in Great Britain – Regional Atlas of Mining Areas

Summit Review

Indicates that site is located within area with inconclusive state of evidence of existence of mining.

D.5 EAN 01_2023

File Description

NR Engineering Advice Note on Subsurface Soil Fires.

Summit Review

Considered in report production.

D.6 EAN 01_2025

File Description

NR Engineering Advice Note on Mining Remediation Authority Permit Applications.

Summit Review

Considered in report production.

D.7 E-MISC-492

File Description

Railtrack PLC communication between John Stothard (Mining Engineer) and others,

Summit Review

Coal Mining Report dated 9th February 2001

Summary of The Coal Authority Records at the time:

Part Underground Mining: Not within the zone of likely physical influence on the surface from past underground coal workings.

Present Underground Mining:

D.8 400002978

File Description

Scan of BGS map Sheet SE20E.

Summit Review

Considered in report production.

D.9 400003686

File Description

Scan of BGS map Sheet 86 Glossop.

Summit Review

Considered in report production.

D.10 400003687

File Description

Scan of BGS map Sheet 86 Glossop.

Summit Review

Considered in report production.

Appendix E Landfill Report

Technical Authority

Providing technical leadership

Floor 2
Loughton Building
The Quadrant
Elder Gate
Milton Keynes
MK9 1EN

Email: nationalminingengineer@networkrail.co.uk
Author: Barbara Wysocka
Tel: 07354 528522

Landfill Gas Report: LFill 01070 - Con 1437 Rev 1 - Penistone Footbridge & Car Park

Recipient	Recipient Email	ELR	Start Mileage	End Mileage	Date
Mike Walsh	mike@summitgeotechnics.co.uk	PEH	13.0700	13.0800	28/09/2026

Further to your request with regards to the migration of landfill gases, we summarise below the information we hold relating to landfill & contaminated land sites within 250m of your site.

These sites are either known to, or have the potential to, be the source of landfill gas.

Network Rail: National Landfill and Wastebook

An extract taken from our internally generated database, the National Wastebook 2019 is provided in the table below. This shows sites within the search mileage that are in the database.

Site Name	ELR	Start/End Miles.Yards	Status	Landfill Gas	Remarks
Depot, Sheffield Road, Penistone	PEH	13.0484 - 13.0924	Closed	Unknown	Landraising with unknown wastes. Site has been built over.
Spring Vale, Sheffield Road, Penistone	PEH	13.0528 - 13.0924	Closed	Unknown	Tip of slag and works wastes. Site is currently being reworked as part of a

					reclamation project.
Churchfield Road, Penistone	PEH	13.0638 - 13.0924	Closed	Unknown	Foundry sand tip. Closed in 1991.
Depot, Sheffield Road, Penistone	PED1	28.0814 - 28.1012	Closed	Unknown	Landraising with unknown wastes. Site has been built over.
Churchfield Road, Penistone	PED1	28.0814 - 28.1144	Closed	Unknown	Foundry sand tip. Closed in 1991.
Spring Vale, Sheffield Road, Penistone	PED1	28.0814 - 28.1496	Closed	Unknown	Tip of slag and works wastes. Site is currently being reworked as part of a reclamation project.

Environment Agency: Historic Waste Sites

Sites within 250m of the search mileage listed by the Environment Agency as Historic Waste Sites are presented in the table below.

As historic waste sites, these sites may be classified as contaminated land by the relevant local authority.

For further information, contact the Environment Agency or the relevant local Authority.

Site Name	Easting	Northing	Waste Type	Landfill Gas
Penistone Church	425100	403100	Industrial, Inert, Licenced.	Unknown

Please find attached a landfill location plan which shows the location of your search mileage and position/s of the sites we describe above.

It should be noted that “landfill gas” consists of a range of gases. The types of gas generated depend primarily on the nature of the fill, the oxygen content of the fill and the hydrogeological conditions. Landfill gas comprises predominantly methane (commonly up to 65% but concentrations greater than this are not unknown) and carbon dioxide. Other potential gaseous components of landfill gas include hydrogen sulphide and numerous trace organic compounds, including alkenes, alkanes, cycloalkanes, aromatic hydrocarbons, halogenated compounds, organosulphur compounds, alcohols, esters and ethers. The landfill gas production process passes through several stages, during which the composition of the gas changes significantly (For further information see CIRIA Report 130 Methane: its Occurrence and Hazards in Construction).

Landfill gases present a hazard to NR works due to the risk of explosion and/or asphyxiation, however, to present such a risk they need to accumulate in poorly ventilated confined spaces (such as culverts, manholes, foundations or tunnels) or beneath an impermeable capping of drift deposits, such as till or head.

If the proposed works will involve any hot working, excavations into the ground beneath the ballast or the requirement to enter confined spaces, then a site specific DSEAR (The Dangerous Substances and Explosive Atmospheres Regulations 2002) risk assessment should be completed to evaluate the risks associated with landfill gas and to establish appropriate mitigation measures prior to the commencement of

the works. The HSE have a number of publications that provide guidance regarding DSEAR:
http://www.hse.gov.uk/fireandexplosion/dsear.htm.

Monitoring for landfill gas and air quality will also be required under such circumstances.

For works involving the requirement to enter confined spaces, please refer to standard NR/L3/MTC/SE0115 "Confined Spaces Working and Entry Procedure" and The Confined Spaces Regulations 1997.

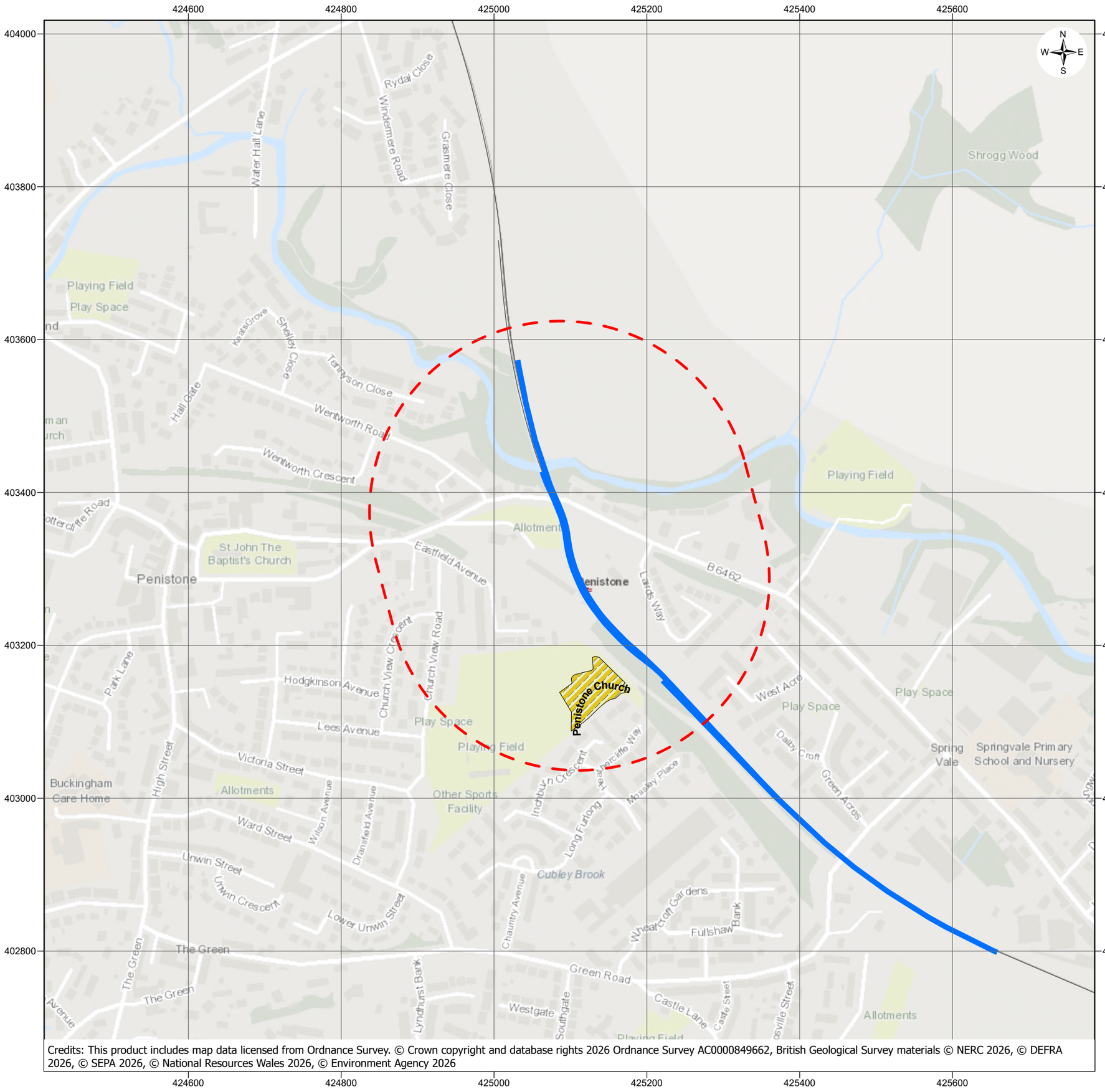
I trust this addresses your enquiry, please contact the Mining Team if you require any further information or guidance.

Barbara Wysocka

For Neal Rushton
Principal Mining Engineer

Enclosures

Landfill Location Plan



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NetworkRail

Technical Authority

Providing technical leadership

NationalMiningEngineer@networkrail.co.uk

Landfill Gas Location Plan

created in accordance with NR/L3/CIV/066

Use type: OFFICIAL

Project Name: Con 1437 Rev 1 - Penistone Footbridge and Car Park

Report Reference: LFill 01070

ELR: PEH **Start Mileage:** 13.0700 **End Mileage:** 13.0800

Date: 28/09/2026 **Scale:** 1:5,000 **Author:** bwysocka

Features marked on this plan are indicative only, and should not be considered accurate. Corporate GIS data is subject to frequent updates, therefore any data exported from the corporate GIS system is a static representation of the data at the time of export and should be treated as such. No warranty or guarantee is given as to the absolute accuracy or completeness of this information. Network Rail disclaims any responsibility for any loss, damage or inconvenience howsoever caused, arising out of, or as a consequence of reliance on this information in any context.

Legend

- Track Links

NR Landfill and Wastebook

Gas

- Landfill Unknown Gas
- EA Historic Waste
- Landfill Gas Report Boundary

Appendix F GI Contractor's Factual Report

Environmental
Geotechnical
Specialists

FACTUAL
REPORT

job number	C6144/26/E/9573
date	17/09/2026
site address	Land adjacent to Penistone Station, Penistone, Sheffield, South Yorkshire, S36 6HP
written by	T. Merry
checked by	R. Palmer
issued by	T. Merry

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<ENVIRONMENTAL><GEOTECHNICAL>

Rogers Geotechnical Services Ltd
Unit 1 Manorcroft Works, Commercial Road, Skelmanthorpe, Huddersfield, HD8 9DT
01484 604 354 www.rogersgeotech.co.uk Company No: 5130864

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Appendices

1.	Site Plan
2.	Windowless Sample and Rotary Cored Borehole Records
3.	Trial Pit Logs
4.	Water Monitoring Results
5.	Plate Load Testing Results
6.	Soakaway Results
7.	Laboratory Testing
8.	Photographs

Please consider the environment
before printing this report.

Factual Report on a Ground Investigation

Location:	Land adjacent to Penistone Station Penistone, Sheffield, South Yorkshire, S36 6HP
For:	Sable Leigh Consultancy Ltd
Report No:	C6144/26/E/9573 Report date: September 2026

For and on behalf of **Rogers Geotechnical Services Ltd**

Tobias Merry MSci (Hons), FGS Geo-environmental Engineer	**Rob Palmer** MSc FGS ACIEH Engineering Director

1. Introduction

Sable Leigh Consultancy Ltd (SLC) propose to develop the Land adjacent to Penistone Station, Penistone, Sheffield, South Yorkshire, S36 6HP by the demolition of the existing derelict structure, replacing it and the surrounding area with a large car park, as well as constructing a pedestrian bridge between each platform. Consequently, a site investigation has been undertaken in accordance with the instruction from the client. This work was required in order to determine the nature of the underlying soils and to assess their engineering properties. This report describes the work undertaken and presents the data obtained.

At the time of the investigation, the north-eastern area of the site was occupied by grassland and shrubbery, accessed from Lairds Way, with the southern area of the site occupied by the Pennine Way with some grassed areas off to the side, accessed by a gate from Eastfield Avenue.

2. Limitations

This report has been prepared in accordance with our understanding of current best practice. However, new information or legislation, or changes to best practice may necessitate revision of the report after the date of issue. No liability can be accepted for the incorrect interpretation of any of the factual data supplied, particularly between investigatory locations.

3. Fieldworks

The fieldworks were undertaken between the 1st and 10th August 2026 and included the following:

- Three dynamic sample boreholes with rotary core follow on.
- Standard Penetration Tests (SPTs) within each borehole.
- Installation of three water monitoring standpipes.
- Eight machine excavated trial pits.
- Four California Bearing Ratio (CBR) tests within trial pits.
- Two soakaway tests within trial pits.
- GPR site clearance by Seddon's Surveys.

The investigatory locations were specified by the client on site and are indicated on the site plan which is presented in Appendix 1 to this report. It is noted that despite site clearance prior to site attendance with the excavator, TP206 could not be undertaken due to responses picked up with the CAT4+ immediately before excavations were to take place.

3.1 Windowless Sample and Rotary Cored Boreholes

These boreholes were initially intended to be sunk using a drive-in windowless sampler through the near surface soils. However, upon excavating the service pit at each location refusal was met on rockhead below the safe-dig depth of 1.20m. Standard penetration tests (SPTs) were undertaken at regular intervals (at the end of each sampler drive). The SPTs were conducted in accordance with the procedures given in BS EN ISO 22476: Part 3: 2005 +A1: 2011, and the results are summarised on the borehole records. During this work an automatic trip hammer of 63.5kg falling through 750mm was employed to drive either a cone or split barrel sampler assembly into the ground, the barrel samples were retained in air-tight plastic containers.

On meeting refusal, the three boreholes were progressed by rotary cored drilling techniques utilising water flushing and a 92mm diameter barrel, which recovers an 85mm diameter core. Where necessary, a 103mm diameter casing was spun into the ground to support the sides of the bore.

The recovered cores were sealed and returned to the laboratory for logging and subsequent testing. The soils were described in general accordance with BS5930: 2015+A1: 2020, and full descriptions are given on the boreholes records which are presented in Appendix 2. Also included on these records are the sample depths, ground water levels, the percentages of *Total Core Recovery* (TCR) and, within rock, the *Solid Core Recovery* (SCR) and *Rock Quality Designation* (RQD).

3.2 Trial Pits (Mechanical Plant)

A total of eight trial pits were excavated in order to reveal the nature of the near surface soils using a 13-ton tracked 360° excavator. The soils were logged on site in general accordance with BS5930: 2015+A1: 2020, and full descriptions are given on the trial pit records which are presented in Appendix 3. At regular intervals throughout the excavation of the pits, samples were taken for chemical and geotechnical testing. The test specimens were retained in the appropriate air-tight containers within cool boxes for onward transition to the geotechnical and chemical laboratories.

Once excavations were completed, the trial pits were carefully re-instated with the arisings. Whilst every care was taken during the infilling process, including compacting of the infill at regular intervals with the back-acting arm of the excavator, it should be appreciated that some mounding of the surface may have resulted. Moreover, the infilled soils may be subjected to settlement over time, such that a depression in the surface may also occur. Therefore, the locations of any pits undertaken in this investigation should be conveyed to the current site user, as the mounds or depressions associated with the pits may present a risk to current site operations. Furthermore, it must be realised that the infilled pits represent an area of disturbance within the site soils, thus the soils at the pit locations may vary characteristically compared to the undisturbed ground. As such, foundations placed in this disturbed material may not perform as anticipated.

3.3 Water Monitoring Standpipes

Borehole monitoring standpipes were installed in each of the rotary boreholes and the details of the installations are shown on the appropriate borehole records. The monitoring standpipes consisted of a perforated pipe from 10m depth to between 1.5m and 1.0m below ground level. The response zone was filled with pea gravel, with a bentonite seal above, and the installation was capped with a stop box cover in a concrete surround.

3.4 Plate Load Testing

Plate load testing was undertaken within four of the excavated trial pits. At the elected test depths, the pit was trimmed and flattened as much as practicable. The plate load testing equipment was then placed underneath the excavator, whereupon the excavator was ‘jacked up’ as a dead weight to provide downward pressure upon the underlying plate. The downward movement of the plate was then monitored constantly, and the test was completed in general accordance with the method given in BS1377: Part 9: 1990: 4.1. These tests are presented in Appendix 5.

3.5 Soakaway Tests

Soakaway tests were conducted within two of the trial pits excavated. At the elected test depths, the pit was trimmed and squared as much as practicable. Water was then pumped into the pit and the level monitored at timed intervals relative to a reference bar at ground level. These tests were conducted and calculated in general accordance with the method given by BRE Digest 365 and the results are presented in Appendix 6.

4. Geology

The available published geological data for the site has been examined, and the following table presents the anticipated geology.

Table 1: Geological Data for the Site

Strata Type	Strata Name[1]	Previous Name[2]	Description[2]
Superficial Geology	-	-	Not anticipated to underly the site.
Solid Geology	Pennine Lower Coal Measures Formation	Grey Measures of Yorkshire and Nottingham	Interbedded grey mudstone, siltstone and pale grey sandstone, commonly with mudstones containing marine fossils in the lower part, and more numerous and thicker coal seams in the upper part.
	Penistone Flags	-	Sandstone.

5. Strata Conditions

The investigation revealed the following strata:

Table 2: Generalised Strata Profile

Depth m below ground level to underside of layer	Strata Type	Encountered in	Groundwater Strikes m below ground level
0.20 – 0.75	Topsoil (Dark brown silty very sandy GRAVEL).	BH101, TP201, TP202, TP203, TP204, TP205, TP207, TP208, TP209	None
0.40	Topsoil (Dark greyish brown silty gravelly SAND with low cobble content).	BH102	None
0.60 – 0.65	Made Ground (Very silty gravelly SAND with low cobble content).	BH102, BH103	None
1.10	Silty very sandy GRAVEL. Residual Pennine Lower Coal Measures Formation	BH101	None
+1.10 – 21.40	MUDSTONE. Pennine Lower Coal Measures Formation	ALL	BH101 at 7.00m, BH103 at 1.20m and 2.00m
+11.00 – +31.00	SILTSTONE. Pennine Lower Coal Measures Formation	BH101, BH102	None
3.45 – 14.70	SANDSTONE. Pennine Lower Coal Measures Formation	BH101, BH102	None
28.85	COAL.	BH101	None

'+' denotes that the strata extended below the termination depth of the investigated positions, thus the extent of the deposit is only proven to the depths indicated.

[1] Sources: British Geological Survey (NERC) Map Sheets 86; Glossop; Solid and Drift Edition, and Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]
[2] Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [*online resource from www.bgs.ac.uk*]

5.1 General Strata

The investigation has revealed that below a thin capping of topsoil and made ground, silty very sandy gravel was recorded to 1.10m below existing ground level (begl) within position BH101. However, underlying this capping within position BH102, sandstone was observed to a depth of 3.45m begl.

Underneath the capping of made ground, and below the sandstone and gravel with BH102 and BH101, mudstone was exposed to a depth of 10.20m and 10.80m within BH102 and BH101 respectively, and to termination of all other positions. Below the mudstone within BH102, siltstone was uncovered to termination; however, within BH101 sandstone was exposed to a depth of 12.95m begl, followed by siltstone to 14.05m begl, then sandstone to 14.70m begl and siltstone to 17.00m begl.

Following on from the siltstone within BH101, mudstone was revealed to a depth of 21.40m begl followed by siltstone to termination of the borehole, with a small band of coal between 27.90m and 28.85m begl. Taking into consideration the available geological data for the site, these strata are anticipated to represent Pennine Lower Coal Measures Formation.

5.2 Groundwater

Groundwater strikes were observed within BH101 at 7.00m depth rising to 4.80m depth after 20 minutes of monitoring, and within BH103 at 1.20m and 2.00m depth remaining static after 20 minutes of monitoring. However, it should be appreciated that the normal rate of boring does not permit the recording of an equilibrium water level for any one strike. Moreover, groundwater levels are subject to seasonal variation or changes on local drainage conditions.

6. Insitu Testing

6.1 Standard Penetration Tests

The standard penetration tests undertaken are summarised in the following table:

Table 3: Summary of Standard Penetration Tests

Strata	Depth Range (m)	SPT 'N' (Blows/300mm)	Comments
		Rock	
Mudstone	0.60 – 8.00	85 to 121	Indicative of rock.

6.2 Groundwater Monitoring

The standpipes were monitored between the 22nd July and the 12th August 2026. The results of the groundwater monitoring undertaken are tabulated below and sull results are presented in Appendix 4.

Table 4: Summary of Standard Penetration Tests			
Location	**Date**	**Water Level (m)**	**Standpipe Depth (m)**
BH101	22/07/2026	5.40	10.73
	29/07/2026	6.40	
	05/08/2026	7.62	
	12/08/2026	9.19	
BH102	22/07/2026	10.03	10.11
	29/07/2026	10.01	
	05/08/2026	10.03	
	12/08/2026	DRY	
BH103	22/07/2026	7.13	8.38
	29/07/2026	7.11	
	05/08/2026	7.14	
	12/08/2026	7.24	

7. Laboratory Testing - Geotechnical

The following programme of laboratory testing has been undertaken on samples obtained during this investigation:

- Determination of water content of rock — BS EN ISO 17892-1:2014+A1:2022
- Dry density/water content relationship light — BS 1377: Pt 4:1990, clause 3.3, 2.5kg
- Dry density/water content relationship heavy — BS 1377: Pt 2:2022
- Uniaxial Compressive Strength — ASTM: D2938-95 (2002)
- Point Load Strength Index Test — ISRM (1984)
- Determination of total sulphur — BS 1377-3:2018+A1:2021: Pt3: 7.10
- Soluble sulphate content — BS 1377-3:2018+A1:2021: Pt3: 7.3
- pH value — BS 1377-3:2018+A1:2021: Pt3: 12

The test results are presented in Appendix 7 and are summarised below:

Table 5: Summary of Geotechnical Test Results				
Test type	**Number of tests**	**Range of results**		**Comments**
Moisture content of soil determinations	8	6.5% to 9.9%		Generally increasing with depth.
Moisture content of rock determinations	44	1.9% to 8.7%		Variable with depth
Dry density/water content relationship – light compaction	5	Max. Dry Density Optimum Water Content	1.84 to 1.94 Mg/m^3 13% to 14%	

Dry density/water content relationship – heavy compaction	3	Max. Dry Density Optimum Water Content	1.94 to 2.02 Mg/m^3 8.8% to 11%	
Dry density/water content relationship – vibrating hammer compaction	2	Max. Dry Density Optimum Water Content	1.85 to 1.90 Mg/m^3 11% to 13%	
Point load	43	$Is_{(50)}$Axial	0.06 to 3.51 MPa	Assume UCS = $Is_{(50)}$*20
Uniaxial compressive strength	1	77 MPa		
Determination of total sulphur	6	0.006% to 0.016%		
Soluble sulphate	6	SO_4	0.00979 & 0.0201g/l	
pH	27	6.1 – 8.7		

*Additional results will be provided in due course.

9. Laboratory Testing - Environmental

A number of testing suites were conducted on samples from across the site and the following regimes were undertaken.

- Suite E1 – As, Cd, Cr (total), Cr^{VI}, Cu, Pb, Hg, Ni, Zn, Sb, Be, V, CN^- (total),pH, B (soluble), phenols (total) and total organic carbon.
- Suite E2 – Asbestos presence and identification, asbestos quantification.
- Suite E3 – Petroleum hydrocarbons (TPHCWG).
- Suite E4 – Polycyclic aromatic hydrocarbons (PAHs).
- Suite E5 – Total BTEX, benzene, toluene, ethyl benzene, m & p xylene, o xylene, MTBE.
- Suite E6 – Volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs).
- Suite E7 – Polychlorinated biphenyls (PCBs).

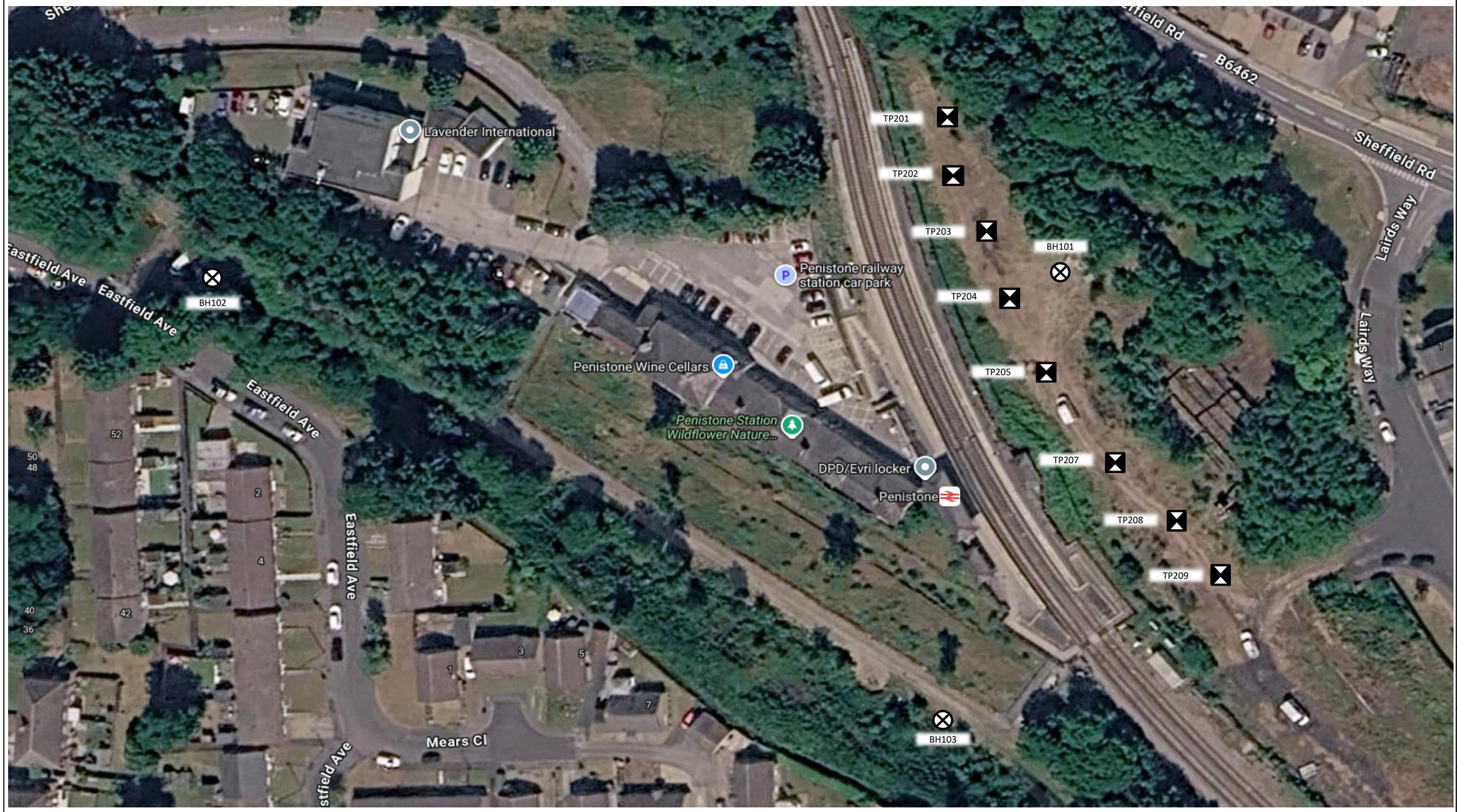
This testing was undertaken by i2 Analytical Ltd and the results of the chemical testing are presented in Appendix 7 of this report.

9. References

- British Standards Institution (1990) BS1377: *British standard methods of test for soils for civil engineering purposes,* B.S.I., London.
- British Standard Institution (2005 +A1: 2011) EN ISO 22476-3: *Geotechnical investigation and testing – Field testing, Part 3: Standard penetration test,* B.S.I., London.
- British Standards Institution (2015+ A1: 2020) BS5930: *Code of practice for ground investigations*, B.S.I., London.
- British Geological Survey (NERC) (2026), BGS, Keyworth.
  - Geology of Britain Viewer: (*http://maps.bgs.ac.uk/geologyviewer_google/googleviewer.html)*
  - Lexicon of Named Rock Units: (*http://www.bgs.ac.uk/lexicon/)*

Appendix 1

Site Plan



Notes:

Investigation positions approximated from site operative's notes.

RGS Environmental Geotechnical Specialists

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Client:

Sable Leigh Consultancy Ltd

Job Number:

C6144/26/E/9573

Project Details:

Land adjacent to Penistone Station

Scale:	Not to scale - reference only

ground investigation | drilling & excavation | insitu testing
laboratory testing & gas monitoring | engineering consultancy
surveying & flood risk assessments | training, CPD & expert witness
... delivered using our own drilling rigs / crews / soils lab / engineers

Appendix 2

Windowless Sample and Rotary Cored Borehole Logs

Borehole Log

RGS Environmental Geotechnical Specialists

Borehole No. **BH101** Sheet 1 of 7

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords:	403315.54 - 425134.22	Hole Type RC
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Level:	213.05m aOD	Scale 1:25
Client:	Sable Leigh Consultancy Ltd		Dates:	01/07/2026 - 02/07/2026	Logged By TM

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	SCR (%)	RQD (%)	FS (mm)	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 0.20	ES						0.25	212.80		TOPSOIL (Dark brown, organic, silty, very sandy angular to sub-angular and fine to coarse GRAVEL of various lithologies, brick, slag and concrete. Sand is fine to coarse).
		0.40 - 0.60	ES									Yellowish brown becoming brown, silty, very sandy angular to sub-angular and fine to coarse GRAVEL of sandstone. Sand is fine to coarse.
		0.80 - 1.00	ES									Extremely weak, thinly laminated, brown and grey MUDSTONE, recovered as silty, sandy gravel. PENNINE LOWER COAL MEASURES FORMATION
									1.10	211.95		Extremely weak, thinly to thickly laminated, greyish brown MUDSTONE. Fractures are very closely spaced, sub-horizontal to sub-vertical, smooth planar to rough undulating, closed to open, commonly clean with iron staining, uncommonly infilled with silty gravel of mudstone. PENNINE LOWER COAL MEASURES FORMATION
				85	100	0	0	3 10 60	1.50	211.55		Extremely weak, thinly laminated, brown and grey MUDSTONE, recovered as silty, sandy gravel. PENNINE LOWER COAL MEASURES FORMATION
									2.50	210.55		Extremely weak, thinly to thickly laminated, greyish brown MUDSTONE. Fractures are very closely spaced, sub-horizontal to sub-vertical, smooth planar to rough undulating, closed to open, commonly clean with iron staining, uncommonly infilled with silty gravel of mudstone. PENNINE LOWER COAL MEASURES FORMATION
								15 30 50	2.75	210.30		Extremely weak, thinly laminated, brown and grey MUDSTONE, recovered as silty, sandy gravel. PENNINE LOWER COAL MEASURES FORMATION
				85	100	0	0	20 35 75	2.95	210.10		Extremely weak, thinly to thickly laminated, greyish brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal to sub-vertical, smooth planar to rough undulating, closed to open, commonly clean with iron staining, uncommonly infilled with silty gravel of mudstone. PENNINE LOWER COAL MEASURES FORMATION
		4.00	C						4.00	209.05		Extremely weak, thinly laminated, brown and grey MUDSTONE, recovered as silty, sandy gravel. PENNINE LOWER COAL MEASURES FORMATION
		4.00 - 4.60	D	85	80	0	0		4.60	208.45		Extremely weak, thinly to thickly laminated, greyish brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal to sub-vertical, smooth planar to rough undulating, closed to open, commonly clean with iron staining,
	▼	4.80 (20 mins)										

Remarks

AGS

Borehole Log

Environmental Geotechnical Specialists

Borehole No. **BH101**

Sheet 2 of 7

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords:	403315.54 - 425134.22	Hole Type RC
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Level:	213.05m aOD	Scale 1:25
Client:	Sable Leigh Consultancy Ltd		Dates:	01/07/2026 - 02/07/2026	Logged By TM

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	SCR (%)	RQD (%)	FS (mm)	Depth (m)	Level (m)	Legend	Stratum Description	
								25 60 170				Extremely weak, thinly to thickly laminated, greyish brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal to sub-vertical, smooth planar to rough undulating, closed to open, commonly clean with iron staining, uncommonly infilled with silty gravel of mudstone. PENNINE LOWER COAL MEASURES FORMATION	
		5.50 5.50 - 5.60	C C									*5.05m to 5.25m: No recovery.*	
		6.00 (0 mins)		85	100	5	0	40 85 120	6.00	207.05		Extremely weak, thickly laminated, grey laminated dark grey MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal to 70°, smooth planar to smooth undulating, clean with iron staining. PENNINE LOWER COAL MEASURES FORMATION	6
								20 55 110	6.60	206.45		Extremely weak, thinly to thickly laminated, greyish brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal to sub-vertical, smooth planar to rough undulating, closed to open, commonly clean with iron staining, uncommonly infilled with silty gravel of mudstone. PENNINE LOWER COAL MEASURES FORMATION	
		7.00 7.00 - 7.55 7.00	C D						7.00	206.05		Extremely weak, thinly laminated, brown and grey MUDSTONE, recovered as silty, sandy gravel. PENNINE LOWER COAL MEASURES FORMATION	7
				85	100	0	0		7.55	205.50		Extremely weak, thinly to thickly laminated, greyish brown MUDSTONE. Fractures are very closely spaced, sub-horizontal to sub-vertical, smooth planar to rough undulating, closed to open, commonly clean with iron staining, uncommonly infilled with silty gravel of mudstone. PENNINE LOWER COAL MEASURES FORMATION	8
								10 35 80					
		8.95 - 9.05	C						8.95	204.10		Extremely weak, thinly laminated, brown and grey MUDSTONE, recovered as silty, sandy gravel. PENNINE LOWER COAL MEASURES FORMATION	9
				85	100	0	0		9.05	204.00		Extremely weak, thinly to thickly laminated, greyish brown MUDSTONE. Fractures are very closely spaced, sub-horizontal to sub-vertical, smooth planar to rough undulating, closed to open, commonly clean with iron staining, uncommonly infilled with silty gravel of mudstone. PENNINE LOWER COAL MEASURES FORMATION	
								5 25 60					10

Remarks

AGS

Borehole Log

Environmental Geotechnical Specialists

Borehole No. **BH101**

Sheet 3 of 7

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords:	403315.54 - 425134.22	Hole Type RC
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Level:	213.05m aOD	Scale 1:25
Client:	Sable Leigh Consultancy Ltd		Dates:	01/07/2026 - 02/07/2026	Logged By TM

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	SCR (%)	RQD (%)	FS (mm)	Depth (m)	Level (m)	Legend	Stratum Description
				85	100	15	10					Extremely weak, thinly to thickly laminated, greyish brown MUDSTONE. Fractures are very closely spaced, sub-horizontal to sub-vertical, smooth planar to rough undulating, closed to open, commonly clean with iron staining, uncommonly infilled with silty gravel of mudstone. PENNINE LOWER COAL MEASURES FORMATION
									10.90	202.15		
		11.10 - 11.26	C					55				Medium strong, thinly bedded, dark grey fine- to medium-grained SANDSTONE. Fractures are closely spaced, sub-horizontal , rough undulating. closed to open and clean. PENNINE LOWER COAL MEASURES FORMATION
		11.26 - 11.35	C					100 160				
		11.45 - 11.50	C									
		11.50 - 11.70	C									
		11.70 - 11.75	C									
				85	100	85	30	20 180 420				
		12.60 - 12.75	C									
		12.75 - 12.80	C									
									12.95	200.10		Extremely weak, thinly bedded, dark grey laminated grey SILTSTONE. Fractures are very closely to closely spaced, sub-horizontal to sub-vertical, rough undulating, closed to open, commonly clean, uncommonly infilled with silty gravel. PENNINE LOWER COAL MEASURES FORMATION
				85	100	35	25	30 50 90				
		13.95 - 14.40	C									
									14.05	199.00		Medium strong, thinly to medium bedded, grey to dark grey SANDSTONE. Fractures are closely to medium spaced, sub-horizontal, rough undulating, open and clean. PENNINE LOWER COAL MEASURES FORMATION
		14.40 - 14.50	C					100 205 350				
		14.50 - 14.70	C									Extremely weak, thinly bedded, dark grey laminated grey SILTSTONE. Fractures are very closely to closely spaced, sub-horizontal to sub-vertical, rough undulating, closed to open and clean. PENNINE LOWER COAL MEASURES FORMATION
									14.70	198.35		

Depth ticks: 11, 12, 13, 14, 15

Remarks

AGS

Borehole Log

Environmental Geotechnical Specialists

Borehole No. **BH101**

Sheet 4 of 7

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords:	403315.54 - 425134.22	Hole Type RC
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Level:	213.05m aOD	Scale 1:25
Client:	Sable Leigh Consultancy Ltd		Dates:	01/07/2026 - 02/07/2026	Logged By TM

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	SCR (%)	RQD (%)	FS (mm)	Depth (m)	Level (m)	Legend	Stratum Description	
				85	90	10	10	10 70 200				Extremely weak, thinly bedded, dark grey laminated grey SILTSTONE. Fractures are very closely to closely spaced, sub-horizontal to sub-vertical, rough undulating, closed to open and clean. PENNINE LOWER COAL MEASURES FORMATION	16
				85	100	5	0		17.00	196.05		Extremely weak, thinly to thickly laminated, greyish brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal to sub-vertical, smooth planar to rough undulating, closed to open, commonly clean with iron staining, uncommonly infilled with silty gravel of mudstone. PENNINE LOWER COAL MEASURES FORMATION	17
		18.10 - 18.26	C	85	100	5	0	5 15 40 20 90 160	17.50 17.90	195.55 195.15		Extremely weak, thinly laminated, brown and grey MUDSTONE, recovered as silty, sandy gravel. PENNINE LOWER COAL MEASURES FORMATION Extremely weak, thinly to thickly laminated, greyish brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal to sub-vertical, smooth planar to rough undulating, closed to open, commonly clean with iron staining, uncommonly infilled with silty gravel of mudstone. PENNINE LOWER COAL MEASURES FORMATION	18
				85	90	0	0	1 10 60	19.00	194.05		Extremely weak, thinly laminated grey and brown heavily fractured MUDSTONE.	19 20

Remarks

AGS

Borehole Log

Borehole No. **BH101**

Sheet 5 of 7

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords:	403315.54 - 425134.22	Hole Type RC
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Level:	213.05m aOD	Scale 1:25
Client:	Sable Leigh Consultancy Ltd		Dates:	01/07/2026 - 02/07/2026	Logged By TM

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	SCR (%)	RQD (%)	FS (mm)	Depth (m)	Level (m)	Legend	Stratum Description
												Extremely weak, thinly laminated grey and brown heavily fractured MUDSTONE.
												20.50m to 21.20m: No recovery.
				85	50	0	0					
									21.40	191.65		Extremely weak, thickly laminated, dark grey SILTSTONE. Fractures are very closely spaced, sub-horizontal and sub-vertical, smooth undulating, closed, commonly clean, uncommonly infilled with silty gravel. PENNINE LOWER COAL MEASURES FORMATION
												22.00m to 22.50m: No recovery.
				85	65	5	0					
								5 35 140				
				85	100	0	0					

21 22 23 24 25

Remarks

AGS

Borehole Log

Environmental Geotechnical Specialists

Borehole No. **BH101**

Sheet 6 of 7

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords:	403315.54 - 425134.22	Hole Type RC
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Level:	213.05m aOD	Scale 1:25
Client:	Sable Leigh Consultancy Ltd		Dates:	01/07/2026 - 02/07/2026	Logged By TM

Well	Water Strikes	Samples and In Situ Testing							Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Dia. (mm)	TCR (%)	SCR (%)	RQD (%)	FS (mm)					
		25.20 - 25.35	C									Extremely weak, thickly laminated, dark grey SILTSTONE. Fractures are very closely spaced, sub-horizontal and sub-vertical, smooth undulating, closed, commonly clean, uncommonly infilled with silty gravel. PENNINE LOWER COAL MEASURES FORMATION	
		25.55 - 25.70	C	85	100	15	15					*25.00m to 25.20m: Recovered as gravel.* *25.35m to 25.55m: Recovered as gravel.*	26
		27.45 - 27.65	C	85	100	0	0						27
		28.00 - 28.20	C					10 100 200	27.90	185.15		Extremely weak, very thinly to thinly bedded, dark grey to black COAL. Fractures are closely spaced, sub-horizontal and sub-vertical, rough stepped, open, commonly infilled with gravel, uncommonly clean.	28
		28.50 - 28.85	C	85	100	60	30					*28.70m to 28.75m: Grey mudstone band.*	
		28.85 - 29.10	C					15 90 250	28.85	184.20		Extremely weak, very thinly bedded to thinly bedded, grey to dark grey SILTSTONE. Fractures are closely spaced, sub-horizontal, rough stepped, open and commonly infilled with gravel.	29
													30

Remarks

AGS

Borehole Log

Borehole No. **BH101**

Sheet 7 of 7

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords:	403315.54 - 425134.22	Hole Type RC
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Level:	213.05m aOD	Scale 1:25
Client:	Sable Leigh Consultancy Ltd		Dates:	01/07/2026 - 02/07/2026	Logged By TM

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	SCR (%)	RQD (%)	FS (mm)	Depth (m)	Level (m)	Legend	Stratum Description
				85	100	50	20		31.00	182.05		Extremely weak, very thinly bedded to thinly bedded, grey to dark grey SILTSTONE. Fractures are closely spaced, sub-horizontal, rough stepped, open and commonly infilled with gravel.
												End of Borehole at 31.00m

31
32
33
34
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Remarks

Borehole Log

RGS Environmental Geotechnical Specialists

Borehole No. **BH102**

Sheet 1 of 3

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords:	403313.15 - 424974.52	Hole Type RC
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Level:	216.43m aOD	Scale 1:25
Client:	Sable Leigh Consultancy Ltd		Dates:	08/07/2026 - 09/07/2026	Logged By TM

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	SCR (%)	RQD (%)	FS (mm)	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 0.20	ES									TOPSOIL (Dark greyish brown, silty, gravelly fine to coarse SAND, with low cobble content. Gravel is angular to sub-angular and fine to coarse of various lithologies, brick, concrete and slag. Cobbles are angular to sub-rounded <110mm of sandstone).
		0.40 - 0.60	ES						0.40	216.03		MADE GROUND (Dark brown, very silty, gravelly fine to coarse SAND, with low cobble content. Gravel is angular to sub-angular and fine to coarse of various lithologies, brick, concrete and slag. Cobbles are angular to sub-angular and <250mm of sandstone and concrete).
		0.65 - 0.90	ES	85	100	0	0		0.65	215.78		Orangish brown, fine-medium grained SANDSTONE, recovered as sandy, silty clay. PENISTONE FLAGS
		1.25 - 1.35	C						0.90	215.53		Medium strong, very thinly to thinly bedded, orangish brown, fine- to medium-grained SANDSTONE. Fractures are very closely to closely spaced, sub-horizontal, rough undulating, open and clean. PENISTONE FLAGS
		1.40 - 1.50	C	85	100	80	0	20				
		1.50 - 1.57	C					85				
		1.57 - 1.76	C					110				
				85	45	5	0					
									2.30	214.13		Medium strong, very thinly to thinly bedded, orangish brown, fine- to medium-grained SANDSTONE, recovered as silty, sandy GRAVEL. PENISTONE FLAGS
									2.50	213.93		Medium strong, very thinly to thinly bedded, orangish brown, fine- to medium-grained SANDSTONE. Fractures are very closely to closely spaced, sub-horizontal, rough undulating, open, commonly clean, uncommonly infilled with silty gravel. PENISTONE FLAGS
		2.85 - 2.90	C					30				
								45				
				85	100	60	15	190				
		3.20 - 3.40	C									
		3.45 - 3.53	C						3.45	212.98		Extremely weak, thickly laminated to very thinly bedded, dark grey locally grey MUDSTONE. Fractures are very closely spaced, sub-horizontal, locally sub-vertical, smooth stepped, closed to open, commonly clean, uncommonly infilled with silty gravel, with localised iron staining. PENNINE LOWER COAL MEASURES FORMATION
		3.53 - 3.59	C									
								5				
								55				
								80				
				85	100	10	0					

1 2 3 4 5

Remarks

AGS

Borehole Log

RGS Environmental Geotechnical Specialists

Borehole No. **BH102**

Sheet 2 of 3

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords:	403313.15 - 424974.52	Hole Type RC
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Level:	216.43m aOD	Scale 1:25
Client:	Sable Leigh Consultancy Ltd		Dates:	08/07/2026 - 09/07/2026	Logged By TM

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	SCR (%)	RQD (%)	FS (mm)	Depth (m)	Level (m)	Legend	Stratum Description
												Extremely weak, thickly laminated to very thinly bedded, dark grey locally grey MUDSTONE. Fractures are very closely spaced, sub-horizontal, locally sub-vertical, smooth stepped, closed to open, commonly clean, uncommonly infilled with silty gravel, with localised iron staining. PENNINE LOWER COAL MEASURES FORMATION
		6.20 - 6.30	C	85	100	20	0		6.20	210.23		Extremely weak, very thinly bedded, dark grey MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal and sub-vertical, smooth stepped and rough undulating, commonly clean, rarely infilled with silty gravel, with localised iron staining. PENNINE LOWER COAL MEASURES FORMATION
		6.73 - 6.84	C					40 60 110				Extremely weak, very thinly bedded, dark grey MUDSTONE, recovered as silty gravel. PENNINE LOWER COAL MEASURES FORMATION
				85	100	0	0		7.05	209.38		Extremely weak, very thinly bedded, dark grey locally orangish brown MUDSTONE. Fractures are very closely spaced, sub-horizontal, smooth stepped, closed and clean with localised iron staining. PENNINE LOWER COAL MEASURES FORMATION
								25	7.50	208.93		Extremely weak, very thinly bedded, dark grey locally orangish brown MUDSTONE, recovered as silty gravel. PENNINE LOWER COAL MEASURES FORMATION
								25 30 30 35 40	7.60 7.70 7.75	208.83 208.73 208.68		Extremely weak, very thinly bedded, dark grey locally orangish brown MUDSTONE. Fractures are very closely spaced, sub-horizontal, smooth stepped, closed and clean with localised iron staining. PENNINE LOWER COAL MEASURES FORMATION
		8.20 - 8.33	C	85	100	15	10					
								50 90 130	8.20 8.40	208.23 208.03		Extremely weak, very thinly bedded, dark grey locally orangish brown MUDSTONE, recovered as silty gravel. PENNINE LOWER COAL MEASURES FORMATION
									8.70	207.73		Extremely weak, very thinly to thinly bedded, dark grey locally orangish brown MUDSTONE. Fractures are very closely spaced, sub-horizontal, smooth stepped, closed and clean with localised iron staining. PENNINE LOWER COAL MEASURES FORMATION
				85	100	0	0	30 80 110				
									9.45	206.98		Extremely weak, very thinly bedded, dark grey locally orangish brown MUDSTONE, recovered as silty gravel. PENNINE LOWER COAL MEASURES FORMATION
								5 20 110				Extremely weak, very thinly to thinly bedded, dark grey and brown MUDSTONE. Fractures are very closely to
									10.00	206.43		

Remarks

AGS

Borehole Log

Environmental Geotechnical Specialists

Borehole No. **BH102**

Sheet 3 of 3

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords:	403313.15 - 424974.52	Hole Type RC
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Level:	216.43m aOD	Scale 1:25
Client:	Sable Leigh Consultancy Ltd		Dates:	08/07/2026 - 09/07/2026	Logged By TM

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	SCR (%)	RQD (%)	FS (mm)	Depth (m)	Level (m)	Legend	Stratum Description
		10.15 - 10.21	C						10.10	206.33		Extremely weak, very thinly to thinly bedded, dark grey and brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal to sub-vertical, rough stepped, closed to open, commonly infilled with silty gravel, uncommonly clean with localised iron staining. PENNINE LOWER COAL MEASURES FORMATION
		10.32 - 10.40	C									
		10.40 - 10.49	C	85	100	80	0	30				
		10.64 - 10.72	C					70 90				
		10.82 - 10.87	C									
									11.00	205.43		Extremely weak, thickly laminated to very thinly bedded, greyish brown locally orangish brown MUDSTONE. Fractures are extremely closely to closely spaced, sub-horizontal to sub-vertical, rough and smooth stepped, closed to open, commonly clean and rarely infilled with silty gravel with localised iron staining. PENNINE LOWER COAL MEASURES FORMATION
												Extremely weak, thickly laminated to very thinly bedded, greyish brown locally orangish brown MUDSTONE, recovered as silty gravel. PENNINE LOWER COAL MEASURES FORMATION
												Extremely weak, very thinly to thinly bedded, dark grey and brown interlaminated SILTSTONE. Fractures are very closely to closely spaced, sub-horizontal to 80°, rough undulating and stepped, closed to open and clean.
												End of Borehole at 11.00m

11 12 13 14 15

Remarks

AGS

Borehole Log

Borehole No. **BH103**

Sheet 1 of 3

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords:	403232.19 - 425095.03	Hole Type RC
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Level:	214.84m aOD	Scale 1:25
Client:	Sable Leigh Consultancy Ltd		Dates:	03/07/2026 - 07/07/2026	Logged By TM

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	SCR (%)	RQD (%)	FS (mm)	Depth (m)	Level (m)	Legend	Stratum Description
		0.00 - 0.20	ES									MADE GROUND (Brownish grey, silty, very gravelly fine to coarse SAND, with low cobble content. Gravel is angular to sub-angular and fine to coarse of various lithologies, brick and concrete. Cobbles are angular to sub-angular and <200mm of sandstone, bricks and concrete).
		0.40 - 0.60	ES						0.60	214.24		Extremely weak, thickly laminated, brownish grey MUDSTONE, recovered as very silty, sandy gravel. PENNINE LOWER COAL MEASURES FORMATION
		0.80 - 1.00	ES	85	100	0	0					*1.00m to 1.30m: No recovery.*
	▼	1.20 1.20 (0 mins)										
				85	80	5	0	15 35 80	1.50	213.34		Extremely weak, thickly laminated grey and brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal and sub-vertical, rough stepped and rough planar, closed to open, commonly infilled with silty gravel, uncommonly clean. PENNINE LOWER COAL MEASURES FORMATION
	▼	2.00 2.00 (0 mins)										
									2.50	212.34		Extremely weak, thickly laminated, brownish grey MUDSTONE, recovered as very silty, sandy gravel. PENNINE LOWER COAL MEASURES FORMATION
		3.10 - 3.25	C	85	75	5	0	15 60 150	3.10	211.74		*2.50m to 2.80m: No recovery.* Extremely weak, thickly laminated grey and brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal and sub-vertical, rough stepped and rough planar, closed to open, commonly infilled with silty gravel, uncommonly clean. PENNINE LOWER COAL MEASURES FORMATION
		3.65 - 3.70	C									
		4.00 - 4.40	C						4.00	210.84		Extremely weak, thickly laminated grey and brown MUDSTONE, recovered as gravelly, silty clay. PENNINE LOWER COAL MEASURES FORMATION
		4.50 - 4.55	C	85	100	15	10	10 60 180	4.40	210.44		Extremely weak, thickly laminated grey and brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal and sub-vertical, rough stepped and rough planar, closed to open, commonly infilled with silty gravel, uncommonly clean. PENNINE LOWER COAL MEASURES FORMATION
		4.73 - 4.89	C									

Remarks

Borehole Log

RGS Environmental Geotechnical Specialists

Borehole No. **BH103**

Sheet 2 of 3

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords:	403232.19 - 425095.03	Hole Type RC
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Level:	214.84m aOD	Scale 1:25
Client:	Sable Leigh Consultancy Ltd		Dates:	03/07/2026 - 07/07/2026	Logged By TM

Well	Water Strikes	Samples and In Situ Testing: Depth (m)	Type	Dia. (mm)	TCR (%)	SCR (%)	RQD (%)	FS (mm)	Depth (m)	Level (m)	Legend	Stratum Description
		5.23 - 5.35	C									Extremely weak, thickly laminated grey and brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal and sub-vertical, rough stepped and rough planar, closed to open, commonly infilled with silty gravel, uncommonly clean. PENNINE LOWER COAL MEASURES FORMATION
									5.50	209.34		Extremely weak, thickly laminated, dark grey locally orangish brown MUDSTONE, recovered as very silty, sandy gravel. PENNINE LOWER COAL MEASURES FORMATION
				85	80	0	0					*5.50m to 5.80m: No recovery.*
									6.80	208.04		Extremely weak, thickly laminated, dark grey locally orangish brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal to sub-vertical, smooth stepped, open and commonly clean locally uncommonly infilled with silty gravel with local iron staining. PENNINE LOWER COAL MEASURES FORMATION
		7.63 - 7.70	C	85	100	5	0	10 25 110				
		8.53 - 8.60 8.60 - 8.70 8.80 - 8.92	C C C	85	100	15	0					
									9.00	205.84		Extremely weak, thickly laminated, dark grey locally orangish brown MUDSTONE, recovered as silty gravel. PENNINE LOWER COAL MEASURES FORMATION
									9.60	205.24		Extremely weak, thickly laminated, dark grey locally orangish brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal to sub-vertical, smooth stepped, open and commonly clean locally uncommonly infilled with silty gravel with local iron staining. PENNINE LOWER COAL MEASURES FORMATION
		9.90 - 9.95	C									

6 7 8 9 10

Remarks

AGS

Borehole Log

Borehole No. **BH103**

Sheet 3 of 3

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords:	403232.19 - 425095.03	Hole Type RC
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Level:	214.84m aOD	Scale 1:25
Client:	Sable Leigh Consultancy Ltd		Dates:	03/07/2026 - 07/07/2026	Logged By TM

Well	Water Strikes	Samples and In Situ Testing							Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Dia. (mm)	TCR (%)	SCR (%)	RQD (%)	FS (mm)				
		10.07 - 10.14	C									Extremely weak, thickly laminated, dark grey locally orangish brown MUDSTONE. Fractures are very closely to closely spaced, sub-horizontal to sub-vertical, smooth stepped, open and commonly clean locally uncommonly infilled with silty gravel with local iron staining. PENNINE LOWER COAL MEASURES FORMATION
		10.45 - 10.50	C						10.50	204.34		
												Extremely weak, thinly to thickly laminated, dark grey locally orangish brown MUDSTONE. Fractures are extremely closely to very closely spaced, sub-horizontal and sub-vertical, smooth stepped, closed to open, commonly clean, uncommonly infilled with silty gravel, with local iron staining. PENNINE LOWER COAL MEASURES FORMATION
		11.35 - 11.44	C						11.35	203.48		
		11.50 - 11.55	C									
									11.65	203.18		Extremely weak, very thinly to thinly bedded, dark grey MUDSTONE. Fractures are very closely spaced, sub-horizontal to 40°, smooth stepped, closed to open and clean, with localised iron staining. PENNINE LOWER COAL MEASURES FORMATION
		11.85 - 11.90	C									
									12.00	202.84		Extremely weak, thinly bedded, dark grey locally orangish brown MUDSTONE. Fractures are closely spaced, sub-horizontal and sub-vertical, smooth stepped and rough undulating, open and clean, within localised iron staining. PENNINE LOWER COAL MEASURES FORMATION
												End of Borehole at 12.00m

11 12 13 14 15

Remarks

Appendix 3

Trial Pit Logs

Trial Pit Log

Trialpit No **TP201** Sheet 1 of 1

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords: 403346.89 - 425113.77 Level: 213.08
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP	Dimensions (m): Depth 1.50	2.1 × 0.7
Client:	Sable Leigh Consultancy Ltd		

Date 10/07/2026 | Scale 1:25 | Logged TM

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.50	ES					TOPSOIL (Dark brown, organic, silty, very sandy angular to sub-angular and fine to coarse GRAVEL of various lithologies, brick, slag and concrete. Sand is fine to coarse).
				0.50	212.58		Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles. PENNINE LOWER COAL MEASURES FORMATION
	1.00 - 1.50 1.00 - 1.50	B ES					
				1.50	211.58		End of pit at 1.50 m

Remarks:

Stability: Stable

Trial Pit Log

Trialpit No **TP202**

Sheet 1 of 1

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords: 403329.64 - 425116.36 Level: 213.14
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP	Dimensions (m): Depth 1.10	2.3 / 1
Client:	Sable Leigh Consultancy Ltd		

Date 10/07/2026

Scale 1:25

Logged TM

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.50	ES					TOPSOIL (Dark brown, organic, silty, very sandy angular to sub-angular and fine to coarse GRAVEL of various lithologies, brick, slag and concrete. Sand is fine to coarse).
				0.75	212.39		Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles. PENNINE LOWER COAL MEASURES FORMATION
	0.75 - 1.25 0.75 - 1.25	B ES		1.10	212.04		End of pit at 1.10 m

Remarks:

Stability: Stable

Trial Pit Log

Trialpit No **TP203**

Sheet 1 of 1

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords: 403323.74 - 425118.04 Level: 213.15
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP	Dimensions (m): Depth 2.60	3.7 × 0.7
Client:	Sable Leigh Consultancy Ltd		

Date 08/07/2026

Scale 1:25

Logged TM

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10 - 0.40	ES		0.40	212.75		TOPSOIL (Dark brown, organic, silty, very sandy angular to sub-angular and fine to coarse GRAVEL of various lithologies, brick, slag and concrete. Sand is fine to coarse).
	1.25 - 1.35 1.25 - 1.35	B ES		2.60	210.55		Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles. PENNINE LOWER COAL MEASURES FORMATION End of pit at 2.60 m

1 2 3 4 5

Remarks:

Stability: Stable

Trial Pit Log

Trialpit No **TP204** Sheet 1 of 1

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords: 403308.91 - 425121.93 Level: 213.19	Date 09/07/2026
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP		Dimensions (m): Depth 1.60 (2.2 × 0.7)	Scale 1:25
Client:	Sable Leigh Consultancy Ltd			Logged TM

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.20	ES		0.20	212.98		TOPSOIL (Dark brown, organic, silty, very sandy angular to sub-angular and fine to coarse GRAVEL of various lithologies, brick, slag and concrete. Sand is fine to coarse).
	0.50 - 1.00 0.50 - 1.00	B ES					Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles. PENNINE LOWER COAL MEASURES FORMATION
				1.60	211.58		End of pit at 1.60 m

Remarks:

Stability: Stable

Trial Pit Log

Trialpit No **TP205**

Sheet 1 of 1

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords: 403273.93 - 425126.82 Level: 213.39
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP	Dimensions (m): Depth 2.40	1.6 × 1.2
Client:	Sable Leigh Consultancy Ltd		

Date 10/07/2026

Scale 1:25

Logged TM

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.25	ES					TOPSOIL (Dark brown, organic, silty, very sandy angular to sub-angular and fine to coarse GRAVEL of various lithologies, brick, slag and concrete. Sand is fine to coarse).
				0.40	212.99		Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles. PENNINE LOWER COAL MEASURES FORMATION
	1.00 - 1.60 1.00 - 1.60	B ES					
				2.40	210.99		End of pit at 2.40 m

Remarks:

Stability: Stable

Trial Pit Log

Trialpit No **TP207** Sheet 1 of 1

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords: 403275.64 - 425145.94 Level: 213.38	Date 08/07/2026
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP	Dimensions (m): Depth 2.10	2.2 × 0.7	Scale 1:25
Client:	Sable Leigh Consultancy Ltd			Logged TM

Water Strike	Samples and In Situ Testing Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.70	ES					TOPSOIL (Dark brown, organic, silty, very sandy angular to sub-angular and fine to coarse GRAVEL of various lithologies, brick, slag and concrete. Sand is fine to coarse).
				0.70	212.68		Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.
	1.40 - 1.50 1.40 - 1.50	B ES					
				2.10	211.28		End of pit at 2.10 m

Remarks:

Stability: Stable

Trial Pit Log

Trialpit No **TP208**

Sheet 1 of 1

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords: 403270.44 - 425147.67 Level: 213.38
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP	Dimensions (m): Depth 1.60	2.6 × 1.2
Client:	Sable Leigh Consultancy Ltd		

Date 09/07/2026

Scale 1:25

Logged TM

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.40	ES					TOPSOIL (Dark brown, organic, silty, very sandy angular to sub-angular and fine to coarse GRAVEL of various lithologies, brick, slag and concrete. Sand is fine to coarse).
				0.60	212.78		
	0.60 - 1.00	B					Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles. PENNINE LOWER COAL MEASURES FORMATION
	0.60 - 1.00	ES					
				1.60	211.78		End of pit at 1.60 m

Remarks:

Stability: Stable

Trial Pit Log

Trialpit No **TP209** Sheet 1 of 1

Project Name:	Land adjacent to Penistone Station	Project No. C6144/26/E/9573	Co-ords: 403258.98 - 425156.07 Level: 213.35
Location:	Penistone, Sheffield, South Yorkshire, S36 6HP	Dimensions (m): Depth 2.40	2.9 × 0.8
Client:	Sable Leigh Consultancy Ltd		Date 10/07/2026 Scale 1:25 Logged TM

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.00 - 0.35	ES					TOPSOIL (Dark brown, organic, silty, very sandy angular to sub-angular and fine to coarse GRAVEL of various lithologies, brick, slag and concrete. Sand is fine to coarse).
				0.35	213.00		Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles. PENNINE LOWER COAL MEASURES FORMATION
	1.00 - 1.50	B					
	1.00 - 1.50	ES					
				2.40	210.95		End of pit at 2.40 m

Remarks:

Stability: Stable

Appendix 4

Water Monitoring Results

Post Fieldworks Discrete Well Monitoring Site Record

Job No:	C/6144/26/E/9573	Client:	SLC Rail	Visit:	1	Of	4
Site:	LandAdjacentPenistoneStation S36 6HP	Date:	22.07.2026				

RGS Environmental Geotechnical Specialists

Rogers Geotechnical Services Ltd , Offices 1 & 2 Barncliffe Business Park, Shelley, Huddersfield, HD8 8LU

Tel: 01484 604 354

enquiries@rogersgeotech.co.uk

Location ID	Methane (%)		Carbon Dioxide (%)		Carbon Monoxide (ppm)		Hydrogen Sulphide (ppm)		Oxygen (%)		VOCs (ppm)		Flowrate (l/hr)		Water Depth (m)	Well Depth (m)	Installed Depth (m)	Comments
	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Minimum	Steady	Peak	Steady	Peak				
BH101															5.40		10.73	
BH102															10.03		10.11	
BH103															7.13		8.65	
Max.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.03			
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.40			

ND - Not detected DRY - No water in well NM - Not Monitored (State Reason in comments)

Meteorological & Site Information	
General Ground Condition	
Precipitation	
Wind	
Temperature	
Barometric Pressure	
Pressure Trend	

Monitor Technical Specifications								
Gas Monitor Used:	GA 5000							
Serial No:	G504785							
Monitor Gas Range	CH_4	5>60	CO_2	5<40	O_2	21.2		
Gas Flow Range	0-10 l/hr							
Date of Calibration	19.02.2026							
PID Monitor (If used)								
PID Monitor Serial No.								
Calibration Date.								

Monitoring Period Summary (All Visits)	Peak	Steady
Max CH_4	0.0	0.0
Max CO_2	0.0	0.0
Max CO	0.0	0.0
Max H_2S	0.0	0.0
Max O_2	0.0	0.0
Min O_2	0.0	0.0
Flow rate	0.0	0.0

	Start	End
Barometric Pressure		

Operative Details.	M.Tuck

Post Fieldworks Discrete Well Monitoring Site Record

Job No:	C/6144/26/E/9573	Client:	SLC Rail	Visit:	2	Of	4
Site:	LandAdjacentPenistoneStation S36 6HP	Date:	29.07.2026				

Environmental Geotechnical Specialists

Rogers Geotechnical Services Ltd , Offices 1 & 2
Barncliffe Business Park, Shelley, Huddersfield, HD8 8LU

Tel: 01484 604 354
enquiries@rogersgeotech.co.uk

Location ID	Methane (%)		Carbon Dioxide (%)		Carbon Monoxide (ppm)		Hydrogen Sulphide (ppm)		Oxygen (%)		VOCs (ppm)		Flowrate (l/hr)		Water Depth (m)	Well Depth (m)	Installed Depth (m)	Comments
	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Minimum	Steady	Peak	Steady	Peak				
BH101															6.40		10.74	
BH102															10.01		10.13	
BH103															7.11		8.71	
Max.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.01			
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.40			

ND - Not detected DRY - No water in well NM - Not Monitored (State Reason in comments)

Meteorological & Site Information	
General Ground Condition	
Precipitation	
Wind	
Temperature	
Barometric Pressure	
Pressure Trend	

Monitor Technical Specifications								
Gas Monitor Used:	GA 5000							
Serial No:	G504785							
Monitor Gas Range	CH_4	5>60	CO_2	5<40	O_2	21.2		
Gas Flow Range	0-10 l/hr							
Date of Calibration	19.02.2026							
PID Monitor (If used)								
PID Monitor Serial No.								
Calibration Date.								

Monitoring Period Summary (All Visits)		
	Peak	Steady
Max CH_4	0.0	0.0
Max CO_2	0.0	0.0
Max CO	0.0	0.0
Max H_2S	0.0	0.0
Max O_2	0.0	0.0
Min O_2	0.0	0.0
Flow rate	0.0	0.0

	Start	End
Barometric Pressure		

Operative Details.	M.Tuck

Post Fieldworks Discrete Well Monitoring Site Record

Job No:	C/6144/26/E/9573	Client:	SLC Rail	Visit:	3	Of	4
Site:	LandAdjacentPenistoneStation S36 6HP	Date:	05.08.2026				

Rogers Geotechnical Services Ltd , Offices 1 & 2
Barncliffe Business Park, Shelley, Huddersfield, HD8 8LU

Tel: 01484 604 354
enquiries@rogersgeotech.co.uk

Location ID	Methane (%)		Carbon Dioxide (%)		Carbon Monoxide (ppm)		Hydrogen Sulphide (ppm)		Oxygen (%)		VOCs (ppm)		Flowrate (l/hr)		Water Depth (m)	Well Depth (m)	Installed Depth (m)	Comments
	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Minimum	Steady	Peak	Steady	Peak				
BH101															7.62		10.82	
BH102															10.03		10.12	
BH103															7.14		8.38	
Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.03			
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.14			

ND - Not detected DRY - No water in well NM - Not Monitored (State Reason in comments)

Meteorological & Site Information	
General Ground Condition	
Precipitation	
Wind	
Temperature	
Barometric Pressure	
Pressure Trend	

Monitor Technical Specifications								
Gas Monitor Used:	GA 5000							
Serial No:	G504785							
Monitor Gas Range	CH_4	5>60	CO_2	5<40	O_2	21.2		
Gas Flow Range	0-10 l/hr							
Date of Calibration	19.02.2026							
PID Monitor (If used)								
PID Monitor Serial No.								
Calibration Date.								

Monitoring Period Summary (All Visits)		
	Peak	Steady
Max CH_4	0.0	0.0
Max CO_2	0.0	0.0
Max CO	0.0	0.0
Max H_2S	0.0	0.0
Max O_2	0.0	0.0
Min O_2	0.0	0.0
Flow rate	0.0	0.0

	Start	End
Barometric Pressure		

Operative Details.	M.Tuck

Post Fieldworks Discrete Well Monitoring Site Record

Job No:	C/6144/26/E/9573	Client:	SLC Rail	Visit:	4	Of	4
Site:	LandAdjacentPenistoneStation S36 6HP	Date:	12.08.2026				

Rogers Geotechnical Services Ltd , Offices 1 & 2
Barncliffe Business Park, Shelley, Huddersfield, HD8 8LU

Tel: 01484 604 354
enquiries@rogersgeotech.co.uk

Location ID	Methane (%)		Carbon Dioxide (%)		Carbon Monoxide (ppm)		Hydrogen Sulphide (ppm)		Oxygen (%)		VOCs (ppm)		Flowrate (l/hr)		Water Depth (m)	Well Depth (m)	Installed Depth (m)	Comments
	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Minimum	Steady	Peak	Steady	Peak				
BH101															9.19		10.76	
BH102															DRY		10.12	
BH103															7.24		8.38	
Max	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.19			
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.24			

ND - Not detected DRY - No water in well NM - Not Monitored (State Reason in comments)

Meteorological & Site Information	
General Ground Condition	
Precipitation	
Wind	
Temperature	
Barometric Pressure	
Pressure Trend	

Monitor Technical Specifications								
Gas Monitor Used:	GA 5000							
Serial No:	G504785							
Monitor Gas Range	CH_4	5>60	CO_2	5<40	O_2	21.2		
Gas Flow Range	0-10 l/hr							
Date of Calibration	19.02.2026							
PID Monitor (If used)								
PID Monitor Serial No.								
Calibration Date.								

Monitoring Period Summary (All Visits)		
	Peak	Steady
Max CH_4	0.0	0.0
Max CO_2	0.0	0.0
Max CO	0.0	0.0
Max H_2S	0.0	0.0
Max O_2	0.0	0.0
Min O_2	0.0	0.0
Flow rate	0.0	0.0

	Start	End
Barometric Pressure		

Operative Details.	M.Tuck

Appendix 5

Plate Load Testing Results

Rogers Geotechnical Services Ltd
Offices 1 & 2, Barncliffe Business Park, Near Bank, Shelley, Huddersfield HD8 8LU
www.rogersgeotech.co.uk
Tel : 0843 50 666 87 **Fax : 0843 51 599 30**

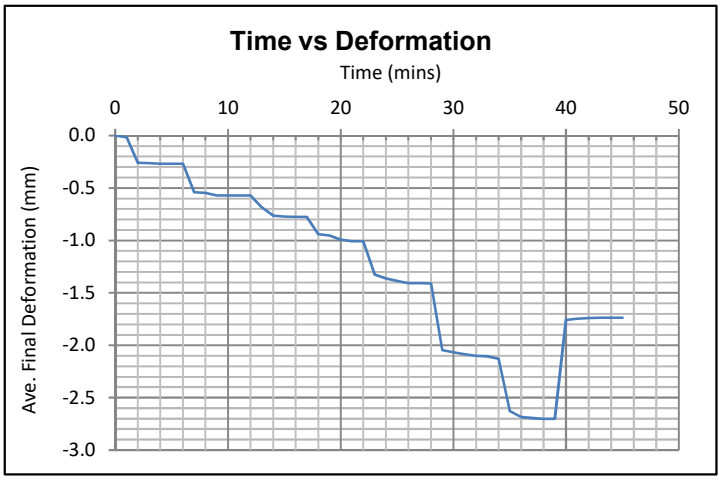
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Penistone Station	SLC Rail
Test Date:	Test Identification:
10/07/2026	TP202

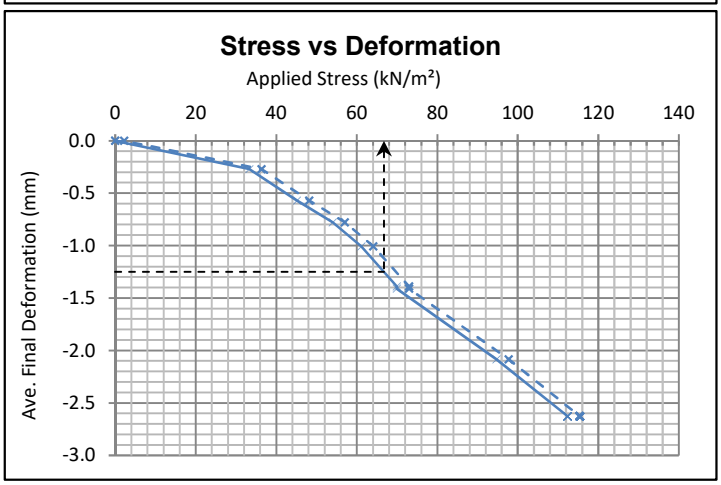
Determination of the vertical deformation and strength characteristics of soil by the plate loading test

BS. 1377 : PART 9 : 1990 : 4.1 - Incremental loading test

Test subject	Light brown mudstone recovered as sandy GRAVEL.		
Test Depth	0.4 m	Material under test	Light brown mudstone recovered as sandy GRAVEL.
Description of reaction	15t 360° Excavator	Moisture Content of material	- %
Plate Diameter	600 mm	In-situ density of material	- kN/m³
Plate Area	0.283 m²	Groundwater level	- m
Mass of test apparatus	64.2 kg	Weather Conditions	Dry and Sunny
Distance between the edge of the loaded plate and the edge of excavation or platform			m

Load Cell (kN)	Applied Load (kN)	Applied Stress (kN/m²)	Average Final Deformation (mm)
0	0.63	2.23	0.00
9.65	10.28	36.36	-0.27
13	13.63	48.21	-0.57
15.5	16.13	57.05	-0.78
17.5	18.13	64.12	-1.01
20	20.63	72.96	-1.39
20	20.63	72.96	-1.41
27	27.63	97.72	-2.08
32	32.63	115.40	-2.63





Original data shown as dashed line. Solid line shows adjusted applied stress which has been considered due to initial unrepresentative movements. Derived CBR value based on applied stress that has been adjusted by 3.01kN/m²

Conversion Factor to a 762mm dia. plate :		0.80
Applied Stress at	1.25 mm Deformation:	67 kN/m²
Modulus of Subgrade Reaction (k_{762}):		43 MN/m²/m
Equivalent CBR by Plate Loading :		7 %
Moisture Content :		- %

Remarks:

Rogers Geotechnical Services Ltd
Offices 1 & 2, Barncliffe Business Park, Near Bank, Shelley, Huddersfield HD8 8LU
www.rogersgeotech.co.uk
Tel : 0843 50 666 87 **Fax : 0843 51 599 30**

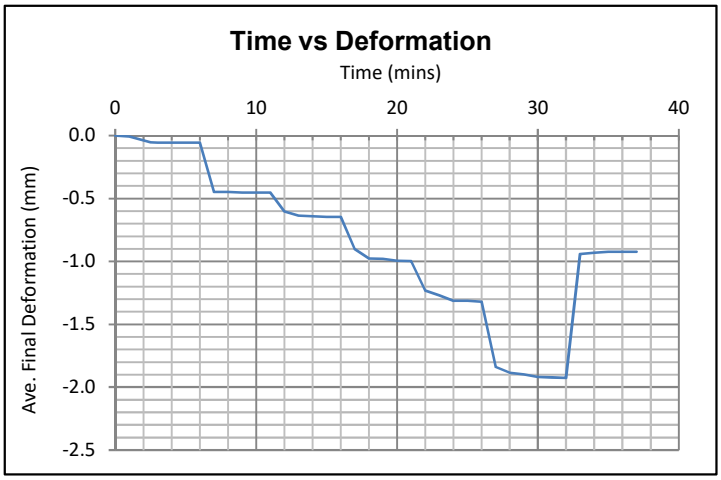
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Penistone Station	SLC Rail
Test Date:	Test Identification:
10/07/2026	TP204

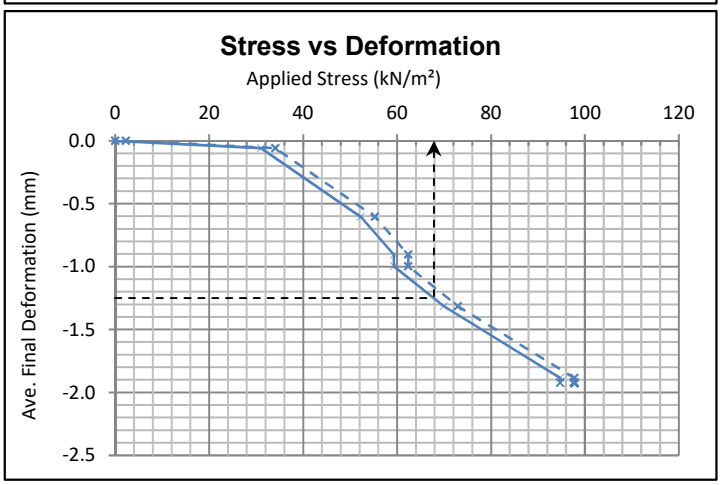
Determination of the vertical deformation and strength characteristics of soil by the plate loading test

BS. 1377 : PART 9 : 1990 : 4.1 - Incremental loading test

Test subject	Light brown mudstone recovered as sandy GRAVEL.		
Test Depth	0.4 m	Material under test	Light brown mudstone recovered as sandy GRAVEL.
Description of reaction	15t 360° Excavator	Moisture Content of material	- %
Plate Diameter	600 mm	In-situ density of material	- kN/m³
Plate Area	0.283 m²	Groundwater level	- m
Mass of test apparatus	64.2 kg	Weather Conditions	Dry and Sunny
Distance between the edge of the loaded plate and the edge of excavation or platform			m

Load Cell (kN)	Applied Load (kN)	Applied Stress (kN/m²)	Average Final Deformation (mm)
0	0.63	2.23	0.00
9	9.63	34.06	-0.06
15	15.63	55.28	-0.60
17	17.63	62.35	-0.90
17	17.63	62.35	-1.00
20	20.63	72.96	-1.31
27	27.63	97.72	-1.88
27	27.63	97.72	-1.92





Original data shown as dashed line. Solid line shows adjusted applied stress which has been considered due to initial unrepresentative movements. Derived CBR value based on applied stress that has been adjusted by 3.01kN/m²

Conversion Factor to a 762mm dia. plate :	0.80	
Applied Stress at 1.25 mm Deformation:	68	kN/m²
Modulus of Subgrade Reaction (k_{762}):	44	MN/m²/m
Equivalent CBR by Plate Loading :	7	%
Moisture Content :	-	%

Remarks:

Rogers Geotechnical Services Ltd
Offices 1 & 2, Barncliffe Business Park, Near Bank, Shelley, Huddersfield HD8 8LU
www.rogersgeotech.co.uk
Tel : 0843 50 666 87 **Fax : 0843 51 599 30**

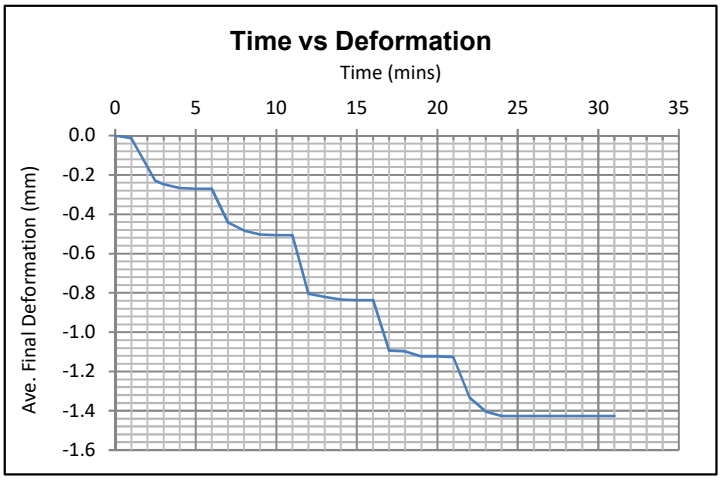
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Penistone Station	SLC Rail
Test Date:	Test Identification:
10/07/2026	TP205

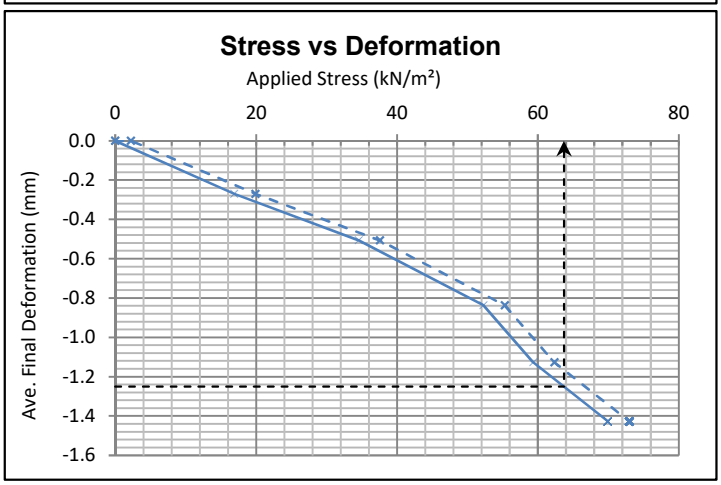
Determination of the vertical deformation and strength characteristics of soil by the plate loading test

BS. 1377 : PART 9 : 1990 : 4.1 - Incremental loading test

Test subject	Light brown mudstone recovered as sandy GRAVEL.		
Test Depth	0.4 m	Material under test	Light brown mudstone recovered as sandy GRAVEL.
Description of reaction	15t 360° Excavator	Moisture Content of material	- %
Plate Diameter	600 mm	In-situ density of material	- kN/m³
Plate Area	0.283 m²	Groundwater level	- m
Mass of test apparatus	64.2 kg	Weather Conditions	Dry and Sunny
Distance between the edge of the loaded plate and the edge of excavation or platform			m

Load Cell (kN)	Applied Load (kN)	Applied Stress (kN/m²)	Average Final Deformation (mm)
0	0.63	2.23	0.00
5	5.63	19.91	-0.27
10	10.63	37.60	-0.51
15	15.63	55.28	-0.84
17	17.63	62.35	-1.13
20	20.63	72.96	-1.43





Original data shown as dashed line. Solid line shows adjusted applied stress which has been considered due to initial unrepresentative movements. Derived CBR value based on applied stress that has been adjusted by 3.01kN/m²

Conversion Factor to a 762mm dia. plate :	0.80	
Applied Stress at 1.25 mm Deformation:	64	kN/m²
Modulus of Subgrade Reaction (k_{762}):	41	MN/m²/m
Equivalent CBR by Plate Loading :	6	%
Moisture Content :	-	%

Remarks:

Rogers Geotechnical Services Ltd
Offices 1 & 2, Barncliffe Business Park, Near Bank, Shelley, Huddersfield HD8 8LU
www.rogersgeotech.co.uk
Tel : 0843 50 666 87 **Fax : 0843 51 599 30**

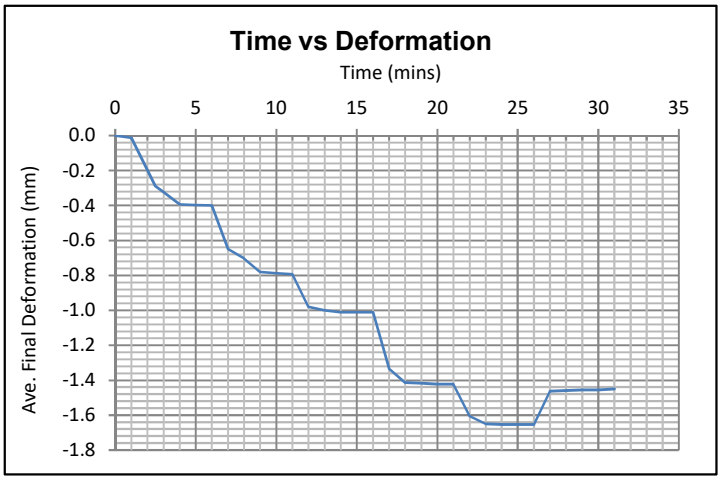
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C6144/26/E/9573	4
Site:	Client:
Penistone Station	SLC Rail
Test Date:	Test Identification:
10/07/2026	TP208

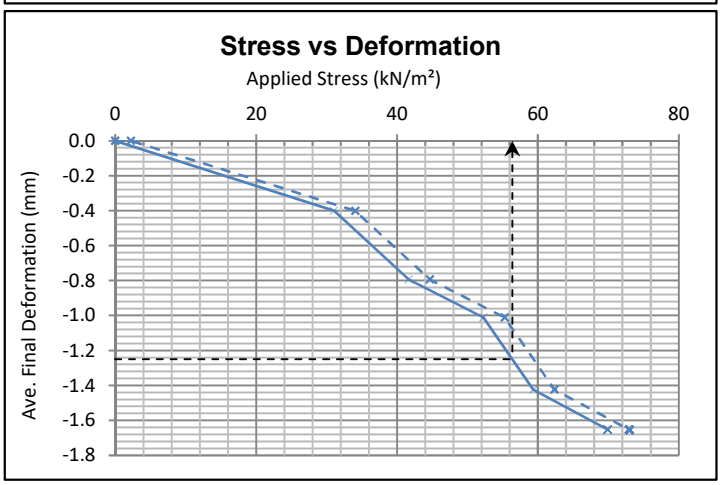
Determination of the vertical deformation and strength characteristics of soil by the plate loading test

BS. 1377 : PART 9 : 1990 : 4.1 - Incremental loading test

Test subject	Light brown mudstone recovered as sandy GRAVEL.		
Test Depth	0.4 m	Material under test	Light brown mudstone recovered as sandy GRAVEL.
Description of reaction	15t 360° Excavator	Moisture Content of material	- %
Plate Diameter	600 mm	In-situ density of material	- kN/m³
Plate Area	0.283 m²	Groundwater level	- m
Mass of test apparatus	64.2 kg	Weather Conditions	Dry and Sunny
Distance between the edge of the loaded plate and the edge of excavation or platform			m

Load Cell (kN)	Applied Load (kN)	Applied Stress (kN/m²)	Average Final Deformation (mm)
0	0.63	2.23	0.00
9	9.63	34.06	-0.40
12	12.63	44.67	-0.79
15	15.63	55.28	-1.01
17	17.63	62.35	-1.42
20	20.63	72.96	-1.65





Original data shown as dashed line. Solid line shows adjusted applied stress which has been considered due to initial unrepresentative movements. Derived CBR value based on applied stress that has been adjusted by 3.01kN/m²

Conversion Factor to a 762mm dia. plate :	0.80	
Applied Stress at 1.25 mm Deformation:	56	kN/m²
Modulus of Subgrade Reaction (k_{762}):	36	MN/m²/m
Equivalent CBR by Plate Loading :	5	%
Moisture Content :	-	%

Remarks:

Appendix 6

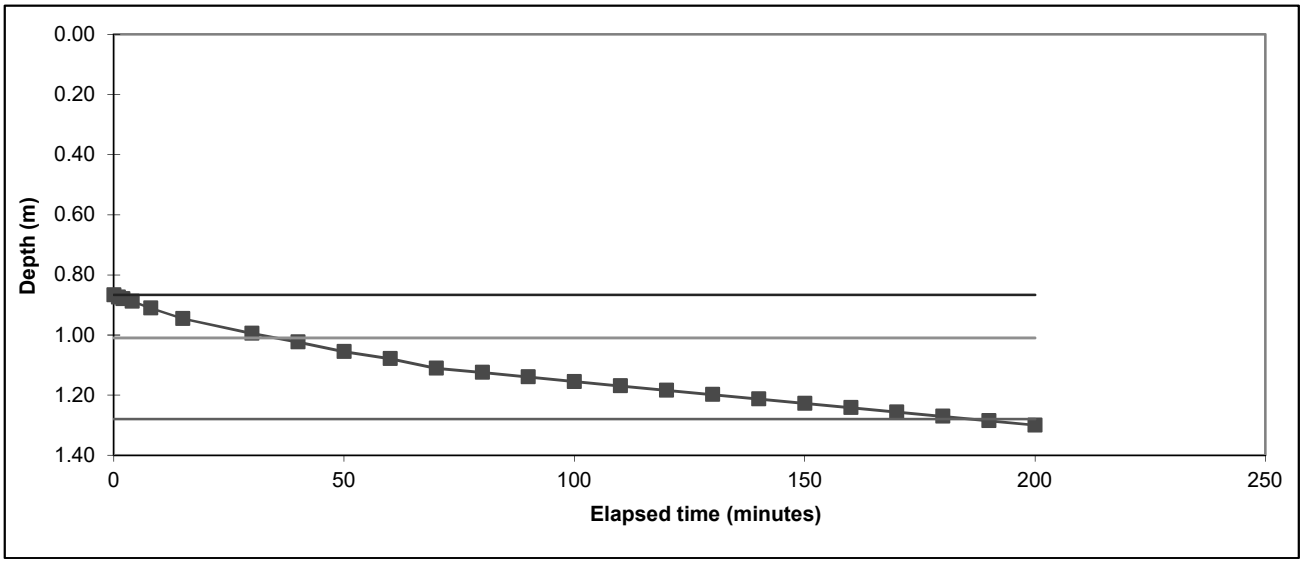
Soakaway Results

Rogers Geotechnical Services Ltd

Soakaway Test

Trial Pit No:	TP201	Test No:	1	Date:	10/07/2026
Length (m):	2.100		Datum Height:	0.00	m agl
Width (m):	0.70		Granular infill:	None	
Depth (m):	1.42		Porosity of infill:	1	(assumed)

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	0.867	110	1.170
1	0.875	120	1.184
2	0.880	130	1.198
4	0.888	140	1.213
8	0.911	150	1.228
15	0.946	160	1.242
30	0.995	170	1.257
40	1.024	180	1.271
50	1.056	190	1.286
60	1.079	200	1.300
70	1.111		
80	1.125		
90	1.140		
100	1.156		



Start water depth for analysis (mbgl):	0.87		
75% effective depth (mbgl):	1.01	Elapsed time (mins):	35.2
50% effective depth (mbgl):	1.14		
25% effective depth (mbgl):	1.28	Elapsed time (mins):	186.0
Base of soakage zone (mbgl):	1.42		

Volume outflow between 75% and 25% effective depth (m^3):	0.397
Mean surface area of outflow (m^2): (side area at 50% effective depth + base area)	3.04
Time for outflow between 75% and 25% effective depth (mins):	150.8

Soil infiltration rate (m/s):	**1.4E-5**

Remarks Results processed following BRE 365 (2007).
Unable to run test at specified depth due to refusal on mudstone.

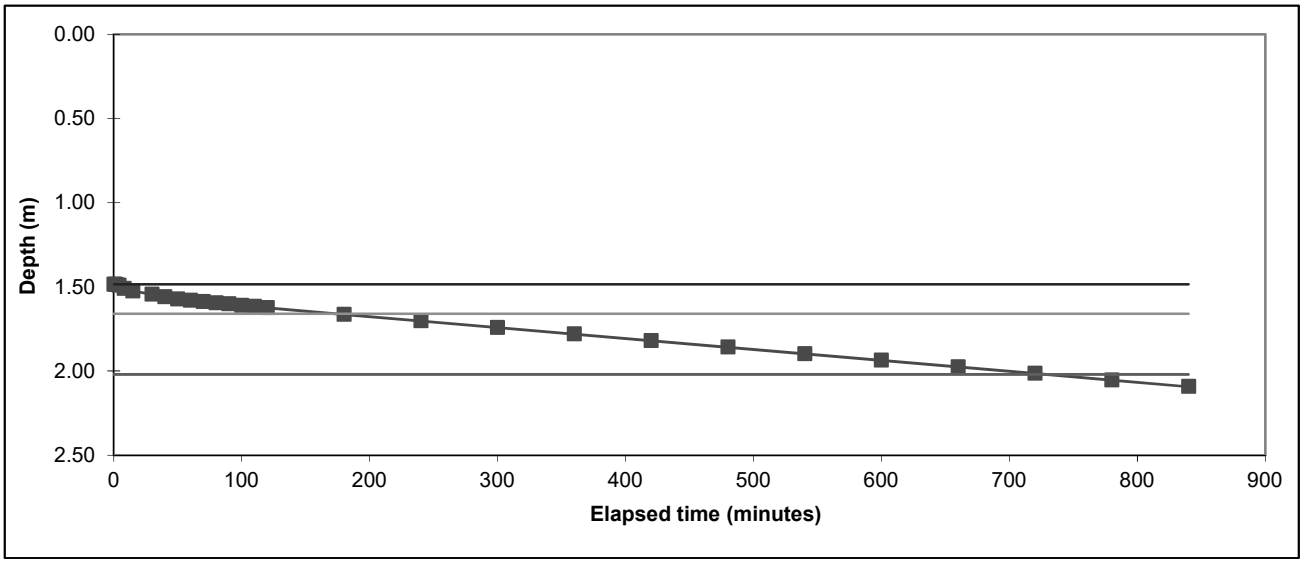
Client:	Sable Leigh Consultancy Ltd	**Job No:**
Site:	Land adjacent to Penistone Station	C6144/26/E/9573

Rogers Geotechnical Services Ltd

Soakaway Test

Trial Pit No:	TP209	Test No:	1	Date:	10/07/2026
Length (m):	2.900		Datum Height:	0.00	m agl
Width (m):	0.80		Granular infill:	None	
Depth (m):	2.20		Porosity of infill:	1	(assumed)

Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)
0	1.485	110	1.618
1	1.486	120	1.625
2	1.488	180	1.664
4	1.492	240	1.703
8	1.511	300	1.742
15	1.525	360	1.781
30	1.545	420	1.820
40	1.560	480	1.859
50	1.574	540	1.898
60	1.580	600	1.937
70	1.588	660	1.976
80	1.595	720	2.015
90	1.602	780	2.054
100	1.611	840	2.093



Start water depth for analysis (mbgl):	1.49		
75% effective depth (mbgl):	1.66	Elapsed time (mins):	173.8
50% effective depth (mbgl):	1.84		
25% effective depth (mbgl):	2.02	Elapsed time (mins):	727.7
Base of soakage zone (mbgl):	2.20		

Volume outflow between 75% and 25% effective depth (m^3):	0.835
Mean surface area of outflow (m^2): (side area at 50% effective depth + base area)	4.98
Time for outflow between 75% and 25% effective depth (mins):	553.9

Soil infiltration rate (m/s):	**5.0E-6**

Remarks Results processed following BRE 365 (2007).
Unable to run test at specified depth due to refusal on mudstone.

Client:	Sable Leigh Consultancy Ltd	**Job No:**
Site:	Land adjacent to Penistone Station	C6144/26/E/9573

Appendix 7

Laboratory Testing

Summary of Classification Test Results

Project No.	Project Name
C6144/26/E/9573	Land adjacent to Penistone Station

Hole No.	Sample Ref	Top	Base	Type	Soil Description	Density bulk Mg/m³	Density dry Mg/m³	*w* %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m³	Date Tested	Remarks
TP201	3	1.00	1.50	B	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.			9.0						28-Jul	
TP202	3	0.75	1.25	B	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.			7.4						28-Jul	
TP203	3	1.25	1.35	B	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.			8.6						28-Jul	
TP204	3	0.50	1.00	B	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.			6.5						28-Jul	
TP205	3	1.00	1.60	B	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.			8.7						28-Jul	
TP207	3	1.40	1.50	B	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.			9.9						28-Jul	
TP208	3	0.60	1.00	B	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.			7.8						28-Jul	
TP209	3	1.00	1.50	B	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.			7.7						28-Jul	

All Water Content Tests perfromed to BS EN ISO 17892-1:2014+A1:2022 Unless specified Otherwise
All Index Property testing preformed to BS EN ISO 17892-12 2018+A2:2022 Unless Specified Otherwise
All Liquid Limit Tests performed on a 80g/30 Degree Cone unless specified otherwise

Key

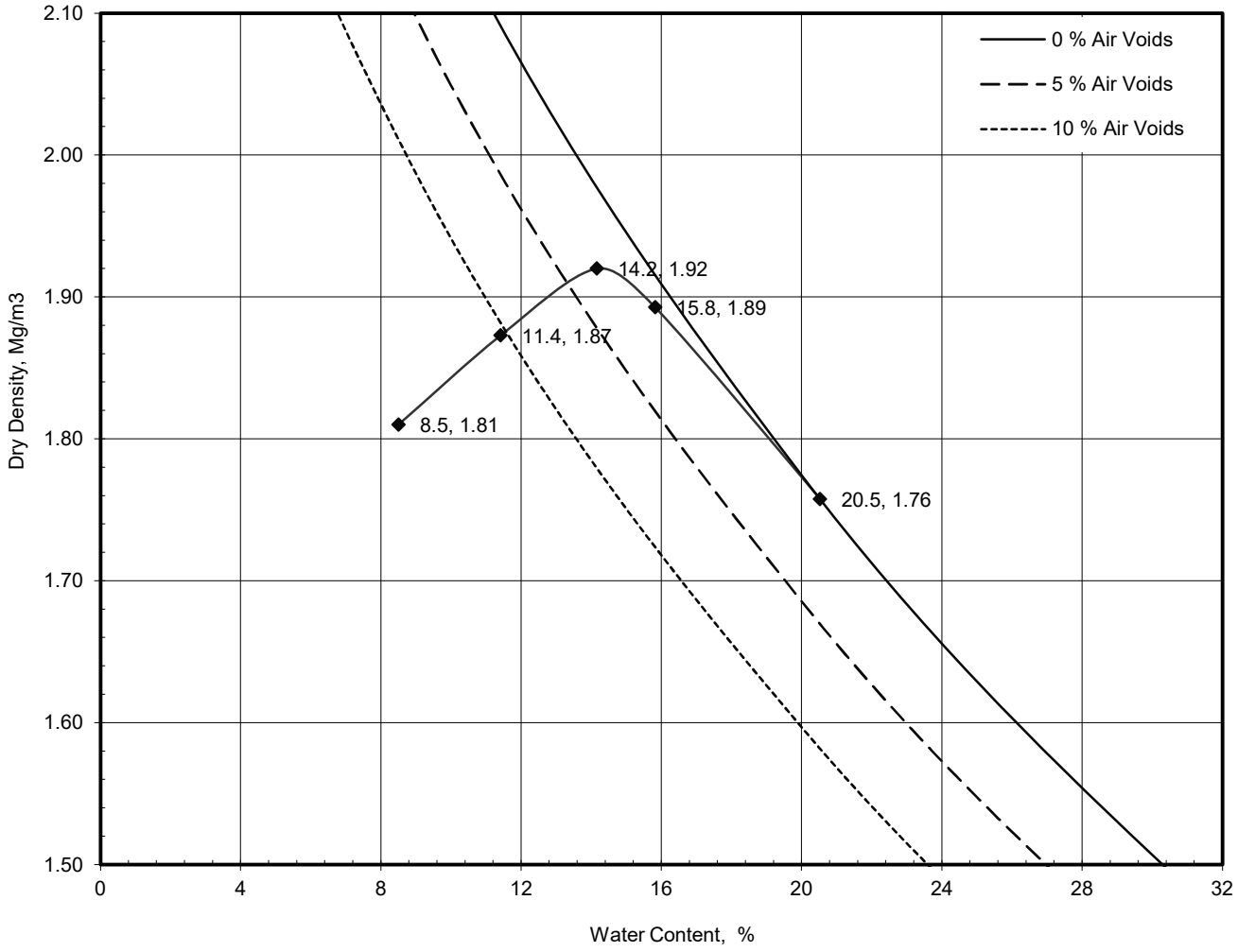
Density test — Linear measurement unless : wd - water displacement; wi - immersion in water

Liquid Limit — 4pt cone unless : cas - Casagrande method; 1pt - single point test

Particle density — sp - small pyknometer; gj - gas jar

Date Printed	Approved By	Table / sheet
06/08/2026	Harry	1 / 1

	Dry Density / Water Content Relationship Light Compaction				Job Ref	C6144/26/E/9573
					Borehole / Pit No	TP201
Site Name	**Land adjacent to Penistone Station**				Sample No	3
Soil Description	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.				Depth	1.00 m
Specimen Ref.	3	Specimen Depth	1	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer				Keylab ID	RGS_2026072853
					Compaction Test Reference/No.	1

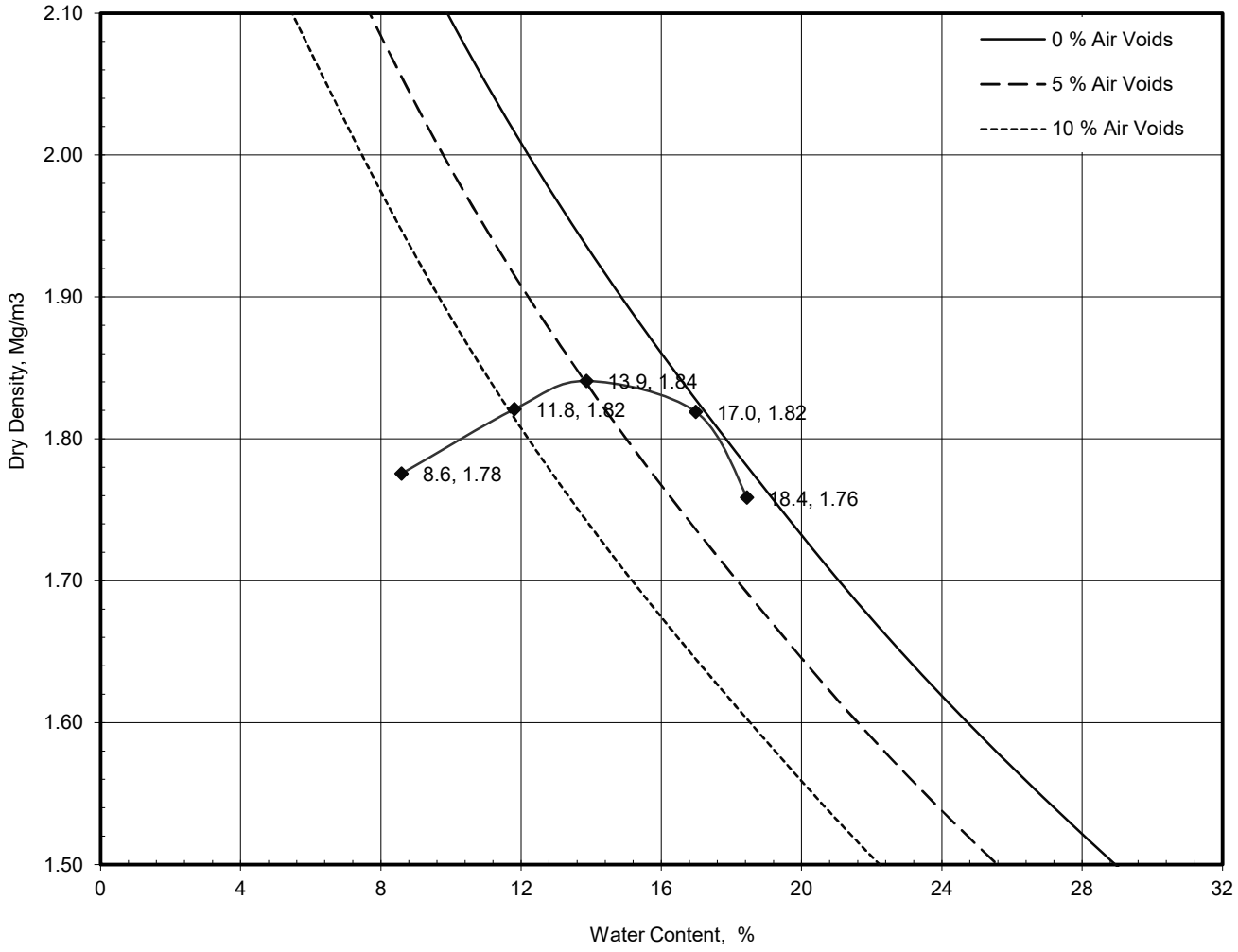


Preparation		Material used was natural
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	31
Material Retained on 20.0 mm Sieve	%	17
Particle Density - Assumed	Mg/m³	2.75
Grading Zone		X
Maximum Dry Density	Mg/m³	**1.92**

Optimum Water Content	%	**14**

Operator	Checked	Approved	Remarks	Fig 2
EC	Harry	Harry		Sheet 1 of 5

	Dry Density / Water Content Relationship Light Compaction				Job Ref	C6144/26/E/9573
					Borehole / Pit No	TP203
Site Name	**Land adjacent to Penistone Station**				Sample No	3
Soil Description	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.				Depth	1.25 m
Specimen Ref.	3	Specimen Depth	1.25	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer				Keylab ID	RGS_2026072855
					Compaction Test Reference/No.	2

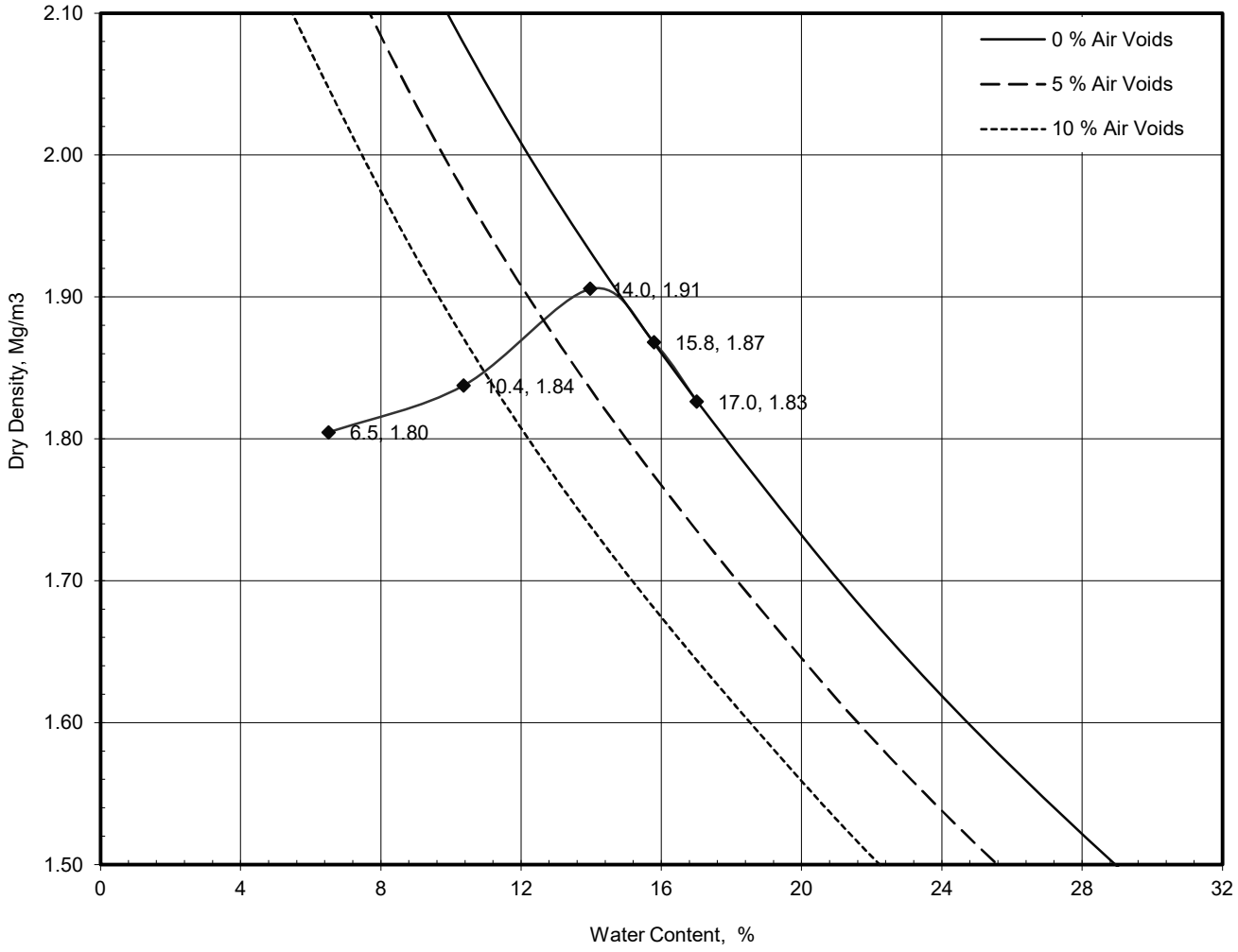


Preparation		Material used was natural
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	24
Material Retained on 20.0 mm Sieve	%	20
Particle Density - Assumed	Mg/m³	2.65
Grading Zone		X
Maximum Dry Density	Mg/m³	**1.84**

Optimum Water Content	%	**14**

Operator	Checked	Approved	Remarks	Fig 2
Harry	Harry	Harry		Sheet 2 of 5

	Dry Density / Water Content Relationship Light Compaction				Job Ref	C6144/26/E/9573
					Borehole / Pit No	TP204
Site Name	**Land adjacent to Penistone Station**				Sample No	3
Soil Description	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.				Depth	0.50 m
Specimen Ref.	3	Specimen Depth	0.5	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer				Keylab ID	RGS_2026072856
					Compaction Test Reference/No.	3

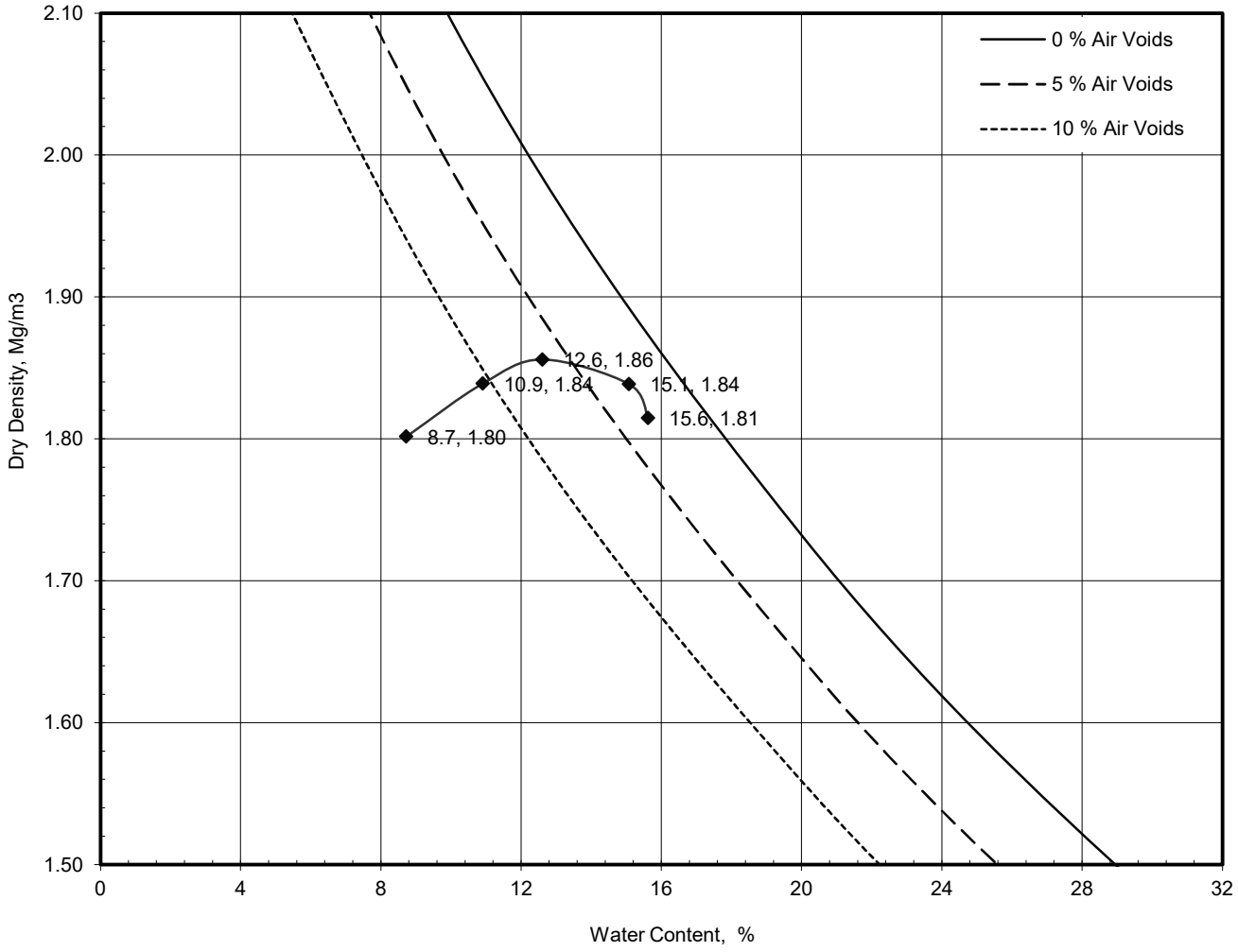


Preparation		Material used was natural
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	28
Material Retained on 20.0 mm Sieve	%	20
Particle Density - Assumed	Mg/m³	2.65
Grading Zone		X
Maximum Dry Density	Mg/m³	**1.91**

Optimum Water Content	%	**14**

Operator	Checked	Approved	Remarks	Fig 2
EC	Harry	Harry		Sheet 3 of 5

	Dry Density / Water Content Relationship Light Compaction				Job Ref	C6144/26/E/9573
					Borehole / Pit No	TP205
Site Name	**Land adjacent to Penistone Station**				Sample No	3
Soil Description	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.				Depth	1.00 m
Specimen Ref.	3	Specimen Depth	1	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer				Keylab ID	RGS_2026072857
					Compaction Test Reference/No.	4

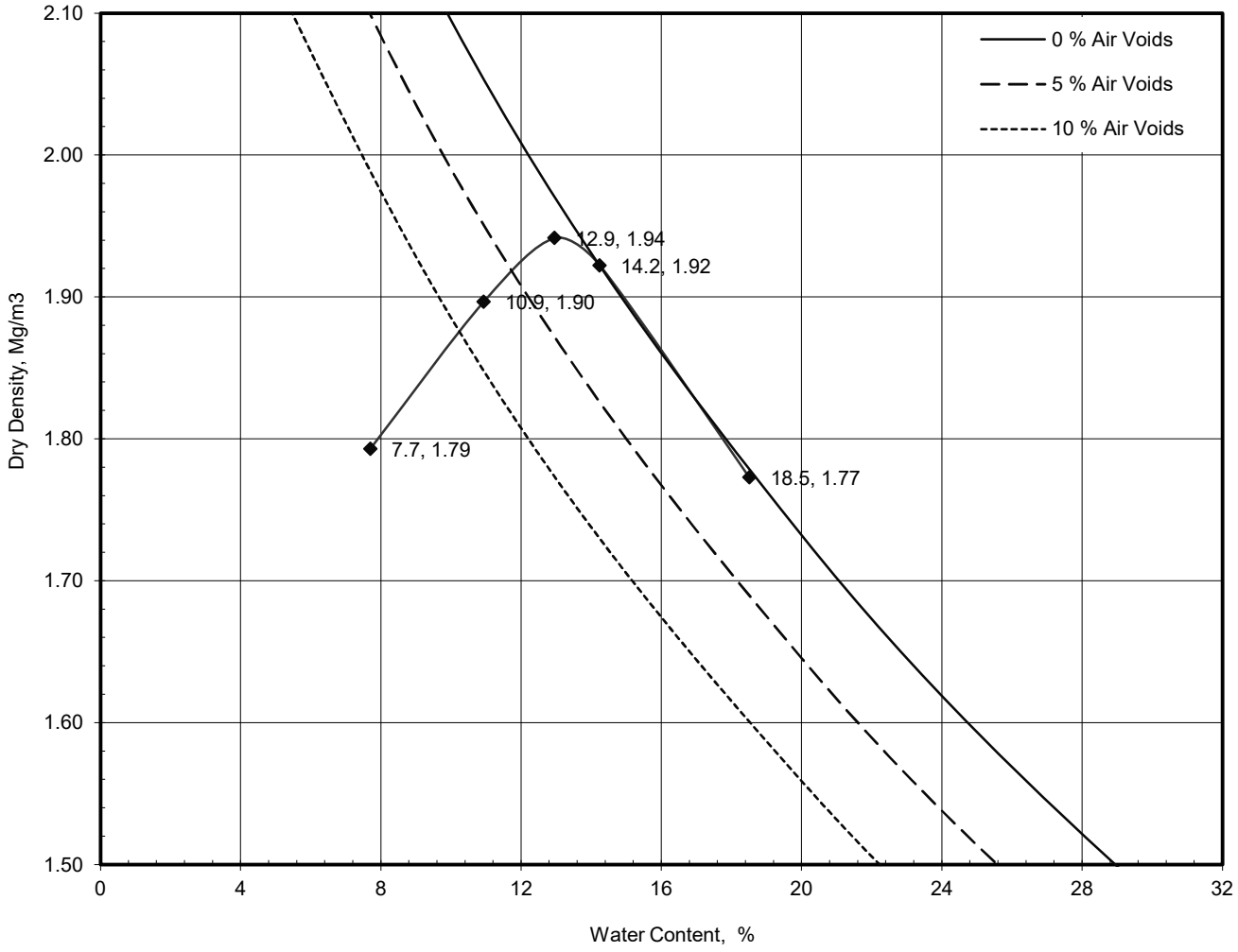


Preparation		Material used was natural
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	20
Material Retained on 20.0 mm Sieve	%	11
Particle Density - Assumed	Mg/m³	2.65
Grading Zone		X
Maximum Dry Density	Mg/m³	**1.86**

Optimum Water Content	%	**13**

Operator	Checked	Approved	Remarks	Fig 2
MH	Harry	Harry		Sheet 4 of 5

	Dry Density / Water Content Relationship Light Compaction				Job Ref	C6144/26/E/9573
					Borehole / Pit No	TP209
Site Name	**Land adjacent to Penistone Station**				Sample No	3
Soil Description	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.				Depth	1.00 m
Specimen Ref.	3	Specimen Depth	1	m	Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.3, 2.5kg rammer				Keylab ID	RGS_2026072860
					Compaction Test Reference/No.	5

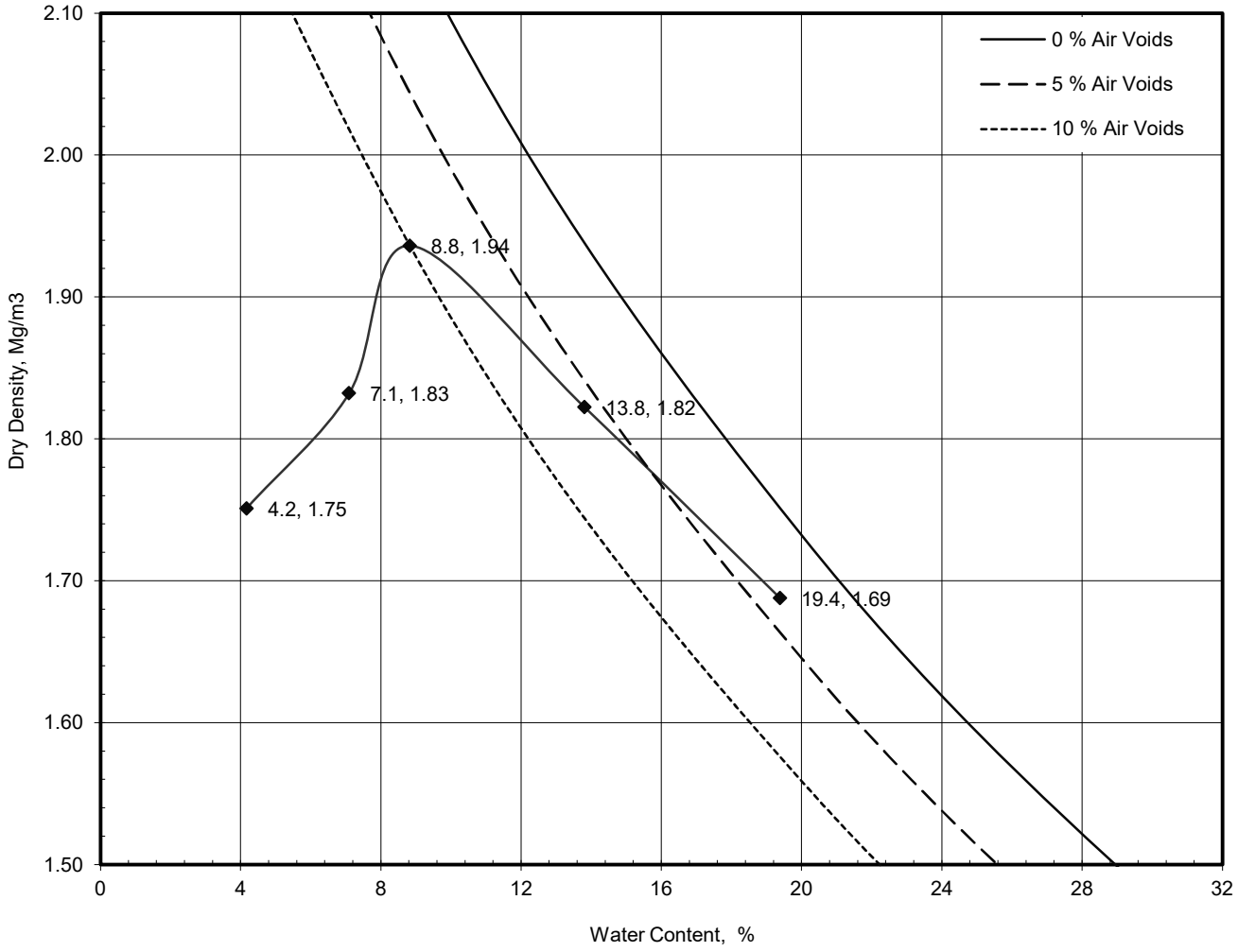


Preparation		Material used was natural
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	14
Material Retained on 20.0 mm Sieve	%	24
Particle Density - Assumed	Mg/m³	2.65
Grading Zone		X
Maximum Dry Density	Mg/m³	**1.94**

Optimum Water Content	%	**13**

Operator	Checked	Approved	Remarks	Fig 2
EC	Harry	Harry		Sheet 5 of 5

	Dry Density / Water Content Relationship Heavy Compaction				Job Ref	C6144/26/E/9573
					Borehole / Pit No	TP202
Site Name	**Land adjacent to Penistone Station**				Sample No	3
Soil Description	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.				Depth	0.75 m
Specimen Ref.	3	Specimen Depth	0.75	m	Sample Type	B
Test Method	BS1377:Part 2:2022				Keylab ID	RGS_2026072854
					Compaction Test Reference/No.	1

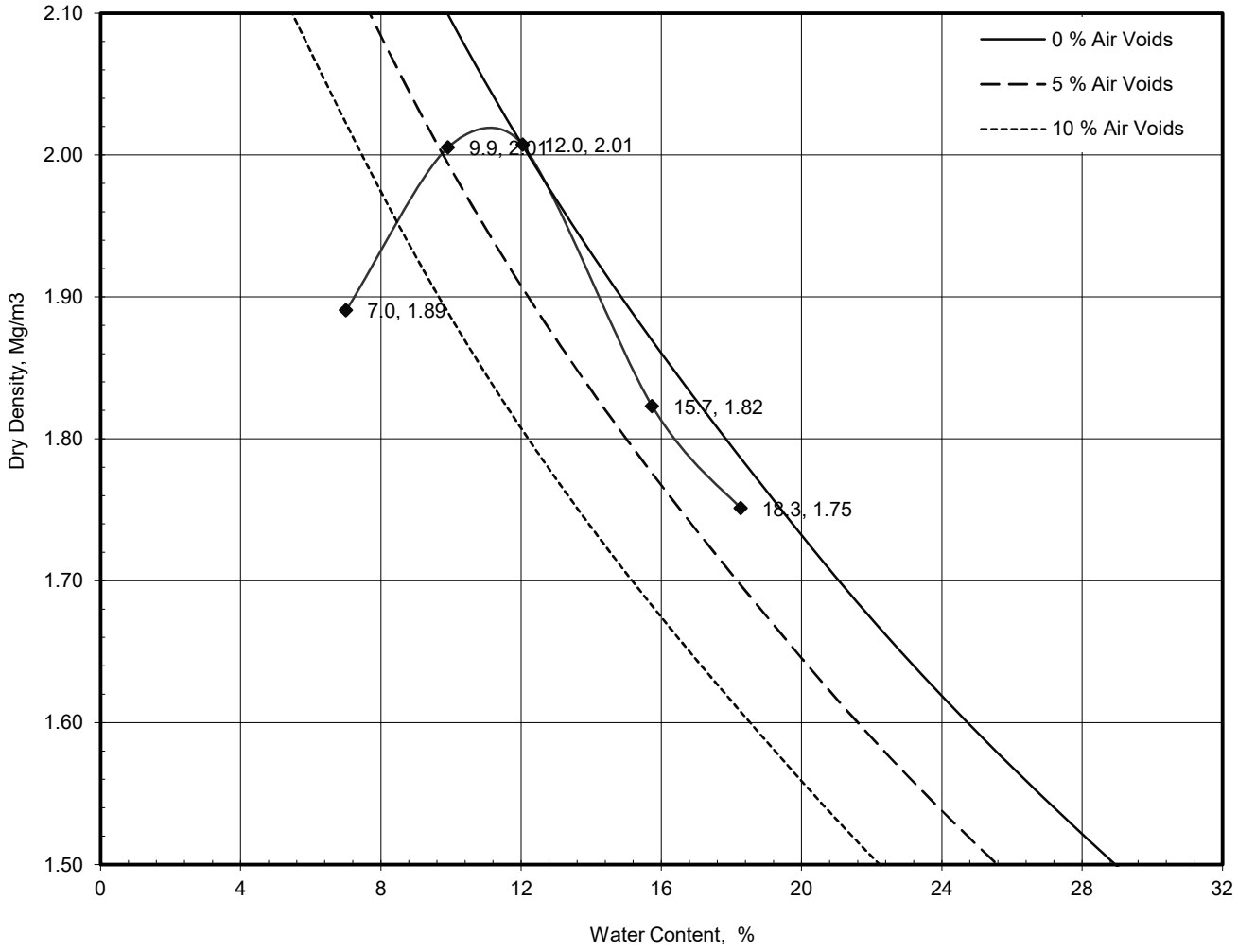


Preparation		Material used was natural
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	41
Material Retained on 20.0 mm Sieve	%	17
Particle Density - Assumed	Mg/m³	2.65
Grading Zone		X
Maximum Dry Density	Mg/m³	**1.94**

Optimum Water Content	%	**8.8**

Operator	Checked	Approved	Remarks	Fig 3
Harry	Harry	Harry		Sheet 1 of 3

	Dry Density / Water Content Relationship Heavy Compaction				Job Ref	C6144/26/E/9573
					Borehole / Pit No	TP207
Site Name	**Land adjacent to Penistone Station**				Sample No	3
Soil Description	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.				Depth	1.40 m
Specimen Ref.	3	Specimen Depth	1.4	m	Sample Type	B
Test Method	BS1377:Part 2:2022				Keylab ID	RGS_2026072858
					Compaction Test Reference/No.	2

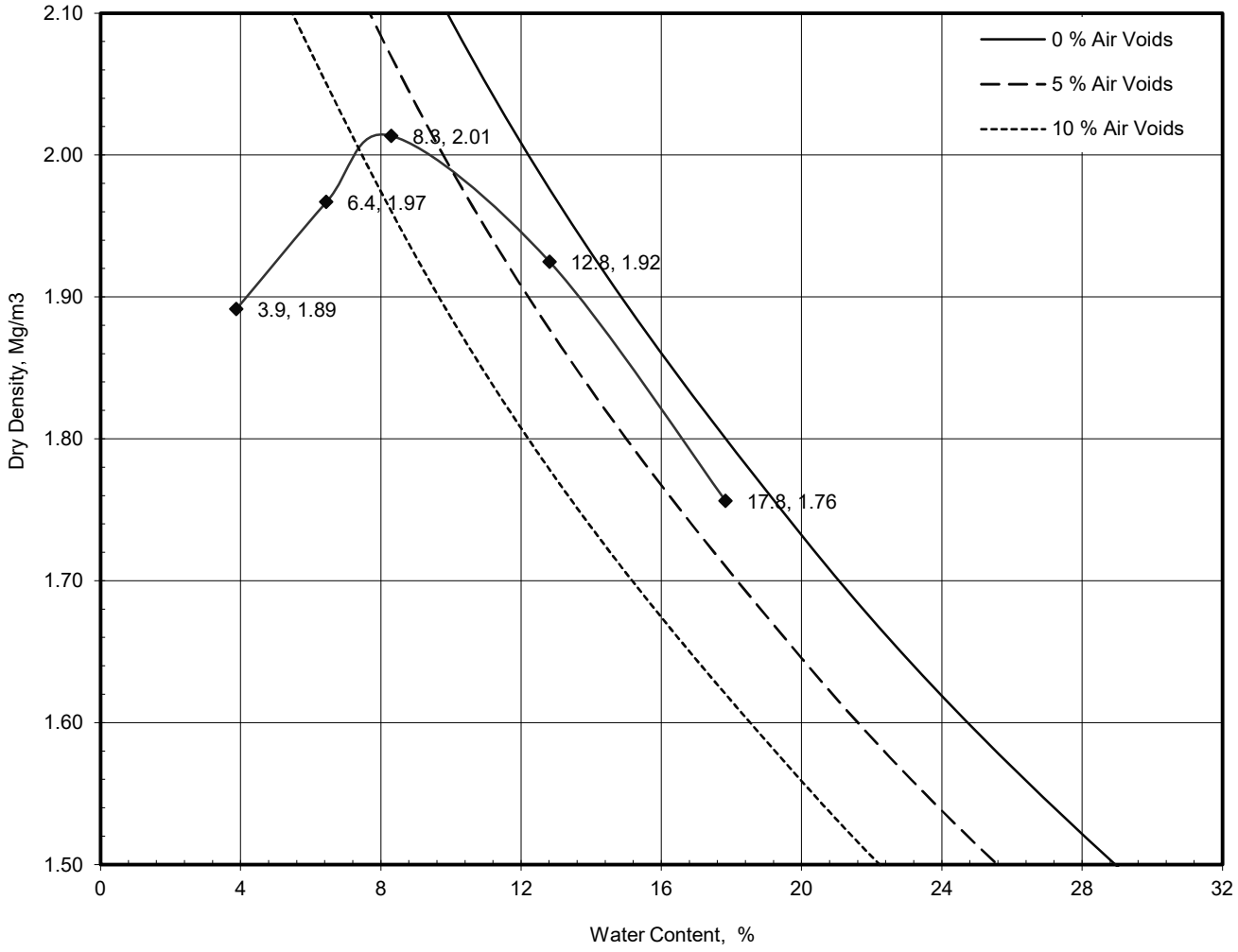


Preparation		Material used was natural
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	17
Material Retained on 20.0 mm Sieve	%	21
Particle Density - Assumed	Mg/m³	2.65
Grading Zone		X
Maximum Dry Density	Mg/m³	**2.02**

Optimum Water Content	%	**11**

Operator	Checked	Approved	Remarks	Fig 3
EC	Harry	Harry		Sheet 2 of 3

	Dry Density / Water Content Relationship Heavy Compaction				Job Ref	C6144/26/E/9573
					Borehole / Pit No	TP208
Site Name	**Land adjacent to Penistone Station**				Sample No	3
Soil Description	Extremely weak, greyish brown MUDSTONE, recovered as silty, sandy, gravelly cobbles.				Depth	0.60 m
Specimen Ref.	3	Specimen Depth	0.6	m	Sample Type	B
Test Method	BS1377:Part 2:2022				Keylab ID	RGS_2026072859
					Compaction Test Reference/No.	3



Preparation		Material used was natural
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	17
Material Retained on 20.0 mm Sieve	%	22
Particle Density - Assumed	Mg/m³	2.65
Grading Zone		X
Maximum Dry Density	Mg/m³	**2.01**

Optimum Water Content	%	**8.3**

Operator	Checked	Approved	Remarks	Fig 3
EC	Harry	Harry		Sheet 3 of 3

4041

TEST CERTIFICATE

DETERMINATION OF DRY DENSITY/WATER CONTENT RELATIONSHIP METHOD USING VIBRATING HAMMER

Tested in Accordance with: BS 1377-2:2022, Cl. 11.7

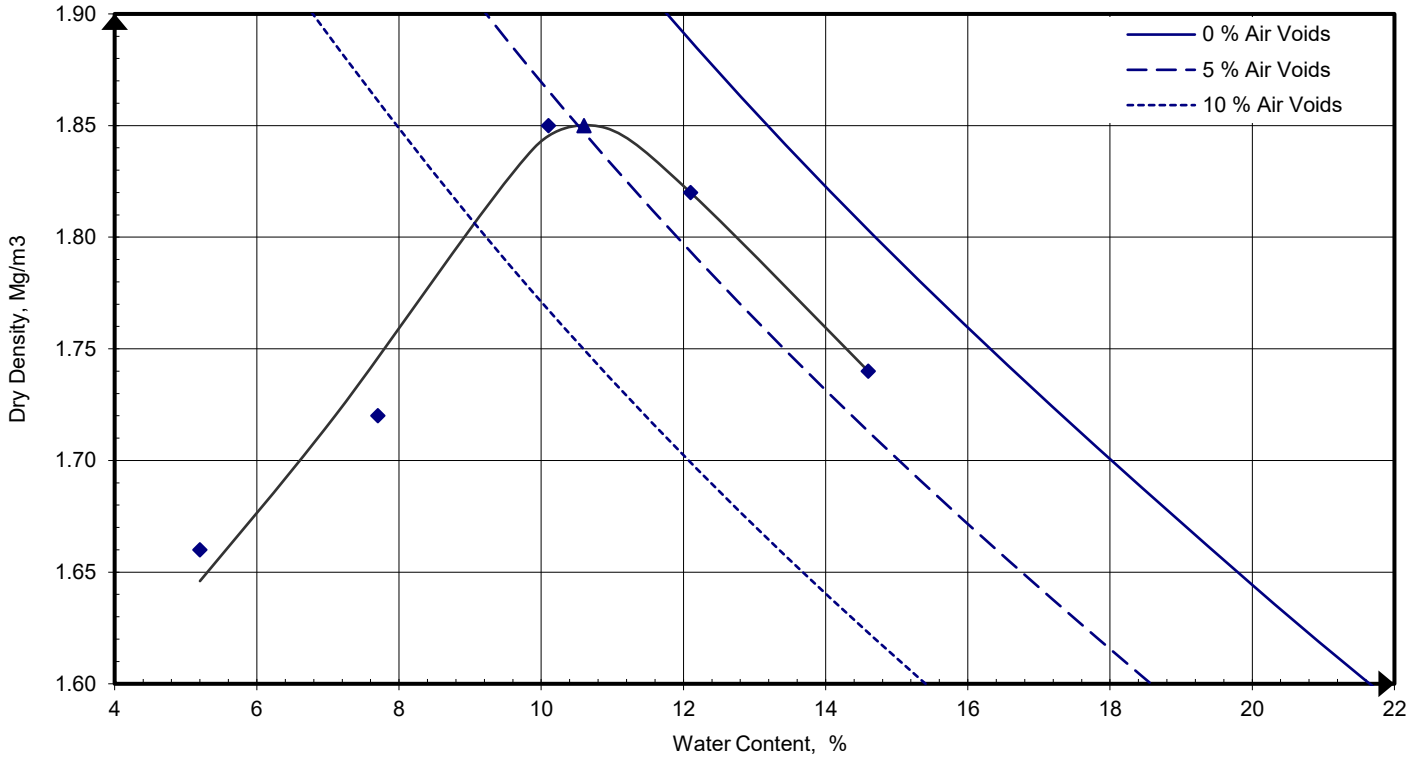
Normec i2 Analytical

Client:	Rogers Geotechnical Services Ltd	Client Reference:	C6144/26/E/9573
Client Address:	Offices 1&2 Barncliffe Business Pk, Near Bank, Shelley, Huddersfield, West Yorkshire, HD8 8LU	Job Number:	26-041913-1
		Date Sampled:	Not Given
		Date Received:	04/08/2026
Contact:	Harry Letch	Date Tested:	18/08/2026
Site Address:	Land Adjacent to Penistone Station	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1002790	Depth Top [m]:	0.75
Hole No.:	TP202	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Dark brown sandy CLAY with siltstones		
Sample Preparation:	Sample was quartered and broken down by hand. Material used was natural.		



Compaction Point No.		1	2	3	4	5
Water Content	%	5.2	7.7	10	12	15
Dry Density	Mg/m³	1.66	1.72	1.85	1.82	1.74

Grading Zone		3
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	29
Particle Density - Assumed	Mg/m³	2.45
As received Water Content	%	3.8
Maximum Dry Density	Mg/m³	**1.85**

Optimum Water Content	%	**11**

Remarks:

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

Signed: Monika Siewior

Monika Siewior
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 19/08/2026

GF 603.2

4041

TEST CERTIFICATE

DETERMINATION OF DRY DENSITY/WATER CONTENT RELATIONSHIP METHOD USING VIBRATING HAMMER

Tested in Accordance with: BS 1377-2:2022, Cl. 11.7

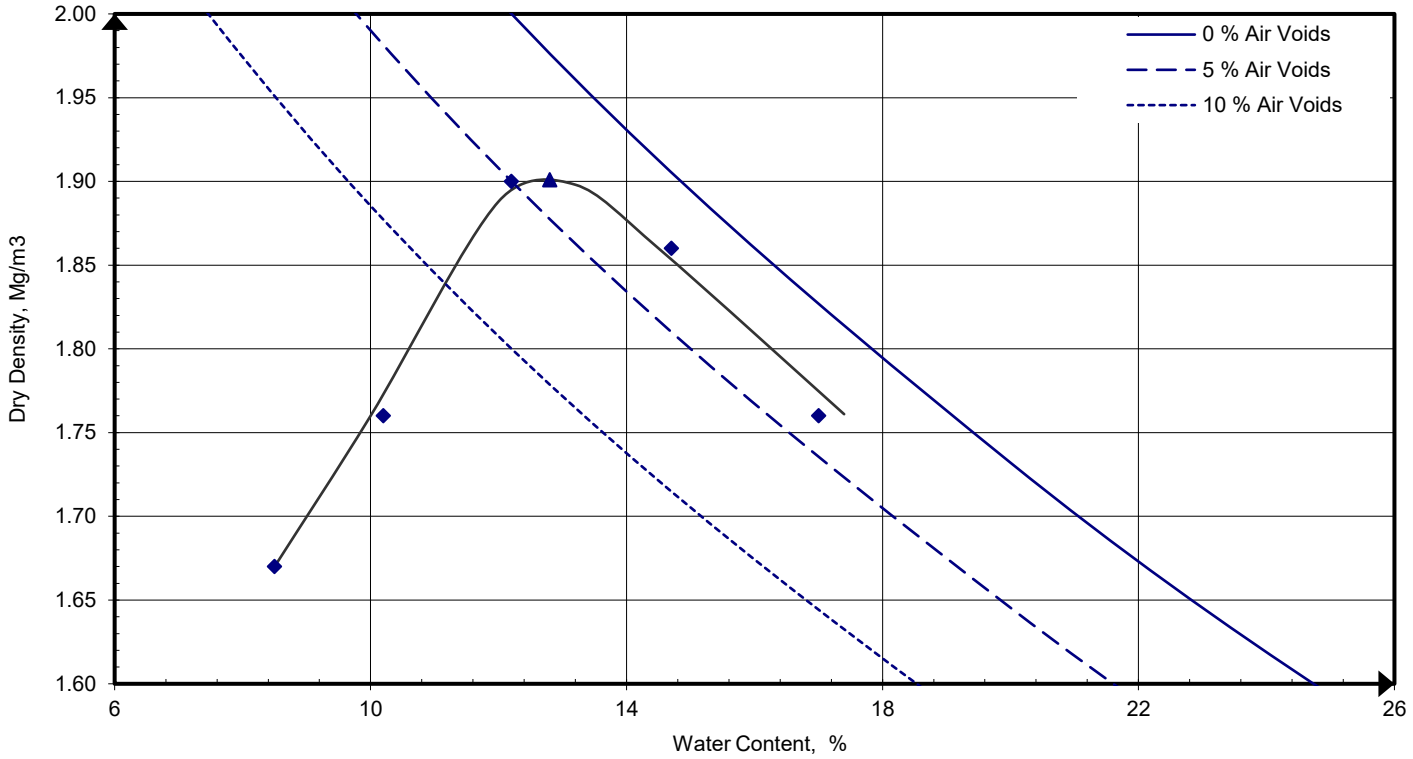
Normec i2 Analytical

Client:	Rogers Geotechnical Services Ltd	Client Reference:	C6144/26/E/9573
Client Address:	Offices 1&2 Barncliffe Business Pk, Near Bank, Shelley, Huddersfield, West Yorkshire, HD8 8LU	Job Number:	26-041913-1
		Date Sampled:	Not Given
		Date Received:	04/08/2026
Contact:	Harry Letch	Date Tested:	18/08/2026
Site Address:	Land Adjacent to Penistone Station	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	1002791	Depth Top [m]:	1.25
Hole No.:	TP203	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Dark brown sandy CLAY with siltstones		
Sample Preparation:	Sample was quartered and broken down by hand. Material used was natural.		



Compaction Point No.		1	2	3	4	5
Water Content	%	8.5	10	12	15	17
Dry Density	Mg/m³	1.67	1.76	1.90	1.86	1.76

Grading Zone		X
Mould Type		CBR
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	23
Material Retained on 20.0 mm Sieve	%	42
Particle Density - Assumed	Mg/m³	2.65
As received Water Content	%	8.5
Maximum Dry Density	Mg/m³	**1.90**

Optimum Water Content	%	**13**

Remarks: Zone X - test carried out with clients consent.

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

Signed: Monika Siewior

Monika Siewior
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 19/08/2026

GF 603.2

i2 Analytical Ltd, Unit 8, Harrowden Road, Brackmills Industrial Estate, Northampton, NN4 7EB

SUMMARY REPORT

METHOD FOR DETERMINATION OF THE WATER CONTENT OF A ROCK SAMPLE

Tested in Accordance with: ISRM:2007, page 87

4041

Client: Rogers Geotechnical Services Ltd

Client Address: Offices 1&2 Barncliffe Business Pk, Near Bank, Shelley, Huddersfield, West Yorkshire, HD8 8LU

Contact: Harry Letch

Site Address: Land Adjacent to Penistone Station

Client Reference: C6144-26-E-9573

Job Number: 26-041499-1

Date Sampled: 24/07/2026

Date Received: 29/07/2026

Date Tested: 18/08/2026

Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC											
		Reference	Depth Top m	Depth Base m	Type			%											
1000734	BH101	Not Given	11.26	11.35	C	Greyish brown SILTSTONE		3.9											

Note:

Comments:

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

Signed:

Monika Siewior
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 19/08/2026

GF 480.4

SUMMARY REPORT

DETERMINATION OF POINT LOAD STRENGTH

Tested in Accordance with: ISRM: 2007, pages 125-132

4041

Client: Rogers Geotechnical Services Ltd

Client Address: Offices 1&2 Barncliffe Business Pk, Near Bank, Shelley, Huddersfield, West Yorkshire, HD8 8LU

Contact: Harry Letch

Site Address: Land Adjacent to Penistone Station

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: C6144-26-E-9573

Job Number: 26-041499-1

Date Sampled: 24/07/2026

Date Received: 29/07/2026

Date Tested: 18/08/2026

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index	
		Reference	Depth Top m	Depth Base m	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm	kN	mm	Is MPa	Is(50) MPa
1000731	BH101	Not Given	5.50	5.60	C	Greyish brown MUDSTONE	WC = 8.7%	1	A	U	YES	-	86.1	79.0	63.0	0.6	83.1	0.08	0.10
1000734	BH101	Not Given	11.26	11.35	C	Greyish brown SILTSTONE	WC = 3.9%	1	D	U	YES	71.9	86.0	86.0	81.0	1.3	83.5	0.18	0.23
1000735	BH101	Not Given	11.45	11.50	C	Grey SILTSTONE	WC = 4.8%	1	D	U	YES	57.8	85.8	86.0	82.0	0.9	83.9	0.12	0.15
1000736	BH101	Not Given	11.50	11.70	C	Light brown SILTSTONE	WC = 4.2%	1	D	U	YES	74.9	86.7	87.0	84.0	2.1	85.4	0.29	0.37
1000737	BH101	Not Given	11.70	11.75	C	Light brown SILTSTONE	WC = 3.4%	1	A	U	YES	-	86.0	69.0	46.0	3.8	71.0	0.74	0.87
1000738	BH101	Not Given	12.60	12.75	C	Light brown SILTSTONE	WC = 3.2%	1	D	U	YES	70.8	86.0	86.0	83.0	0.8	84.5	0.11	0.13
1000739	BH101	Not Given	12.75	12.80	C	Greyish brown SILTSTONE	WC = 5.1%	1	A	U	YES	-	87.0	60.0	6.0	1.5	25.8	2.26	1.68
1000740	BH101	Not Given	13.95	14.40	C	Light brown SILTSTONE	WC = 2.1%	1	D	U	YES	53.2	86.1	86.0	81.0	16.2	83.5	2.32	2.92
1000741	BH101	Not Given	14.40	14.50	C	Light brown SILTSTONE	WC = 1.9%	1	A	U	YES	-	86.1	68.0	60.0	7.8	81.1	1.18	1.46
1000742	BH101	Not Given	14.50	14.70	C	Greyish brown SILTSTONE	WC = 2.8%	1	D	U	YES	57.0	87.2	87.0	80.0	2.3	83.5	0.33	0.42

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random; Dimensions: Dps - Distance between platens (platen separation), Dps' - at failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P; Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Equipment No.: i2 4341 Calibration Date: 10/03/2026 - 10/03/2027

Comments:

Signed:

Monika Siewior
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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Date Reported: 19/08/2026 **GF 134.17**

SUMMARY REPORT

DETERMINATION OF POINT LOAD STRENGTH

Tested in Accordance with: ISRM: 2007, pages 125-132

4041

Client: Rogers Geotechnical Services Ltd

Client Address: Offices 1&2 Barncliffe Business Pk, Near Bank, Shelley, Huddersfield, West Yorkshire, HD8 8LU

Contact: Harry Letch

Site Address: Land Adjacent to Penistone Station

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: C6144-26-E-9573

Job Number: 26-041499-1

Date Sampled: 24/07/2026

Date Received: 29/07/2026

Date Tested: 18/08/2026

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index	
		Reference	Depth Top m	Depth Base m	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm	kN	mm	Is MPa	Is(50) MPa
1000743	BH101	Not Given	18.10	18.26	C	Greyish brown SILTSTONE	WC = 4.6%	1	I	U	YES	43.1	78.6	63.0	52.0	2.0	72.1	0.38	0.45
1000744	BH101	Not Given	25.20	25.35	C	Grey MUDSTONE	WC = 2.8%	1	D	U	YES	57.0	85.9	86.0	79.0	2.7	82.4	0.39	0.49
1000745	BH101	Not Given	25.55	25.70	C	Grey MUDSTONE	WC = 2.4%	1	D	U	YES	47.5	85.5	85.0	82.0	2.4	83.8	0.34	0.43
1000746	BH101	Not Given	27.45	27.65	C	Grey MUDSTONE	WC = 3.3%	1	I	U	YES	54.2	86.4	72.0	67.0	2.8	85.8	0.37	0.48
1000747	BH101	Not Given	28.00	28.20	C	Grey MUDSTONE	WC = 3.2%	1	A	U	YES	-	85.8	63.0	57.0	3.5	78.9	0.56	0.69
1000748	BH101	Not Given	28.50	28.85	C	Grey MUDSTONE	WC = 2.1%	1	D	U	YES	61.9	86.0	86.0	80.0	4.3	82.9	0.62	0.78
1000749	BH101	Not Given	28.85	29.10	C	Grey MUDSTONE	WC = 2.7%	1	D	U	YES	80.4	86.1	86.0	83.0	3.4	84.5	0.47	0.59
1000750	BH102	Not Given	1.25	1.35	C	Brown SILTSTONE	WC = 4.7%	1	D	U	YES	47.2	86.1	86.0	83.0	8.7	84.5	1.21	1.53
1000751	BH102	Not Given	1.40	1.50	C	Brown SILTSTONE	WC = 4.4%	1	D	U	YES	65.0	86.0	86.0	83.0	2.7	84.5	0.38	0.48
1000752	BH102	Not Given	1.50	1.57	C	Brown SILTSTONE	WC = 4.6%	1	A	U	YES	-	86.1	83.0	66.0	14.9	85.1	2.05	2.61

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random; Dimensions: Dps - Distance between platens (platen separation), Dps' - at failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P; Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Equipment No.: i2 4341 Calibration Date: 10/03/2026 - 10/03/2027

Comments:

Signed:

Monika Siewior
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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Date Reported: 19/08/2026 **GF 134.17**

SUMMARY REPORT

DETERMINATION OF POINT LOAD STRENGTH

Tested in Accordance with: ISRM: 2007, pages 125-132

4041

Client: Rogers Geotechnical Services Ltd

Client Address: Offices 1&2 Barncliffe Business Pk, Near Bank, Shelley, Huddersfield, West Yorkshire, HD8 8LU

Contact: Harry Letch

Site Address: Land Adjacent to Penistone Station

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: C6144-26-E-9573

Job Number: 26-041499-1

Date Sampled: 24/07/2026

Date Received: 29/07/2026

Date Tested: 18/08/2026

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index	
		Reference	Depth Top	Depth Base	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)
			m	m								mm	mm	mm	mm	kN	mm	MPa	MPa
1000753	BH102	Not Given	1.57	1.76	C	Brown SILTSTONE	WC = 5.1%	1	A	U	YES	-	86.5	78.0	56.0	17.7	78.6	2.86	3.51
1000754	BH102	Not Given	6.73	6.84	C	Brown SILTSTONE	WC = 4.0%	1	I	U	YES	47.3	85.5	80.0	30.0	6.8	57.2	2.07	2.19
1000755	BH102	Not Given	8.20	8.33	C	Brown SILTSTONE	WC = 4.6%	1	A	U	YES	-	85.7	45.0	36.0	3.4	62.7	0.87	0.96
1000756	BH102	Not Given	10.15	10.21	C	Brown SILTSTONE	WC = 3.2%	1	I	U	YES	43.2	82.2	53.0	51.0	4.0	73.1	0.75	0.89
1000757	BH102	Not Given	10.32	10.40	C	Brown SILTSTONE	WC = 3.2%	1	A	U	YES	-	85.5	69.0	62.0	6.4	82.1	0.95	1.19
1000758	BH102	Not Given	10.40	10.49	C	Brown SILTSTONE	WC = 3.2%	1	D	U	YES	47.0	85.5	86.0	83.0	0.4	84.3	0.05	0.06
1000759	BH102	Not Given	10.49	10.55	C	Brown SILTSTONE	WC = 3.5%	1	A	U	YES	-	85.8	53.0	43.0	7.2	68.5	1.53	1.77
1000760	BH102	Not Given	10.64	10.72	C	Brown SILTSTONE	WC = 4.0%	1	A	U	YES	-	85.5	37.0	30.0	3.8	57.1	1.15	1.22
1000761	BH102	Not Given	10.82	10.87	C	Brown SILTSTONE	WC = 3.4%	1	A	U	YES	-	85.8	30.0	27.0	2.4	54.3	0.80	0.83
1000762	BH103	Not Given	3.10	3.25	C	Brown SILTSTONE	WC = 3.5%	1	A	U	YES	-	85.6	79.0	41.0	4.7	66.8	1.04	1.19

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random; Dimensions: Dps - Distance between platens (platen separation), Dps' - at failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P; Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Equipment No.: i2 4341 Calibration Date: 10/03/2026 - 10/03/2027

Comments:

Signed:

Monika Siewior
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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Date Reported: 19/08/2026 **GF 134.17**

SUMMARY REPORT

DETERMINATION OF POINT LOAD STRENGTH

Tested in Accordance with: ISRM: 2007, pages 125-132

4041

Client: Rogers Geotechnical Services Ltd

Client Address: Offices 1&2 Barncliffe Business Pk, Near Bank, Shelley, Huddersfield, West Yorkshire, HD8 8LU

Contact: Harry Letch

Site Address: Land Adjacent to Penistone Station

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: C6144-26-E-9573

Job Number: 26-041499-1

Date Sampled: 24/07/2026

Date Received: 29/07/2026

Date Tested: 18/08/2026

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index	
		Reference	Depth Top m	Depth Base m	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm	kN	mm	Is MPa	Is(50) MPa
1000763	BH103	Not Given	3.65	3.70	C	Brown SILTSTONE	WC = 6.1%	1	A	U	YES	-	85.7	31.0	24.0	0.9	51.2	0.34	0.35
1000764	BH103	Not Given	4.50	4.55	C	Brown SILTSTONE	WC = 6.5%	1	A	U	YES	-	84.6	43.0	34.0	1.5	60.5	0.40	0.43
1000765	BH103	Not Given	4.55	4.63	C	Brown SILTSTONE	WC = 4.5%	1	A	U	YES	-	86.7	56.0	51.0	1.6	75.0	0.28	0.33
1000766	BH103	Not Given	4.73	4.89	C	Brown SILTSTONE	WC = 6.1%	1	A	U	YES	-	85.6	42.0	39.0	1.6	65.2	0.36	0.41
1000767	BH103	Not Given	5.23	5.35	C	Brown SILTSTONE	WC = 7.5%	1	I	U	YES	44.1	79.1	70.0	47.0	1.0	68.8	0.20	0.23
1000768	BH103	Not Given	7.63	7.70	C	Grey MUDSTONE	WC = 5.2%	1	A	U	YES	-	84.3	45.0	34.0	1.5	60.4	0.41	0.45
1000769	BH103	Not Given	8.53	8.60	C	Grey MUDSTONE	WC = 7.4%	1	A	U	YES	-	87.3	60.0	55.0	0.4	78.2	0.06	0.07
1000770	BH103	Not Given	8.60	8.70	C	Grey MUDSTONE	WC = 8.0%	1	A	U	YES	-	84.5	73.0	44.0	0.5	68.8	0.10	0.11
1000771	BH103	Not Given	8.80	8.92	C	Grey MUDSTONE	WC = 4.6%	1	I	U	YES	85.1	82.7	72.0	67.0	1.1	84.0	0.16	0.20
1000772	BH103	Not Given	10.45	10.50	C	Grey MUDSTONE	WC = 4.3%	1	A	U	YES	-	86.3	53.0	45.0	0.4	70.3	0.07	0.08

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random; Dimensions: Dps - Distance between platens (platen separation), Dps' - at failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P; Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Equipment No.: i2 4341 Calibration Date: 10/03/2026 - 10/03/2027

Comments:

Signed:

Monika Siewior
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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Date Reported: 19/08/2026 **GF 134.17**

SUMMARY REPORT

DETERMINATION OF POINT LOAD STRENGTH

Tested in Accordance with: ISRM: 2007, pages 125-132

4041

Client: Rogers Geotechnical Services Ltd

Client Address: Offices 1&2 Barncliffe Business Pk, Near Bank, Shelley, Huddersfield, West Yorkshire, HD8 8LU

Contact: Harry Letch

Site Address: Land Adjacent to Penistone Station

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: C6144-26-E-9573

Job Number: 26-041499-1

Date Sampled: 24/07/2026

Date Received: 29/07/2026

Date Tested: 18/08/2026

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index	
		Reference	Depth Top m	Depth Base m	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm	kN	mm	Is MPa	Is(50) MPa
1000773	BH103	Not Given	11.35	11.44	C	Grey MUDSTONE	WC = 8.0%	1	A	U	YES	-	80.1	78.0	46.0	1.2	68.5	0.26	0.29
1000774	BH103	Not Given	11.50	11.55	C	Grey MUDSTONE	WC = 5.8%	1	A	U	YES	-	81.7	49.0	40.0	1.8	64.5	0.42	0.47
1000775	BH103	Not Given	11.85	11.90	C	Brown SILTSTONE	WC = 5.3%	1	I	U	YES	47.0	85.9	70.0	67.0	1.9	85.6	0.26	0.33

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random; Dimensions: Dps - Distance between platens (platen separation), Dps' - at failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P; Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Equipment No.: i2 4341 Calibration Date: 10/03/2026 - 10/03/2027

Comments:

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Signed:

Monika Siewior
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 19/08/2026 **GF 134.17**

SUMMARY REPORT

DETERMINATION OF UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Tested in Accordance with: ISRM, 2007, p153, part 1

4041

Client: Rogers Geotechnical Services Ltd

Client Address: Offices 1&2 Barncliffe Business Pk, Near Bank, Shelley, Huddersfield, West Yorkshire, HD8 8LU

Contact: Harry Letch

Site Address: Land Adjacent to Penistone Station

Client Reference: C6144-26-E-9573
Job Number: 26-041499-1
Date Sampled: 24/07/2026
Date Received: 29/07/2026
Date Tested: 18/08/2026
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Specimen Dimensions (2)				Bulk density (2)	Water Content (1)	Uniaxial Compression (3)			
		Reference	Depth Top m	Depth Base m	Type			Diameter mm	Length mm	H/D	Orientation of sample	Mg/m3	%	Condition	Stress Rate Mpa/s	Mode of failure	UCS Mpa
1000740	BH101	Not Given	13.95	14.40	C	Light brown SILTSTONE		86.0	219.2	2.5	Vertical	2.53	2.1	as received	0.1723	AC	77.0

Note: 1 - ISRM p87 test 1, water content at 105 ± 3 °C, specimen as tested for UCS, 2 - ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density, 3 - ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials, above notes apply unless annotated otherwise in the remarks. Compaction machine: VJ Tech AUTOCON - VJT 51-3011; Mode of failure legend: S - Single shear, MS - multiple shear, AC - Axial cleavage, F - Fragmented

Comments:

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Signed:

Monika Siewior
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 19/08/2026

GF 223.18

Rogers Geotechnical Services Ltd
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7 Woodshots Meadow,
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e: info-i2analytical@normecgroup.com

Analytical Report Number : 26-038216

Project / Site name:	Land Adjacent to Penistone Station	**Samples received on:**	15/07/2026
Your job number:	C6144/26/E/9573	**Samples instructed on/ Analysis started on:**	15/07/2026
Your order number:		**Analysis completed by:**	29/07/2026
Report Issue Number:	1	**Report issued on:**	29/07/2026
Samples Analysed:	4 soil samples		



Signed:

Rachel Chappell
Key Account Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 26-038216
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				983615	983616	983617	983618
Sample Reference				TP204	TP204	TP208	TP208
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.00-0.20	0.50-1.00	0.00-0.40	0.60-1.00
Date Sampled				09/07/2026	09/07/2026	09/07/2026	09/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				
Mass of stone >10mm	%	0.1	NONE	< 0.1	55.8	30	43.6
Moisture Content	%	0.01	NONE	1.9	4.8	4.1	6
Total mass of sample received	kg	0.1	NONE	2	2	2	2
Whole Sample Crushed	N/A	N/A	NONE	-	Crushed	-	-
Asbestos							
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KWB	KWB	KWB	KWB
Analysis completed	N/A	N/A	N/A	24/07/2026	24/07/2026	24/07/2026	24/07/2026
General Inorganics							
pH (L099)	pH Units	N/A	MCERTS	8.7	7.2	6.4	7
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	5.4	0.8	6.2	1.1
Total Phenols							
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	1.1	-	3.8	-
Acenaphthylene	mg/kg	0.05	MCERTS	0.1	-	0.2	-
Acenaphthene	mg/kg	0.05	MCERTS	0.27	-	1.1	-
Fluorene	mg/kg	0.05	MCERTS	0.22	-	0.74	-
Phenanthrene	mg/kg	0.05	MCERTS	2.9	-	7.7	-
Anthracene	mg/kg	0.05	MCERTS	0.69	-	1.3	-
Fluoranthene	mg/kg	0.05	MCERTS	4.3	-	9.9	-
Pyrene	mg/kg	0.05	MCERTS	4.1	-	9.1	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.7	-	5.2	-
Chrysene	mg/kg	0.05	MCERTS	3.1	-	5.7	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	4.1	-	6.7	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	1.3	-	2.1	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3	-	4.6	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.7	-	2.4	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.43	-	0.65	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2	-	2.7	-
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	32	-	64	-

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Analytical Report Number: 26-038216
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				983615	983616	983617	983618
Sample Reference				TP204	TP204	TP208	TP208
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.00-0.20	0.50-1.00	0.00-0.40	0.60-1.00
Date Sampled				09/07/2026	09/07/2026	09/07/2026	09/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				
Heavy Metals / Metalloids							
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	17	< 1.0	17	< 1.0
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	42	11	52	11
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	2	1.1	1.8	1.2
Boron (water soluble)	mg/kg	0.2	MCERTS	0.5	0.2	0.6	< 0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.7	< 0.2	0.6	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	68	26	25	23
Copper (aqua regia extractable)	mg/kg	1	MCERTS	270	54	460	110
Lead (aqua regia extractable)	mg/kg	1	MCERTS	380	32	380	46
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	51	39	49	35
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	69	29	50	28
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	130	88	130	100
Petroleum Hydrocarbons							
TPHCWG - Aliphatic >EC5 - EC6 $_{HS_1D_AL}$	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-
TPHCWG - Aliphatic >EC6 - EC8 $_{HS_1D_AL}$	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-
TPHCWG - Aliphatic >EC8 - EC10 $_{HS_1D_AL}$	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-
TPHCWG - Aliphatic >EC10 - EC12 $_{EH_CU_1D_AL}$	mg/kg	1	MCERTS	< 1.0	-	1.5	-
TPHCWG - Aliphatic >EC12 - EC16 $_{EH_CU_1D_AL}$	mg/kg	2	MCERTS	< 2.0	-	5.4	-
TPHCWG - Aliphatic >EC16 - EC21 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	< 8.0	-	13	-
TPHCWG - Aliphatic >EC21 - EC35 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	14	-	100	-
TPHCWG - Aliphatic >EC35 - EC44 $_{EH_CU_1D_AL}$	mg/kg	8.4	NONE	< 8.4	-	28	-
TPHCWG - Aliphatic >EC5 - EC35 $_{EH_CU+HS_1D_AL}$	mg/kg	10	NONE	14	-	120	-
TPHCWG - Aliphatic >EC5 - EC44 $_{EH_CU+HS_1D_AL}$	mg/kg	10	NONE	14	-	150	-
TPHCWG - Aromatic >EC5 - EC7 $_{HS_1D_AR}$	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-
TPHCWG - Aromatic >EC7 - EC8 $_{HS_1D_AR}$	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-
TPHCWG - Aromatic >EC8 - EC10 $_{HS_1D_AR}$	mg/kg	0.02	MCERTS	< 0.020	-	< 0.020	-
TPHCWG - Aromatic >EC10 - EC12 $_{EH_CU_1D_AR}$	mg/kg	1	MCERTS	< 1.0	-	< 1.0	-
TPHCWG - Aromatic >EC12 - EC16 $_{EH_CU_1D_AR}$	mg/kg	2	MCERTS	2.2	-	3	-
TPHCWG - Aromatic >EC16 - EC21 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	11	-	13	-
TPHCWG - Aromatic >EC21 - EC35 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	30	-	48	-
TPHCWG - Aromatic >EC35 - EC44 $_{EH_CU_1D_AR}$	mg/kg	8.4	NONE	10	-	12	-
TPHCWG - Aromatic >EC5 - EC35 $_{EH_CU+HS_1D_AR}$	mg/kg	10	NONE	43	-	64	-
TPHCWG - Aromatic >EC5 - EC44 $_{EH_CU+HS_1D_AR}$	mg/kg	10	NONE	53	-	76	-
VOCs							
Chloromethane	µg/kg	5	MCERTS	< 5.0	-	-	-
Chloroethane	µg/kg	5	MCERTS	< 5.0	-	-	-
Bromomethane	µg/kg	5	MCERTS	< 5.0	-	-	-
Vinyl Chloride	µg/kg	5	NONE	< 5.0	-	-	-
Trichlorofluoromethane	µg/kg	5	MCERTS	< 5.0	-	-	-
1,1-Dichloroethene	µg/kg	5	MCERTS	< 5.0	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	MCERTS	< 5.0	-	-	-
Trans 1,2-dichloroethylene	µg/kg	5	MCERTS	< 5.0	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,1-Dichloroethane	µg/kg	5	MCERTS	< 5.0	-	-	-

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Analytical Report Number: 26-038216
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				983615	983616	983617	983618
Sample Reference				TP204	TP204	TP208	TP208
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.00-0.20	0.50-1.00	0.00-0.40	0.60-1.00
Date Sampled				09/07/2026	09/07/2026	09/07/2026	09/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				
2,2-Dichloropropane	µg/kg	5	NONE	< 5.0	-	-	-
Chloroform	µg/kg	5	MCERTS	< 5.0	-	-	-
1,1,1-Trichloroethane	µg/kg	5	MCERTS	< 5.0	-	-	-
1,2-Dichloroethane	µg/kg	7	MCERTS	< 7.0	-	-	-
1,1-Dichloropropene	µg/kg	5	MCERTS	< 5.0	-	-	-
Cis-1,2-dichloroethene	µg/kg	5	MCERTS	< 5.0	-	-	-
Benzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Carbontetrachloride	µg/kg	5	MCERTS	< 5.0	-	-	-
1,2-Dichloropropane	µg/kg	6	MCERTS	< 6.0	-	-	-
Trichloroethene	µg/kg	10	MCERTS	< 10	-	-	-
Dibromomethane	µg/kg	5	MCERTS	< 5.0	-	-	-
Bromodichloromethane	µg/kg	5	MCERTS	< 5.0	-	-	-
Cis-1,3-dichloropropene	µg/kg	5	MCERTS	< 5.0	-	-	-
Trans-1,3-dichloropropene	µg/kg	10	MCERTS	< 10	-	-	-
Toluene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,1,2-Trichloroethane	µg/kg	6	MCERTS	< 6.0	-	-	-
1,3-Dichloropropane	µg/kg	5	MCERTS	< 5.0	-	-	-
Dibromochloromethane	µg/kg	5	MCERTS	< 5.0	-	-	-
Tetrachloroethene	µg/kg	5	MCERTS	< 5.0	-	-	-
1,2-Dibromoethane	µg/kg	5	MCERTS	< 5.0	-	-	-
Chlorobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	5	MCERTS	< 5.0	-	-	-
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	-	< 8.0	-
Styrene	µg/kg	5	MCERTS	< 5.0	-	-	-
Bromoform	µg/kg	5	MCERTS	< 5.0	-	-	-
o-Xylene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Isopropylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	< 5.0	-	-	-
Bromobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-
n-Propylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-
2-Chlorotoluene	µg/kg	5	MCERTS	< 5.0	-	-	-
4-Chlorotoluene	µg/kg	5	MCERTS	< 5.0	-	-	-
1,3,5-Trimethylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-
tert-Butylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-
1,2,4-Trimethylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-
sec-Butylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-
1,3-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-
p-Isopropyltoluene	µg/kg	5	MCERTS	< 5.0	-	-	-
1,4-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-
1,2-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-
Butylbenzene	µg/kg	5	MCERTS	< 5.0	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	8	MCERTS	< 8.0	-	-	-
1,2,4-Trichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-
Hexachlorobutadiene	µg/kg	5	MCERTS	< 5.0	-	-	-
1,2,3-Trichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	-	-

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Analytical Report Number: 26-038216
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				983615	983616	983617	983618
Sample Reference				TP204	TP204	TP208	TP208
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.00-0.20	0.50-1.00	0.00-0.40	0.60-1.00
Date Sampled				09/07/2026	09/07/2026	09/07/2026	09/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	< 0.005	-	-	-
Benzene	mg/kg	0.005	MCERTS	< 0.005	-	-	-
Toluene	mg/kg	0.005	MCERTS	< 0.005	-	-	-
Ethylbenzene	mg/kg	0.005	MCERTS	< 0.005	-	-	-
p & m-xylene	mg/kg	0.008	MCERTS	< 0.008	-	-	-
o-Xylene	mg/kg	0.005	MCERTS	< 0.005	-	-	-
SVOCs							
Aniline	mg/kg	0.1	NONE	< 0.1	-	-	-
Phenol	mg/kg	0.2	ISO 17025	< 0.2	-	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2	-	-	-
1,3-Dichlorobenzene	mg/kg	0.2	NONE	< 0.2	-	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1	-	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-
Hexachloroethane	mg/kg	0.05	ISO 17025	< 0.05	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	-	-	-
Isophorone	mg/kg	0.2	MCERTS	< 0.2	-	-	-
2-Nitrophenol	mg/kg	0.3	NONE	< 0.3	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	< 0.1	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	< 0.2	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	1.2	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	NONE	< 0.1	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	NONE	< 0.2	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	0.5	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	< 0.3	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	-
4-Nitroaniline	mg/kg	0.2	NONE	< 0.2	-	-	-
Azobenzene	mg/kg	0.3	NONE	< 0.3	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.30	-	-	-
Carbazole	mg/kg	0.3	MCERTS	< 0.3	-	-	-
Dibutyl phthalate	mg/kg	0.2	NONE	< 0.2	-	-	-
Anthraquinone	mg/kg	0.3	NONE	0.4	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	NONE	< 0.3	-	-	-

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Analytical Report Number: 26-038216
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				983615	983616	983617	983618
Sample Reference				TP204	TP204	TP208	TP208
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.00-0.20	0.50-1.00	0.00-0.40	0.60-1.00
Date Sampled				09/07/2026	09/07/2026	09/07/2026	09/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				
PCBs							
PCB Congener 077	mg/kg	0.001	NONE	< 0.001	-	-	-
PCB Congener 081	mg/kg	0.001	NONE	< 0.001	-	-	-
PCB Congener 105	mg/kg	0.001	NONE	< 0.001	-	-	-
PCB Congener 114	mg/kg	0.001	NONE	< 0.001	-	-	-
PCB Congener 118	mg/kg	0.001	NONE	< 0.001	-	-	-
PCB Congener 123	mg/kg	0.001	NONE	< 0.001	-	-	-
PCB Congener 126	mg/kg	0.001	NONE	< 0.001	-	-	-
PCB Congener 156	mg/kg	0.001	NONE	< 0.001	-	-	-
PCB Congener 157	mg/kg	0.001	NONE	< 0.001	-	-	-
PCB Congener 167	mg/kg	0.001	NONE	< 0.001	-	-	-
PCB Congener 169	mg/kg	0.001	NONE	< 0.001	-	-	-
PCB Congener 189	mg/kg	0.001	NONE	< 0.001	-	-	-
Total PCBs	mg/kg	0.012	NONE	< 0.012	-	-	-

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

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Analytical Report Number : 26-038216
Project / Site name: Land Adjacent to Penistone Station

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
983615	TP204	None Supplied	0.00-0.20	Brown sand with gravel and vegetation
983616	TP204	None Supplied	0.50-1.00	Brown loam and sand with gravel and stones
983617	TP208	None Supplied	0.00-0.40	Brown sand with vegetation and stones
983618	TP208	None Supplied	0.60-1.00	Brown sand with gravel and stones

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Analytical Report Number : 26-038216
Project / Site name: Land Adjacent to Penistone Station

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content (Wet Weight)	Moisture content (% wet weight), determined gravimetrically (up to 30°C)	In-house-procedure based on BS EN 12880:2000	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCBs WHO 12 in soil	Determination of PCBs (WHO-12 Congeners) by GC-MS	In-house method based on USEPA 8082	L027B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID in soil	Determination of total petroleum hydrocarbons in soil by GC-FID with carbon banding aliphatic and aromatic	In-house method	L076B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil (Summed Bands)	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic (Summed Bands).	Calculation	L076B/L088-PL	D/W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total petroleum hydrocarbons with carbon banding by HS-GC/MS in soil	Determination of total petroleum hydrocarbons in soil by HS-GC/MS with carbon banding aliphatic and aromatic	In-house method	L088-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

Analytical Report Number : 26-038216
Project / Site name: Land Adjacent to Penistone Station

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE
Whole Sample Crushed	Either: Client specific preparation instructions - sample(s) crushed whole prior to analysis OR Sample unsuitable for standard preparation and therefore crushed whole prior to analysis	In house method, applicable to dry samples only	L019B	D	NONE

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

Where coal tar is reported as "indicative/not indicative", PAH source attribution has been assessed using the ratio of parent PAHs to alkylated PAHs to indicate a likely pyrogenic (coal tar–related) or petrogenic (bitumen-related) origin. This assessment is independent of total residue and/or benzo(a)pyrene concentrations and is provided for indicative purposes only; it represents a single line of evidence and does not, in isolation, constitute confirmation or classification as hazardous under WM3 guidance.

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

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Analytical Report Number : 26-038562

Project / Site name:	Land Adjacent to Penistone Station	**Samples received on:**	15/07/2026
Your job number:	C6144 26 E 9573	**Samples instructed on/ Analysis started on:**	15/07/2026
Your order number:		**Analysis completed by:**	27/07/2026
Report Issue Number:	1	**Report issued on:**	27/07/2026
Samples Analysed:	4 soil samples		



Signed:

Claire Bancroft
Customer Service and Accounts Support
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 26-038562
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				985323	985324	985325	985326
Sample Reference				TP203	TP203	TP207	TP207
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.10-0.40	0.60-1.00	0.00-0.70	0.70-1.00
Date Sampled				08/07/2026	08/07/2026	08/07/2026	08/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				
Mass of stone >10mm	%	0.1	NONE	28.7	63.9	71	70.9
Moisture Content	%	0.01	NONE	5.1	5.7	4.4	5.4
Total mass of sample received	kg	0.1	NONE	1	1.4	1.7	2
Whole Sample Crushed	N/A	N/A	NONE	-	Crushed	Crushed	Crushed
Asbestos							
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	PDO	PDO	PDO	PDO
Analysis completed	N/A	N/A	N/A	24/07/2026	24/07/2026	24/07/2026	24/07/2026
General Inorganics							
pH (L099)	pH Units	N/A	MCERTS	7.5	7.5	7.5	6.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	6.1	0.9	3	0.5
Total Phenols							
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	1	-	0.94	-
Acenaphthylene	mg/kg	0.05	MCERTS	0.08	-	0.19	-
Acenaphthene	mg/kg	0.05	MCERTS	0.14	-	0.17	-
Fluorene	mg/kg	0.05	MCERTS	0.14	-	0.15	-
Phenanthrene	mg/kg	0.05	MCERTS	2	-	2	-
Anthracene	mg/kg	0.05	MCERTS	0.49	-	0.49	-
Fluoranthene	mg/kg	0.05	MCERTS	2.8	-	3	-
Pyrene	mg/kg	0.05	MCERTS	2.7	-	2.8	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.6	-	1.6	-
Chrysene	mg/kg	0.05	MCERTS	1.8	-	1.6	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2	-	1.8	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.72	-	0.91	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.3	-	1.4	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.72	-	0.8	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.2	-	0.18	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.74	-	0.81	-
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	18.5	-	18.8	-

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Lab Sample Number				985323	985324	985325	985326
Sample Reference				TP203	TP203	TP207	TP207
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.10-0.40	0.60-1.00	0.00-0.70	0.70-1.00
Date Sampled				08/07/2026	08/07/2026	08/07/2026	08/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				
Heavy Metals / Metalloids							
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	11	3.2	9.3	< 1.0
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	32	11	26	6.3
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.8	1.1	1.4	1.3
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	0.3	0.4	< 0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	< 0.2	0.3	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	27	21	27
Copper (aqua regia extractable)	mg/kg	1	MCERTS	280	59	170	43
Lead (aqua regia extractable)	mg/kg	1	MCERTS	120	25	180	38
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	39	39	34	39
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	52	28	34	26
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	69	130	110
Petroleum Hydrocarbons							
TPHCWG - Aliphatic >EC5 - EC6 $_{HS_1D_AL}$	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-
TPHCWG - Aliphatic >EC6 - EC8 $_{HS_1D_AL}$	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-
TPHCWG - Aliphatic >EC8 - EC10 $_{HS_1D_AL}$	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-
TPHCWG - Aliphatic >EC10 - EC12 $_{EH_CU_1D_AL}$	mg/kg	1	MCERTS	< 1.0	-	< 1.0	-
TPHCWG - Aliphatic >EC12 - EC16 $_{EH_CU_1D_AL}$	mg/kg	2	MCERTS	< 2.0	-	< 2.0	-
TPHCWG - Aliphatic >EC16 - EC21 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	< 8.0	-	< 8.0	-
TPHCWG - Aliphatic >EC21 - EC35 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	35	-	39	-
TPHCWG - Aliphatic >EC35 - EC44 $_{EH_CU_1D_AL}$	mg/kg	8.4	NONE	< 8.4	-	< 8.4	-
TPHCWG - Aliphatic >EC5 - EC35 $_{EH_CU+HS_1D_AL}$	mg/kg	10	NONE	35	-	39	-
TPHCWG - Aliphatic >EC5 - EC44 $_{EH_CU+HS_1D_AL}$	mg/kg	10	NONE	35	-	39	-
TPHCWG - Aromatic >EC5 - EC7 $_{HS_1D_AR}$	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-
TPHCWG - Aromatic >EC7 - EC8 $_{HS_1D_AR}$	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-
TPHCWG - Aromatic >EC8 - EC10 $_{HS_1D_AR}$	mg/kg	0.02	MCERTS	< 0.020	-	< 0.020	-
TPHCWG - Aromatic >EC10 - EC12 $_{EH_CU_1D_AR}$	mg/kg	1	MCERTS	< 1.0	-	< 1.0	-
TPHCWG - Aromatic >EC12 - EC16 $_{EH_CU_1D_AR}$	mg/kg	2	MCERTS	< 2.0	-	< 2.0	-
TPHCWG - Aromatic >EC16 - EC21 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	< 10	-	< 10	-
TPHCWG - Aromatic >EC21 - EC35 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	< 10	-	18	-
TPHCWG - Aromatic >EC35 - EC44 $_{EH_CU_1D_AR}$	mg/kg	8.4	NONE	< 8.4	-	< 8.4	-
TPHCWG - Aromatic >EC5 - EC35 $_{EH_CU+HS_1D_AR}$	mg/kg	10	NONE	< 10	-	18	-
TPHCWG - Aromatic >EC5 - EC44 $_{EH_CU+HS_1D_AR}$	mg/kg	10	NONE	< 10	-	18	-
VOCs							
Chloromethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Chloroethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Bromomethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Vinyl Chloride	µg/kg	5	NONE	< 5.0	-	< 5.0	-
Trichlorofluoromethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,1-Dichloroethene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Trans 1,2-dichloroethylene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,1-Dichloroethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-

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Analytical Report Number: 26-038562
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				985323	985324	985325	985326
Sample Reference				TP203	TP203	TP207	TP207
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.10-0.40	0.60-1.00	0.00-0.70	0.70-1.00
Date Sampled				08/07/2026	08/07/2026	08/07/2026	08/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				
2,2-Dichloropropane	µg/kg	5	NONE	< 5.0	-	< 5.0	-
Chloroform	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,1,1-Trichloroethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,2-Dichloroethane	µg/kg	7	MCERTS	< 7.0	-	< 7.0	-
1,1-Dichloropropene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Cis-1,2-dichloroethene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Benzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Carbontetrachloride	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,2-Dichloropropane	µg/kg	6	MCERTS	< 6.0	-	< 6.0	-
Trichloroethene	µg/kg	10	MCERTS	< 10	-	< 10	-
Dibromomethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Bromodichloromethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Cis-1,3-dichloropropene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Trans-1,3-dichloropropene	µg/kg	10	MCERTS	< 10	-	< 10	-
Toluene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,1,2-Trichloroethane	µg/kg	6	MCERTS	< 6.0	-	< 6.0	-
1,3-Dichloropropane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Dibromochloromethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Tetrachloroethene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,2-Dibromoethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Chlorobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,1,1,2-Tetrachloroethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	-	< 8.0	-
Styrene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Bromoform	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
o-Xylene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Isopropylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	< 5.0	-	< 5.0	-
Bromobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
n-Propylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
2-Chlorotoluene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
4-Chlorotoluene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,3,5-Trimethylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
tert-Butylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,2,4-Trimethylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
sec-Butylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,3-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
p-Isopropyltoluene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,4-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,2-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Butylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,2-Dibromo-3-chloropropane	µg/kg	8	MCERTS	< 8.0	-	< 8.0	-
1,2,4-Trichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
Hexachlorobutadiene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-
1,2,3-Trichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-

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Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				985323	985324	985325	985326
Sample Reference				TP203	TP203	TP207	TP207
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.10-0.40	0.60-1.00	0.00-0.70	0.70-1.00
Date Sampled				08/07/2026	08/07/2026	08/07/2026	08/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	< 0.005	-	< 0.005	-
Benzene	mg/kg	0.005	MCERTS	< 0.005	-	< 0.005	-
Toluene	mg/kg	0.005	MCERTS	< 0.005	-	< 0.005	-
Ethylbenzene	mg/kg	0.005	MCERTS	< 0.005	-	< 0.005	-
p & m-xylene	mg/kg	0.008	MCERTS	< 0.008	-	< 0.008	-
o-Xylene	mg/kg	0.005	MCERTS	< 0.005	-	< 0.005	-
SVOCs							
Aniline	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-
Phenol	mg/kg	0.2	ISO 17025	< 0.2	-	< 0.2	-
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	-
1,3-Dichlorobenzene	mg/kg	0.2	NONE	< 0.2	-	< 0.2	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	-
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-
Hexachloroethane	mg/kg	0.05	ISO 17025	< 0.05	-	< 0.05	-
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	-	< 0.2	-
Isophorone	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	-
2-Nitrophenol	mg/kg	0.3	NONE	< 0.3	-	< 0.3	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	< 0.2	-	< 0.2	-
2-Methylnaphthalene	mg/kg	0.1	NONE	1	-	1	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	-
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	-
2,6-Dinitrotoluene	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-
2,4-Dinitrotoluene	mg/kg	0.2	NONE	< 0.2	-	< 0.2	-
Dibenzofuran	mg/kg	0.2	MCERTS	0.4	-	0.4	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	-
4-Nitroaniline	mg/kg	0.2	NONE	< 0.2	-	< 0.2	-
Azobenzene	mg/kg	0.3	NONE	< 0.3	-	< 0.3	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.30	-	< 0.30	-
Carbazole	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-
Dibutyl phthalate	mg/kg	0.2	NONE	< 0.2	-	< 0.2	-
Anthraquinone	mg/kg	0.3	NONE	< 0.3	-	0.3	-
Butyl benzyl phthalate	mg/kg	0.3	NONE	< 0.3	-	< 0.3	-

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Lab Sample Number				985323	985324	985325	985326
Sample Reference				TP203	TP203	TP207	TP207
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.10-0.40	0.60-1.00	0.00-0.70	0.70-1.00
Date Sampled				08/07/2026	08/07/2026	08/07/2026	08/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				
PCBs							
PCB Congener 077	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-
PCB Congener 081	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-
PCB Congener 105	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-
PCB Congener 114	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-
PCB Congener 118	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-
PCB Congener 123	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-
PCB Congener 126	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-
PCB Congener 156	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-
PCB Congener 157	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-
PCB Congener 167	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-
PCB Congener 169	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-
PCB Congener 189	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-
Total PCBs	mg/kg	0.012	NONE	< 0.012	-	< 0.012	-

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

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Project / Site name: Land Adjacent to Penistone Station

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
985323	TP203	None Supplied	0.10-0.40	Brown sandy clay with vegetation and stones
985324	TP203	None Supplied	0.60-1.00	Brown sand with gravel and stones
985325	TP207	None Supplied	0.00-0.70	Brown loam and sand with gravel and stones
985326	TP207	None Supplied	0.70-1.00	Brown sandy clay with gravel and stones

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 26-038562
Project / Site name: Land Adjacent to Penistone Station

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content (Wet Weight)	Moisture content (% wet weight), determined gravimetrically (up to 30°C)	In-house-procedure based on BS EN 12880:2000	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCBs WHO 12 in soil	Determination of PCBs (WHO-12 Congeners) by GC-MS	In-house method based on USEPA 8082	L027B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID in soil	Determination of total petroleum hydrocarbons in soil by GC-FID with carbon banding aliphatic and aromatic	In-house method	L076B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil (Summed Bands)	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic (Summed Bands).	Calculation	L076B/L088-PL	D/W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total petroleum hydrocarbons with carbon banding by HS-GC/MS in soil	Determination of total petroleum hydrocarbons in soil by HS-GC/MS with carbon banding aliphatic and aromatic	In-house method	L088-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

Analytical Report Number : 26-038562
Project / Site name: Land Adjacent to Penistone Station

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE
Whole Sample Crushed	Either: Client specific preparation instructions - sample(s) crushed whole prior to analysis OR Sample unsuitable for standard preparation and therefore crushed whole prior to analysis	In house method, applicable to dry samples only	L019B	D	NONE

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

Where coal tar is reported as "indicative/not indicative", PAH source attribution has been assessed using the ratio of parent PAHs to alkylated PAHs to indicate a likely pyrogenic (coal tar–related) or petrogenic (bitumen-related) origin. This assessment is independent of total residue and/or benzo(a)pyrene concentrations and is provided for indicative purposes only; it represents a single line of evidence and does not, in isolation, constitute confirmation or classification as hazardous under WM3 guidance.

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

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Analytical Report Number : 26-038566

Project / Site name:	Land Adjacent to Penistone Station	**Samples received on:**	15/07/2026
Your job number:	C6144 26 E 9573	**Samples instructed on/ Analysis started on:**	15/07/2026
Your order number:		**Analysis completed by:**	25/07/2026
Report Issue Number:	1	**Report issued on:**	25/07/2026
Samples Analysed:	2 soil samples		

Signed:

Rachel Chappell
Key Account Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

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

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 26-038566
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				985351	985352
Sample Reference				BH101	BH101
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				0.00-0.20	0.40-0.60
Date Sampled				01/07/2026	01/07/2026
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		
Mass of stone >10mm	%	0.1	NONE	75.5	39.8
Moisture Content	%	0.01	NONE	2.1	5
Total mass of sample received	kg	0.1	NONE	2	2
Whole Sample Crushed	N/A	N/A	NONE	Crushed	-
Asbestos					
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	PKU	PKU
Analysis completed	N/A	N/A	N/A	24/07/2026	24/07/2026
General Inorganics					
pH (L099)	pH Units	N/A	MCERTS	8.6	7.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2.3	0.4
Total Phenols					
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0
Heavy Metals / Metalloids					
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	13	3.6
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	22	9.7
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.8	1.3
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	< 0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.5	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	91	36
Copper (aqua regia extractable)	mg/kg	1	MCERTS	150	44
Lead (aqua regia extractable)	mg/kg	1	MCERTS	89	27
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	32	42
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	66	28
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	110
PCBs					
PCB Congener 077	mg/kg	0.001	NONE	< 0.001	< 0.001
PCB Congener 081	mg/kg	0.001	NONE	< 0.001	< 0.001
PCB Congener 105	mg/kg	0.001	NONE	< 0.001	< 0.001
PCB Congener 114	mg/kg	0.001	NONE	< 0.001	< 0.001
PCB Congener 118	mg/kg	0.001	NONE	< 0.001	< 0.001
PCB Congener 123	mg/kg	0.001	NONE	< 0.001	< 0.001
PCB Congener 126	mg/kg	0.001	NONE	< 0.001	< 0.001
PCB Congener 156	mg/kg	0.001	NONE	< 0.001	< 0.001
PCB Congener 157	mg/kg	0.001	NONE	< 0.001	< 0.001
PCB Congener 167	mg/kg	0.001	NONE	< 0.001	< 0.001
PCB Congener 169	mg/kg	0.001	NONE	< 0.001	< 0.001
PCB Congener 189	mg/kg	0.001	NONE	< 0.001	< 0.001

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Analytical Report Number: 26-038566
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				985351	985352
Sample Reference				BH101	BH101
Sample Number				None Supplied	None Supplied
Water Matrix				N/A	N/A
Depth (m)				0.00-0.20	0.40-0.60
Date Sampled				01/07/2026	01/07/2026
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		
Total PCBs	mg/kg	0.012	NONE	< 0.012	< 0.012

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

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Analytical Report Number : 26-038566
Project / Site name: Land Adjacent to Penistone Station

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
985351	BH101	None Supplied	0.00-0.20	Brown sand with gravel and stones
985352	BH101	None Supplied	0.40-0.60	Brown sand with gravel and stones

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Analytical Report Number : 26-038566
Project / Site name: Land Adjacent to Penistone Station

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Whole Sample Crushed	Either: Client specific preparation instructions - sample(s) crushed whole prior to analysis OR Sample unsuitable for standard preparation and therefore crushed whole prior to analysis	In house method, applicable to dry samples only	L019B	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content (Wet Weight)	Moisture content (% wet weight), determined gravimetrically (up to 30°C)	In-house-procedure based on BS EN 12880:2000	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
PCBs WHO 12 in soil	Determination of PCBs (WHO-12 Congeners) by GC-MS	In-house method based on USEPA 8082	L027B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

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

Where coal tar is reported as "indicative/not indicative", PAH source attribution has been assessed using the ratio of parent PAHs to alkylated PAHs to indicate a likely pyrogenic (coal tar–related) or petrogenic (bitumen-related) origin. This assessment is independent of total residue and/or benzo(a)pyrene concentrations and is provided for indicative purposes only; it represents a single line of evidence and does not, in isolation, constitute confirmation or classification as hazardous under WM3 guidance.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 26-038566
Project / Site name: Land Adjacent to Penistone Station

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

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

Analytical Report Number : 26-038566
Project / Site name: Land Adjacent to Penistone Station

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container/Insufficient material provided c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH101	N/A	S	985351	c	Monohydric phenols in soil	L080-PL	c
BH101	N/A	S	985351	c	Total cyanide in soil	L080-PL	c
BH101	N/A	S	985351	c	pH in soil (automated)	L099-PL	c
BH101	N/A	S	985352	c	Monohydric phenols in soil	L080-PL	c
BH101	N/A	S	985352	c	Total cyanide in soil	L080-PL	c
BH101	N/A	S	985352	c	pH in soil (automated)	L099-PL	c

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 26-041294

Project / Site name:	Land Adjacent to Penistone Station	**Samples received on:**	29/07/2026
Your job number:	C6144/26/E/9573	**Samples instructed on/ Analysis started on:**	29/07/2026
Your order number:		**Analysis completed by:**	11/08/2026
Report Issue Number:	1	**Report issued on:**	11/08/2026
Samples Analysed:	11 soil samples		



Signed:

Rachel Chappell
Key Account Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

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

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999782	999783	999784	999785	999786
Sample Reference				BH101	BH102	BH103	TP201	TP201
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.80-1.00	0.65-0.90	0.80-1.00	0.00-0.50	1.00-1.50
Date Sampled				24/07/2026	24/07/2026	24/07/2026	24/07/2026	24/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					
Mass of stone >10mm	%	0.1	NONE	81.5	< 0.1	< 0.1	59.1	< 0.1
Moisture Content	%	0.01	NONE	4.1	9	5.9	5.9	5.2
Total mass of sample received	kg	0.1	NONE	2	0.4	0.3	2	2
Whole Sample Crushed	N/A	N/A	NONE	Crushed	-	-	Crushed	-
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	-	-	-	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	-	-	-	MBI	MBI
Analysis completed	N/A	N/A	N/A	-	-	-	05/08/2026	05/08/2026
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	6.1	7.6	8.2	7.6	8
Total Cyanide	mg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Total Sulphate as SO_4	%	0.005	MCERTS	0.024	0.016	0.007	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	40	42	20	-	-
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	20.1	20.8	9.79	-	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	0.8	1.5	2.3	-	-
Total Sulphur	mg/kg	50	MCERTS	160	67	59	-	-
Total Sulphur	%	0.005	MCERTS	0.016	0.007	0.006	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-	-	3.8	1.1
Nitrate as NO_3 (Water Soluble) (2:1)	mg/kg	0.9	NONE	< 0.90	< 0.90	< 0.90	-	-
Water Soluble Nitrate (2:1) as NO_3 (leachate equivalent)	mg/l	0.9	N/A	< 0.90	< 0.90	< 0.90	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	0.99	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	0.1	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	0.09	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	1.5	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	0.27	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	1.8	-
Pyrene	mg/kg	0.05	MCERTS	-	-	-	1.6	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	0.83	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	1.2	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	1.3	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	0.6	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	0.79	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	0.52	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	0.17	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	0.56	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	-	-	12.2	-
Heavy Metals / Metalloids								

Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999782	999783	999784	999785	999786
Sample Reference				BH101	BH102	BH103	TP201	TP201
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.80-1.00	0.65-0.90	0.80-1.00	0.00-0.50	1.00-1.50
Date Sampled				24/07/2026	24/07/2026	24/07/2026	24/07/2026	24/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	-	-	-	9.1	4.3
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	24	13
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	1	1.1
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	0.6	0.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	22	30
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	190	80
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	87	38
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	32	40
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	36	31
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	99	96
Magnesium (leachate equivalent)	mg/l	2.5	NONE	< 2.5	4.9	27	-	-
Magnesium (water soluble)	mg/kg	5	NONE	< 5.0	9.9	53	-	-
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 $_{HS_1D_AL}$	mg/kg	0.01	MCERTS	-	-	-	< 0.010	-
TPHCWG - Aliphatic >EC6 - EC8 $_{HS_1D_AL}$	mg/kg	0.01	MCERTS	-	-	-	< 0.010	-
TPHCWG - Aliphatic >EC8 - EC10 $_{HS_1D_AL}$	mg/kg	0.01	MCERTS	-	-	-	< 0.010	-
TPHCWG - Aliphatic >EC10 - EC12 $_{EH_CU_1D_AL}$	mg/kg	1	MCERTS	-	-	-	< 1.0	-
TPHCWG - Aliphatic >EC12 - EC16 $_{EH_CU_1D_AL}$	mg/kg	2	MCERTS	-	-	-	< 2.0	-
TPHCWG - Aliphatic >EC16 - EC21 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	-	-	-	< 8.0	-
TPHCWG - Aliphatic >EC21 - EC35 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	-	-	-	33	-
TPHCWG - Aliphatic >EC35 - EC44 $_{EH_CU_1D_AL}$	mg/kg	8.4	NONE	-	-	-	9.2	-
TPHCWG - Aliphatic >EC5 - EC35 $_{EH_CU+HS_1D_AL}$	mg/kg	10	NONE	-	-	-	33	-
TPHCWG - Aliphatic >EC5 - EC44 $_{EH_CU+HS_1D_AL}$	mg/kg	10	NONE	-	-	-	42	-
TPHCWG - Aromatic >EC5 - EC7 $_{HS_1D_AR}$	mg/kg	0.01	MCERTS	-	-	-	< 0.010	-
TPHCWG - Aromatic >EC7 - EC8 $_{HS_1D_AR}$	mg/kg	0.01	MCERTS	-	-	-	< 0.010	-
TPHCWG - Aromatic >EC8 - EC10 $_{HS_1D_AR}$	mg/kg	0.02	MCERTS	-	-	-	< 0.020	-
TPHCWG - Aromatic >EC10 - EC12 $_{EH_CU_1D_AR}$	mg/kg	1	MCERTS	-	-	-	< 1.0	-
TPHCWG - Aromatic >EC12 - EC16 $_{EH_CU_1D_AR}$	mg/kg	2	MCERTS	-	-	-	< 2.0	-
TPHCWG - Aromatic >EC16 - EC21 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	-	-	-	< 10	-
TPHCWG - Aromatic >EC21 - EC35 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	-	-	-	14	-
TPHCWG - Aromatic >EC35 - EC44 $_{EH_CU_1D_AR}$	mg/kg	8.4	NONE	-	-	-	< 8.4	-
TPHCWG - Aromatic >EC5 - EC35 $_{EH_CU+HS_1D_AR}$	mg/kg	10	NONE	-	-	-	14	-
TPHCWG - Aromatic >EC5 - EC44 $_{EH_CU+HS_1D_AR}$	mg/kg	10	NONE	-	-	-	14	-
VOCs								
Chloromethane	µg/kg	5	MCERTS	-	-	-	-	-
Chloroethane	µg/kg	5	MCERTS	-	-	-	-	-
Bromomethane	µg/kg	5	MCERTS	-	-	-	-	-
Vinyl Chloride	µg/kg	5	NONE	-	-	-	-	-
Trichlorofluoromethane	µg/kg	5	MCERTS	-	-	-	-	-
1,1-Dichloroethene	µg/kg	5	MCERTS	-	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	MCERTS	-	-	-	-	-
Trans 1,2-dichloroethylene	µg/kg	5	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	-	-	-	< 5.0	-
1,1-Dichloroethane	µg/kg	5	MCERTS	-	-	-	-	-
2,2-Dichloropropane	µg/kg	5	NONE	-	-	-	-	-

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Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999782	999783	999784	999785	999786
Sample Reference				BH101	BH102	BH103	TP201	TP201
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.80-1.00	0.65-0.90	0.80-1.00	0.00-0.50	1.00-1.50
Date Sampled				24/07/2026	24/07/2026	24/07/2026	24/07/2026	24/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					
Chloroform	µg/kg	5	MCERTS	-	-	-	-	-
1,1,1-Trichloroethane	µg/kg	5	MCERTS	-	-	-	-	-
1,2-Dichloroethane	µg/kg	7	MCERTS	-	-	-	-	-
1,1-Dichloropropene	µg/kg	5	MCERTS	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	5	MCERTS	-	-	-	-	-
Benzene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
Carbontetrachloride	µg/kg	5	MCERTS	-	-	-	-	-
1,2-Dichloropropane	µg/kg	6	MCERTS	-	-	-	-	-
Trichloroethene	µg/kg	10	MCERTS	-	-	-	-	-
Dibromomethane	µg/kg	5	MCERTS	-	-	-	-	-
Bromodichloromethane	µg/kg	5	MCERTS	-	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	5	MCERTS	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	10	MCERTS	-	-	-	-	-
Toluene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
1,1,2-Trichloroethane	µg/kg	6	MCERTS	-	-	-	-	-
1,3-Dichloropropane	µg/kg	5	MCERTS	-	-	-	-	-
Dibromochloromethane	µg/kg	5	MCERTS	-	-	-	-	-
Tetrachloroethene	µg/kg	5	MCERTS	-	-	-	-	-
1,2-Dibromoethane	µg/kg	5	MCERTS	-	-	-	-	-
Chlorobenzene	µg/kg	5	MCERTS	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	5	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
p & m-Xylene	µg/kg	8	MCERTS	-	-	-	< 8.0	-
Styrene	µg/kg	5	MCERTS	-	-	-	-	-
Bromoform	µg/kg	5	MCERTS	-	-	-	-	-
o-Xylene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
Isopropylbenzene	µg/kg	5	MCERTS	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	-	-	-	-	-
Bromobenzene	µg/kg	5	MCERTS	-	-	-	-	-
n-Propylbenzene	µg/kg	5	MCERTS	-	-	-	-	-
2-Chlorotoluene	µg/kg	5	MCERTS	-	-	-	-	-
4-Chlorotoluene	µg/kg	5	MCERTS	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	5	MCERTS	-	-	-	-	-
tert-Butylbenzene	µg/kg	5	MCERTS	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	5	MCERTS	-	-	-	-	-
sec-Butylbenzene	µg/kg	5	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	µg/kg	5	MCERTS	-	-	-	-	-
p-Isopropyltoluene	µg/kg	5	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	µg/kg	5	MCERTS	-	-	-	-	-
1,2-Dichlorobenzene	µg/kg	5	MCERTS	-	-	-	-	-
Butylbenzene	µg/kg	5	MCERTS	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	8	MCERTS	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	5	MCERTS	-	-	-	-	-
Hexachlorobutadiene	µg/kg	5	MCERTS	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	5	MCERTS	-	-	-	-	-

MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	-	-	-	-	-
Benzene	mg/kg	0.005	MCERTS	-	-	-	-	-
Toluene	mg/kg	0.005	MCERTS	-	-	-	-	-
Ethylbenzene	mg/kg	0.005	MCERTS	-	-	-	-	-
p & m-xylene	mg/kg	0.008	MCERTS	-	-	-	-	-

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Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999782	999783	999784	999785	999786
Sample Reference				BH101	BH102	BH103	TP201	TP201
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.80-1.00	0.65-0.90	0.80-1.00	0.00-0.50	1.00-1.50
Date Sampled				24/07/2026	24/07/2026	24/07/2026	24/07/2026	24/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					
o-Xylene	mg/kg	0.005	MCERTS	-	-	-	-	-
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-	-	-	-
Phenol	mg/kg	0.2	ISO 17025	-	-	-	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	mg/kg	0.2	NONE	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Hexachloroethane	mg/kg	0.05	ISO 17025	-	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Nitrophenol	mg/kg	0.3	NONE	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	-	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	-	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	NONE	-	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	NONE	-	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	-	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Nitroaniline	mg/kg	0.2	NONE	-	-	-	-	-
Azobenzene	mg/kg	0.3	NONE	-	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	NONE	-	-	-	-	-
Anthraquinone	mg/kg	0.3	NONE	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	NONE	-	-	-	-	-
PCBs								
PCB Congener 077	mg/kg	0.001	NONE	-	-	-	-	-
PCB Congener 081	mg/kg	0.001	NONE	-	-	-	-	-
PCB Congener 105	mg/kg	0.001	NONE	-	-	-	-	-
PCB Congener 114	mg/kg	0.001	NONE	-	-	-	-	-
PCB Congener 118	mg/kg	0.001	NONE	-	-	-	-	-
PCB Congener 123	mg/kg	0.001	NONE	-	-	-	-	-
PCB Congener 126	mg/kg	0.001	NONE	-	-	-	-	-

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Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999782	999783	999784	999785	999786
Sample Reference				BH101	BH102	BH103	TP201	TP201
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.80-1.00	0.65-0.90	0.80-1.00	0.00-0.50	1.00-1.50
Date Sampled				24/07/2026	24/07/2026	24/07/2026	24/07/2026	24/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					
PCB Congener 156	mg/kg	0.001	NONE	-	-	-	-	-
PCB Congener 157	mg/kg	0.001	NONE	-	-	-	-	-
PCB Congener 167	mg/kg	0.001	NONE	-	-	-	-	-
PCB Congener 169	mg/kg	0.001	NONE	-	-	-	-	-
PCB Congener 189	mg/kg	0.001	NONE	-	-	-	-	-
Total PCBs	mg/kg	0.012	NONE	-	-	-	-	-

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

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Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999787	999788	999789	999790	999791
Sample Reference				TP202	TP202	TP205	TP205	TP209
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.00-0.50	0.75-1.25	0.00-0.25	1.00-1.60	0.00-0.32
Date Sampled				24/07/2026	24/07/2026	24/07/2026	24/07/2026	24/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					
Mass of stone >10mm	%	0.1	NONE	< 0.1	< 0.1	61.5	< 0.1	46.5
Moisture Content	%	0.01	NONE	5.7	4.6	6.7	5.4	4.9
Total mass of sample received	kg	0.1	NONE	1.9	2	2	2	2
Whole Sample Crushed	N/A	N/A	NONE	-	-	Crushed	-	-
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	MBI	MBI	MBI	MBI	MBI
Analysis completed	N/A	N/A	N/A	05/08/2026	05/08/2026	05/08/2026	05/08/2026	05/08/2026
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	7.4	7.8	7.5	7.4	7.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO_4	%	0.005	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	-
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	-
Total Sulphur	%	0.005	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	7.1	1.3	2.1	1	5.6
Nitrate as NO_3 (Water Soluble) (2:1)	mg/kg	0.9	NONE	-	-	-	-	-
Water Soluble Nitrate (2:1) as NO_3 (leachate equivalent)	mg/l	0.9	N/A	-	-	-	-	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	2.6	-	0.47	-	1.1
Acenaphthylene	mg/kg	0.05	MCERTS	0.08	-	0.05	-	0.22
Acenaphthene	mg/kg	0.05	MCERTS	0.2	-	< 0.05	-	0.16
Fluorene	mg/kg	0.05	MCERTS	0.21	-	< 0.05	-	0.19
Phenanthrene	mg/kg	0.05	MCERTS	2.9	-	0.68	-	3
Anthracene	mg/kg	0.05	MCERTS	0.45	-	0.17	-	0.79
Fluoranthene	mg/kg	0.05	MCERTS	3.2	-	0.96	-	6.1
Pyrene	mg/kg	0.05	MCERTS	3	-	0.86	-	5.6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.8	-	0.63	-	3.2
Chrysene	mg/kg	0.05	MCERTS	1.9	-	0.72	-	3.5
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2	-	0.89	-	4.2
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.74	-	0.4	-	1.9
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.4	-	0.71	-	3.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.69	-	0.48	-	1.8
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.2	-	0.13	-	0.52
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.72	-	0.53	-	2.1
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	22.1	-	7.69	-	37.8
Heavy Metals / Metalloids								

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Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999787	999788	999789	999790	999791
Sample Reference				TP202	TP202	TP205	TP205	TP209
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.00-0.50	0.75-1.25	0.00-0.25	1.00-1.60	0.00-0.32
Date Sampled				24/07/2026	24/07/2026	24/07/2026	24/07/2026	24/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	17	4.9	7.2	4.8	16
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	41	12	18	14	46
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.7	1	1.2	1.1	1.5
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.6	< 0.2	0.7	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.8	< 0.2	< 0.2	< 0.2	0.6
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	25	18	26	39
Copper (aqua regia extractable)	mg/kg	1	MCERTS	380	76	200	66	320
Lead (aqua regia extractable)	mg/kg	1	MCERTS	130	33	59	35	320
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	0.6
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	39	39	36	37	39
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	51	28	38	29	53
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	140	100	81	87	170
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	-	-
Magnesium (water soluble)	mg/kg	5	NONE	-	-	-	-	-

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	-	< 1.0	-	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	-	< 2.0	-	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	-	< 8.0	-	21
TPHCWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	59	-	< 8.0	-	250
TPHCWG - Aliphatic >EC35 - EC44 EH_CU_1D_AL	mg/kg	8.4	NONE	15	-	< 8.4	-	45
TPHCWG - Aliphatic >EC5 - EC35 EH_CU+HS_1D_AL	mg/kg	10	NONE	59	-	< 10	-	270
TPHCWG - Aliphatic >EC5 - EC44 EH_CU+HS_1D_AL	mg/kg	10	NONE	74	-	< 10	-	310
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	-	< 0.010	-	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.02	MCERTS	< 0.020	-	< 0.020	-	< 0.020
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	-	< 1.0	-	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	-	< 2.0	-	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	-	< 10	-	17
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	19	-	< 10	-	120
TPHCWG - Aromatic >EC35 - EC44 EH_CU_1D_AR	mg/kg	8.4	NONE	< 8.4	-	< 8.4	-	38
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	19	-	< 10	-	140
TPHCWG - Aromatic >EC5 - EC44 EH_CU+HS_1D_AR	mg/kg	10	NONE	19	-	< 10	-	170

VOCs

Chloromethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Chloroethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Bromomethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Vinyl Chloride	µg/kg	5	NONE	< 5.0	-	< 5.0	-	< 5.0
Trichlorofluoromethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,1-Dichloroethene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Trans 1,2-dichloroethylene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,1-Dichloroethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
2,2-Dichloropropane	µg/kg	5	NONE	< 5.0	-	< 5.0	-	< 5.0

Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999787	999788	999789	999790	999791
Sample Reference				TP202	TP202	TP205	TP205	TP209
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.00-0.50	0.75-1.25	0.00-0.25	1.00-1.60	0.00-0.32
Date Sampled				24/07/2026	24/07/2026	24/07/2026	24/07/2026	24/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					
Chloroform	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,1,1-Trichloroethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,2-Dichloroethane	µg/kg	7	MCERTS	< 7.0	-	< 7.0	-	< 7.0
1,1-Dichloropropene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Cis-1,2-dichloroethene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Carbontetrachloride	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,2-Dichloropropane	µg/kg	6	MCERTS	< 6.0	-	< 6.0	-	< 6.0
Trichloroethene	µg/kg	10	MCERTS	< 10	-	< 10	-	< 10
Dibromomethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Bromodichloromethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Cis-1,3-dichloropropene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Trans-1,3-dichloropropene	µg/kg	10	MCERTS	< 10	-	< 10	-	< 10
Toluene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,1,2-Trichloroethane	µg/kg	6	MCERTS	< 6.0	-	< 6.0	-	< 6.0
1,3-Dichloropropane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Dibromochloromethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Tetrachloroethene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,2-Dibromoethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Chlorobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,1,1,2-Tetrachloroethane	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	-	< 8.0	-	< 8.0
Styrene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Bromoform	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Isopropylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	< 5.0	-	< 5.0	-	< 5.0
Bromobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
n-Propylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
2-Chlorotoluene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
4-Chlorotoluene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,3,5-Trimethylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
tert-Butylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,2,4-Trimethylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
sec-Butylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,3-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
p-Isopropyltoluene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,4-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,2-Dichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Butylbenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,2-Dibromo-3-chloropropane	µg/kg	8	MCERTS	< 8.0	-	< 8.0	-	< 8.0
1,2,4-Trichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
Hexachlorobutadiene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0
1,2,3-Trichlorobenzene	µg/kg	5	MCERTS	< 5.0	-	< 5.0	-	< 5.0

MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	< 0.005	-	< 0.005	-	< 0.005
Benzene	mg/kg	0.005	MCERTS	< 0.005	-	< 0.005	-	< 0.005
Toluene	mg/kg	0.005	MCERTS	< 0.005	-	< 0.005	-	< 0.005
Ethylbenzene	mg/kg	0.005	MCERTS	< 0.005	-	< 0.005	-	< 0.005
p & m-xylene	mg/kg	0.008	MCERTS	< 0.008	-	< 0.008	-	< 0.008

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Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999787	999788	999789	999790	999791
Sample Reference				TP202	TP202	TP205	TP205	TP209
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.00-0.50	0.75-1.25	0.00-0.25	1.00-1.60	0.00-0.32
Date Sampled				24/07/2026	24/07/2026	24/07/2026	24/07/2026	24/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					
o-Xylene	mg/kg	0.005	MCERTS	< 0.005	-	< 0.005	-	< 0.005
SVOCs								
Aniline	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-	< 0.1
Phenol	mg/kg	0.2	ISO 17025	< 0.2	-	< 0.2	-	< 0.2
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	-	< 0.1
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	-	< 0.2
1,3-Dichlorobenzene	mg/kg	0.2	NONE	< 0.2	-	< 0.2	-	< 0.2
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	-	< 0.1
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	-	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	-	< 0.1
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-	< 0.3
Hexachloroethane	mg/kg	0.05	ISO 17025	< 0.05	-	< 0.05	-	< 0.05
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-	< 0.3
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	-	< 0.2	-	< 0.2
Isophorone	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	-	< 0.2
2-Nitrophenol	mg/kg	0.3	NONE	< 0.3	-	< 0.3	-	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-	< 0.3
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-	< 0.3
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-	< 0.3
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-	< 0.3
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-	< 0.1
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	-	< 0.1
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-	< 0.1
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-	< 0.1
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	< 0.2	-	< 0.2	-	< 0.2
2-Methylnaphthalene	mg/kg	0.1	NONE	2.8	-	0.5	-	1.2
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	-	< 0.1
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	-	< 0.1
2,6-Dinitrotoluene	mg/kg	0.1	NONE	< 0.1	-	< 0.1	-	< 0.1
2,4-Dinitrotoluene	mg/kg	0.2	NONE	< 0.2	-	< 0.2	-	< 0.2
Dibenzofuran	mg/kg	0.2	MCERTS	1	-	0.2	-	0.6
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-	< 0.3
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	-	< 0.2
4-Nitroaniline	mg/kg	0.2	NONE	< 0.2	-	< 0.2	-	< 0.2
Azobenzene	mg/kg	0.3	NONE	< 0.3	-	< 0.3	-	< 0.3
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	-	< 0.2
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.30	-	< 0.30	-	< 0.30
Carbazole	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-	< 0.3
Dibutyl phthalate	mg/kg	0.2	NONE	< 0.2	-	< 0.2	-	< 0.2
Anthraquinone	mg/kg	0.3	NONE	< 0.3	-	< 0.3	-	< 0.3
Butyl benzyl phthalate	mg/kg	0.3	NONE	< 0.3	-	< 0.3	-	1
PCBs								
PCB Congener 077	mg/kg	0.001	NONE	< 0.001	-	-	-	-
PCB Congener 081	mg/kg	0.001	NONE	< 0.001	-	-	-	-
PCB Congener 105	mg/kg	0.001	NONE	< 0.001	-	-	-	-
PCB Congener 114	mg/kg	0.001	NONE	< 0.001	-	-	-	-
PCB Congener 118	mg/kg	0.001	NONE	< 0.001	-	-	-	-
PCB Congener 123	mg/kg	0.001	NONE	< 0.001	-	-	-	-
PCB Congener 126	mg/kg	0.001	NONE	< 0.001	-	-	-	-

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Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999787	999788	999789	999790	999791
Sample Reference				TP202	TP202	TP205	TP205	TP209
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.00-0.50	0.75-1.25	0.00-0.25	1.00-1.60	0.00-0.32
Date Sampled				24/07/2026	24/07/2026	24/07/2026	24/07/2026	24/07/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					
PCB Congener 156	mg/kg	0.001	NONE	< 0.001	-	-	-	-
PCB Congener 157	mg/kg	0.001	NONE	< 0.001	-	-	-	-
PCB Congener 167	mg/kg	0.001	NONE	< 0.001	-	-	-	-
PCB Congener 169	mg/kg	0.001	NONE	< 0.001	-	-	-	-
PCB Congener 189	mg/kg	0.001	NONE	< 0.001	-	-	-	-
Total PCBs	mg/kg	0.012	NONE	< 0.012	-	-	-	-

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

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Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999792
Sample Reference				TP209
Sample Number				None Supplied
Water Matrix				N/A
Depth (m)				1.00-1.50
Date Sampled				24/07/2026
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status	
Mass of stone >10mm	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	5.3
Total mass of sample received	kg	0.1	NONE	2
Whole Sample Crushed	N/A	N/A	NONE	-

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	MBI
Analysis completed	N/A	N/A	N/A	05/08/2026

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	6.7
Total Cyanide	mg/kg	1	MCERTS	< 1.0
Total Sulphate as SO_4	%	0.005	MCERTS	-
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-
Total Sulphur	mg/kg	50	MCERTS	-
Total Sulphur	%	0.005	MCERTS	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.3
Nitrate as NO_3 (Water Soluble) (2:1)	mg/kg	0.9	NONE	-
Water Soluble Nitrate (2:1) as NO_3 (leachate equivalent)	mg/l	0.9	N/A	-

Total Phenols

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

Speciated PAHs

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

Total PAH

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

Heavy Metals / Metalloids

Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999792
Sample Reference				TP209
Sample Number				None Supplied
Water Matrix				N/A
Depth (m)				1.00-1.50
Date Sampled				24/07/2026
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status	
Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	3.3
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.2
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.3
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	32
Copper (aqua regia extractable)	mg/kg	1	MCERTS	49
Lead (aqua regia extractable)	mg/kg	1	MCERTS	21
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	41
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	30
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-
Magnesium (water soluble)	mg/kg	5	NONE	-

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.01	MCERTS	-
TPHCWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.01	MCERTS	-
TPHCWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.01	MCERTS	-
TPHCWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	-
TPHCWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	-
TPHCWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	-
TPHCWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	-
TPHCWG - Aliphatic >EC35 - EC44 EH_CU_1D_AL	mg/kg	8.4	NONE	-
TPHCWG - Aliphatic >EC5 - EC35 EH_CU+HS_1D_AL	mg/kg	10	NONE	-
TPHCWG - Aliphatic >EC5 - EC44 EH_CU+HS_1D_AL	mg/kg	10	NONE	-
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	MCERTS	-
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	MCERTS	-
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.02	MCERTS	-
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	-
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	-
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	-
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	-
TPHCWG - Aromatic >EC35 - EC44 EH_CU_1D_AR	mg/kg	8.4	NONE	-
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	-
TPHCWG - Aromatic >EC5 - EC44 EH_CU+HS_1D_AR	mg/kg	10	NONE	-

VOCs

Chloromethane	µg/kg	5	MCERTS	-
Chloroethane	µg/kg	5	MCERTS	-
Bromomethane	µg/kg	5	MCERTS	-
Vinyl Chloride	µg/kg	5	NONE	-
Trichlorofluoromethane	µg/kg	5	MCERTS	-
1,1-Dichloroethene	µg/kg	5	MCERTS	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	MCERTS	-
Trans 1,2-dichloroethylene	µg/kg	5	MCERTS	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	-
1,1-Dichloroethane	µg/kg	5	MCERTS	-
2,2-Dichloropropane	µg/kg	5	NONE	-

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Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999792
Sample Reference				TP209
Sample Number				None Supplied
Water Matrix				N/A
Depth (m)				1.00-1.50
Date Sampled				24/07/2026
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status	
Chloroform	µg/kg	5	MCERTS	-
1,1,1-Trichloroethane	µg/kg	5	MCERTS	-
1,2-Dichloroethane	µg/kg	7	MCERTS	-
1,1-Dichloropropene	µg/kg	5	MCERTS	-
Cis-1,2-dichloroethene	µg/kg	5	MCERTS	-
Benzene	µg/kg	5	MCERTS	-
Carbontetrachloride	µg/kg	5	MCERTS	-
1,2-Dichloropropane	µg/kg	6	MCERTS	-
Trichloroethene	µg/kg	10	MCERTS	-
Dibromomethane	µg/kg	5	MCERTS	-
Bromodichloromethane	µg/kg	5	MCERTS	-
Cis-1,3-dichloropropene	µg/kg	5	MCERTS	-
Trans-1,3-dichloropropene	µg/kg	10	MCERTS	-
Toluene	µg/kg	5	MCERTS	-
1,1,2-Trichloroethane	µg/kg	6	MCERTS	-
1,3-Dichloropropane	µg/kg	5	MCERTS	-
Dibromochloromethane	µg/kg	5	MCERTS	-
Tetrachloroethene	µg/kg	5	MCERTS	-
1,2-Dibromoethane	µg/kg	5	MCERTS	-
Chlorobenzene	µg/kg	5	MCERTS	-
1,1,1,2-Tetrachloroethane	µg/kg	5	MCERTS	-
Ethylbenzene	µg/kg	5	MCERTS	-
p & m-Xylene	µg/kg	8	MCERTS	-
Styrene	µg/kg	5	MCERTS	-
Bromoform	µg/kg	5	MCERTS	-
o-Xylene	µg/kg	5	MCERTS	-
Isopropylbenzene	µg/kg	5	MCERTS	-
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	-
Bromobenzene	µg/kg	5	MCERTS	-
n-Propylbenzene	µg/kg	5	MCERTS	-
2-Chlorotoluene	µg/kg	5	MCERTS	-
4-Chlorotoluene	µg/kg	5	MCERTS	-
1,3,5-Trimethylbenzene	µg/kg	5	MCERTS	-
tert-Butylbenzene	µg/kg	5	MCERTS	-
1,2,4-Trimethylbenzene	µg/kg	5	MCERTS	-
sec-Butylbenzene	µg/kg	5	MCERTS	-
1,3-Dichlorobenzene	µg/kg	5	MCERTS	-
p-Isopropyltoluene	µg/kg	5	MCERTS	-
1,4-Dichlorobenzene	µg/kg	5	MCERTS	-
1,2-Dichlorobenzene	µg/kg	5	MCERTS	-
Butylbenzene	µg/kg	5	MCERTS	-
1,2-Dibromo-3-chloropropane	µg/kg	8	MCERTS	-
1,2,4-Trichlorobenzene	µg/kg	5	MCERTS	-
Hexachlorobutadiene	µg/kg	5	MCERTS	-
1,2,3-Trichlorobenzene	µg/kg	5	MCERTS	-

MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	MCERTS	-
Benzene	mg/kg	0.005	MCERTS	-
Toluene	mg/kg	0.005	MCERTS	-
Ethylbenzene	mg/kg	0.005	MCERTS	-
p & m-xylene	mg/kg	0.008	MCERTS	-

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Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999792
Sample Reference				TP209
Sample Number				None Supplied
Water Matrix				N/A
Depth (m)				1.00-1.50
Date Sampled				24/07/2026
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status	
o-Xylene	mg/kg	0.005	MCERTS	-

SVOCs

Aniline	mg/kg	0.1	NONE	-
Phenol	mg/kg	0.2	ISO 17025	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-
1,3-Dichlorobenzene	mg/kg	0.2	NONE	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-
2-Methylphenol	mg/kg	0.3	MCERTS	-
Hexachloroethane	mg/kg	0.05	ISO 17025	-
Nitrobenzene	mg/kg	0.3	MCERTS	-
4-Methylphenol	mg/kg	0.2	NONE	-
Isophorone	mg/kg	0.2	MCERTS	-
2-Nitrophenol	mg/kg	0.3	NONE	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-
4-Chloroaniline	mg/kg	0.1	NONE	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-
2,4,6-Trichlorophenol	mg/kg	0.1	NONE	-
2,4,5-Trichlorophenol	mg/kg	0.2	NONE	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-
2,6-Dinitrotoluene	mg/kg	0.1	NONE	-
2,4-Dinitrotoluene	mg/kg	0.2	NONE	-
Dibenzofuran	mg/kg	0.2	MCERTS	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-
4-Nitroaniline	mg/kg	0.2	NONE	-
Azobenzene	mg/kg	0.3	NONE	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-
Carbazole	mg/kg	0.3	MCERTS	-
Dibutyl phthalate	mg/kg	0.2	NONE	-
Anthraquinone	mg/kg	0.3	NONE	-
Butyl benzyl phthalate	mg/kg	0.3	NONE	-

PCBs

PCB Congener 077	mg/kg	0.001	NONE	-
PCB Congener 081	mg/kg	0.001	NONE	-
PCB Congener 105	mg/kg	0.001	NONE	-
PCB Congener 114	mg/kg	0.001	NONE	-
PCB Congener 118	mg/kg	0.001	NONE	-
PCB Congener 123	mg/kg	0.001	NONE	-
PCB Congener 126	mg/kg	0.001	NONE	-

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Analytical Report Number: 26-041294
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				999792
Sample Reference				TP209
Sample Number				None Supplied
Water Matrix				N/A
Depth (m)				1.00-1.50
Date Sampled				24/07/2026
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**	
PCB Congener 156	mg/kg	0.001	NONE	-
PCB Congener 157	mg/kg	0.001	NONE	-
PCB Congener 167	mg/kg	0.001	NONE	-
PCB Congener 169	mg/kg	0.001	NONE	-
PCB Congener 189	mg/kg	0.001	NONE	-

Total PCBs	mg/kg	0.012	NONE	-

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

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Analytical Report Number : 26-041294
Project / Site name: Land Adjacent to Penistone Station

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
999782	BH101	None Supplied	0.80-1.00	Brown gravelly sand with stones
999783	BH102	None Supplied	0.65-0.90	Brown sandy clay
999784	BH103	None Supplied	0.80-1.00	Brown sandy clay
999785	TP201	None Supplied	0.00-0.50	Brown sand with gravel and stones
999786	TP201	None Supplied	1.00-1.50	Brown clay and sand
999787	TP202	None Supplied	0.00-0.50	Brown clay and sand with gravel
999788	TP202	None Supplied	0.75-1.25	Brown clay and sand with gravel and vegetation
999789	TP205	None Supplied	0.00-0.25	Brown sand with gravel and stones
999790	TP205	None Supplied	1.00-1.60	Brown sandy clay
999791	TP209	None Supplied	0.00-0.32	Brown loam and sand with vegetation and stones
999792	TP209	None Supplied	1.00-1.50	Brown clay and sand

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Analytical Report Number : 26-041294
Project / Site name: Land Adjacent to Penistone Station

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Whole Sample Crushed	Either: Client specific preparation instructions - sample(s) crushed whole prior to analysis OR Sample unsuitable for standard preparation and therefore crushed whole prior to analysis	In house method, applicable to dry samples only	L019B	D	NONE
Moisture Content (Wet Weight)	Moisture content (% wet weight), determined gravimetrically (up to 30°C)	In-house-procedure based on BS EN 12880:2000	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES	In-house method based on TRL 447	L038B	D	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser	In-house method	L082B	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS
Water Soluble Nitrate (2:1) as NO3 in soil	Determination of nitrate as NO3 in soil by discrete method	In-house method by discrete analyzer based on TON as N, Total Oxidized Nitrogen (Vanadium Chloride reduction), Thermo Fisher Scientific, MANUAL 2015-0	L082B	W	NONE
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS

Analytical Report Number : 26-041294
Project / Site name: Land Adjacent to Penistone Station

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID in soil	Determination of total petroleum hydrocarbons in soil by GC-FID with carbon banding aliphatic and aromatic	In-house method	L076B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil (Summed Bands)	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic (Summed Bands).	Calculation	L076B/L088-PL	D/W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Total petroleum hydrocarbons with carbon banding by HS-GC/MS in soil	Determination of total petroleum hydrocarbons in soil by HS-GC/MS with carbon banding aliphatic and aromatic	In-house method	L088-PL	W	MCERTS
PCBs WHO 12 in soil	Determination of PCBs (WHO-12 Congeners) by GC-MS	In-house method based on USEPA 8082	L027B	D	NONE

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

Where coal tar is reported as "indicative/not indicative", PAH source attribution has been assessed using the ratio of parent PAHs to alkylated PAHs to indicate a likely pyrogenic (coal tar–related) or petrogenic (bitumen-related) origin. This assessment is independent of total residue and/or benzo(a)pyrene concentrations and is provided for indicative purposes only; it represents a single line of evidence and does not, in isolation, constitute confirmation or classification as hazardous under WM3 guidance.

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

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Analytical Report Number : 26-041500

Project / Site name:	Land Adjacent to Penistone Station	**Samples received on:**	29/07/2026
Your job number:	C6144-26-E-9573	**Samples instructed on/ Analysis started on:**	29/07/2026
Your order number:		**Analysis completed by:**	19/08/2026
Report Issue Number:	1	**Report issued on:**	19/08/2026
Samples Analysed:	3 soil samples		



Signed:

Rachel Chappell
Key Account Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

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Analytical Report Number: 26-041500
Project / Site name: Land Adjacent to Penistone Station

Lab Sample Number				1000776	1000777	1000778
Sample Reference				BH101	BH101	BH101
Sample Number				None Supplied	None Supplied	None Supplied
Water Matrix				N/A	N/A	N/A
Depth (m)				4.00-4.60	5.50-5.60	7.00-7.55
Date Sampled				24/07/2026	24/07/2026	24/07/2026
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status			
Mass of stone >10mm	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	5.7	14
Total mass of sample received	kg	0.1	NONE	0.3	0.5	0.2

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	7.4	6.5	7.8
Total Sulphate as SO_4	%	0.005	MCERTS	0.015	0.014	0.015
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	48	90	86
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	24.1	44.8	42.9
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	3	3.8	2.7
Total Sulphur	mg/kg	50	MCERTS	< 50	71	72
Total Sulphur	%	0.005	MCERTS	< 0.005	0.007	0.007
Nitrate as NO_3 (Water Soluble) (2:1)	mg/kg	0.9	NONE	1.11	< 0.90	< 0.90
Water Soluble Nitrate (2:1) as NO_3 (leachate equivalent)	mg/l	0.9	N/A	< 0.90	< 0.90	< 0.90

Heavy Metals / Metalloids

Magnesium (leachate equivalent)	mg/l	2.5	NONE	< 2.5	8.4	< 2.5
Magnesium (water soluble)	mg/kg	5	NONE	< 5.0	17	< 5.0

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

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Analytical Report Number : 26-041500
Project / Site name: Land Adjacent to Penistone Station

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1000776	BH101	None Supplied	4.00-4.60	Brown clay
1000777	BH101	None Supplied	5.50-5.60	Brown clay and loam
1000778	BH101	None Supplied	7.00-7.55	Brown clay

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Analytical Report Number : 26-041500
Project / Site name: Land Adjacent to Penistone Station

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content (Wet Weight)	Moisture content (% wet weight), determined gravimetrically (up to 30°C)	In-house-procedure based on BS EN 12880:2000	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES	In-house method based on TRL 447	L038B	D	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser	In-house method	L082B	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS
Water Soluble Nitrate (2:1) as NO3 in soil	Determination of nitrate as NO3 in soil by discrete method	In-house method by discrete analyzer based on TON as N, Total Oxidized Nitrogen (Vanadium Chloride reduction), Thermo Fisher Scientific, MANUAL 2015-0	L082B	W	NONE
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
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The result for sum should be interpreted with caution

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Appendix 8

Photographs

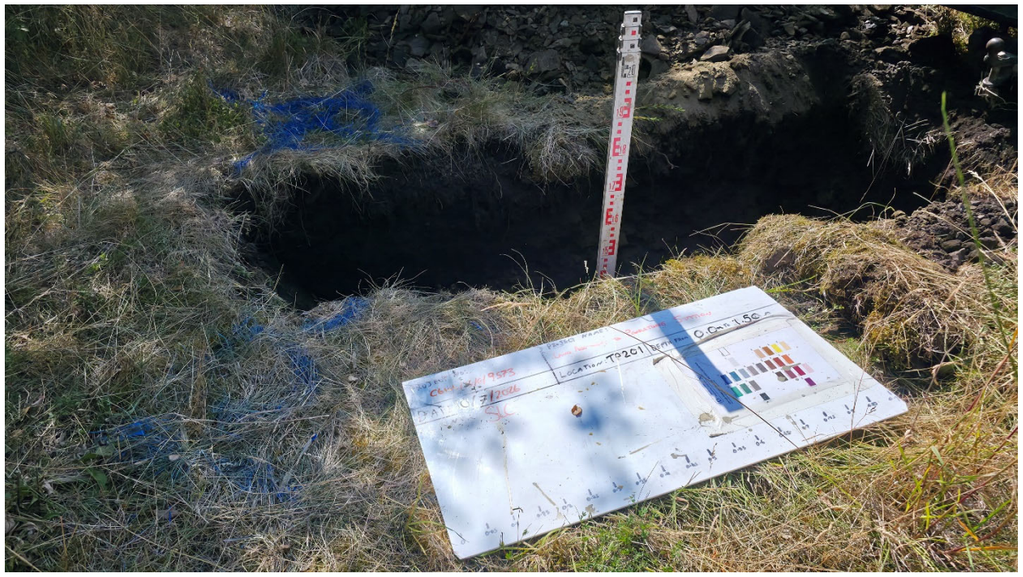


Photo 1: TP201 Overview - 0.00m - 1.50m



Photo 2: TP201 Downhole View 1



Photo 3: TP201 Downhole View 2



Photo 4: TP201 Topsoil



Photo 5: TP201 Natural Spoil



Photo 6: TP201 Soakaway Testing



Photo 7: TP201 Reinstatement

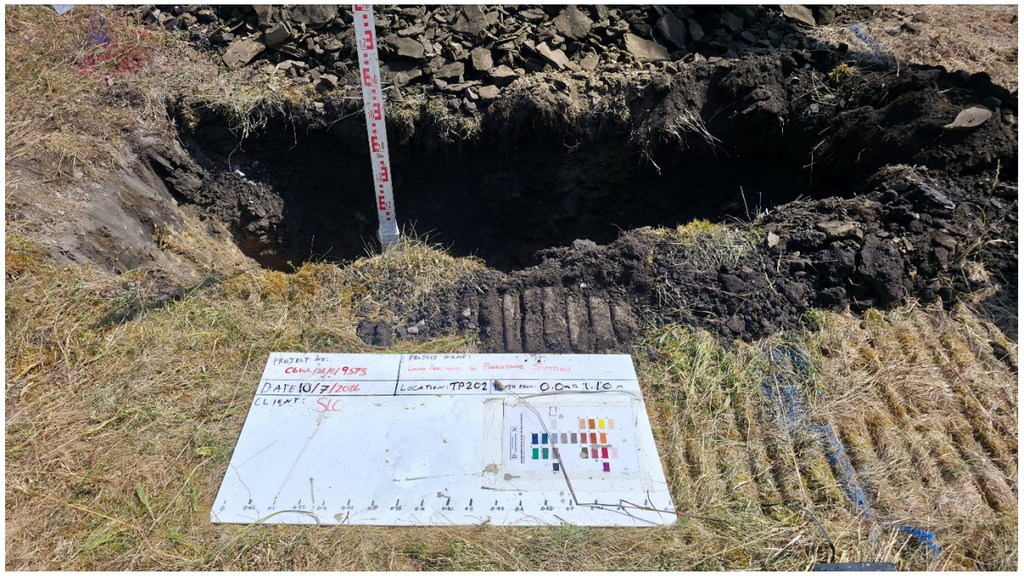


Photo 8: TP202 Overview - 0.00m - 1.10m



Photo 9: TP202 Downhole View



Photo 10: TP202 Topsoil Spoil



Photo 11: TP202 Natural Spoil



Photo 12: TP202 Reinstatement



Photo 13: TP203 Overview - 0.00m - 2.60m



Photo 14: TP203 Overview - 0.00m - 2.60m



Photo 15: TP203 Overview - 0.00m - 2.60m



Photo 16: TP203 Downhole View



Photo 17: TP203 Topsoil Spoil



Photo 18: TP203 Natural Spoil



Photo 19: TP203 Reinstatement

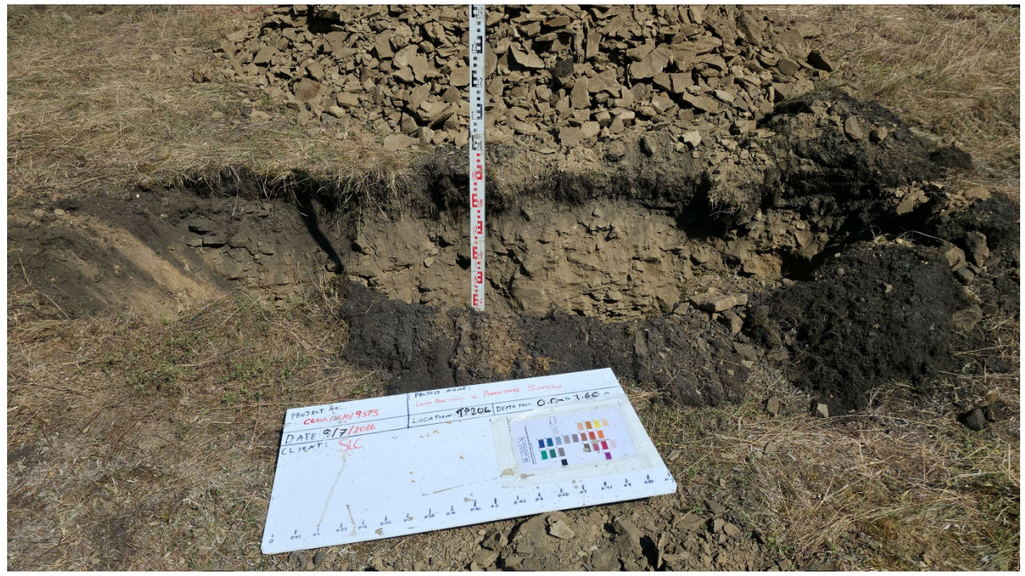


Photo 20: TP204 Overview - 0.00m - 1.60m



Photo 21: TP204 Downhole View 1



Photo 22: TP204 Downhole View 2



Photo 23: TP204 Topsoil Spoil



Photo 24: TP204 Natural Spoil



Photo 25: TP204 Reinstatement



Photo 26: TP205 Overview - 0.00m - 1.60m



Photo 27: TP205 Overview - 0.00m - 1.60m



Photo 28: TP205 Downhole View 1



Photo 29: TP205 Downhole View 2



Photo 30: TP205 Topsoil Spoil



Photo 31: TP205 Natural Spoil



Photo 32: TP205 Reinstatement



Photo 33: TP206 - Not undertaken



Photo 34: TP207 Overview - 0.00m - 2.10m



Photo 35: TP207 Overview - 0.00m - 2.10m



Photo 36: TP207 Overview - 0.00m - 2.10m



Photo 37: TP207 Downhole View



Photo 38: TP207 Topsoil Spoil



Photo 39: TP207 Natural Spoil



Photo 40: TP207 Reinstatement



Photo 41: TP208 Overview - 0.00m - 1.60m



Photo 42: TP208 Downhole View



Photo 43: TP208 Topsoil Spoil



Photo 44: TP208 Natural Spoil



Photo 45: TP208 Reinstatement

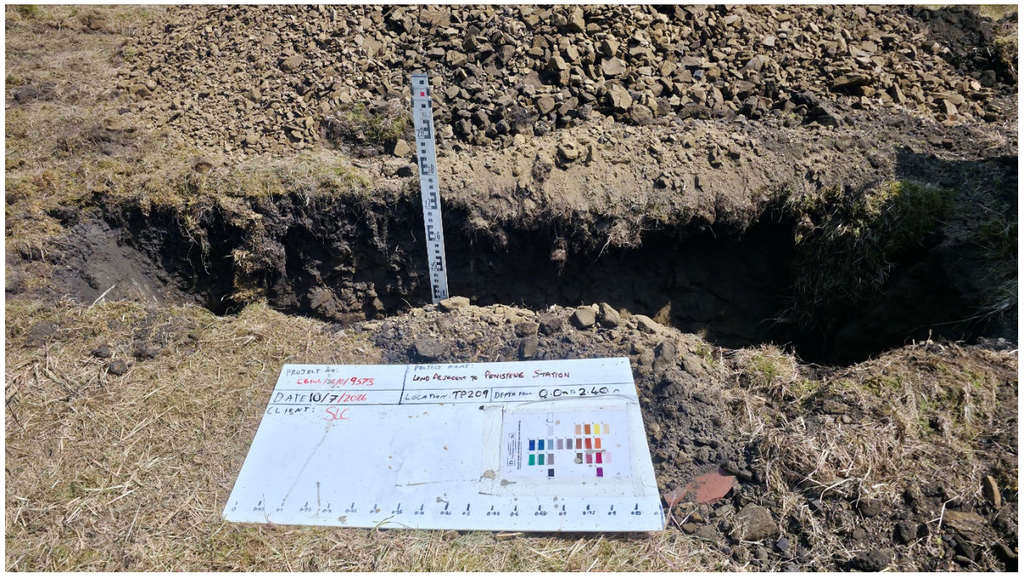


Photo 46: TP209 Overview - 0.00m - 2.40m



Photo 47: TP209 Overview - 0.00m - 2.40m



Photo 48: TP209 Overview - 0.00m - 2.40m



Photo 49: TP209 Downhole View



Photo 50: TP209 Topsoil



Photo 51: TP209 Natural Spoil



Photo 52: TP209 Soakaway Testing



Photo 53: TP209 Reinstatement



Photo 54: BH101 - 1.00m - 2.50m

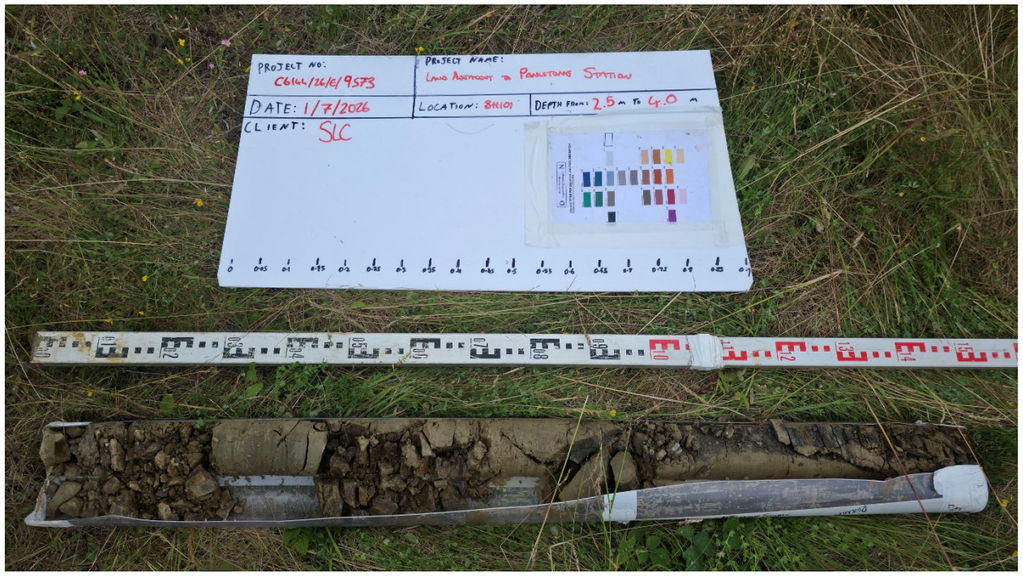


Photo 55: BH101 - 2.50m - 4.00m



Photo 56: BH101 - 4.00m - 5.50m



Photo 57: BH101 - 5.50m - 7.00m



Photo 58: BH101 - 7.00m - 8.50m



Photo 59: BH101 - 8.50m - 10.00m

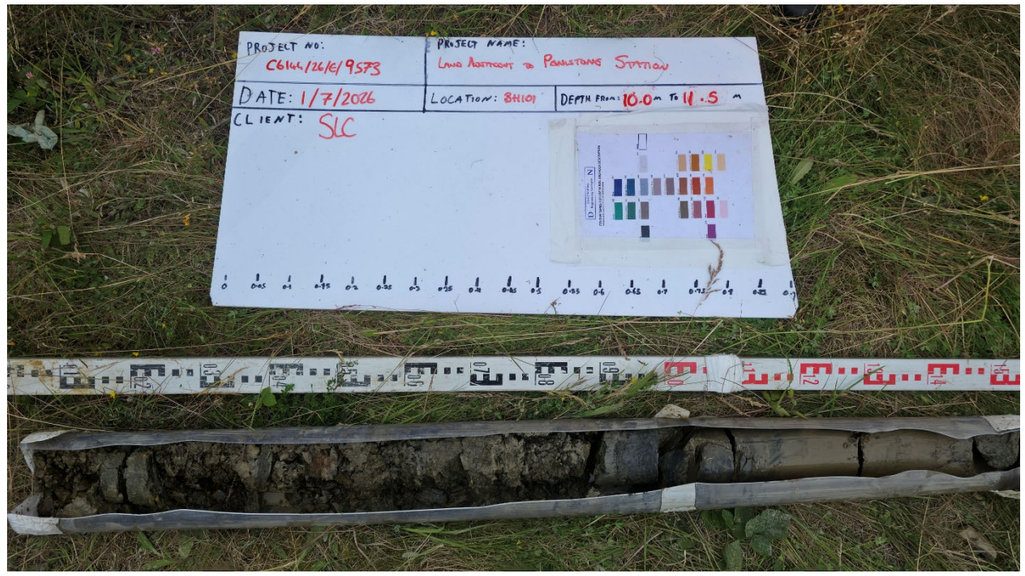


Photo 60: BH101 - 10.00m - 11.50m

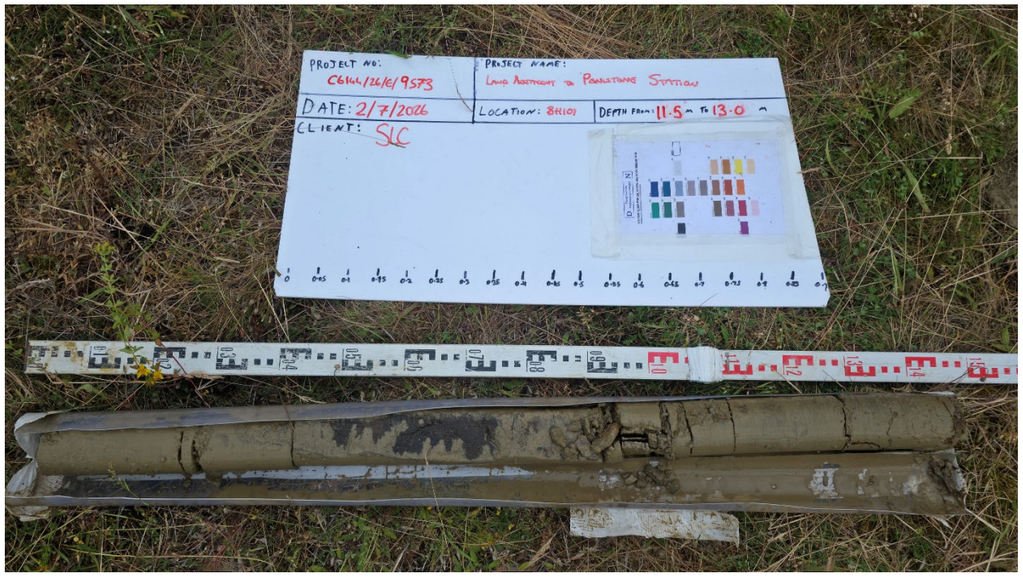


Photo 61: BH101 - 11.50m - 13.00m

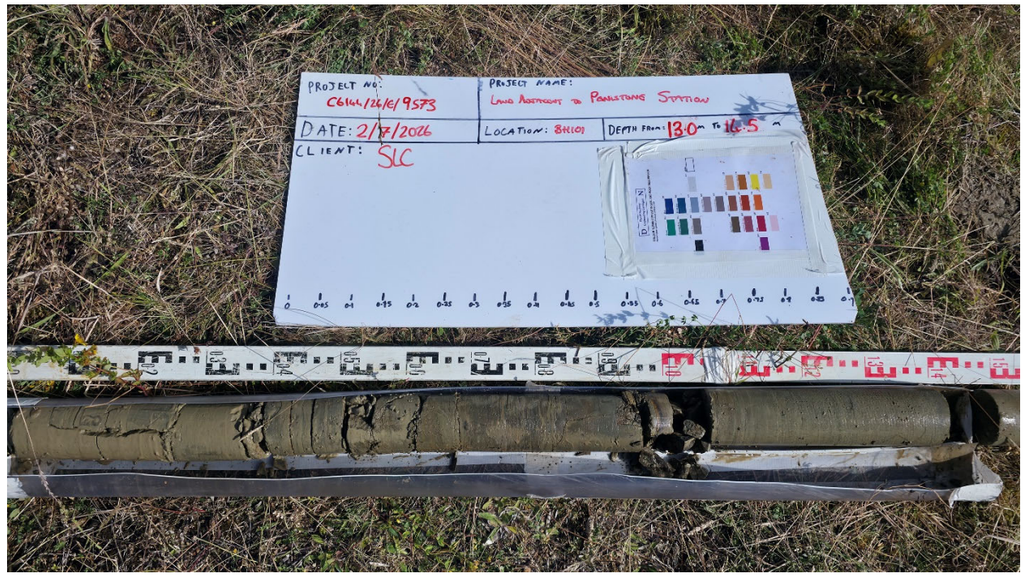


Photo 62: BH101 - 13.00m - 14.50m



Photo 63: BH101 - 14.50m - 16.00m

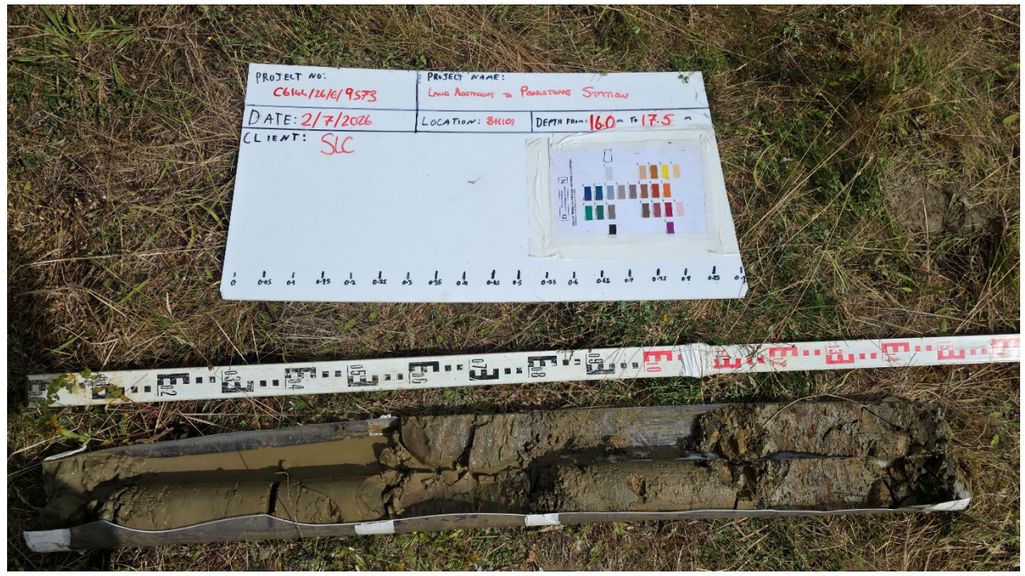


Photo 64: BH101 - 16.00m - 17.50m

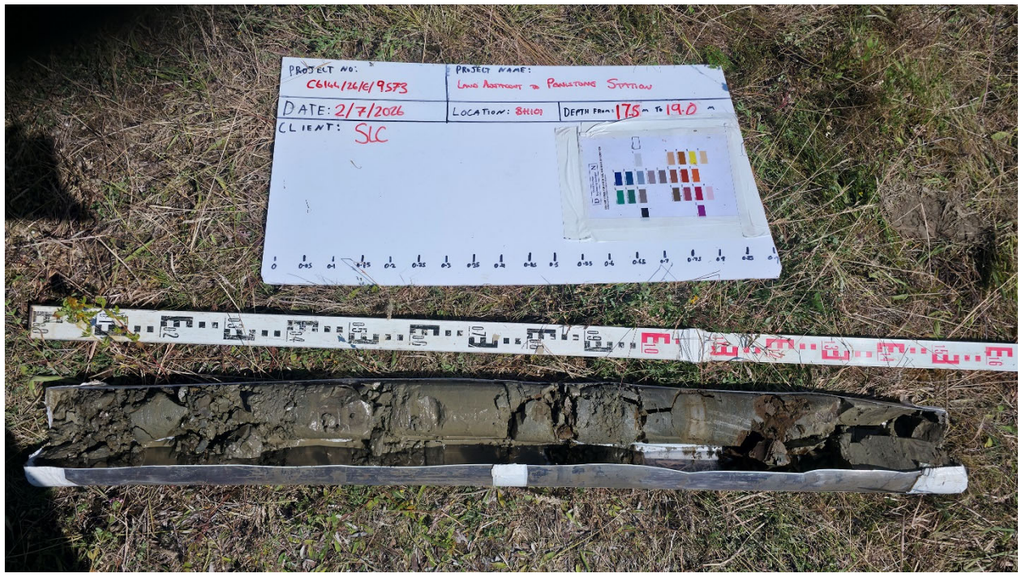


Photo 65: BH101 - 17.50m - 19.00m

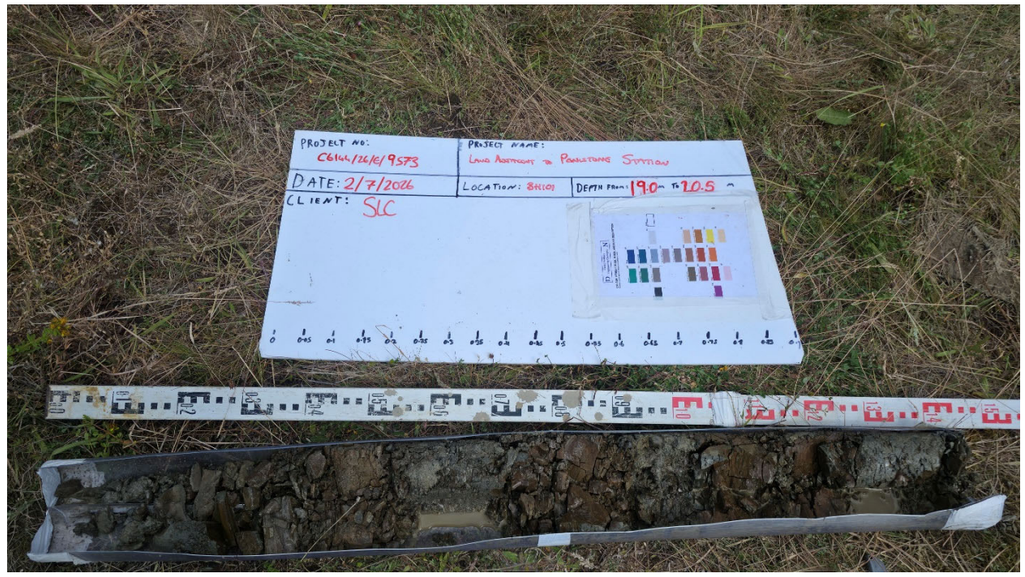


Photo 66: BH101 - 19.00m - 20.50m

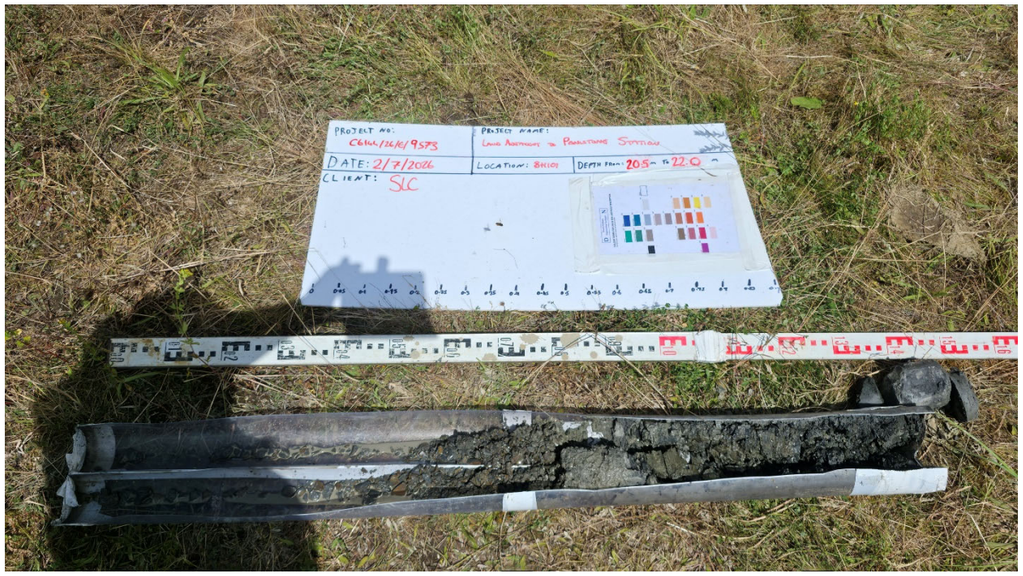


Photo 67: BH101 - 20.50m - 22.00m

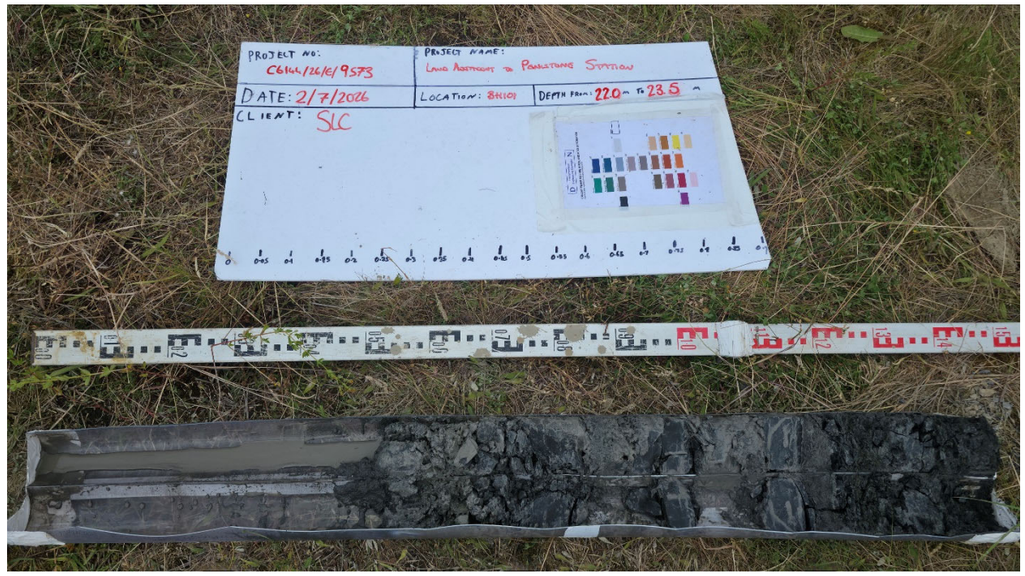


Photo 68: BH101 - 22.00m - 23.50m

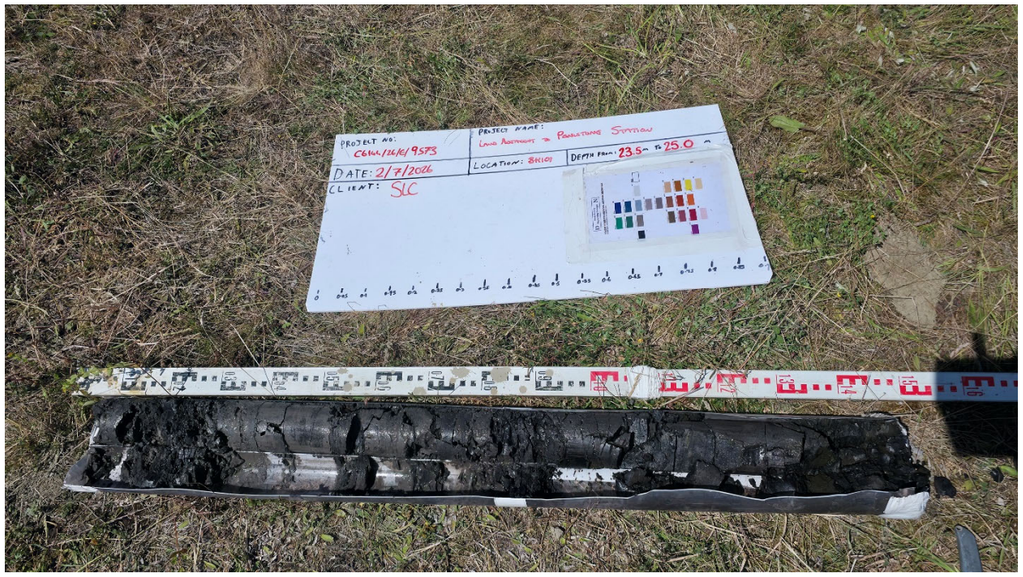


Photo 69: BH101 - 23.50m - 25.00m



Photo 70: BH101 - 25.00m - 26.50m

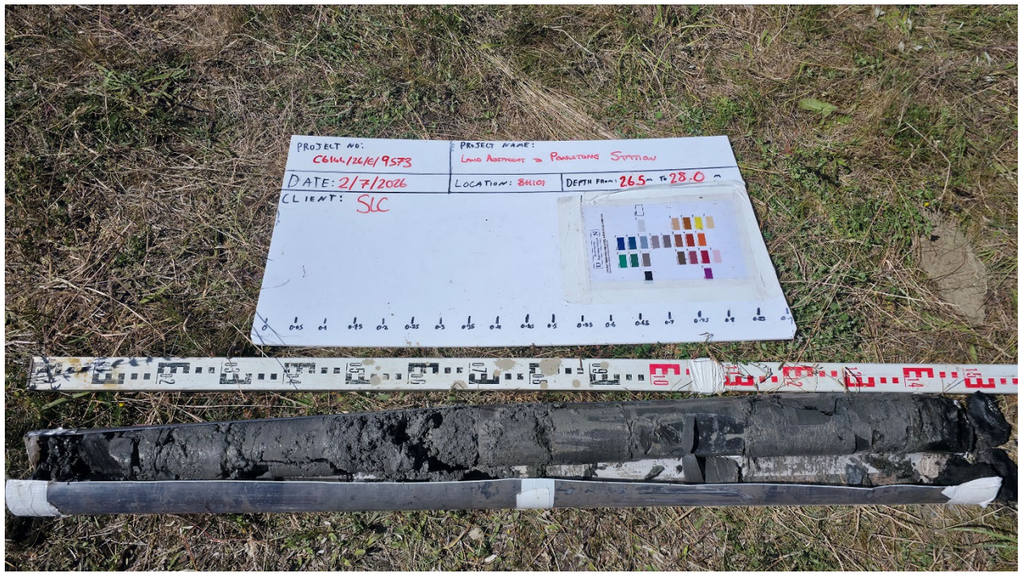


Photo 71: BH101 - 26.50m - 28.00m

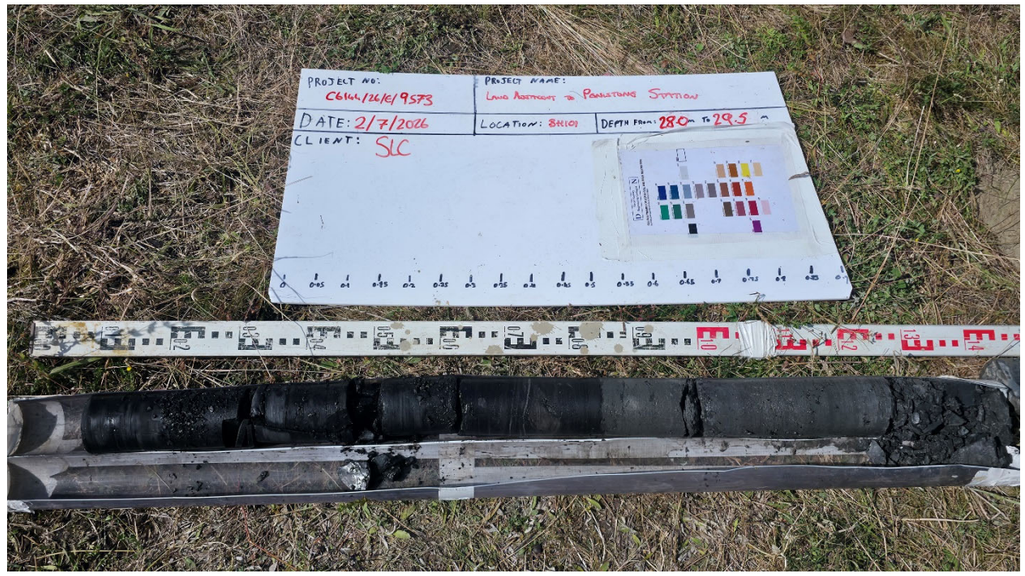


Photo 72: BH101 - 28.00m - 29.50m

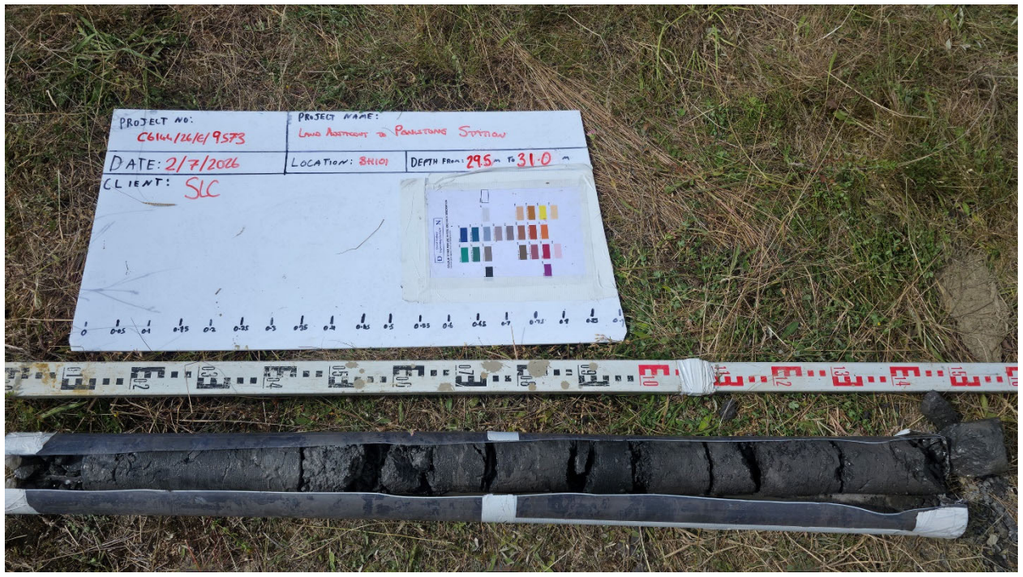


Photo 73: BH101 - 29.50m - 31.00m



Photo 74: BH102 Service Pit - 0.00m - 0.65m



Photo 75: BH102 Downhole View 1



Photo 76: BH102 Downhole View 2



Photo 77: BH102 Spoil



Photo 78: BH102 Spoil



Photo 79: BH102 - 0.65m - 1.10m



Photo 80: BH102 - 0.65m - 1.10m



Photo 81: BH102 - 1.10m - 1.70m



Photo 82: BH102 - 1.70m - 2.30m



Photo 83: BH102 - 2.30m - 4.00m

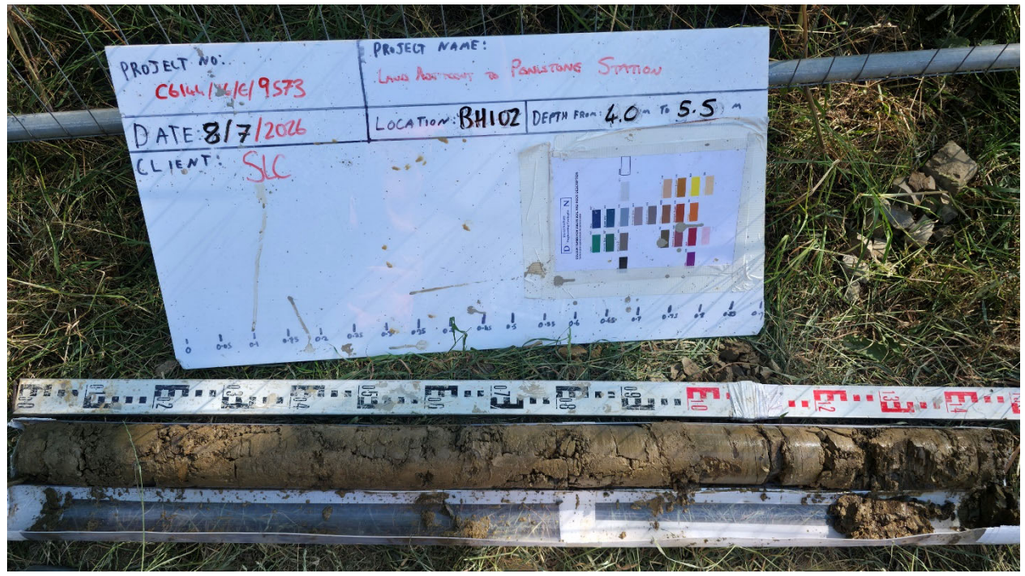


Photo 84: BH102 - 4.00m - 5.50m

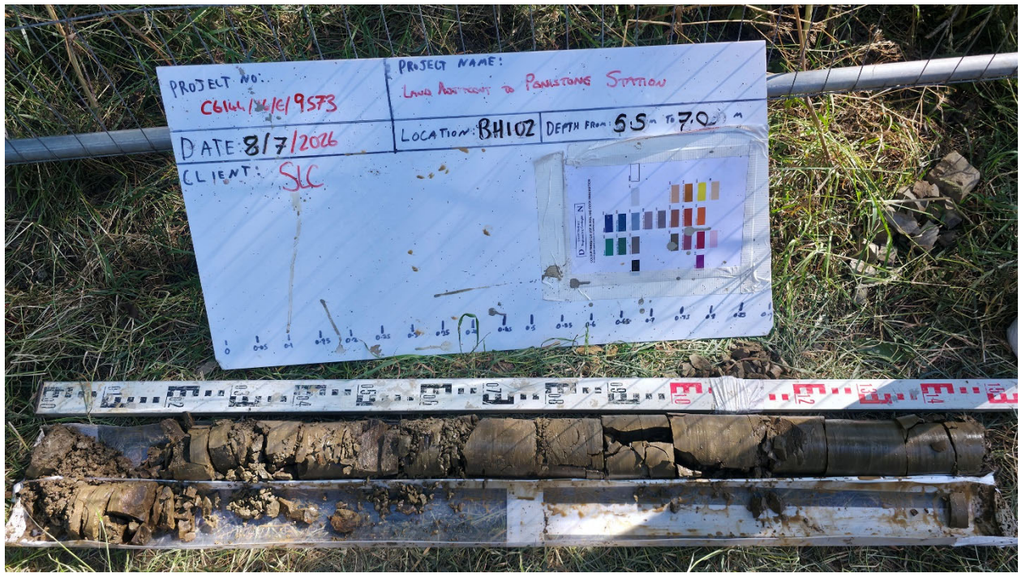


Photo 85: BH102 - 5.50m - 7.00m



Photo 86: BH102 - 7.00m - 7.50m

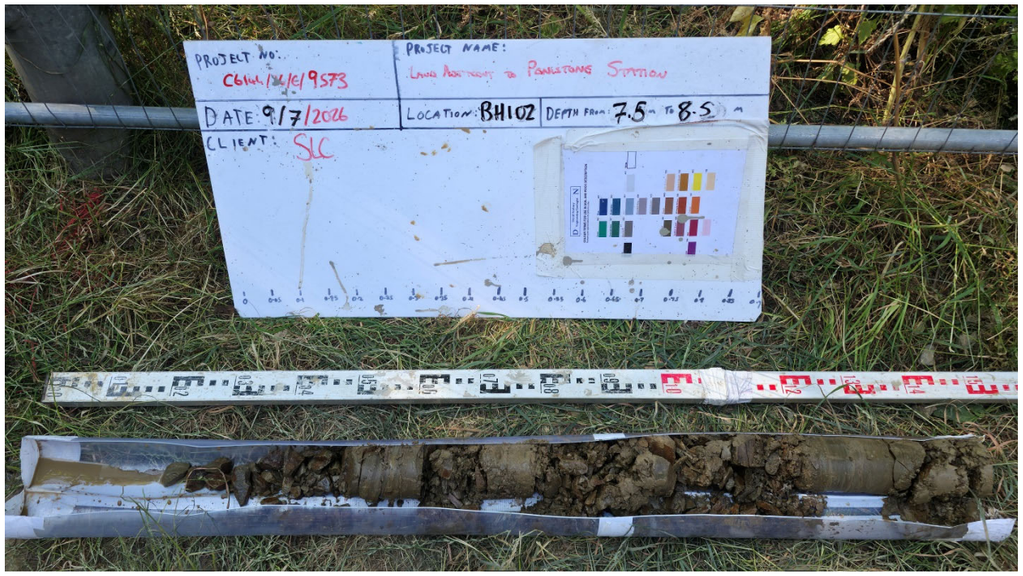


Photo 87: BH102 - 7.50m - 8.50m

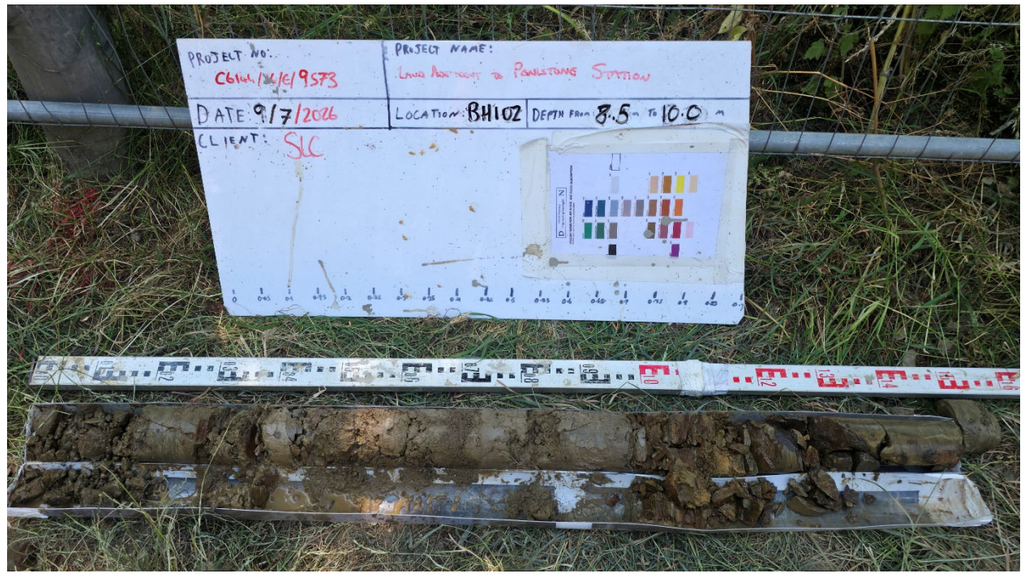


Photo 88: BH102 - 8.50m - 10.00m

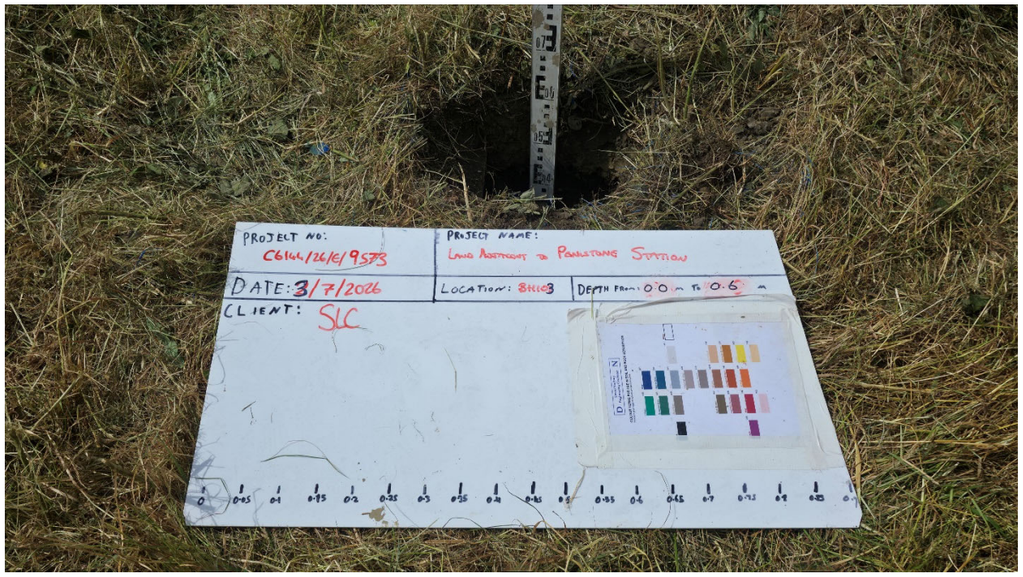


Photo 89: BH103 Service Pit - 0.00m - 0.60m



Photo 90: BH103 Downhole View



Photo 91: BH103 Spoil

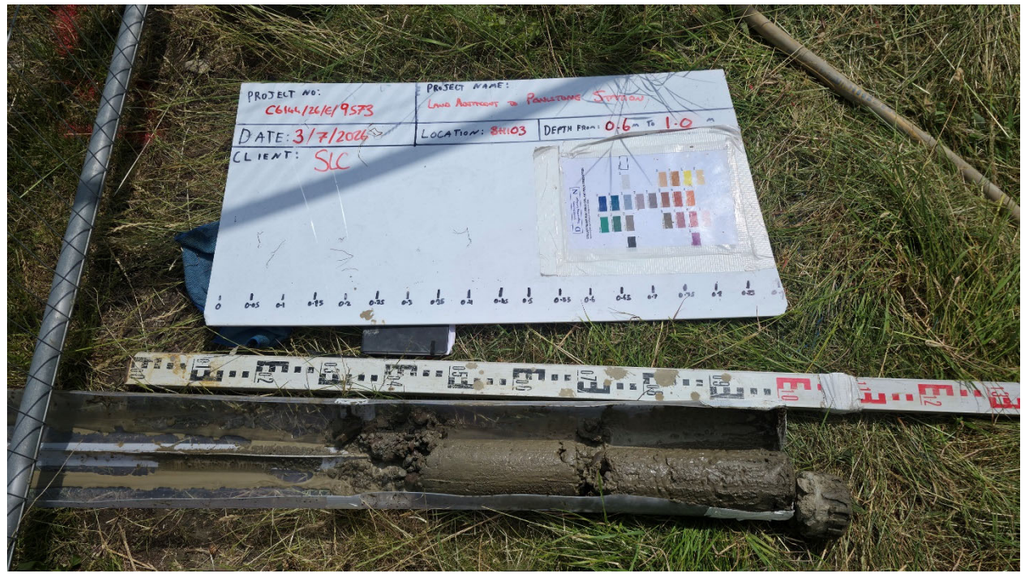


Photo 92: BH103 - 0.60m - 1.00m

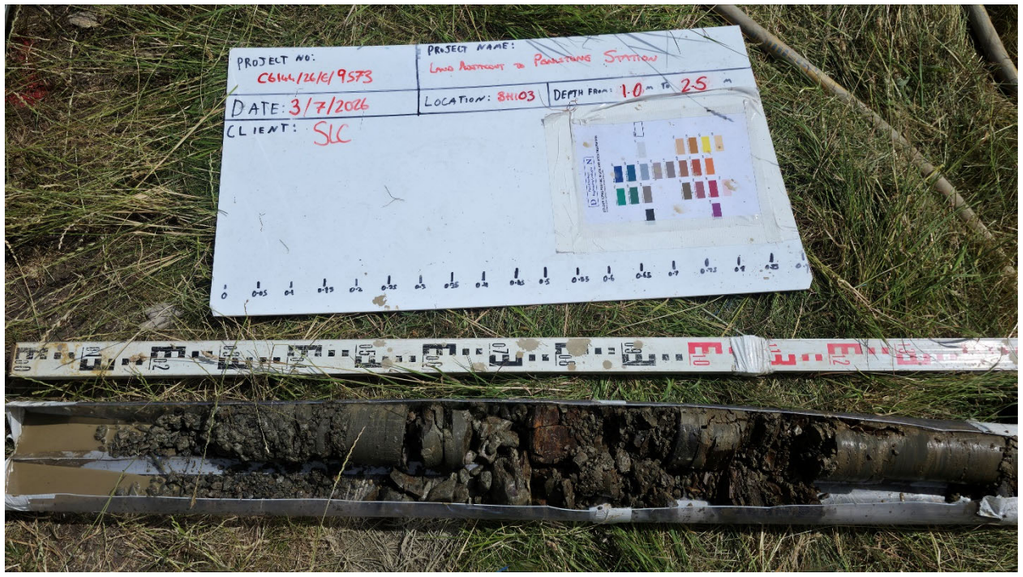


Photo 93: BH103 - 1.00m - 2.50m

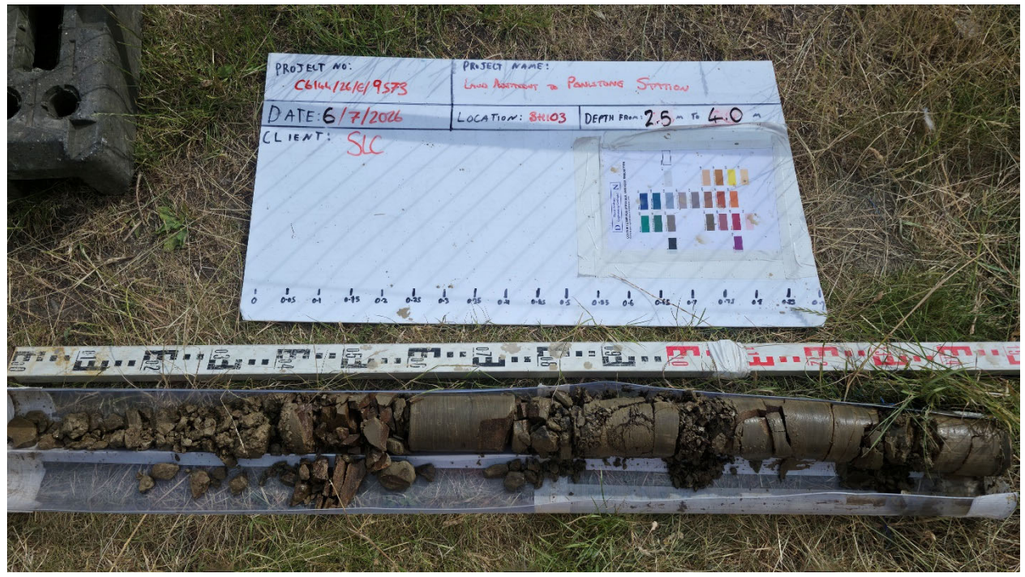


Photo 94: BH103 - 2.50m - 4.00m

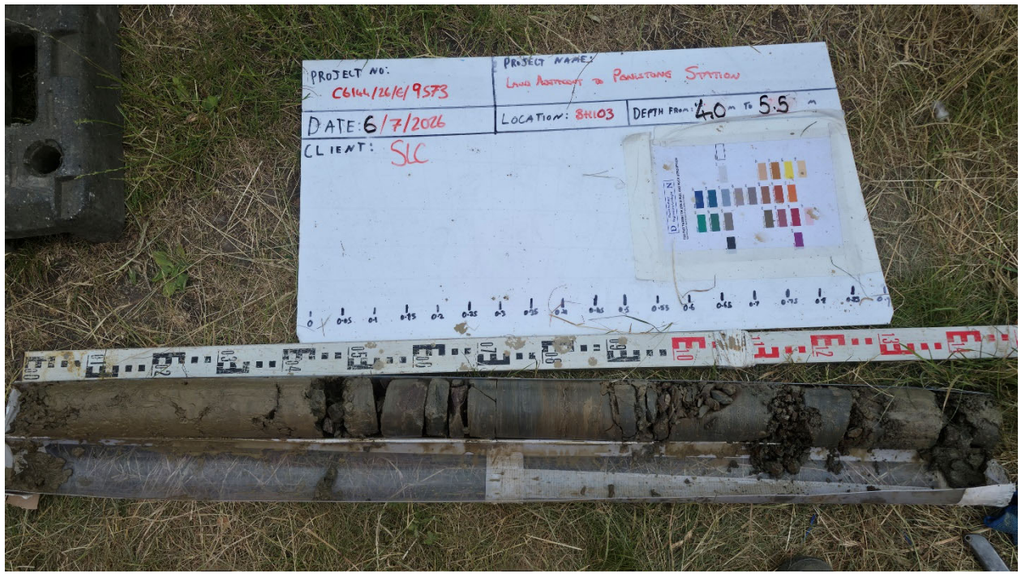


Photo 95: BH103 - 4.00m - 5.50m



Photo 96: BH103 - 5.50m - 7.00m

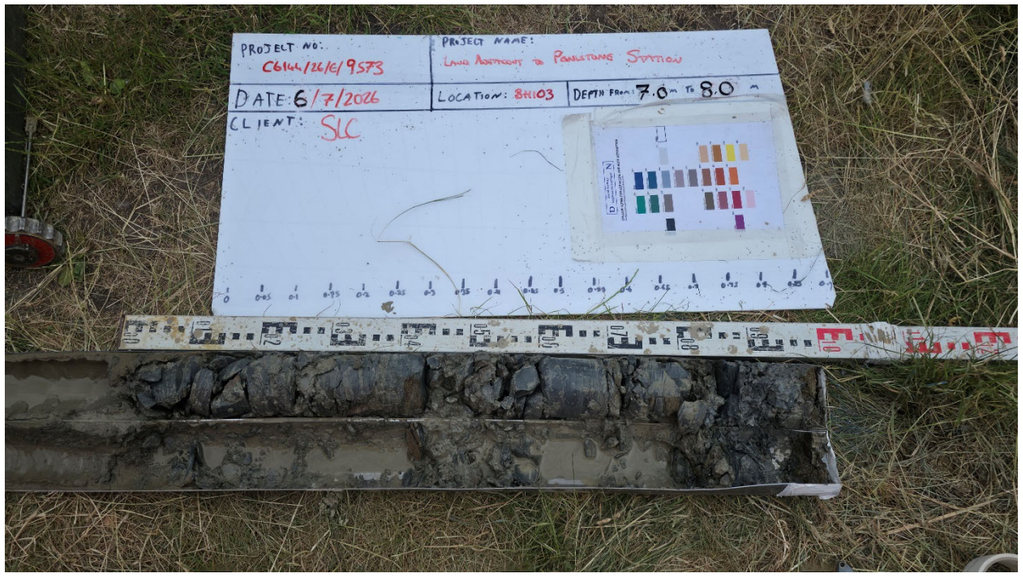


Photo 97: BH103 - 7.00m - 8.00m

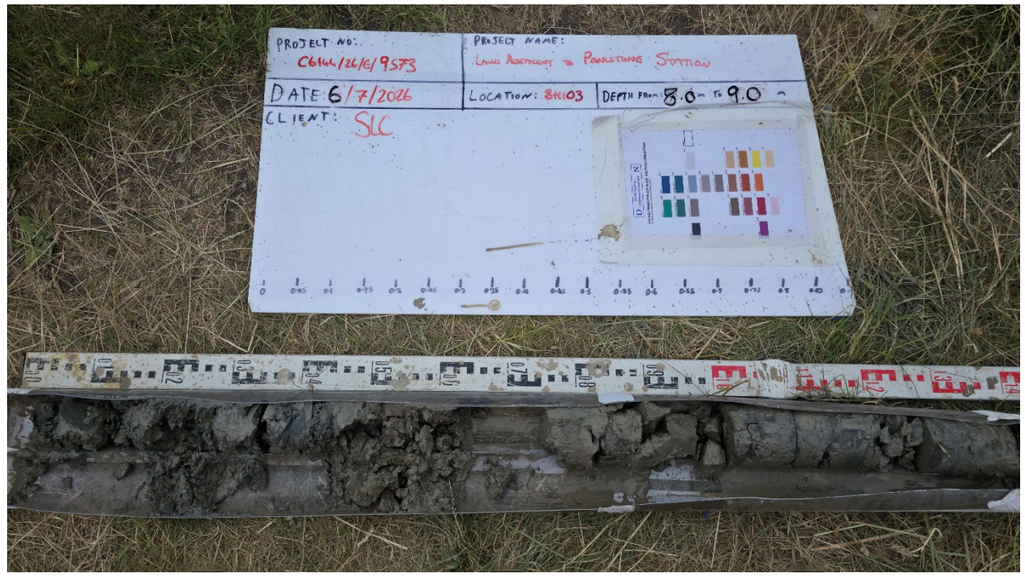


Photo 98: BH103 - 8.00m - 9.00m

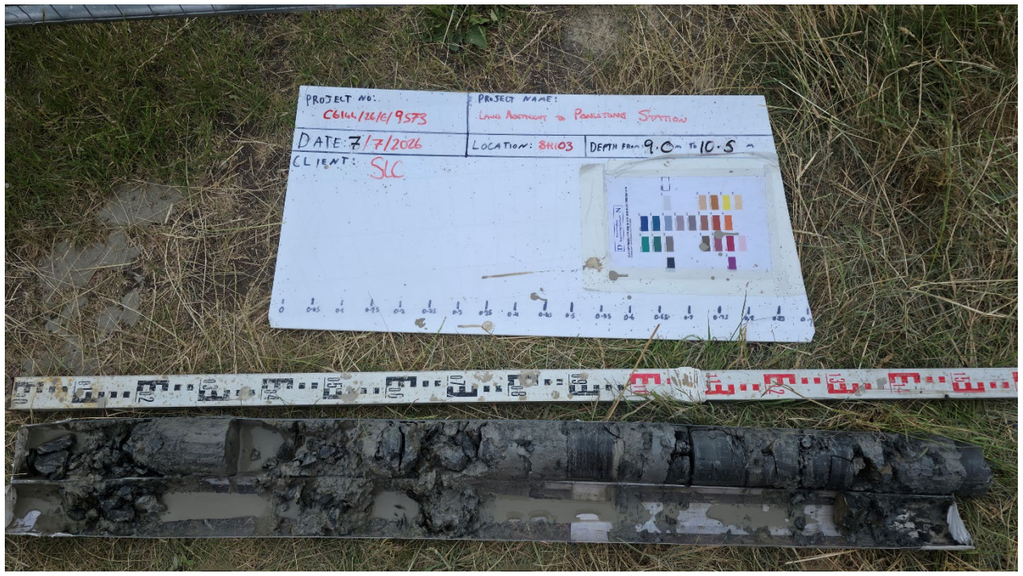


Photo 99: BH103 - 9.00m - 10.50m

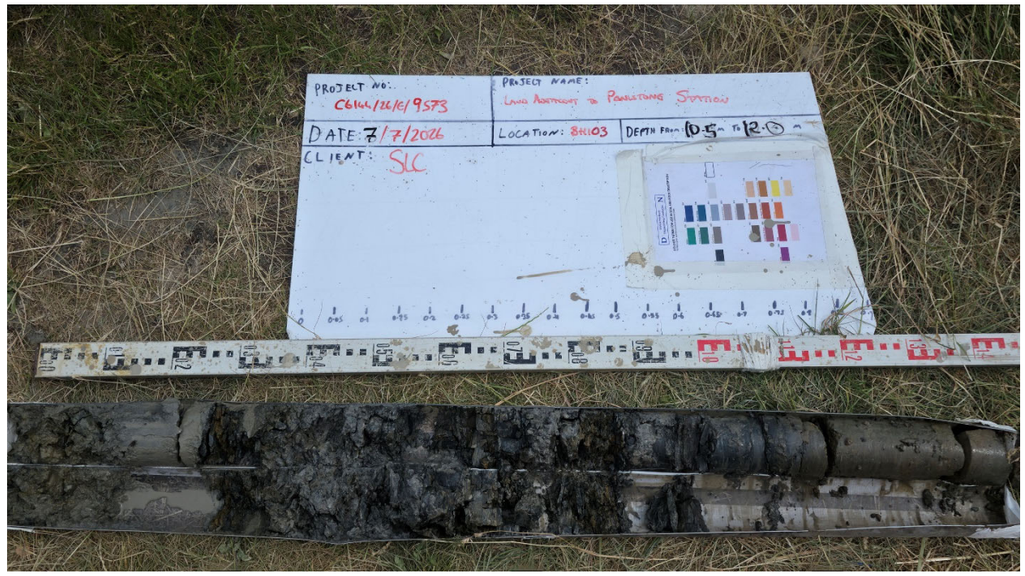


Photo 100: BH103 - 10.50m - 12.00m

Appendix G Supplementary Information

G.1 Network Rail

Evidence of Mine Workings Catalogue

Mine workings are classified by NR into four categories depending on the evidence available. The following provides definitions for the levels of evidence.

- Probable*: A workable mineable soil/rock has been identified from a geological plan ro similar information source, that is within influencing distance of the railway, with no evidence to indicate that it has been worked in the locality.
- Probable with Evidence: Probable workings with some corroborative evidence identified. Examples of corroborative evidence include localised collapse, proven or recorded adjacent workings in the same strata, historical remedial measures taken o the railway and the presence of mine entries in the locality.
- Recorded: Workings within influencing distance of the railway that are recorded on a mine abandonment plan or similar.
- Proven: Mine workings within influencing distance of the railway that have been intersected by a borehole or other excavation, including adjacent workings that are accessible or have reliable survey. The burden of proof for “proven workings” is higher than that associated with recorded workings.

* For this study the following text within the definition of Probable has been modified from “a workable thickness of coal (0.3m minimum)” to “a workable mineral or mineable soil/rock”.

Mining Hazard Database

NR/L2/CIV/191 Module 1 [1] states that the Principal Mining Engineer shall establish a Mining Hazard Database (MHD) that shall be used to capture:

- All known abandoned mine workings that are within influencing distance of NR’s operational railway infrastructure property at 50m or less vertical depth below rail level;
- All known abandoned mine workings that are greater than 50m depth below rail level that have the potential to cause ground movement which could impact on the safety or performance of the railway;
- All identified abandoned mine entries with a best fit position that is within 10m lateral distance of NR’s operational railway infrastructure; and
- All identified abandoned mine entries with best fit position outside of 10m lateral distance from the railway that are within influencing distance of the railway by virtue of their diameter and superficial depth/type present in the locality.

G.2 Failure Mechanisms and Preliminary Geotechnical Assessment

Underground Mine Workings

Any discussion of mining related risk must be related to several variables including:

- Depth of overlying materials to competent (engineering) rockhead;
- Depth to workings;
- Age of workings;
- Known versus suspected extent of workings;
- Thickness of worked seam horizon, noting the recorded thickness of workings may not represent the maximum void height of roadways, etc., as they were often driven at a height sufficient to allow movement of men and wagons;
- Materials within the mined horizon, e.g., fireclays and ironstones;
- Impact of previously collapsed workings on the overlying strata; and
- Relationship of multiple worked seams – in these situations any assessment of "cover ratios" are further complicated.

A general industry "rule of thumb" based on many decades of experience within the British coalfields is that if the ratio of rock cover (H) to seam extraction thickness (T) is greater than 10:1 there should be limited risk of ground surface instability resulting from any mining collapse. For instance, a 3.3m thick extraction would require 33m of (competent) rock cover to meet the 10:1 ratio.

A variety of geometric forms of collapse, including conical, wedge and rectangular, have been postulated by Piggott and Eynon [22]. The highest void estimated is when assuming the conical collapse mechanism as observed in crown hole development. The typical range of bulking factors for coal measures strata is 30-50%, with the lower the bulking factor assumed giving the greatest void size estimated. The conical collapse mechanism, expressed as:

$$H = \frac{2T}{B}$$

Where H = height above the mine workings, T = extracted seam thickness, and B = bulking factor (assumed to be 30%), produces a general ratio of rock cover: seam thickness of 6.7:1 to be required before a migrating void. However, in some cases, usually where there are zones of weakness, collapse zone can continue beyond this, but only rarely to beyond a ratio of rock cover to worked thickness of 10:1.

For this assessment, H is assumed to be competent rock cover, i.e., not including in situ residual soils of weathered rock, above the mine workings.

There is evidence that where certain ground and engineering factors exist, cover ratios of greater than or less than 10:1 may be adequate to protect the ground surface from mining instability. Table 5.1 in CIRIA C578 [6] outlines several scenarios where the acceptable cover criterion may be either increased or decreased from 10:1. The geological, site locale and development circumstances influence the selection of a site-specific cover ratio. The following geological conditions contributing to site-specific considerations of risk (ground model) at the site include:

- Presence of other economic deposits, i.e., fireclay and ironstone, which may have been extracted alongside coal; and
- Uncertainty remining in the ground model.

For this assessment, a 10:1 ratio has been utilised.

Where workings are present in thin seams, i.e., those less than 1.2m in thickness, the impact of in-seam roadways needs to be considered as these may be more critical than the workings. It is recognised that old workings may still contain open voids and constitute a possible hazard, due to reduced support provided along them.

When assessing the potential impact of mine access tunnels to coal mine workings, the recommendations in Nicholls [23] have been followed. In-seam roadways will be taken as 6' (1.8m) and main roadways cross seam as 8' or 2.3m unless greater heights are shown on mine plans.

When considering the potential mode of failure of roadings, following Piggott and Eynon [22], a wedge failure is considered appropriate and a tunnel height to rock cover ratio of 7:1 is taken as acceptable for the void to be choked by bulking of the rock entering the void. This is only taken to apply where there is no evidence of water flow in these roadways or the slope on the roadway is less than 20°.

In practice, a seam less than 1.2m in thickness will be treated as 1.2m in thickness to allow for a 10:1 ratio for workings and a 7:1 for 1.8m high in-seam roadways.

Consideration has also been made where there is less than 10T separation between seams of workable thickness. The preliminary ground model suggests there is not expected to be this scenario beneath the site.

Table 18: Preliminary geotechnical assessment of underground workings

Seam (CA Code)	Evidence & Working Type	Effective (Worked) Thickness (m)	Estimated Depth (m below track level)	Depth to Engineering Rockhead (m below track level)	Notes	Geotechnical Assessment
Lower Penistone Coal (NY398K)	Probable with unknown working type	0-0.50	27.90	1.10	Data review is inconclusive regarding which seam outcrops beneath the site. Hazard present, but consideration of failure mechanisms indicates it is unlikely to impact the site	>10T cover present
Better Bed (Unknown)	Probable with unknown working type	0-0.30				