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PROPOSED RESIDENTIAL DEVELOPMENT (CHANGE OF USE)

Agricultural Building off Hartcliffe Lane,

Hillside, Thurlstone, Sheffield, S36 9QJ

,

LOCAL PLANNING REF: (tba)

PHASE 1 POTENTIAL CONTAMINATED LAND

& PRELIMINARY RISK ASSESSMENT REPORT

ref: TH/Ridge/Bothy/001 - 29th July 2019

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(i) Terms of Reference

In July 2019, on the instructions of the Planning Consultant (Mr Tom Warren, Prism Agriculture Ltd) acting for the owner, Mrs Angela Ridge, a *Potential Contaminated Land & Preliminary Risk Assessment* (PRA) was requested on a proposed low-scale development off Hartcliffe Lane, Hillside, Thurlstone, South Yorkshire, S36 9QJ.

The development proposals consist of the change of use of an old historic stone agricultural building (*not dissimilar in proportions to remote hillside a 'bothy' found in northern England*) to create a small, compact residential dwelling in accordance with a proposed Class Q planning application to be submitted to Barnsley MBC (ref: tba). The client's Planning Consultant has advised that the Local Planning Authority can be expected to require, as a minimum, further information regarding the suitability of the site for the change of use / new dwelling: in particular, further details of the history of the site were sought - specifically in relation to potential land contamination, ground stability, mining etc. Generally, there are five recognised steps to making a preliminary assessment of this type;

- ***Desk Study*** - a brief search of available environmental information and historical maps to determine the physical characteristics of the site and to identify the likelihood of contamination, including information on the general characteristics of underlying soils and geological setting.

- ***Site Walkover & Trial Holes*** - a short survey to identify pollution leakages not obvious from the desk study and to identify what risk, if any, is present from ground instability, past coal mining and/or the presence of Radon.

- ***Conceptual Site Model (CSM)*** - to identify potential sources of contamination, the receptors that may be harmed, and possible pathways linking the two.

- ***Risk Assessment*** - to indicate what, if any, the risk of contamination is.

- ***Conclusion to the Assessment*** - to confirm to the local authority (and any other party) that the findings are satisfactory and that no further work is required (or) that there is no significant risk to human health (or) whether additional works (intrusive site investigation and risk assessment) are required to identify, quantify and confirm the presence of pollutant linkages in order to develop mitigation measures.

(ii) Mandatory Guidance

- *The Contaminated Land (England) Regulations 2000.*
- *Contaminated Land (England)(Amendment) Regulations 2012.*
- *The Environment Act 1995.*
- *The Environmental Protection Act 1990.*
- *Department for Communities and Local Government, 2012, Nat Planning Policy Framework.*
- *Department for Environment, Food and Rural Affairs, April 2012.Environmental Protection Act 1990, Contaminated Land Statutory Guidance. The Stationery Office Ltd.*

(iii) The Parties

Property	Existing old stone built agricultural barn and curtilage off Hartcliffe Lane, Hillside, Thurlstone, Sheffield, S36 9QJ
Client/Owner	Mrs A Ridge
Planning Consultant	Prism-Agriculture Ltd Mr Tom Warren

PART 1 SITE LOCATION, DESCRIPTION & HISTORY

1.0 The Site

The site is located off Hartcliffe Land, Hillside, just off the A628 Manchester/Penistone Road; elevated some 180m above sea level on a steep hillside location and close to the rural conurbation of Thursltone.

Thurlstone is a village near Penistone in the metropolitan borough of Barnsley in South Yorkshire. Originally it was a small farming community. Some industries developed using water power from the River Don such as corn milling, wire drawing and various wool and cloth processes. Most of these are now gone and the village is now a dormitory for the urban areas of South and West Yorkshire. The village now falls in the Penistone West ward of the Metropolitan Borough of Barnsley.



Fig 1 – Location plan: existing agricultural barn (bothy), off Hartcliffe Lane, Hillside, Thurstone, S36 9QJ

Penistone lies approximate 10km to the south-west of Barnsley, 1.5km to the east of the subject site as shown on Figure 1. It is situated approximately 17km south-east of Huddersfield and 19km north-west of Sheffield. The area of is a civil parish of approximately 2,262 hectares (22.62km²) and includes the township of Penistone, as well as the villages of Cubley, Springvale, Thurlstone, Millhouse Green and Hoylandswaine.

The population of the wider civil parish was approximately 11,000 at the last census in 2011. To the immediate west of the Penistone civil parish is the parish of Dunford, to the north-west is Gunthwaite and Ingbirchworth. South of Penistone parish is Langsett, to the south-east is Oxspring. Finally, to the east is Silkstone and to the north / north-east of Penistone is the parish of Cawthorne.

In addition, the Peak District National Park boundary falls 1km to the south-west of the Parish. The parish of Turlstone/Penistone is crossed by two key transport routes - the A628 and the A629. The A628 is a major Pennine crossing, running west-east between Hollingworth (approximately 10 miles east of Manchester), and Pontefract in West Yorkshire. Running north-south, the A629 connects Skipton and Rotherham via Keighley, Halifax and Huddersfield. The A628 and A629 cross each other just to the south of Hoylandswaine. The study area only has two secondary routes which complement the 'A' roads; these are the B6106 and the B6462. The B6106 is a 10.8km route which runs north-west from Thurlstone towards Holmfirth, whereas the B6462 is the former route of the A629 prior to construction of the Penistone bypass, linking Scout Dike to the north-west of Penistone with Thurgoland.

In terms of key gateways and nodes, there are a number of locations within the study area which are thresholds and meeting points. Most obviously is the centre of Penistone, which forms a key and busy node. In addition, the junction of the A628 and A629 forms a key transport node. The settlements of Millhouse Green, Scout Dike, Hoylandswaine and Spring Vale act as gateways to the wider parish.

Water exerts a strong influence on the character of the area with the River Don flowing west-east through the centre of Penistone civil parish, and Scout Dike and Royd Moor reservoirs providing recreational amenity in the northwest of the area. In addition, the Transpennine Trail forms an important recreational route, running west-east broadly parallel with the River Don (along an old railway embankment). National Cycle Route 62 mirrors this route through the study area. National Cycle Route 672 meets National Cycle Route 62 at Millhouse Green and follows the route of the Transpennine Trail spur to Kirkburton.



Fig 2 – Location plan and photos existing agricultural building, Hillside, Thurstone, S36 9QJ

The proposed development consists of a small existing detached agricultural building of stone construction (possibly dating to the mid 1800s) in fair general order for its age, situated on agricultural land. The current land use is small-scale agricultural and livestock (sheep) with grazing and there is good general curtilage. The present surfacing consists mixed grasses and grazing with some compacted stone (deteriorated) and general hard-standing at the front and at the entrance to the site off Hartcliffe Lane. The land parcel is situated on the valley side and slopes steeply to the west. The building sits on a generally level footprint with well-defined boundaries. There is an operational stone quarry fairly close and a buried water reservoir (Yorkshire Water) up the hill side to the north-east at an elevation of c.250m AOD, but the site (as with other residential dwellings in proximity) is well screened, sitting some 70m lower in elevation There are a number of established residential houses on all sides on Side Lane, Hillside and Hornthwaite Hill Road off the A628.

The footprint of the building is compact, rectangular, and is arranged as single storey barn of solid wall construction comprising coursed squared stone outer leaf, rubble cavity fill and rough stone inner leaf. It is in good structural order with thick stone abutments and is estimated to date to at least the middle 19th Century, with evidence that it has been repaired at various times in the past. The roof is flat/low single pitch with a basic timber rafter type skeleton and what would have been traditional tile/stone slate covering (it is presently covered with galvanised tin sheeting). The ground floor is part soil part compacted fill and the building incorporates a substantial dividing wall that, like the primary elevations, are in good structural order and should be capable of retention.

There is clear evidence that the site has been subject solely to agricultural use, and it has been established by inquiry that it has been associated with the current owners' family for at least three generations, where its use has been universally for animal storage. Initial research has not been able to determine its date of construction, but the style of building and the structure itself suggests the building is at least 140 years old. There is no indication (from local knowledge, research, observations or otherwise) that suggests the site had any other previous industrial or commercial use.

PART 2 HISTORY OF THE SITE & LOCALITY

2.1 General History

The proposed development site lies in *Thursltone* in near proximity (but not directly within) of the conurbation of *Penistone* - just off Cross Lane which is off the A628 Manchester/Penistone Road.

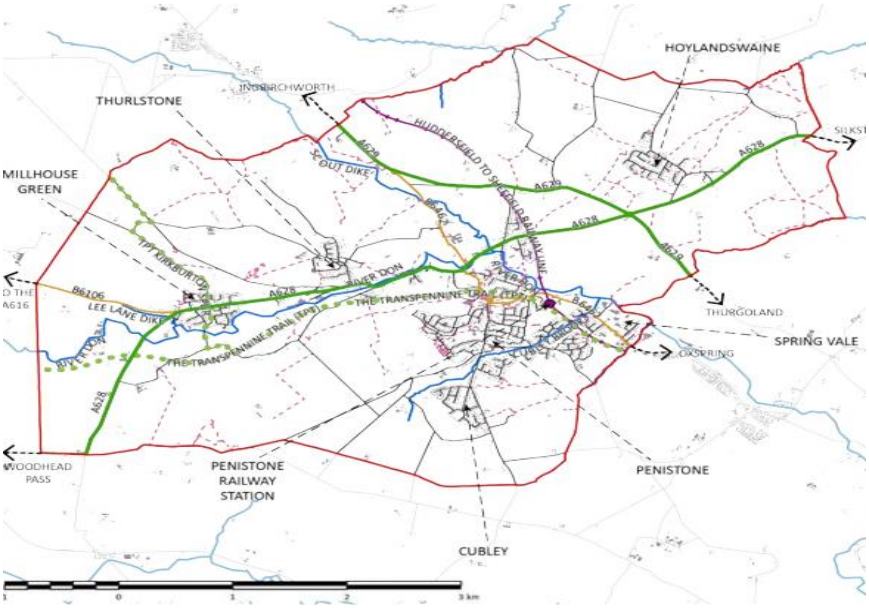


Fig 3 – Map showing environs, settlement, land-use & heritage assets

Earliest evidence of human habitation of the area dates to the pre-historic period with flint tools and stone axes found on the moors and earthworks at *Denby Common, Langsett* and *Roughbirchworth*. Other indicators are marked on old Ordnance survey maps as 'Castle Hill' or 'Castle Dyke' and provide clues about early settlers within the area.

2.2 Medieval History

The earliest mention of Penistone is in the Domesday Book where it is called Pengestone and Alric was Lord of the area. The origin of this name has been disputed. It is sometimes said to derive from a personal name such as pening, an Old English name, or Penny used from at least 1273 and probably earlier. Others suggest that the name derives from the Celtic word Pen meaning a prominent hill with tun being a universal word for village or settlement. Many of the farms and hamlets in the old parish of Penistone (which extended over the moors to the county boundary in the west) were first recorded by name in the thirteenth and fourteenth centuries when local records began, but at that time some may have been centuries old.

Documentary sources suggest that Penistone was an active settlement during the medieval period. The focus of activity was in the village itself particularly around the church. The faint traces of ridge and furrow plough marks within the area are remnants of the medieval open field system of farming and indicative of an ancient landscape and represent medieval agriculture and farming activity. Penistone was at this time a rural and agricultural community and this state of affairs continued until the 18th century. During the 17th century the Riches, an influential major landowner within the area developed a complex of buildings at Bullhouse.

2.3 Recent History

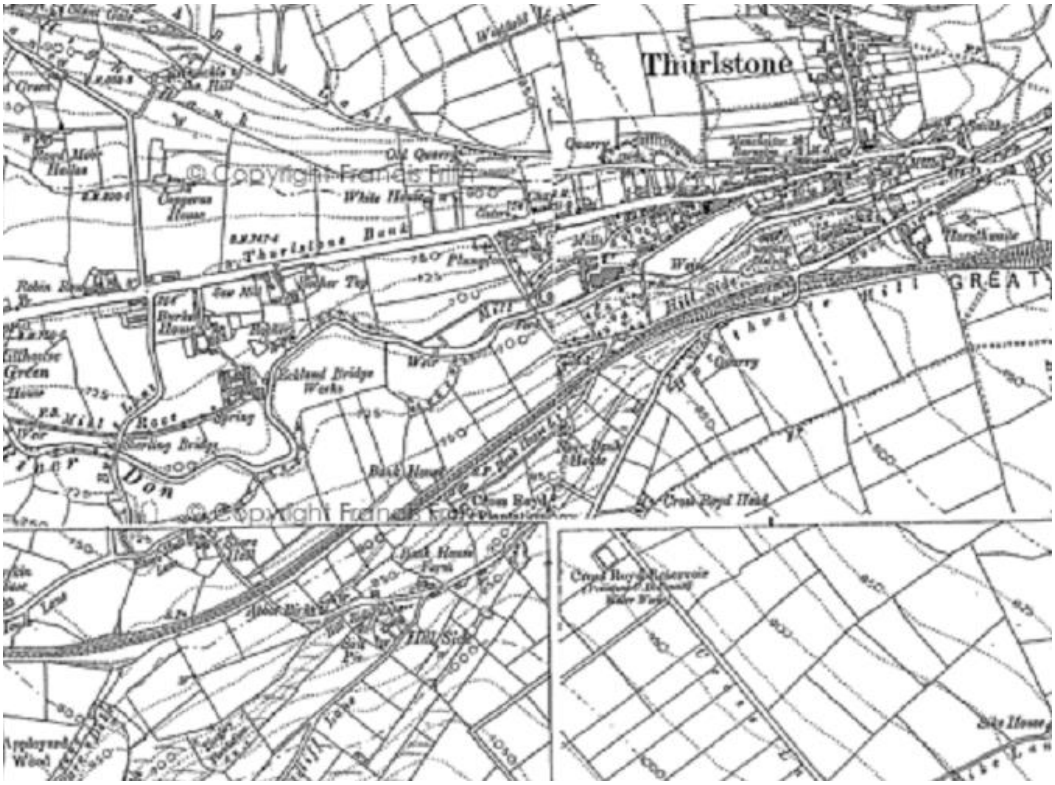
The area contains a large selection of 17th century buildings all centred on Bullhouse Hall, a grade II* listed building, what has been referred to as the greatest house in these parts. The Rich family records back in the 1370. The Riches owned two corn mills at Bullhouse and two fulling mills for thickening and cleansing cloth at Millhouse and Thurlstone. Their influence is still readily visible through the collection of impressive 17th century buildings at Bullhouse. During the 18th century Penistone and the surrounding areas were still rural.

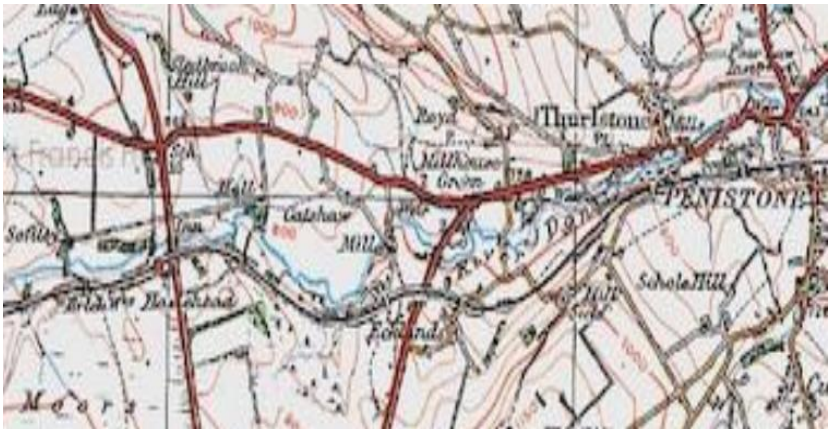
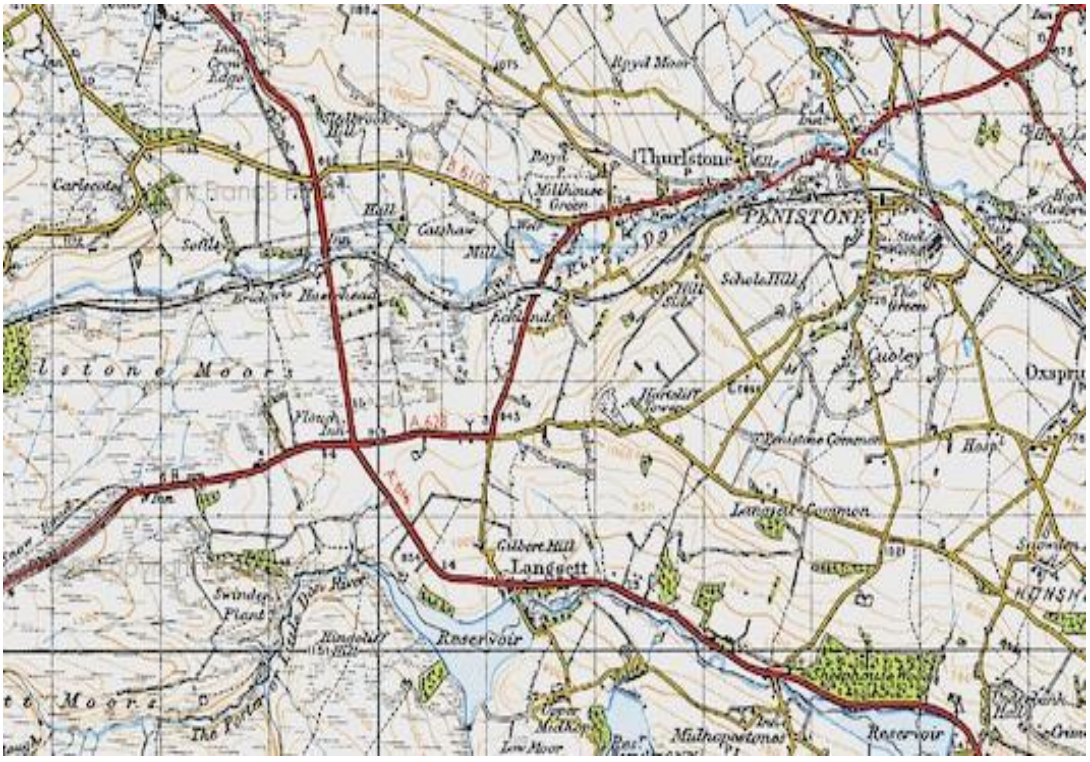


Fig 4 – Historical Map 1850 to 1854

The earliest map covering the study area is the 1772 Thomas Jeffrey map of Yorkshire. This early edition shows the whole county in some detail in the pre-industrial era with many of the most prominent features marked on it. Penistone is written in bold type and capital letters which signifies it as a larger settlement of slightly more importance than the smaller villages around it. The nucleus of Penistone at this time is around the church of St. John the Baptist and the High Street, with the surrounding area of a rural character. This map is fairly detailed with the church well illustrated and the gradients of the area accurately portrayed.

In 1741 the old track along which salt had been brought from Cheshire over Woodhead and across the county boundary at Saltersbrook towards Salter Hill and the markets at Barnsley, Doncaster and Rotherham had been converted into a turnpike road. The pattern of ancient highways and byways of Penistone is still evident in the landscape and have informed the development of the area with some of the oldest routes still being used by modern traffic - many have listed milestones indicating the routes. Others have become overgrown but evidence such as holloways, packhorse bridges, and guide stoops indicate their former use and importance.

Dates	On site (salient)	Description
1891-1892	All of the site	*Agricultural Land* – featured on OS Maps of 1891 as Common fields. 
1896	All of the site	OS County Maps show the subject site as field 

1924	All of the site	OS County Maps show the subject site as field 
1947	All of the site	OS County Maps show the subject site as field 

***[*From the above records it is clear that the development site in question has been predominantly agricultural field from before c.1800 and it has been used solely for agricultural animal storage right up to the present day*].**

Dates	Off site	Description
650BC-43AD	In proximity	*Earliest evidence of human habitation of the area dates to the pre-historic period with flint tools and stone axes found on the moors and earthworks at Denby Common, Langsett and Roughbirchworth. Other indicators are marked on old Ordnance survey maps as 'Castle Hill' or 'Castle Dyke' and provide clues about early settlers within the area.*
1200	In proximity	*The earliest mention of Thurlstone is associated with Penistone, and is in the Domesday Book where it is called Pengestone and Alric was Lord of the area. The origin of this name is said to derive from a personal name such as pening, an Old English name, or Penny used from at least 1273 and probably earlier. Others suggest that the name derives from the Celtic word Pen meaning a prominent hill with tun being a universal word for village or settlement.*

1300 – 1400		*Many of the farms and hamlets in the old parish of Penistone (which extended over the moors to the county boundary in the west) were first recorded by name in the thirteenth and fourteenth centuries when local records began, but at that time some may have been centuries old.*
1652-1697	In proximity	*During the 17th century the Riches, an influential major landowner within the area developed a complex of buildings at Bullhouse. This area contains a large selection of 17th century buildings all centred on Bullhouse Hall, a grade II* listed building, what has been referred to as the greatest house in these parts. The Rich family records back in the 1370. The Riches owned two corn mills at Bullhouse and two fulling mills for thickening and cleansing cloth at Millhouse and Thurlstone. Their influence is still readily visible through the collection of impressive 17th century buildings at Bullhouse.*
1800's	In proximity	*Around the early 19th century, the economy of the area was still focussed on agriculture and relied heavily on sheep farming. The lack of development in this town was apparent even to the casual observer. John Holland wrote in his 1837 book, Tour of the Don that "Penistone has often been called in joke 'the finished town' – not from the perfection of the plan…but from the fact that no additions appear to have been made." However, weaving and clothiers were also on the rise. Thurlstone for example had 40 weavers, 21 clothiers, 4 cloth dressers, a slubber, a yarn maker and a dyer. This is represented through the large proportion of weavers' cottages still evident within Thurlstone and indicated that agriculture was no longer the focus of the economy. During the last quarter of the century, the preparation and spinning processes became mechanised by water power.*  *Penistone High Street - c. 1895*
1850 - 1900	In proximity	*The 19th century was a period of dramatic change for the area. The Enclosures Act of 1819-1826 transformed the countryside by the division of the commons and wastes into the rectangular, stone walled fields that are now a feature of the landscape. At this time Penistone is listed as having acreage of 420 made up of commons, fields and wastes and in 1801, the population of the town was a mere 493. At the same time new textile mills along the banks of the River Don and Dearne were changing the local economy and attracting new settlements alongside them. The mid-19th century saw the development of railways and steelworks. The Manchester, Sheffield and Lincolnshire railway was completed in 1837 and the arrival led to an expansion of Penistone.*  *Penistone High Street - c. 1900*
1901	In proximity	*In 1845 the Woodhead Tunnel (at that time the longest in Britain) opened. Steam trains took a steady supply of coal from the South Yorkshire coalfield to Lancashire and Cheshire. So important was the line that in 1954 it became the first in the country to be electrified. Now it lies abandoned, converted in part into a long-distance walk between the Pennines. The Penistone Viaduct (NHLE 1286798) was also built at this time to carry the line across the River Don and its valley. This viaduct is a grade II listed structure but has not remained intact since its original construction. In the February of 1916, the second and third arches collapsed and a locomotive plunged into the valley below. A further railway was built, the Huddersfield and Sheffield Junction line in 1850. This allowed even more traffic to go through Penistone and businesses were soon aware of the potential of Penistone for industry.*  *Cattle market on St Mary's Street - c. 1901-1914*

1900s	In proximity	*Penistone expanded considerably in the second half of the 19th century after the opening of the Yorkshire Steel and Iron Works to the east of the town. At its peak it employed 1,500 men. Old photographs show tall chimneys beyond the railway station and sidings. The company built seventy houses for its workforce along Sheffield Road in a new settlement that they named Spring Vale, while another group of houses around Don Street were named Spring Gardens. Alternative employment was provided by the flax and thread mills erected between Sheffield Road and the River Don in about 1860. Further housing for the steelworkers was erected on Castle Green from the 1860s. By the end of the 19th century the parish of Penistone had three times as many people living within its boundaries that it had at the beginning of the century. Old farming families, such as the Riches at Bullhouse, were being replaced in social status by entrepreneurs of the industrial revolution.*
1914	In proximity	*Penistone town centre developed rapidly at this time with the High Street extending southwards towards the new Victoria Street. Soon afterwards, more houses were provided in Ward, Unwin and Clarel Streets and at Penistone Green, which had previously been fields and gardens. Other residential and public buildings were built down Church Hill and St Mary's Street. The appearance of the town was essentially strengthened during this period with late Victorian buildings such as the Vicarage, the police station, the Liberal Club and the Midland Bank all becoming prominent and recognisable features of Penistone now. Other buildings were built such as schools, workhouses, and utilities such as Gas Works and Waterworks.*  *Penistone station and Cammell Laird steelworks - c. 1910-1914*
1924	In proximity	*The construction of reservoirs, which began at Ingbirchworth in 1868, Midthorpe in 1897, Langsett in 1904 and Scout Dyke in 1924, changed not only the facilities for residents but also the landscape in and around the area. Development continued into the 20th century with construction of the Park Avenue Estate housing estate beginning in 1936 and after the war a large council estate was erected. A generation later, the town expanded to its present size beyond Park Avenue and down the hill towards Water Hall. More recently, the old Lairage site and ambulance station has given way to a large retail store, and timber framed open market, continuing the historic tradition of buying and selling in Penistone.*
1800	In proximity	*Other main settlements within the area include Thurlstone and Hoylandswaine. Thurlstone can be roughly dived into two zones: one representing old Thurlstone high above Manchester Road stretching along Towngate and Ingbirchworth Road to the north and another, along Manchester Road and the area backing onto Plumpton Mills (developed during the 19th century). The old village area contains a number of seventeenth and eighteenth century houses, with locally characteristic weavers' windows inserted during the nineteenth century. The textile industry was the mainstay of the village up until the early part of the twentieth century. The village has undergone some infill development over recent years, along with an amount of encroachment from relatively new developments around Smithy Drive and Westfield Avenue.*  *High Street, Penistone - c. 1928*

2.4 Summary of Past Usage

The proposed development site off Hartcliffe Lane, Hillside, Thurlstone, South Yorkshire, S36 9QJ has been predominantly **AGRICULTURAL FIELD & STONE BARN** from initial settlement predating the middle 1800s where its agricultural usage sustained up until the present day.

2.5 Geology (by Research)

The bedrock geology is a mixture of Penistone Flags, which is a sandstone formation, as well as the Pennine Coal Measures Formation - a mixture of mudstone, siltstone and sandstone containing coal measures and marine fossils. The sandstone within the area has historically been quarried. Soils in the study area are loamy - sometimes mixed with clay or peat – and range from low to very low fertility. Centred on Penistone is a loam/clay mix which is seasonally wet and acidic and suited to grass production. To the east and west of this, the soils become less acidic and freely draining, supporting a range of spring and autumn crops, as well as a longer grazing season. Both of these soils are of low fertility. To the south of Thurlstone and Millhouse Green is a small strip of very acidic loam/peat soil, which has surface wetness, is of very low fertility and suitable only for rough grazing.

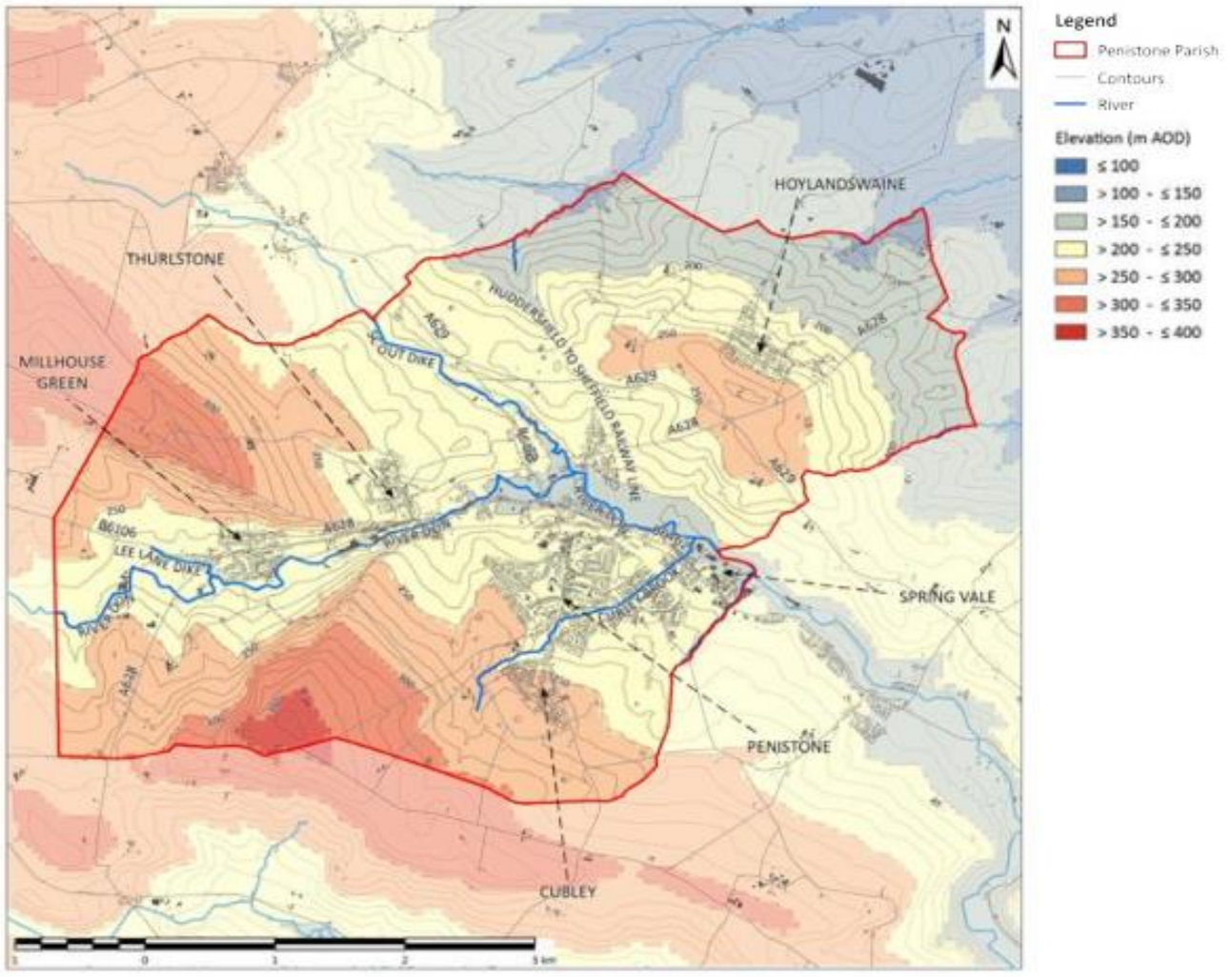


Fig 5 – Topography & Geology

PART 3 SITE INVESTIGATION (BY TRIAL HOLES)

3.1 Geology (by Intrusive Trial Hole Investigations)

The site was surveyed on Friday 26th July 2019 by Mr T. M. Hyett MSc FGS MCIOB MIEI, a Chartered Consultant Engineering Geologist. The purpose was to generally identify the undisturbed near surface geology; observe/witness a series of trial holes and comment on the potential for contaminants in the soils that can be expected, either at foundation

depth (if new foundations are to be excavated) or at typical drainage depths etc., as well as providing advice to the owner on the suitability of the ground generally for the construction of the proposed development.

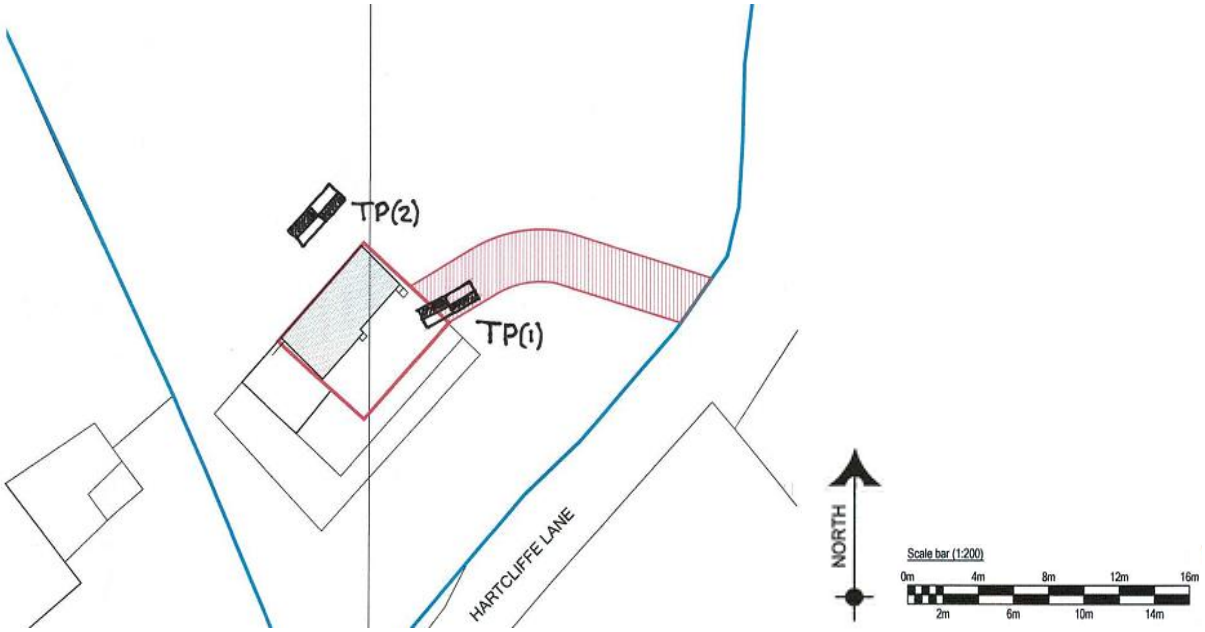


Fig 6 -Trial Pit Locations - TP1 & TP2

The topography of the site slopes quite steeply from the north-east towards the west, with the building sitting generally level and well-founded on bedrock within the middle of the field curtilage. There was no evidence of unstable slopes on the boundaries, and no evidence of subsidence, compressible soils, swelling soils or weak soils in the immediate proximity of the existing building. Two trial holes were carried out during the visit, TP1 to the front offset to the side (eastern edge) of the building off-set circa 2.5m, and TP2 to the rear (north-western edge) off-set circa 3m in the curtilage areas. The full Trail holes Logs are attached at Appendix A.

Trial hole No.1



Fig 7 - 3t mini-excavator TP(1)



Fig 8 - Trial Hole No.1



Fig 9 - Spoil Heap from Trial Hole No.1

Trial hole No.2.



Fig 10 - Trial Hole No.2



Fig 11 - Spoil Heap from Trial Hole No.2

The soil descriptions & classification is based are based on visual examination and INDEX TESTSING and are in accordance with *BS EN ISO 14688-1:2002 Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 1, BS EN ISO 14688-2:2004 Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 2*, and *BS EN ISO 14689-1:2003 Geotechnical Investigation and Testing - Identification and Classification of Rock - Part 1.*

The trial pits revealed superficial soils consisting topsoil (no Made Ground) over stiff light orange and brown slightly to very sandy clay. Bedrock was encountered in both Trial Pits and accords with empirical knowledge of the area that indicates bedrock close to the surface and within 1.0m to 1.2m below the superficial soil. Samples were taken from TP1 and TP2 for further index testing, and both trail pits were 'dry' upon completion.

From field observations, the general near surface geology was found to consist as follows:

> "TOPSOIL, with no evidence of Made Ground around the existing building: some *dark grey compacted sandy gravels. Gravel is angular coarse sandstone, occasional brick, clinker*" approximately 100mm to 150mm thick overlying natural *"yellowish brown, firm to stiff slightly silty CLAY with sands and gravels – gravels are angular tabular fine to medium sandstone and mudstone litho-relics."* (GLACIOFLUVIAL DEPOSITS)."

There was no unusual colouration or odours to any of the soils encountered during the investigation and no evidence from the trail holes that the site had any previous heavy industrial/engineering use and no visual indicators to suggest the presence of hazardous contaminants in high (or any) concentrations, or any evidence of high (or any) concentration

of *oils, lubricants, sulphates, asbestos (chrysotile, amosite, tremolite, actinolite or ferroactinolite), radon gas, methane, high concentrations of carbon monoxide, hydrogen sulphide* or *carbon dioxide*.

From consulting *Geological Map Extracts* from the BGS -*British Geological Survey* (specifically 1:10560 scale sheet 261SW and 1:50,000 scale sheet 86) the superficial deposits identified in the trial holes overly the natural bedrock consisting "*Weathered Sandstone*" (GRENOSIDE SANDSTONE and PENISTONE FLAGS SANDSTONE) and "*Weathered, moderately strong Mudstone, Siltstone and Sandstone*" (PENNINE LOWER COAL MEASURES FORMATION).

The Penistone Flags is a prominent sandstone which can be expected to have weathered to a gravelly sand or sandy gravel in the near surface. There are no drift deposits shown on the geological maps, although a roughly northeast-southwest trending fault is shown to pass just to the south of the site but does not affect the site itself.

3.2 Soil Strength

The trial holes were excavated under the full-time supervision of a Chartered Engineering Geologist (CGeol FGS) from Earth-Tech Consulting Ltd. The subsoils were inspected visually on site and tested in-situ for consistence in undisturbed and disturbed conditions in accordance with BS5930: 2015. This indicated a CLAY soil classified as *firm* (TP1 & TP2) - typically, at this depth, for existing foundations sited upon the clay, allowable bearing pressures of up to **80kN/m2** can be adopted. The clays are of medium plasticity. They can be expected to exhibit *low to medium* swelling and shrinkage properties but are not likely to be frost susceptible.

3.3 Ground Gas

It is well known that both historic coal workings and old quarries that have been used for landfill have the possibility of generating varying levels of ground gases. Methane is the dominant constituent of most ground gas and can form an explosive mixture in air at concentrations of between 5% and 15%, thus 5% methane in air is known as the *Lower Explosive Limit* (LEL). Concentrations less than this do not normally ignite. Carbon dioxide can also be a potential problem, especially where it occurs in concentrations greater than 1.5%. Basic in-situ methane gas tests were carried out in probe holes made in the sides of Trial Pit (1) and Trial Pit (2) using a portable RS-Pro gas detector (shown below) which measures the methane content as its percentage volume in air.





Fig 12 - Portable RS-Pro methane detector (above) & (right) in use during survey at Hillside on 26.07.2019

RS-PRO PORTABLE GROUND GAS MONITOR **GAS DETECTOR FEEDBACK FOR METHANE CONCENTRATION LEVELS**							
Low Sensitivity White Light ON	*High Sensitivity Yellow Light ON*	*Level Lights*					*Audible Alert Beeping*
		L1	*L2*	*L3*	*L4*	*L5*	
= 0 ppm	= 0 ppm	OFF	OFF	OFF	OFF	OFF	OFF
1… 100ppm	1… 1000ppm	ON	OFF	OFF	OFF	OFF	1 cyc/sec
100… 400ppm	1000… 4000ppm	ON	ON	OFF	OFF	OFF	1.2 cyc/sec
400… 700ppm	4000… 7000ppm	ON	ON	ON	OFF	OFF	1.65 cyc/sec
700… 1000ppm	7000… 10000ppm	ON	ON	ON	ON	OFF	3.25 cyc/sec
> 1000ppm	> 10000ppm	ON	ON	ON	ON	ON	6.25 cyc/sec

No methane, carbon monoxide or hydrogen sulphide gases were detected in any of the trial holes. Carbon dioxide ranged from zero to 0.3% by volume indicating no further requirement to initiate a phase of ground gas monitoring.

3.4 Hydrogeology

As shown in Fig 5, the topography of the study area is heavily influenced by the River Don, with generally steep slopes towards the valley floor and various local high points, often with panoramic views of the surroundings, as referenced in the Landscape Character descriptions of LCA F1 and F2. The highest point in the parish is Hartcliff Hill, at just over 360m AOD, although Royd Moor and Hoylandswaine are also high points, at 330m and 270m AOD respectively. By contrast, the lowest point in the study area is 130m AOD at Whin Moor plantation in the far north-eastern corner of the parish. In this location, the topography falls northwards from Hoylandswaine and the low point occurs in the valley of Ellhirst Beck. The main watercourse flowing through the parish is the River Don. Within the study area it flows west-east, with a number of smaller tributaries such as Scout Dike. There are also a series of reservoirs within the west of the parish – these include Royd Moor Reservoir and Scout Dike Reservoir. Stone bridges and industrial remnants such as weirs, sluices and mill races are key historic landscape features along the watercourses.

Specific to the site at Hillside, Thursltone, groundwater was not observable in any locations surrounding the site, which sits at an elevation of c.170m above sea level. It can be reasonably assumed that ground water level is below the zone of influence of the existing foundations (which are unaffected by the proposals) and/or below any potential new drainage connection trenches. There was no evidence of soils of high leaching potential, no evidence of abstractions or springs on current mapping, and no evidence of a perched water table and/or artesian pressure within the soil at shallow depth.

Vegetation on the site is sparse, and what shrubbery does exist occurs as overgrowth around the perimeter of the site, and there are no trees or vegetation that might be affected by the proposed works, nor is the vegetation likely to affect the works as proposed. Evidence suggests a level water table at depth with a stable, consistent soil type comprising mainly COHESIVE SOIL (Clay) overlying BEDROCK of *Sandstone* (Grenoside Sandstone and Penistone Flags Sandstone) and/or the *Pennine Lower Coal Measures* formation. No problems are envisaged with swelling or shrinkage of soil due to the movement of groundwater and the propagation of trees, vegetation, flora and fauna.

Groundwater, whilst not observed in any significant quantity (or at all), if found to be present at deeper elevations (if applicable) can reliably be estimated from empirical data to be in the region of between pH 5.5 - 7.0 representing a *low risk* in terms of acidic ground and potential sulphate attack on existing concrete and cement mortars.

3.5 Landcover

Farmland is usually laid to pasture or grassland, although there are a small number of arable fields. There are also some areas with paddocks for equestrian grazing. Fields tend to be divided by dry stone walls and occasionally hedges. As a result, there are very few hedgerow trees, and trees are generally scarce. There are also a number of semi-natural habitats (including some Biodiversity Action Plan (BAP) Priority Habitats) including riparian vegetation, semi-improved grassland, moorland, and ancient woodland. Semi-improved grassland occurs close to the north of Millhouse Green and to the east of Thurlstone, as well as around Scout Dike reservoir, and a small patch approx. 0.5km south of Cubley.

In the Penistone parish, ancient woodland occurs in three distinct patches – semi-natural ancient woodland is seen at Shrogg Wood to the south of Hoylandswaine, with replanted ancient woodland at Cat Hill Clough Wood to the west of Hoylandswaine and at Cubley Wood, immediately north of Cubley. Linear belts of trees are especially apparent along the River Don, as well as some of its smaller tributaries such as Scout Dike and Coal Pit Dike.

A small portion of the parish at Hartcliff Hill is above the moorland line, but moorland habitat is more apparent to the south of this - a location which is outside of the parish boundary. Woodland is primarily deciduous, although there is a coniferous plantation to the immediate south-west of Scout Dike Reservoir, presumably planted to aid screening of the dam and side channel spillway from Penistone and surrounding areas.

The majority of woodland included in the National Forest Inventory by the Forestry Commission is riparian, following the River Don or one of its tributaries, or is in small woodland groups in the north-east of the parish (near Hoylandswaine). Elsewhere, tree cover tends to be more common in the valleys than on higher ground, including belts of trees either side of the disused railway line which now forms part of the *Transpennine Trail*.

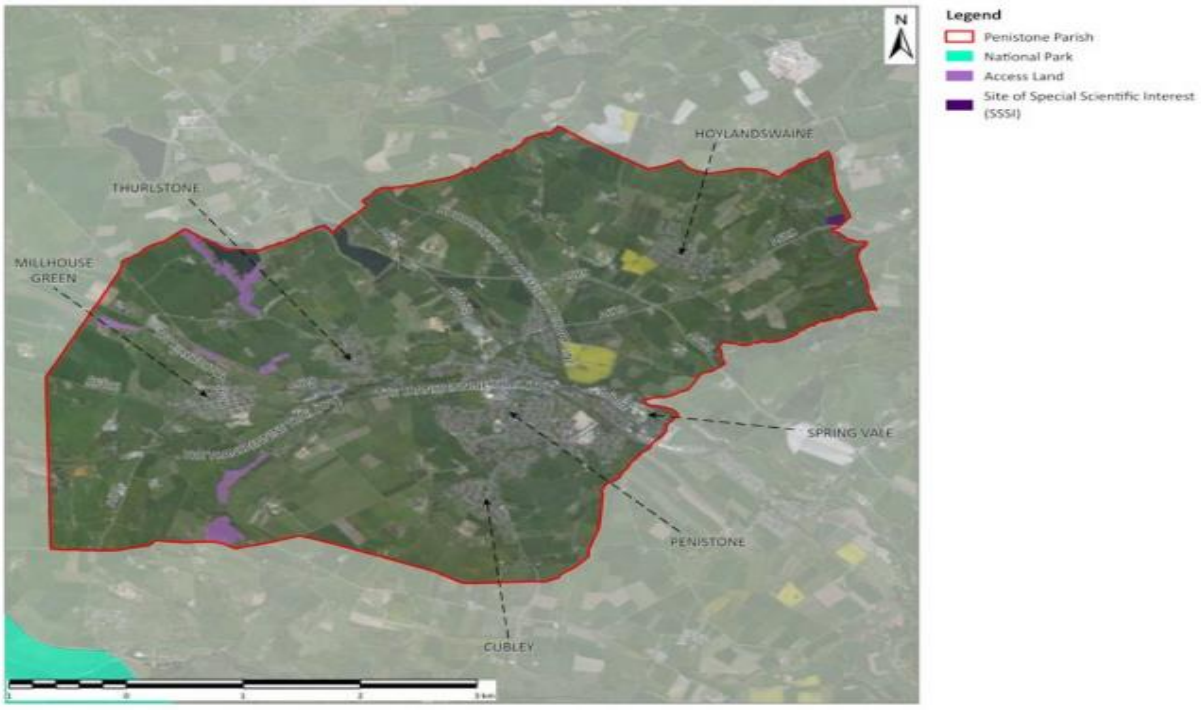


Fig 13 - Land Cover

Within the settlements, including Thursltone and the subject site area, trees tend to be limited to gardens of houses, especially in the Chapel Lane, High Street, and Park Avenue areas of Penistone, the Ingbirchworth Road area of Thurlstone, and either side of Hamper Lane in Hoylandswaine. To higher ground, trees tend to be scattered or in small groups, such as the circular plantation to the south-west of Hartcliff Hill.

The primary boundary treatment for the site (being of agricultural nature) is stone walls, as mentioned above. Therefore, elsewhere, hedgerows are most common within private gardens. As a result, the hedgerows within the parish are commonly well managed and single species, often comprising Leylandii or privet. There are a number of areas within the Parish that are designated as 'Access Land' as defined in the Countryside and Rights of Way Act 2000. This means that the land is privately owned, but the general public has the right to freely roam over the land and undertake activities such as walking, running, climbing and wildlife-watching. Activities such as cycling and horse-riding are restricted on access land and only allowed if the landowner permits it, or there is a public bridleway or byway crossing the land.

PART 4 POTENTIAL FOR GROUND INSTABILITY)

4.1 Superficial Soils / Drift Geology

The geological information derived from 1:10,000 scale BGS Geological mapping 1.2.1 Superficial Deposits/ Drift Geology shows there are no records of landslips within 500m of the site (the geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:10,000 scale).

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	339.0	NW	ALV-CZ	Alluvium - Silty Clay	Clay, Silty

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

4.2 Solid Geology (bedrock)

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age
2	0.0	On Site	GM-SDST	Greenmoor Rock - Sandstone	Langsettian Sub-age
3	4.0	NW	PLCM-MDSI	Pennine Lower Coal Measures Formation - Mudstone And Siltstone	Langsettian Sub-age
4	32.0	NW	GM-SDST	Greenmoor Rock - Sandstone	Langsettian Sub-age
5	49.0	SE	PLCM-SDST	Pennine Lower Coal Measures Formation - Sandstone	Langsettian Sub-age

4.3 Natural Ground Stability

The following *Shrink Swell Clay* information is provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
2	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

The following *Landslides* information is provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.

The following *Ground Dissolution* information is provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

The following *Compressible Deposits* information is provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

Regarding *Radon*: the site is NOT in a *Radon* affected area – there is NO REQUIREMENT for *Radon* protective measures.

The following *Collapsible Deposits* information is provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

What does this mean?

This means that there are no significant natural ground instability issues indicated in the vicinity of the site: namely weak or unstable rocks that could slip downhill on steep slopes (greater than c. 5 degrees) or into excavations ('Landslides (slope instability)') (LEVEL C). There is no evidence of *running sands*, and no specific need to check for *plasticity of clay soils* (PI). It is not likely that any *collapsible* (loessic) deposits will be encountered and the buildings' foundation loads are unlikely to exceed the *safe bearing capacity* of the soil during or after construction as observed.

The relevant Geo-Sure data and BGS Digital Geological mapping of Great Britain at 1:50,000 scale indicates the Maximum Hazard Rating for Natural Subsidence within the study site boundary is VERY LOW

4.4 Mining, Extraction & Natural Cavities

Regarding the possibility of risks associated with past *mining, mineral extraction* and *natural cavities*, the Geo-Insight Report states that the site is located within 1000m of a Coal Mining area (921m to the West).

ID	Distance (m)	Direction	NGR	Details	Date
Not shown	921.0	W	421383 402617	Colliery	1891

Regarding non-coal mining 'Ground Workings' within 1000m of the site, the Geo-Insight Report identifies the following historical underground working features;

Distance (m)	Direction	Details
0.0	On Site	The site lies in or in proximity to the coal mining reporting area as defined by the Coal Authority

Further inquiry with the Coal Authority (by way of a CON29 Report) confirms that;

Has the search report highlighted evidence or potential of		
1	Past underground coal mining	No
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	No
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	No
13	Working facilities order	No
14	Payments to owners of former copyhold land	No

What does this mean?

This means that the site is on the 1000m boundary of a coal mining area, and along with the obvious topography of the site, there is therefore **NO RISK** of shallow mine working being present beneath the site, and **NEGLIGIBLE RISK** of other non-coal mining related cavities, or cavities associated with mineral extraction (all of the above having ceased) which could affect the site (or) the development proposal.

For the purposes of Local Authority Planning, this means that there is NO REQUIREMENT to carry out a COAL MINING RISK ASSESSMENT to assess the potential for shallow mine workings (or) to consider the wider impact.

PART 5 POTENTIAL FOR CONTAMINATION

CONTAMINATION ASSESSMENT OBJECTIVES

5.1 Aims of the Desk Study & Trial Hole Investigation.

The aim of the desk study; walkover; trial holes and in situ ground gas testing was to make a preliminarily assessment of the level of contamination on the site in order to determine if there was any significant risk associated with contaminants in respect of both human health and the environment, including controlled waters. All the observable soils were screened for visual or olfactory evidence of contamination including the presence of VOCs.

5.2 Contamination Assessment & Approach.

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

In the past there has been considerable uncertainty over how to decide when land is, and is not, contaminated land on grounds of the legal test of significant possibility of significant harm to human health or the environment – to help address this, one of the main changes set out in the new *Statutory Guidance*, is the introduction of a new four category test to help decide when land is, and is not, contaminated land on grounds of significant possibility of significant harm to human health. Under the new four category test:

- Category 1 - describes land that is clearly contaminated land, for example because similar land is known to have caused significant harm in the past.

- Categories 2 and 3 - cover less straightforward land where more detailed consideration is needed before the regulator can decide either:

  (a) that there is a strong case for regulatory action, in which case the land would be in Category 2 and be classified as contaminated land under Part 2A; or

  (b) that such a case does not exist, in which case the land would be in Category 3 and not be classified as contaminated land under Part 2A.

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

One of the main purposes of including the Categories in the Statutory Guidance is to provide a legal framework against which new technical tools can be developed by the land contamination sector to describe the Categories in more detail

with regard to specific substances and/or situations. The new Category 4 (C4SLs) test is particularly important in terms of reducing uncertainty over when land is definitely not caught by the regime. The new Statutory Guidance makes clear what land should be placed into Category 4, for example:

a. Land where no relevant contaminant linkage has been established.

b. Land where there are only normal levels of contaminants in soil (as explained in Section 3 of the guidance), unless there is a particular reason to consider otherwise i.e. land with normal background concentrations.

c. Land that has been excluded from the need for further inspection and assessment under Part 2A because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of the guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of the guidance, e.g. Category 4 Screening Levels.

d. Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed to in the normal course of their lives).

For the purposes of this report, it is taken that the C4SLs are intended as 'relevant technical tools' to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health). The Impact Assessment which accompanied the revised Statutory Guidance (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that: *'The new statutory guidance with bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land'.*

A key distinction between the previous guidance (i.e. using *Soil Guideline Values* (SGVs)) and the C4SLs is the level of risk that they describe. The Environment Agency (EA) consider that; 'SGVs are guidelines on the level of long-term human exposure to individual chemicals in soils that, unless stated otherwise, are tolerable or pose a minimal risk to human health'. C4SLs, therefore, should not be used as a legal trigger for the determination of land under Part 2A. As such, the approach taken in this report follows the **2014 CL:AIRE (Contaminated Land: Application in Real Environments)** guidance published in the reference document '*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*' which lists the following C4SLs;

Analyte	Residential (with home grown produce) (mg/kg)	Residential (without home grown produce) (mg/kg)	Allotments (mg/kg)	Commercial (mg/kg)	PoS (mg/kg)
Arsenic	37	40	49	640	79
Benzene	0.87	3.3	0.18	98	140
Benzo(a)Pyrene	5.0	5.3	5.7	77	10
Cadmium	22	150	3.9	410	880
Chromium (vi)	21	21	170	49	21
Lead	200	310	80	2300	630

5.3 Background Screening Levels from research.

From research (the Geo-Insight Report) the *Estimated Background Soil Chemistry* within 250m of the study area boundary suggests the following:

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<100 mg/kg
23.0	SE	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<100 mg/kg
24.0	NW	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<100 mg/kg

5.4 Summary of Screening Levels.

Both the *background soil chemistry (A)* and the *soil chemistry established by observation (B)* indicate levels of contaminants within the accepted range contained in the guidance in **2014 CL:AIRE (Contaminated Land: Application in Real Environments)** '*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*' based on the six C4SLs.

a. From the initial desk top *Research (1),* and from visual observations of *Trial Holes (2)* there was no indication that the site had any previous heavy industrial/engineering use.

b. There were no visual indicators or olfactory screening evidence to suggest the presence of hazardous contaminants in high (or any) concentrations, or any evidence of high (or any) concentration of *oils, lubricants, sulphates, asbestos (chrysotile, amosite, tremolite, actinolite or ferroactinolite), radon gas, methane, high concentrations of carbon monoxide, hydrogen sulphide* or *carbon dioxide*.

c. From *Soil Index Testing (4)* there was no evidence of significant or excessive contamination in the soils.

d. An *extremely low* risk of vapour inhalation by site workers is still possible (as is the case with all sites where older buildings are present and where buildings have been used for agricultural purposes, animal storage etc.). There is always a *minor* risk of possible contamination of soils and groundwater by hydrocarbons due the possible presence of fertilisers, animal waste and fuels and combustibles in very small quantities i.e. for agricultural machinery etc.

However, these risks would only manifest if physical evidence of hydrocarbon contamination in the underlying soil was detected/observed during the construction phase of the development. In the *unlikely* event that this occurs, consideration should be given to further chemical analysis testing of specific soil samples, but in my opinion, it is *extremely unlikely* that hydrocarbons will be present in any significant or high concentrations.

CONTAMINATION RISK ASSESSMENT

5.5 Conceptual Site Model

A quantitative health and environmental risk assessment forms part of this report: the process of risk assessment follows the guidance contained in **Part 2A of the Environment Protection Act 1990**, which defines contaminated land as:

> *'any land which appears to the local authority in whose area it is situated to be in such a condition by reason of substances in, on or under the land, that there is a significant possibility of significant harm being caused, or that significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused'.*

The guidance introduces the concept of a *pollution linkage*: this consists of (A) a pollution source or hazard, and (B) a receptor, together with (C) an established pathway between the two. For land to be regarded as being 'contaminated' a pollution linkage (*hazard-pathway-receptor*) must exist, which creates the so-called 'conceptual model' of the site. Examples of pathways and effects (after PPS 23) include:

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

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

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

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

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

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

5.7 Buildings (Pathways 7 and 8)

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

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

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

5.8 Natural Environment (Pathway 6, Receptors D-E)

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

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

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

5.9 Assessment Methodology

For any potential contaminant source identified, professional judgement is required to assess the probability of a pollution linkage occurring and to quantify the possible consequences of that linkage. Based on the probability and likely consequences, the overall risk (significance) can then be established. This is based on the standard risk assessment that risk = the likelihood of an identified hazard to cause harm, combined with the severity of the consequences.

5.10 Sources

The site has had no previous commercial or industrial use and has been used solely for agricultural purposes for at least the past 140 years. Nonetheless, there are some residual *very low risk* potential sources:

i. Animal wastes in the front courtyard area.

ii. Possibility of very low hydrocarbons due to past use of agricultural machinery.

iii. Possibility of fertilisers in the soils.

In addition, wherever there is Made Ground present there is always the possibility of imported contaminants, as well as localised spillages of fuels, oils, lubricants etc. However, in this case there is NO Made Ground on the site.

5.11 Summary of Hazards, Pathways & Receptors

Source	Potential Pollutant	Pathways	Receptor	Risk
Potential contaminated Made Ground Possible past minor spillages and metals Possible contaminants from previous burning	Oils, fuels, greases, hydraulic fluids, metals, Creosote(s), oil, tar, pitch. Asbestos, anthropogenic debris, e.g. ash, clinker	1-5	A. Present users (owner)	No Risk involved with pre-construction phase as no disturbance is required.
			B. Groundworkers.	No Risk involved with excavation work providing personnel adopt robust RAMS and suitable precautions together with adequate washing facilities (which is an absolute obligation under CDM2015).
			C. Future workers, visitors and members of the public.	No Risk providing any exposed Made Ground is capped by clean sub-soil and topsoil.
		6	D. Controlled waters.	Low Risk.
			E. Ecosystems	Low Risk.
		7	F. Building Materials and Services.	Low Risk provided no extraordinary construction materials /methods proposed.
Underground workings, cavities, mines, landfills.	Mine, landfill and ground gases, Radon, VOCs	8	A - F	No Risk. No Radon protection or special measures required.
Waste Materials	Past tipping, uncontrolled wastes			Any identifiable wastes to be removed from site

5.12 Contamination Summary

There was **NO EVIDENCE** from the research (or) observation of the trail holes that the site had any previous industrial or commercial use - there was an indication that the building has been used for animal storage but there were no visual indicators to suggest the presence of hazardous contaminants in high (or any) concentrations, or any evidence of high (or any) concentration of *oils, lubricants, sulphates, asbestos (chrysotile, amosite, tremolite, actinolite or ferroactinolite), radon gas, methane, high concentrations of carbon monoxide, hydrogen sulphide* or *carbon dioxide*.

An **EXTREMELY LOW** risk of vapour inhalation by site workers is possible (as is the case with all sites where former animal storage has taken place) and there is always a *very minor* risk of possible contamination of groundwater by hydrocarbons (*extremely low* in this case) due the possible historic presence of fuels and combustibles in very small quantities (i.e. for agricultural machinery etc.). However, these risks would only manifest if physical evidence of hydrocarbon contamination in the underlying soil was detected/observed during construction.

In the *highly unlikely* event that this occurs, it should be checked in the laboratory using chemical analysis testing of soil samples, but in my opinion, it is highly unlikely that hydrocarbons will be present in significant or high concentrations.

In my professional opinion, as a qualified Chartered Engineering Geologist (CGeol FGS) there is **NO REQUIREMENT** to further investigate the soils at pre-planning stage for contamination.

5.13 Planning policy Context

National Planning Policy Framework (NPPF), 2012.

The NPPF requires local authorities to set out in their Local Plan a positive vision for the enhancement and enjoyment of heritage assets (DCLG, 2012). Part 12 Conserving and enhancing the historic environment clearly states that local authorities should recognise; '*the desirability of new development making a positive contribution to local character and distinctiveness*' and should seek '*opportunities to draw on the contribution made by the historic environment to the character of a place'*.

Planning Practice Guidance, 2014: Planning Practice Guidance was reviewed, catalogued and published on the internet by the government in 2014 (DCLG, 2014). The section on design includes guidance on promoting landscape character (Paragraph: 007Reference ID: 26-007-20140306). It states that '*development should seek to promote character in townscape and landscape by responding to and reinforcing locally distinctive patterns of development*' and that the '*successful integration of new development with their surrounding context is an important design objective*'.

PART 6 CONCLUSIONS & RECOMMENDATIONS

6.1 Conclusions

a. The site is assessed to present ***no risk*** of contamination from evidence of its historic use. Records (and observations) indicate the site was predominantly fields and agricultural land with the building that occupies the site dating back at least as far as 1850. There is ***no evidence*** that the site had any association with any industrial usage, and the site (and building) has remained in the same use until the present day. As such, in my opinion, there is ***no risk*** of contamination from any previous or current use.

b. An ***extremely low*** possibility exists that hydrocarbon contamination (if later found) could have an mild adverse impact on site workers during construction, and it is recommended that this *extremely low risk* nonetheless be mitigated by the usual adoption of basic safe working procedures and the use of appropriate PPE, as can be expected of any reputable builder in his normal construction method statements and risks assessments etc.

c. It is ***not likely*** that hydrocarbons (if later found) would adversely impact controlled waters due to the unlikely presence in high (or any) concentrations, and due to the nature and general lack of continuity of groundwater beneath the site.

d. The site is therefore considered **SUITABLE** for the development as proposed.

e. Based on the information collected, and from observations of the trial holes, soil description and classification can be performed sufficiently adequately in accordance with BS5930 during the construction phase of the development by way of Building Regulations inspection, and there are no immediate concerns regarding *moisture content, plastic limit, liquid limit* and *plasticity index* of soils for foundation design.

f. For the purposes of the planning conditions, it is not necessary in my opinion to fully characterise the geological conditions any further by way of an intrusive ***Phase II Site Investigation***, and there is no requirement to include chemical analysis on soil samples - and from my observations there is no immediate need to carry out *TPH analysis, PAH analysis* and/or *Loss on Drying*. There is no requirement for any ***Site Remediation.*** Consequently, there is no requirement for a ***Remediation Strategy*** and no requirement for a ***Validation Report***.

6.2 Basis of Assessment

This assessment is a *Preliminary Phase 1 Investigation* intended to give a robust indication as to the need for further assessment of the site. This report may be submitted in support of either a planning application or for the purposes of due diligence on the part of the owner. I can confirm to Barnsley District Planning Authority (and any other third party),

that the geological conditions on the site are adequate for carrying out the development as proposed under Planning Application No. (tba).

4.2 Testimony of Independence

I am a professionally qualified Chartered Civil Engineer (CEng), Chartered Consultant Engineering Geologist (CGeol), and Chartered Construction Manager (CMan). I am a Fellow of *The Geological Society* (FGS), Member of the *Institute of Engineers Ireland* (MIEI) and Member of the *Chartered Institute of Building* (MCIOB). I hold a post-graduate law degree (LLM), a post-graduate MSc degree in *Engineering Geology;* a degree in *Mathematics and Physics* and under-graduate qualifications in *Civil Engineering*, and I have more than 30 years of experience working in construction specialising in the fields of underground space, mining and foundation engineering.

I confirm that under para. 2.E.2 of Appendix 2E of *Planning Policy Guidance Note 14 (PPG14) – Development on Unstable Land, DoE, 1990* I am suitably qualified to make these statements, and I understand that my overriding duty is to present independent and impartial expert analysis, and I believe I have complied with that duty. The facts I have stated in this report are true and the opinions I have expressed are correct and they are entirely my own, based upon the evidence I have been shown and my own observations.

Signed



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REFERENCES

Ambler, L., 1913. Old Hall and Manor Houses of Yorkshire Brownhill, R. N., 1987.

Brownhill, R. N., 1987. The Penistone Scene

Cumberpatch, C., 2004. An Archaeological Desk Top Assessment of a site at 'Sunnymede', Huddersfield Road, Penistone, South Yorkshire

Dransfield, J. D., 1906. History of Penistone Parts 1 & 2

Elliot, B., (Ed) 1993. Aspects of Barnsley

Elliot, B., (Ed) 1996. Aspects of Barnsley 4

Ekwall, E., 1960. The Concise Oxford Dictionary of English Place-names 4th Ed.

Hambleton, D. & Young, M., 1995. Penistone

Hey, D., 2016. A History of Penistone and District

Hunter, Rev. J., 1820. History of the Deanery of Doncaster and South Yorkshire

Penistone Local History Group., 1990. Times Remembered

Penistone Urban District Council., 1969. Centenary 1869-1969

Victoria County History of Yorkshire Vol. II 1925.

Victoria County History of Yorkshire Vol. III 1925.

Appendix A - Trial Hole Logs

01		TRAIL PIT No. 01 LOG	
Project		Land off Hartcliffe Lane, Hillside, Thurlstone, S36 9QJ	
Location		Front of the '*Bothy*' - offset by 2.5m	
Depth (m)		**Strata Description**	
From	**To**		
0.00	0.12	Dark grey compacted sandy gravels. Gravel is angular coarse sandstone, occasional brick, ceramic, clinker. (TOPSOIL) approximately 100mm thick	
0.12	1.1	Yellowish brown, firm to stiff sandy silty CLAY with occasional gravels - gravels are angular tabular fine to medium sandstone and mudstone litho-relics." (GLACIOFLUVIAL DEPOSITS)	
1.1	1.2	Natural bedrock: Highly weathered Sandstone: (GRENOSIDE SANDSTONE and PENISTONE FLAGS SANDSTONE FORMATION)	
1.2		End of Trial Pit	
P and V values where given refer to unconfined compressive strength in Kn/m² measured with a hand penetrometer (P) or hand vane (V)			
Groundwater		No ground water	
Side Stability		Stable	
Sampling		None	
Pit dimensions		1.5m long x 0.6m wide	
Machine		3t mini-excavator	
Weather		Cold, dry	
Other		-	

Prepared By	TH	**Logged**	TH	**Date**	26.07.2019	**Job Ref:** TH/Ri TH/Ridge/Bothy/001/Jul2019

PHOTOGRAPHIC LOG (S)







02		TRAIL PIT No. 02 LOG				
Project		Land off Hartcliffe Lane, Hillside, Thurlstone, S36 9QJ				
Location		Rear of the '*Bothy*' - offset by 3m				
Depth (m)		**Strata Description**				
From	**To**					
0.00	0.18	Dark grey compacted sandy gravels. Gravel is angular coarse sandstone, occasional brick, ceramic, clinker. (TOPSOIL) approximately 100mm thick				
0.18	1.1	Yellowish brown, firm to stiff sandy silty CLAY with occasional gravels - gravels are angular tabular fine to medium sandstone and mudstone litho-relics." (GLACIOFLUVIAL DEPOSITS)				
1.1	1.2	Natural bedrock: Highly weathered Sandstone: (GRENOSIDE SANDSTONE and PENISTONE FLAGS SANDSTONE FORMATION)				
1.2		End of Trial Pit				
P and V values where given refer to unconfined compressive strength in Kn/m² measured with a hand penetrometer (P) or hand vane (V)						
Groundwater		No ground water				
Side Stability		Stable				
Sampling		None				
Pit dimensions		1.4m long x 0.6m wide				
Machine		3t mini-excavator				
Weather		Cold, dry				
Other		-				
Prepared By	TH	**Logged**	TH	**Date**	26.07.2019	**Job Ref:** TH/Ri TH/Ridge/Bothy/001/Jul2019

PHOTOGRAPHIC LOG (S)





Appendix B – Groundsure Geo-Insight Report (Ref: GS-6191104)