GEO Environmental Engineering

SOIL REMEDIATION STRATEGY

PROPOSED RESIDENTIAL DEVELOPMENT

LAND AT SCURGILL

EGREMONT

CUMBRIA

FOR:

MR LEE WALKER

GEO Environmental Engineering

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1.0 Introduction

GEO Environmental Engineering Ltd (GEO) has completed a Remediation Strategy (RS) for contamination identified on land adjacent to Scurgill Terrace in Egremont, Cumbria as indicated on the plan included in Appendix I and where it is proposed to construct two residential properties with associated areas of private gardens and soft landscaping.

Geo Environmental Engineering Ltd has been commissioned to complete the report by the Client, Mr Lee Walker.

Further development details are available from the Client.

This Remediation Strategy (RS) is designed to appropriately remediate the contamination identified within the following reports with respect to Human Health (proposed end users):

Prior to the completion of this RS, a meeting was undertaken at the site (August 2023) between the Client, the Contaminated Land Officer for Cumberland Council and a representative of GEO.

The meeting was called due to concerns from the local neighbours about the site works commencing and the potential for contamination present on the site becoming airborne and impacting the neighbours.

It should be stressed that the elevated contaminants present on site as identified during the previous ground investigation works (discussed in Section 4) included elevated Arsenic and PAH compounds. These analytes do not represent a significant or acute risk during brief exposure periods when any soil arisen dust becomes airborne and are only considered to represent a potential risk to the proposed residential end users over prolonged exposure periods (i.e., years) through any areas of proposed soft landscaping (private gardens) where a combination of dermal contact, ingestion and inhalation are the anticipated pathways and the reason this RS has been completed.

There is no acute risk associated with the contamination on site and no unacceptable or significant risk is present to the neighbours and the general public.

2.0 Remediation Strategy

2.1 Remediation Strategy Aims and Objectives

The aims and objectives of this RS are to appropriately remediate the contamination identified on site during the GEO Ground Investigation to ensure that the development site is “fit for purpose” with respect to Human Health (ground contamination).

It is understood that the site will be developed for residential end use and will incorporate private gardens and general areas of soft landscaping.

Invasive plant species fall outside the remit of this report and a suitably qualified surveyor should be approached for advice with respect to treatment and disposal techniques.

2.2 Remediation Statement Limitations of Use

Although every effort is made to ensure a full and comprehensive investigation has been completed it should always be considered that ground conditions have the potential to vary between the exploratory hole locations to those identified and it is always recommended that a prudent developer adopt a “watching brief” during the redevelopment works, to ensure that any potential variations encountered are identified and dealt with in an appropriate manner.

In addition, this RS and its contents are limited to the boundaries of the site, as indicated on the plans in Appendix II. No reliance, copying or use of this report (in part or whole) by any Third Party is permitted without prior Geo Environmental Engineering Ltd written approval, with intellectual copyright remaining the sole property of the author.

Reliance on the report is for the named Client only. Reliance on the report and its associated information is strictly in accordance with Geo Environmental Engineering Ltd Terms and Conditions, copies of which are available on request.

3.0 Development Site Details and Proposals

It is understood that the proposal for the site is to construct a single residential property with private gardens and associated infrastructure. Further details associated with the full (proposed) scope of redevelopment can be obtained from the Client.

During the intrusive works, the site surfacing comprised grey silty loamy gravel of aggregate, clinker, brick and concrete with occasional ash and shale. Metal reinforcement bars (rebar) were also noted. Trial pit TP01 also included occasional slag and many boulders of sandstone, concrete and brick.

No buildings were present on site.

During the investigation, GEO did not identify any visual or olfactory evidence of fuel/oil type contamination (no staining, odour or free product). The site was secure and there was no “fly-tipped” materials.

The previously completed Generic Quantitative Risk Assessment (GQRA) within the GIR report details potential future risks to Human Health (proposed end users) from the made ground/contamination identified on site. For the Human Health Risk Assessment, it is considered that the future residents will be subjected to the greatest exposure periods and consequently the most risk. Therefore, in accordance with current guidance and legislation a CLEA end use classification of *residential* has been considered most appropriate.

4.0 Previous Reports & Findings

GEO have completed the following reports for the development of the site.

- Phase 1: Desk Top Study Report (Preliminary Geo-Environmental Risk Assessment), Proposed Redevelopment of Land at Scurgill, Egremont, ref: 2019-3547, dated: 13.02.2019.

- Phase 2: Ground Investigation Report for the Proposed Residential Development, Land at Scurgill, Egremont, Cumbria (Ref: GEO2021-4817, dated 27th September 2021).

It is recommended that these reports are read in conjunction with this report since only a brief overview is given below.

The DTS identified the following.

- The site surfacing is of gravel hardstand, with some grass in the northern site area. The site was historically single-storey domestic garages/lock-ups that have recently been removed.
- As the site was previously developed and due to localised topographical variations, some made ground is anticipated across parts of the site. Made ground could comprise a mixture of disturbed natural materials (i.e. clay, silt, sand and gravel) with anthropogenic debris (i.e. fragments of ash, clinker, brick, red shale, concrete etc.).
- A review of published geological plans and the GSR indicates that the site is underlain by Glacial Till, typically comprising sandy gravelly clay.
- The development site is underlain by the St Bees Sandstone, typically comprising layers Sandstone. It is understood that the St. Bees Sandstone is devoid of productive ore bodies or coal seams. However, iron bodies may potentially be present in older strata at a greater depth.
- No geological structural faults are inferred on geological plans and the GSR as passing beneath the site, however, numerous are recorded around the site. Whilst they are not considered to pose a structural risk, they could potentially act as conduits for ground gas migrations.
- At the time of completion, the site was recorded as being outwith a Radon Affected Area as less than 1% of properties are above the action level. Please see the comment below for further information on the current Radon status for the site.
- Several groundwater and potable abstractions are recorded within c.250m of the site. All appear to be from Florence Mine for British Nuclear Fuels. They are unlikely to be affected by the proposed development.
- Potentially Contaminative include four entries on site and a further thirteen entries within c.250m. They include tramway sidings, iron ore pit, refuse heaps and cuttings.
- There is potentially infilled land within c.250m with two entries on site with a further fifteen entries recorded within c.250m. They include iron ore pits, refuse heaps, reservoirs and cuttings. Areas of infilling within c.250m pose a potential risk of ground gas generation.
- Should development be planned, a soils investigation should be undertaken.

At the time of completing the DTS report (February 2019), the GSR indicated that the development site was not located within a Radon Affected Area as defined by the British Geological Survey and Public Health England, as less than 1% of properties are above the action level. The plan provided in the GSR indicates that there no radon affected areas within c.250m of the site. Consequently, in accordance with the British Geological Survey and Public Health England, radon protection measures are not necessary.

However, the UK was subject to a radon reassessment December 2022 and in general radon risk levels have increased across the whole country, resulting in more areas requiring protection measures. On that basis, GEO have procured an updated GSR report to further assess the potential risk from radon gas and any precautions that may now be necessary.

As can be seen in the GSR included as Appendix III, the site remains in an area where less than 1% of properties are above the action level. The plan provided in the GSR indicates that there no radon affected areas within c.250m of the site. Consequently, in accordance with the British Geological Survey and Health Security Agency, radon protection measures are not necessary.

The previously completed GIR comprised the following fieldworks and identified the following.

- The fieldworks comprised 2 no. percussive boreholes (BH's 01 and 02) to depths of between c.2.60m and c.4.00m bgl. In addition, 3 no. trial pits (TP's 01 to 03) were excavated to depths of between c.0.50m and c.1.60m bgl using a mechanical excavator and hand digging tools.
- The ground investigation has encountered variable granular made ground including much aggregate, clinker, brick, concrete and occasional ash, slag, shale and rebar. Boulders of sandstone, concrete and brick we also noted. The made ground was not considered suitable for re-use within the proposed gardens.
- The made ground was underlain by natural drift deposits comprising clays, sands and gravels.
- During the investigation, GEO did not identify any visual or olfactory evidence of fuel/oil type contamination (no staining, odour or free product).
- Groundwater was noted at depths of between c.1.50m and c.4.00m bgl, rising up to c.0.70m bgl following completion.
- No ground gas protection measures were deemed to be required.
- Following the results of the contamination assessment elevated concentrations of Arsenic and PAH compounds were recorded to be present in the made ground that pose a risk to human health where it is exposed at the surface such as in the proposed garden.
- The most suitable form of remediation based on the results of the investigation would be to cap the made ground with suitable, clean, inert soils as part of a Clean Cover System (CCS)
- The CCS would need to be at least 600mm thick and should incorporate a no-dig layer (150mm thick layer of type 1 crushed quarry stone) and a geomembrane at the base to prevent intermixing and to act as a marker layer.

5.0 Remediation Strategy Options Appraisal

5.1 Remedial Options

There is a possible risk to Human Health (future residents) in areas of private gardens where there is a potential for direct contact, inhalation or consumption of contaminants. The risk to Human Health is mitigated where the contaminated soils are covered by proposed buildings or areas of hardstand such as roads, car parks and pavements as the pathway between the source and the receptor will be broken.

If made ground is to remain below areas of any soft landscaping (i.e., lawns, planted borders, etc. that will include all proposed private gardens), it is considered appropriate to incorporate a clean cover system as a "capping" layer. This will allow the contaminated materials to remain on site but not to represent a risk to the proposed end users (i.e., the residents).

Given the presence of private gardens, two remedial options are recommended for the site which are detailed below:

- Removal of the contaminated soils from areas of soft landscaping / private gardens (made ground) and removed for appropriate off-site disposal.
- If the above is not deemed appropriate, in areas of soft landscaping a suitable clean cover system (minimum 600mm thick incorporating a no dig layer) within areas of proposed soft landscaping (where present) may be required.

By undertaking one of the above options, the proposed residents will be suitably protected from the contaminated made ground.

5.1.1 Clean Cover System (Private Gardens)

There is a greater potential risk to the end users within private gardens of residential houses as it is conceivable that they may have homegrown produce for human consumption. Therefore, a robust clean cover system incorporating a "no-dig" layer, totalling a minimum 600mm (0.60m) in thickness should be utilised, which is summarised below:

- Ground Level to minimum c.0.30m depth – Topsoil to act as a growing medium.
- c.0.30m to c.0.50m depth – Inert materials (i.e., disturbed natural materials such as "clean" clay).
- c.0.50m to c.0.60m depth – Geosynthetics Alert Contamination Indicator (or similar) to act as a separator and contamination indicator overlain by c.0.10m (100mm) of compacted "clean" gravel, which will act as the "no-dig"/separation/drainage layer.

The above robust clean cover system will be required across the rear gardens areas. In areas of front gardens and areas of general soft landscaping within the development boundary, this can be reduced to c.0.30m thickness. This would typically comprise 150mm of compacted stone as a no dig layer with 300mm of subsoil and at least 150mm of topsoil at the surface. A high visibility permeable membrane should be placed directly over the contaminated soils to act as a marker and prevent intermixing.

The "robust" clean cover system and "marker" layer are designed to be in place for the life of the buildings/development and is present to ensure that future end users (i.e., residents) do not come into direct contact with the underlying contaminated made ground. The "marker layer" and "compacted stone" layer should be verified for their suitability and thickness during their installation so not to damage them when completing the validation works (i.e., once the topsoil has been added).

The above methodology has been formulated in parallel with the YALPAG "Verification Requirements for Cover Layers guidance, a copy of which is attached in Appendix V.

As well as providing a barrier between the contaminated material and the end user, the clean cover layer also provides a suitable growing medium for plants and trees. Deepening of the clean cover is recommended where large plants and trees are proposed.

Following acceptance of this methodology by the Local Planning Authority the Quantity Surveyor can use the (finalised) Proposed Site Layout Plan to determine the physical extent of the proposed soft landscaping associated with the development. They will then be able to determine the volume of material required to construct the clean cover and thus the cost of the remedial method.

The Design Team will need to consider the impact to the development proposal and permission granted from raising site levels by c.600mm to accommodate the clean cover system. If site levels cannot be raised to sufficiently accommodate the clean cover system, then it would be necessary to reduce the thickness of made ground (contamination source) within the areas of soft landscaping/private gardens to accommodate the placement of the clean cover system.

Following the removal of made ground in areas of soft landscaping to accommodate the required clean cover system (i.e., 600mm), if no made ground remains then there is no requirement for the marker layer, compacted stone and topsoil to a depth of 600mm, although suitable validation screening or visual inspection of the natural soils may be required to validate that no residual contaminants remain.

5.1.2 Removal of Made Ground (In areas of Private Gardens)

The second option is to remove the source of the elevated contaminants (i.e. made ground) in any areas of soft landscaping.

By removing the source of the contaminants present on site (i.e. made ground) then the source-pathway-receptor will be broken.

Once the made ground of concern has been removed, suitable validation screening or visual inspection of the underlying soils may be required to validate that no residual contaminants remain.

By removing the made ground that is considered to pose a risk, the full clean cover (600mm) will not be required although suitable soils will be required to act as a growing medium for future plant growth, minimum of 150mm for grass and then increased to 300mm to 600mm for shrubs, trees, etc.

If made ground removal is required to accommodate the clean cover system, then the excavated materials can either be disposed of at an appropriately licensed facility or it can be utilised as an engineered fill beneath areas of proposed hardstanding. If the intention is to maintain materials on site (i.e., up fill of the site and beneath roads, etc,.).

5.1.3 General Requirements

All materials utilised in areas of soft landscaping will require validation testing prior to importation.

Any materials brought to site which are to be utilised as part of the clean cover system across the site as a whole should be suitably stored where they can remain untouched (until required to be put into gardens) to avoid the risk of cross contamination and any mixing occurring (with general site construction waste materials).

Prior to delivery and storage, a membrane should be placed on the ground at the location of each material (i.e., topsoil, quarry stone, clay) that is to be stored on site to avoid cross contamination with the materials below and then suitably cordoned off and sign posted.

During the completion of these remedial works, monitoring and laboratory testing of the clean cover materials will be required prior to placement to ensure that contaminated materials are not brought to site, which will be the responsibility of the Client and Main Contractor.

Although none have been identified on site, if during the redevelopment works, asbestos fragments are identified, then these should be handpicked by personnel wearing suitable PPE with any asbestos fragments being bagged and labelled for disposal at a suitable waste facility.

5.2 Remediation Overview

At this stage made ground will be remaining on site and therefore the robust clean cover system is considered to be the most appropriate form of remediation and should comprise the following.

- The robust c.600mm clean cover system within proposed private rear gardens is designed to be in place for the life of the buildings/development and is present to ensure that future end users (i.e., residents) do not come into contact with the underlying contaminated made ground.
- The remaining external areas of soft landscaping (i.e. front gardens and general soft landscaping) will need to be c.300mm thick.
- It is recommended that the developer import “clean” topsoil, quarry stone, clay (as part of the clean cover system) to act as a future growing medium and contamination screening of those materials should be completed prior to their placement to ensure contaminated materials are not inadvertently being brought to site.

By undertaking the above, the proposed residents will be suitably protected from the contaminated made ground.

All materials utilised in areas of soft landscaping will require validation testing prior to importation.

Any materials brought to site which are to be utilised should be suitably stored where they can remain untouched (until required to be put into gardens) to avoid the risk of cross contamination and any mixing occurring (with general site construction waste materials).

6.0 Soil Validation Works and Reporting

It will be necessary to complete validation works and reporting once the remedial measures are put in place. The remediation of the areas of soft landscaping including the private gardens would normally be completed towards the end of the development as part of the landscaping phase, but prior to occupation. The validation works and reporting should be completed by a suitably qualified and experienced Geo-Environmental Engineer, and it is the responsibility of the Client and the Main Contractor to ensure that the remediation and validation works are completed to the satisfaction of the Local Planning Authority, prior to the first occupation of the buildings. In summary, the following items should be detailed within the Validation Report (as a guide):

- Photographic evidence of:
  - Remedial earthworks including the removal of any contaminated soils.
  - Placement of geotextile, 'no-dig' layer and cover soils.
  - Storage of clean cover soils on site prior to placement.
- Plans indicating:
  - storage of clean cover materials on site.
  - areas where made ground has been excavated or where a clean cover has been placed.
- Undertake regular surveys for all excavations where made ground has been removed or capped.
- Waste Acceptance Criteria (WAC) testing may be required for any waste materials requiring off-site disposal. This should be completed prior to disposal at an appropriate facility.
- Retain all off-site disposal tickets (including the chain of custody records) to confirm the appropriate disposal of any contaminated soils.
- Contamination test reports for any imported topsoil, subsoil and stone materials brought on to site to be placed in areas of soft landscaping or private gardens.
- Provide details of where the imported materials (stone and soils) are being sourced.
- Prior to delivery to site, any imported materials should be suitably tested to verify that the chosen soils are suitable for use.
  - Sampling frequency and the chemical screening requirements are outlined in the YALPAG document in Appendix V.

All topsoil/subsoil/quarry stone etc. to be imported to site for use within the areas of soft landscaping should be tested with results being evaluated against appropriate criteria at the time of sampling and laboratory testing and should be completed in accordance with the YALPAG guidance.

During the completion of the works, monitoring and laboratory testing of any imported materials (i.e. topsoil / subsoil) will be required prior to placement to ensure that contaminated materials are not brought to site, which will be the responsibility of the Client and Main Contractor. As discussed above, this should be undertaken in accordance with the above YALPAG guidance, which details the relationship between the number of soil tests required for the volume of material to be imported to site. It also details the suite of laboratory analysis required.

For greenfield/manufactured soils (assumed source) the site would require a minimum of three tests or one between per $50m^3$ to $250m^3$ (whichever is greatest). The suite of laboratory testing for greenfield/manufactured soils (assumed source) would be as follows:

- Standard metals/metalloids (Arsenic, Cadmium, Chromium, Chromium IV, Copper, Lead, Nickel, Selenium and Zinc), Speciated PAH and Asbestos. The testing should also include for total organic content.

For brownfield soils (assumed source) the site would require a minimum of six tests or one between per $50m^3$ to $100m^3$, whichever is the greater. The suite of laboratory testing for greenfield/manufactured soils (assumed source) would be as follows:

- Standard metals/metalloids (Arsenic, Cadmium, Chromium, Chromium IV, Copper, Lead, Nickel, Selenium and Zinc), Speciated PAH, Speciated TPH and Asbestos. The testing should also include for total organic content.

Where imported topsoil materials are to be brought on to site for use in areas of soft landscaping the laboratory results should be compared against the most appropriate end use target concentration, a copy of which is appended to this report and will be based on the SOM value of these soils. It should be noted that the end use target concentrations are subject to change and that the most appropriate values at the time of the assessment should be chosen.

Imported topsoil should also be as specified in BS 3882:2015 as 'suitable for their intended purpose'. BS3882:2015 relates to nutrient content of topsoil and phytotoxic contamination and does not consider contaminants that pose a risk specifically to human health. Soils should be tested for contaminants that are considered to pose a risk to human health in addition to BS3882:2015 to ensure that they are suitable for their intended use. All materials brought on to site should be tested with results being evaluated against the human health assessment criteria set out within the appended table (which is correct at the time of writing but may be subject to change) and is SOM specific.

It is considered appropriate to sample the materials at source and then again from stockpiles on site prior to placement into the garden/soft landscaped areas to ensure the materials are appropriate for use prior to placement.

This assessment criteria may change depending on the source of the materials brought to site. Prior to delivery, the materials should be tested at source to verify the materials are suitable for use in the intended residential development.

Once the remedial works are completed and the above information is obtained, a Validation Report can be completed by GEO to confirm that the remedial measures have been completed in accordance with the agreed methodology. It is recommended that a representative of GEO be present during the works to ensure they are completed in accordance with this methodology.

Appendix 1a – Sampling & Testing Matrix

Type	Number of Samples	Testing Schedule	Assessment Criteria
	Please note that these guidelines apply to a typical residential development, and relaxation of the guidelines or more stringent requirements may apply dependent on local and site specific factors. Therefore, all parameters need to be agreed with the Local Authority.		
Virgin Quarried Material	1 or 2 depending on the type of stone utilised, to confirm the inert nature of the material.	Standard metals/metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn)	The assessment criteria need to be UK based, e.g. LQM S4ULs, Defra C4SLs or other similarly derived GACs.
Crushed Hardcore, Stone, Brick (excluding asphalt)	Minimum 1 per 500m^3	Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, total TPH. Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).	
Greenfield/ Manufactured Soils	Minimum 3 Dependent on source and receptor, between 1 per 50m^3 and 1 per 250m^3	Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, pH and soil organic matter (SOM) (or calculated from total organic carbon (TOC)).	
Brownfield/ Screened Soils	Minimum 6 Dependent on source and receptor, between 1 per 50m^3 and 1 per 100m^3	Standard metals/ metalloids (as above), PAH (16 USEPA speciation), TPH (CWG banded), asbestos, pH and SOM (or calculated from TOC). Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).	

Above – YALPAG Guidance Relating to Topsoil Testing Parameters

7.0 Construction Related Excavations and Off-Site Disposal

During the construction works it is likely that materials will be excavated on site (i.e., future foundations and buried utilities, etc.) that will not be able to be accommodated on site during to space and level constraints, ultimately requiring removal off site. During the construction works different materials should be kept separate, as it may be the case that uncontaminated natural materials can be classified as Inert and transferred to an Inert Landfill site. A separate assessment will be required for any topsoil and peat (naturally occurring organic materials) that may be encountered as they cannot be classified as inert due to their natural organic content.

Where made ground materials or disturbed natural strata is to be removed the results of the soil testing undertaken within this report can be used as a preliminary assessment and the anticipated waste disposal facility should be provided with a copy of the results for review. It may be the case that the waste facility requires additional contamination screening to aid the characterisation of the made ground for off-site disposal (i.e., Waste Acceptance Criteria – WAC).

During the construction phase, it may be the case that WAC screening is required to aid classification for disposal, and it is recommended that all materials are classified prior to excavation and disposal off site. Conversely, if materials are required to be brought to site to raise site levels or as part of a clean cover system then certification and/or soil testing results should be reviewed by a suitably experienced and qualified geo-environmental engineer to ensure that potentially contaminated materials are not being brought to site.

Conversely, if materials are required to be brought to site to raise site levels or as part of a clean cover system then certification and/or soil testing results should be reviewed by a suitably experienced and qualified geo-environmental engineer to ensure that potentially contaminated materials are not being brought to site.

It is considered the responsibility of the Client and their appointed Main Contractor to ensure that any materials removed from site are disposed of at an appropriate facility and any materials brought to site are free from contamination.

The site may consider the use of a Materials Management Plan (MMP) in accordance with CL:AIRE.

8.0 General Comments

It is the responsibility of the Design Team to confirm the preferred method of remediation (in association with the Quantity Surveyor and Client), with the Local Planning Authority.

It is also the responsibility of the Client to collate relevant information during the remediation works as part of the validation as indicated in Section 6. This includes maintaining photographic records, retaining all off-site disposal tickets (chain of custody records), keeping records of where materials have been sourced, providing material test reports (where provided by others) and completing regular surveys during remediation works.

The remediation of the areas of soft landscaping including the private gardens would normally be completed towards the end of the development as part of the landscaping phase, but prior to occupation. The validation works and reporting should be completed by a suitably qualified and experienced Geo-Environmental Engineer, and it is the responsibility of the Client and the Main Contractor to ensure that the remediation and validation works are completed to the satisfaction of the Local Planning Authority, including any warranty providers, prior to the first occupation of the buildings.

Imported topsoil should be as specified in BS3882:2015 as 'suitable for their intended purpose'. BS3882:2015 relates to nutrient content of topsoil and phytotoxic contamination and does not consider contaminants that pose a risk specifically to human health. Soils should also be tested for contaminants that are considered to pose a risk to human health in addition to BS3882:2015 to ensure that they are suitable for their intended use.

All materials brought on to site that are to be used as part of the clean cover should also be tested with results being evaluated against the human health assessment criteria set out within the table within Appendix IV (which is correct at the time of writing but may be subject to change). This assessment criteria may change in line with current legislation and guidelines.

It is recommended that a "watching brief" is applied to ensure that if visual or olfactory evidence of contamination is encountered or is significant made ground is encountered, then advice should be sought from a suitably qualified and experienced Engineering Geologist, Geotechnical or Geo-Environmental Engineer.

The recommendations and opinions expressed in this report are based on the strata observed within the exploratory holes in addition to the results of the site and laboratory tests commissioned by GEO. Consequently, GEO takes no responsibility for conditions that have not been revealed or which occur between them. GEO takes no responsibility for the accuracy of third party information.

The conclusions and recommendations presented within this report are considered reasonable based on the available information. However, these cannot be guaranteed to gain regulatory approval. Therefore, the report should be passed to the appropriate regulatory authorities and/ or other key stakeholders in order to seek their approval of the findings prior to undertaking any works on site.

Consideration must be made for variations to occur in the ground conditions between the exploratory hole locations for which GEO holds no responsibility and areas where limited access was available. It is therefore recommended that a "watching brief" and "observational technique" be applied to this site to ensure that if ground conditions appear to vary from those identified within this investigation report then advice should be sought from a suitably qualified and experienced Geotechnical or Geo-Environmental Engineer.

The recommendations and opinions expressed in this report are based on the strata observed within the exploratory holes and the results of the laboratory tests. Consequently, GEO takes no responsibility for

conditions that have not been revealed or which occur between them. GEO takes no responsibility for the accuracy of third-party information provided by sub-contract drillers or laboratories.

The conclusions and recommendations presented within this report are considered reasonable based on the available information. However, these cannot be guaranteed to gain regulatory approval. Therefore, the report should be passed to the appropriate regulatory authorities and/ or other key stakeholders in order to seek their approval of the findings prior to undertaking any works on site.

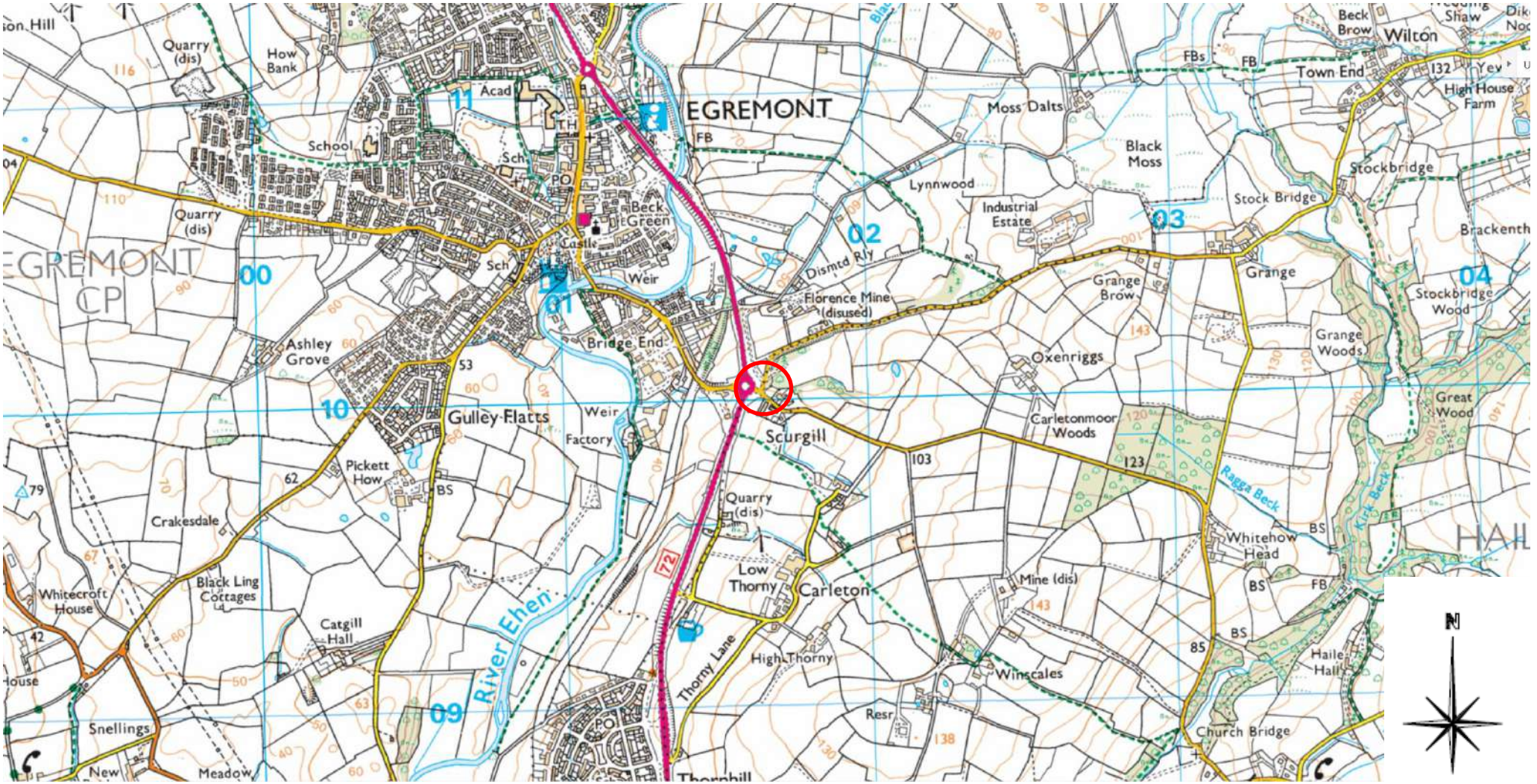
End of Report

Appendix I

- Site Location Plan

GEO
Environmental Engineering

GEO2023-6037: Site Location Plan (Not to Scale)



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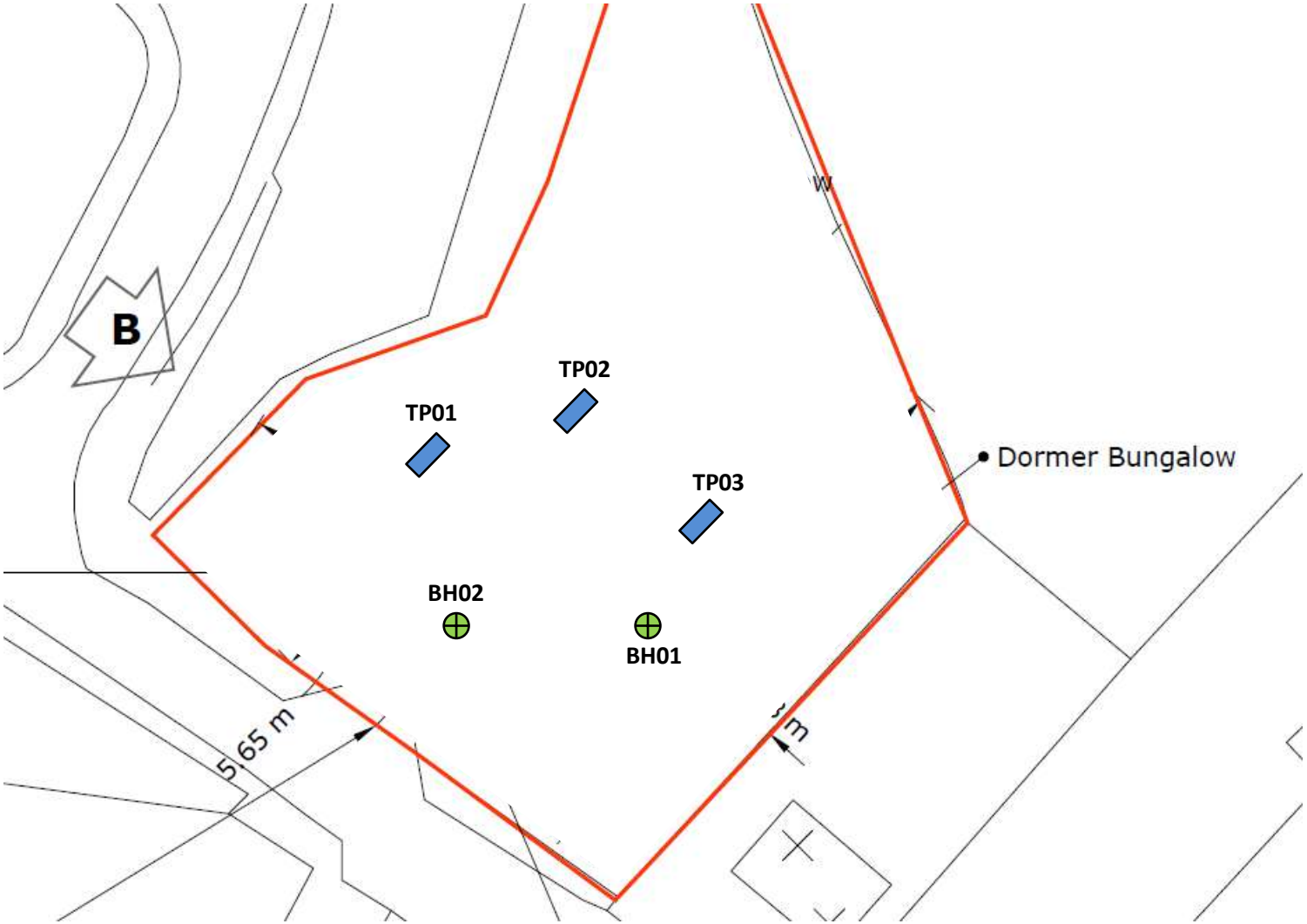
Appendix II

- Exploratory Hole Location Plan
- Exploratory Hole Record Sheets

GEO2021-4817: Scurgill, Egremont, Cumbria – Exploratory Hole Location Plan



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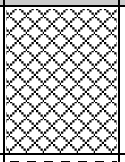
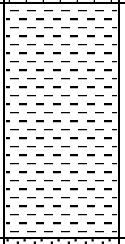
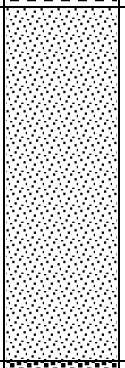
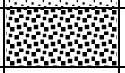
GEO Environmental Engineering

GEO2021-4817: Scurgill, Egremont, Cumbria – BH01

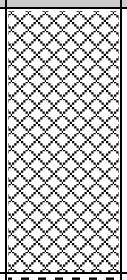
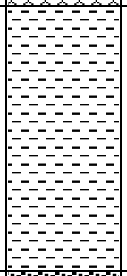
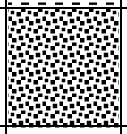
Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.47	MADE GROUND: Dark grey brown sandy loamy angular GRAVEL of mixed aggregate with occasional angular cobbles and boulders.		0.30 - J
0.47	1.30	Stiff red brown slightly sandy very gravelly CLAY.		0.90 - T 1.00 SPT = N12
1.30	2.50	Loose brown slightly silty gravelly medium SAND. Becoming increasingly gravelly with depth.		2.00 SPT = N6
2.50	2.60	Dense brown slight silty very sandy sub-rounded to sub-angular GRAVEL of mixed lithology.		2.60 SPT = N>50 (LP)
		End of borehole at 2.60m due to sample tube and SPT refusal. Groundwater strike at 1.50m bgl. Standing groundwater at 1.40m bgl on completion. Borehole installed: GL to 0.50m plain pipe and bentonite seal. 0.50m to 2.30m slotted pipe and gravel.		Hand dug to 1.00m

Engineer: J.Brock
Site Works Date: 18/06/2021
Plant: Archway Competitor C130 Superheavy

Log Notes:
SPT = Standard Penetration test (N value)
HSV = Hand Shear Vane (kN/m^2)
LP = Limited Penetration (HSV/CBR)
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

GEO Environmental Engineering

GEO2021-4817: Scurgill, Egremont, Cumbria – BH02

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.88	MADE GROUND: Dark grey silty sandy loamy GRAVEL of aggregate, clinker and occasional brick and concrete. Layers of meshed rebar.		0.20 - J
0.88	1.80	Firm red brown slightly sandy very gravelly CLAY.		1.00 SPT = N6
1.80	2.20	Loose brown silty very sandy fine to coarse sub-rounded GRAVEL of mixed lithology. Occasional cobbles.		2.00 SPT = N9
2.20	4.00	No recovery 2.20m to 3.00m. SPT probe 3.00m to 4.00m (SPT values only)		3.00 SPT = N26 3.50 SPT = N7 4.00 SPT = N29
		End of borehole at 4.00m. Groundwater strike at 4.00m bgl. Standing groundwater at 0.70m bgl on completion. Borehole installed: GL to 0.50m plain pipe and bentonite seal. 0.50m to 2.30m slotted pipe and gravel.		Hand dug to 1.00m

Engineer: J.Brock
Site Works Date: 18/06/2021
Plant: Archway Competitor C130 Superheavy

Log Notes:
SPT = Standard Penetration test (N value)
HSV = Hand Shear Vane (kN/m^2)
LP = Limited Penetration (HSV/CBR)
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

GEO Environmental Engineering

GEO2021-4817: Scurgill, Egremont, Cumbria – TP01

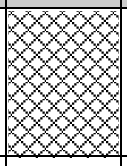
Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	1.50	MADE GROUND: Dark grey slightly silty sandy angular GRAVEL and COBBLES of aggregate, clinker, ash, shale, brick, concrete and occasional slag. Many boulders. Very unstable (collapsing). Made ground is too unstable to sink borehole.		0.50 - J
1.50	1.60	Soft to firm brown slightly sandy very gravelly CLAY.		
		End of trial pit at 1.60m. Trial pit is dry on completion. Trial pit backfilled with arisings.		

Engineer: J.Brock
Site Works Date: 18/06/2021
Plant: 3CX Backhoe Excavator

Log Notes:
HSV = Hand Shear Vane (kN/m²)
LP = Limited Penetration (HSV/CBR)
B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

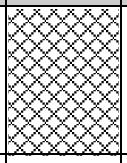
Website: www.geoenvironmentalengineering.com
Email: info@geoenvironmentalengineering.com
Telephone: 08456 768 895 / 07883 440 186

GEO2021-4817: Scurgill, Egremont, Cumbria – TP02

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.50	MADE GROUND: Dark grey slightly silty, sandy, loamy angular GRAVEL and COBBLES of aggregate with occasional clinker, ash, shale, brick and concrete.		0.30 - J
		End of trial pit at 0.50m. Trial pit is dry on completion. Trial pit backfilled with arisings.		

Engineer: J.Brock **Site Works Date:** 18/06/2021 **Plant:** 3CX Backhoe Excavator	**Log Notes:** HSV = Hand Shear Vane (kN/m^2) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

GEO2021-4817: Scurgill, Egremont, Cumbria – TP03

Depth From (m)	Depth To (m)	Strata Description	Legend	Testing / Samples
0.00	0.50	MADE GROUND: Dark grey slightly silty, sandy, loamy angular GRAVEL and COBBLES of aggregate with occasional brick and concrete.		0.10 - J
		End of trial pit at 0.50m. Trial pit is dry on completion. Trial pit backfilled with arisings.		

Engineer: J.Brock **Site Works Date:** 18/06/2021 **Plant:** Hand Digging Equipmement	**Log Notes:** HSV = Hand Shear Vane (kN/m^2) LP = Limited Penetration (HSV/CBR) B = Bulk Bag, J = Amber Glass Jar, T = Plastic Tub

Appendix III

- Updated GSR Report (Radon Assessment)

Groundsure LOCATION INTELLIGENCE

Geo Insight

unspecified

Order Details

Date: 01/09/2023

Your ref: EMS_891406_1103309

Our Ref: EMS-891406_1138800

Site Details

Location: 301685 510031

Area: 0.17 ha

Authority: Cumberland Council ↗

Summary of findings p. 2 >

OS MasterMap site plan p. 9 >

Aerial image p. 5 >

groundsure.com/insightuserguide ↗

Contact us with any questions at:
info@groundsure.com ↗
01273 257 755

Summary of findings

Page	Section	Geology 1:10,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
10 >	1.1 >	10k Availability >	Identified (within 500m)				
11	1.2	Artificial and made ground (10k)	0	0	0	0	-
12	1.3	Superficial geology (10k)	0	0	0	0	-
12	1.4	Landslip (10k)	0	0	0	0	-
13	1.5	Bedrock geology (10k)	0	0	0	0	-
13	1.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
14 >	2.1 >	50k Availability >	Identified (within 500m)				
15	2.2	Artificial and made ground (50k)	0	0	0	0	-
15	2.3	Artificial ground permeability (50k)	0	0	-	-	-
16 >	2.4 >	Superficial geology (50k) >	1	0	1	6	-
17 >	2.5 >	Superficial permeability (50k) >	Identified (within 50m)				
17	2.6	Landslip (50k)	0	0	0	0	-
17	2.7	Landslip permeability (50k)	None (within 50m)				
18 >	2.8 >	Bedrock geology (50k) >	1	0	0	4	-
19 >	2.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
19 >	2.10 >	Bedrock faults and other linear features (50k) >	0	1	1	3	-
Page	Section	Boreholes >	On site	0-50m	50-250m	250-500m	500-2000m
20 >	3.1 >	BGS Boreholes >	0	3	43	-	-
Page	Section	Natural ground subsidence >					
23 >	4.1 >	Shrink swell clays >	Very low (within 50m)				
24 >	4.2 >	Running sands >	Very low (within 50m)				
26 >	4.3 >	Compressible deposits >	Negligible (within 50m)				
27 >	4.4 >	Collapsible deposits >	Very low (within 50m)				
28 >	4.5 >	Landslides >	Very low (within 50m)				
30 >	4.6 >	Ground dissolution of soluble rocks >	Negligible (within 50m)				

Page	Section	Mining and ground workings >	On site	0-50m	50-250m	250-500m	500-2000m
32 >	5.1 >	BritPits >	0	0	2	2	-
33 >	5.2 >	Surface ground workings >	2	2	13	-	-
34 >	5.3 >	Underground workings >	0	0	0	2	10
35	5.4	Underground mining extents	0	0	0	0	-
35	5.5	Historical Mineral Planning Areas	0	0	0	0	-
35 >	5.6 >	Non-coal mining >	1	1	0	3	3
37	5.7	JPB mining areas	None (within 0m)				
37	5.8	The Coal Authority non-coal mining	0	0	0	0	-
37 >	5.9 >	Researched mining >	0	0	2	4	-
38 >	5.10 >	Mining record office plans >	1	3	3	2	-
38 >	5.11 >	BGS mine plans >	1	0	1	5	-
39	5.12	Coal mining	None (within 0m)				
39	5.13	Brine areas	None (within 0m)				
39	5.14	Gypsum areas	None (within 0m)				
39	5.15	Tin mining	None (within 0m)				
39	5.16	Clay mining	None (within 0m)				

Page	Section	Ground cavities and sinkholes >	On site	0-50m	50-250m	250-500m	500-2000m
40	6.1	Natural cavities	0	0	0	0	-
41 >	6.2 >	Mining cavities >	0	1	0	1	2
41	6.3	Reported recent incidents	0	0	0	0	-
42	6.4	Historical incidents	0	0	0	0	-
42	6.5	National karst database	0	0	0	0	-

Page	Section	Radon >	
43 >	7.1 >	Radon >	Less than 1% (within 0m)

Page	Section	Soil chemistry >	On site	0-50m	50-250m	250-500m	500-2000m
45 >	8.1 >	BGS Estimated Background Soil Chemistry >	1	2	-	-	-
45	8.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
45	8.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-

Page	Section	Railway infrastructure and projects >	On site	0-50m	50-250m	250-500m	500-2000m
46	9.1	Underground railways (London)	0	0	0	-	-
46	9.2	Underground railways (Non-London)	0	0	0	-	-
47	9.3	Railway tunnels	0	0	0	-	-
47 >	9.4 >	Historical railway and tunnel features >	3	0	3	-	-
47	9.5	Royal Mail tunnels	0	0	0	-	-
48 >	9.6 >	Historical railways >	0	0	1	-	-
48	9.7	Railways	0	0	0	-	-
48	9.8	Crossrail 1	0	0	0	0	-
48	9.9	Crossrail 2	0	0	0	0	-
48	9.10	HS2	0	0	0	0	-

Recent aerial photograph

Capture Date: 10/10/2018

Site Area: 0.17ha

Recent site history - 2008 aerial photograph

Capture Date: 05/10/2008

Site Area: 0.17ha

Recent site history - 2000 aerial photograph

Capture Date: 16/06/2000

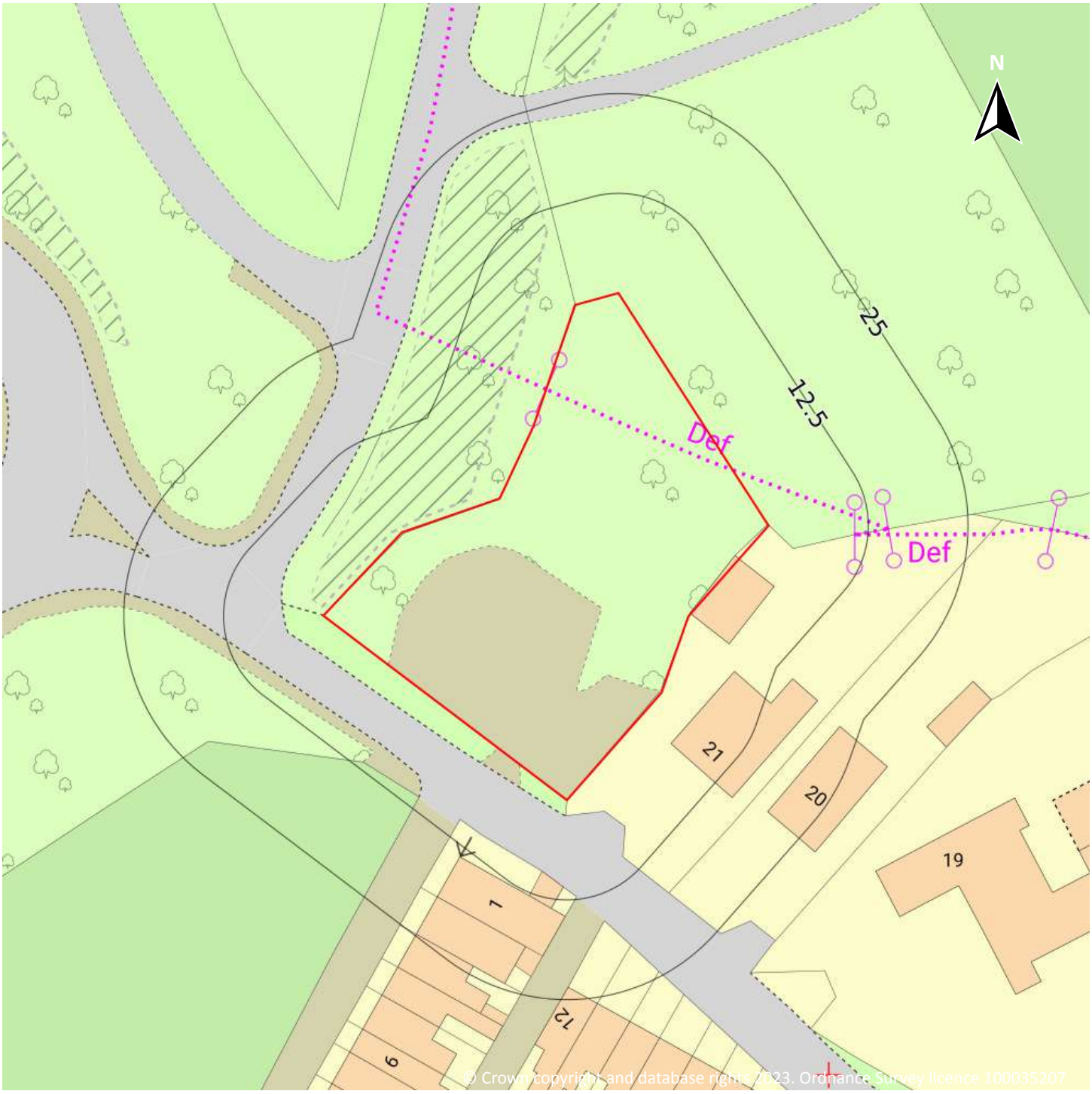
Site Area: 0.17ha

Recent site history - 1999 aerial photograph

Capture Date: 26/07/1999

Site Area: 0.17ha

OS MasterMap site plan



Site Area: 0.17ha

1 Geology 1:10,000 scale - Availability

Site Outline

Search buffers in metres (m)

Full coverage

Partial coverage

No coverage

1.1 10k Availability

Records within 500m	1

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 10 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**No coverage**	**No coverage**	**No coverage**	**NoCov**

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

1.2 Artificial and made ground (10k)

Records within 500m	0

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.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial

1.3 Superficial geology (10k)

Records within 500m	0

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.

This data is sourced from the British Geological Survey.

1.4 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

1.5 Bedrock geology (10k)

Records within 500m	0

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.

This data is sourced from the British Geological Survey.

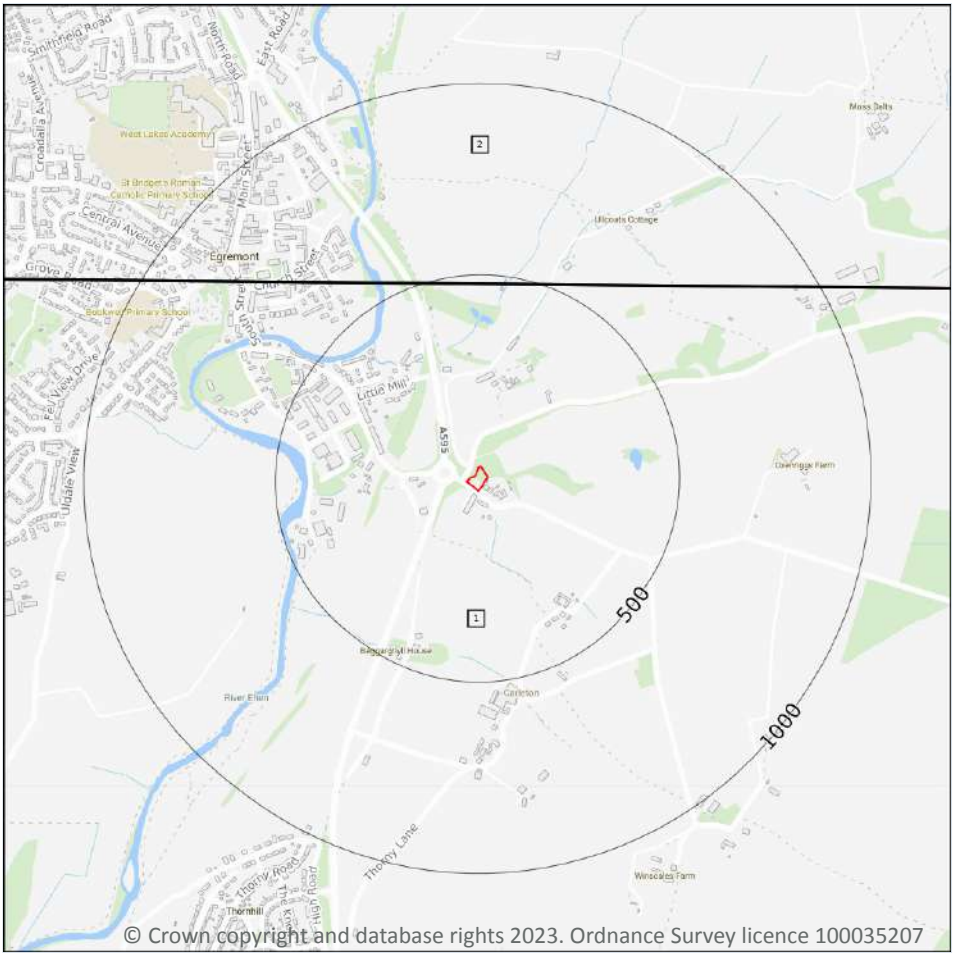
1.6 Bedrock faults and other linear features (10k)

Records within 500m	0

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.

This data is sourced from the British Geological Survey.

2 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

2.1 50k Availability

Records within 500m	2

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 14 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**EW037_gosforth_v4**
2	477m N	Full	Full	Full	Full	EW028_whitehaven_v4

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

2.2 Artificial and made ground (50k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

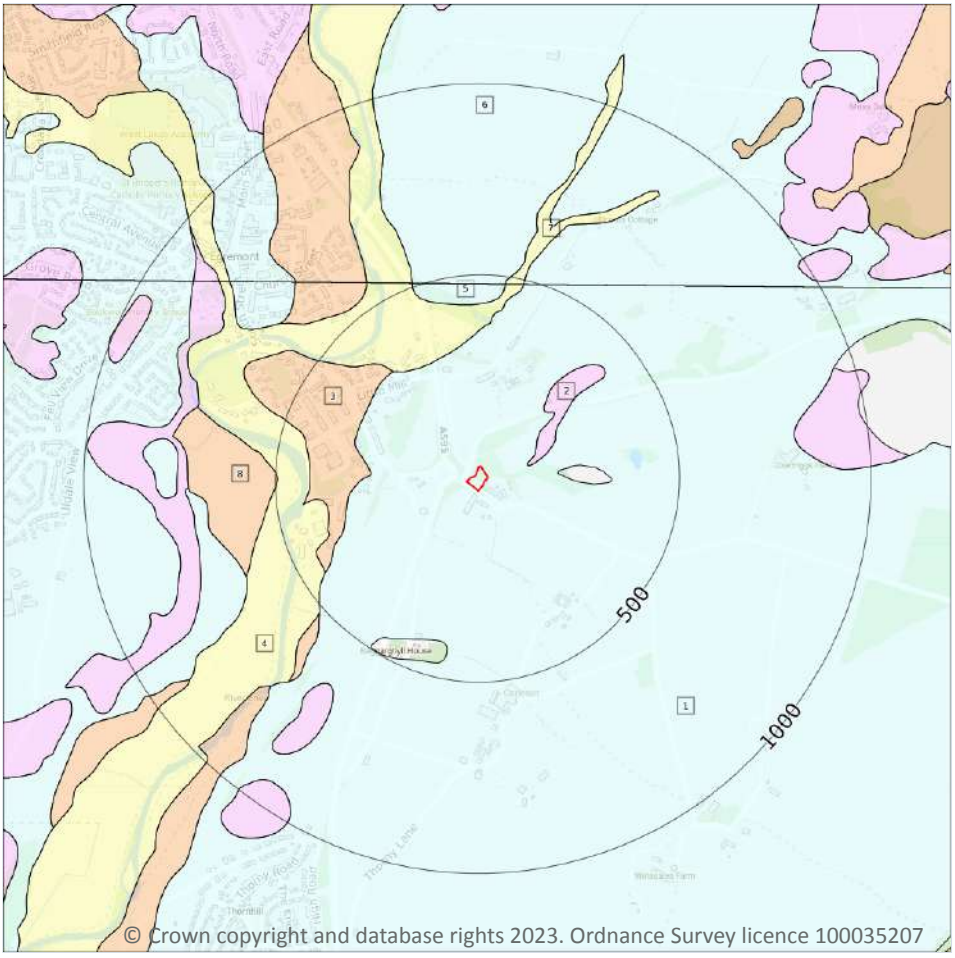
2.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

2.4 Superficial geology (50k)

Records within 500m **8**

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 16 >**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**TILLD-DMTN**	**TILL, DEVENSIAN**	**DIAMICTON**
2	107m E	GFDUD-XSV	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
3	251m W	RTDU-XSV	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL

ID	Location	LEX Code	Description	Rock description
4	298m NW	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
5	423m N	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
6	477m N	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
7	480m N	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
8	494m W	RTDU-XSV	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL

This data is sourced from the British Geological Survey.

2.5 Superficial permeability (50k)

Records within 50m	**2**

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
On site	**Mixed**	**High**	**Low**
1m S	Mixed	High	Low

This data is sourced from the British Geological Survey.

2.6 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.

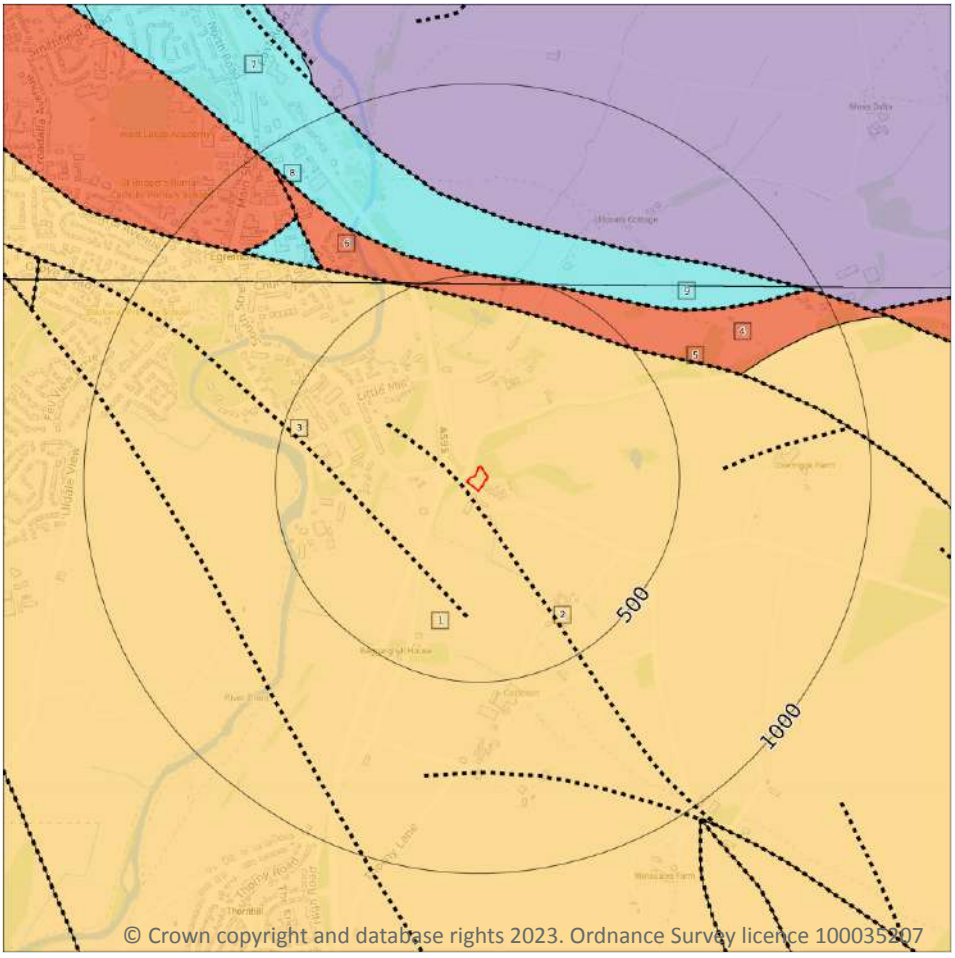
2.7 Landslip permeability (50k)

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.

2.8 Bedrock geology (50k)

Records within 500m **5**

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 18 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**SBS-SDST**	**ST BEES SANDSTONE MEMBER - SANDSTONE**	**-**
4	418m N	BK-BREC	BROCKRAM - BRECCIA	-
6	477m N	BK-BREC	BROCKRAM - BRECCIA	-
7	494m N	FRLI-LMST	FRIZINGTON LIMESTONE FORMATION - LIMESTONE	VISEAN

ID	Location	LEX Code	Description	Rock age
9	500m N	FRLI-LMST	FRIZINGTON LIMESTONE FORMATION - LIMESTONE	VISEAN

This data is sourced from the British Geological Survey.

2.9 Bedrock permeability (50k)

Records within 50m	**2**

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	**Mixed**	**High**	**Moderate**
1m S	Mixed	High	Moderate

This data is sourced from the British Geological Survey.

2.10 Bedrock faults and other linear features (50k)

Records within 500m	**5**

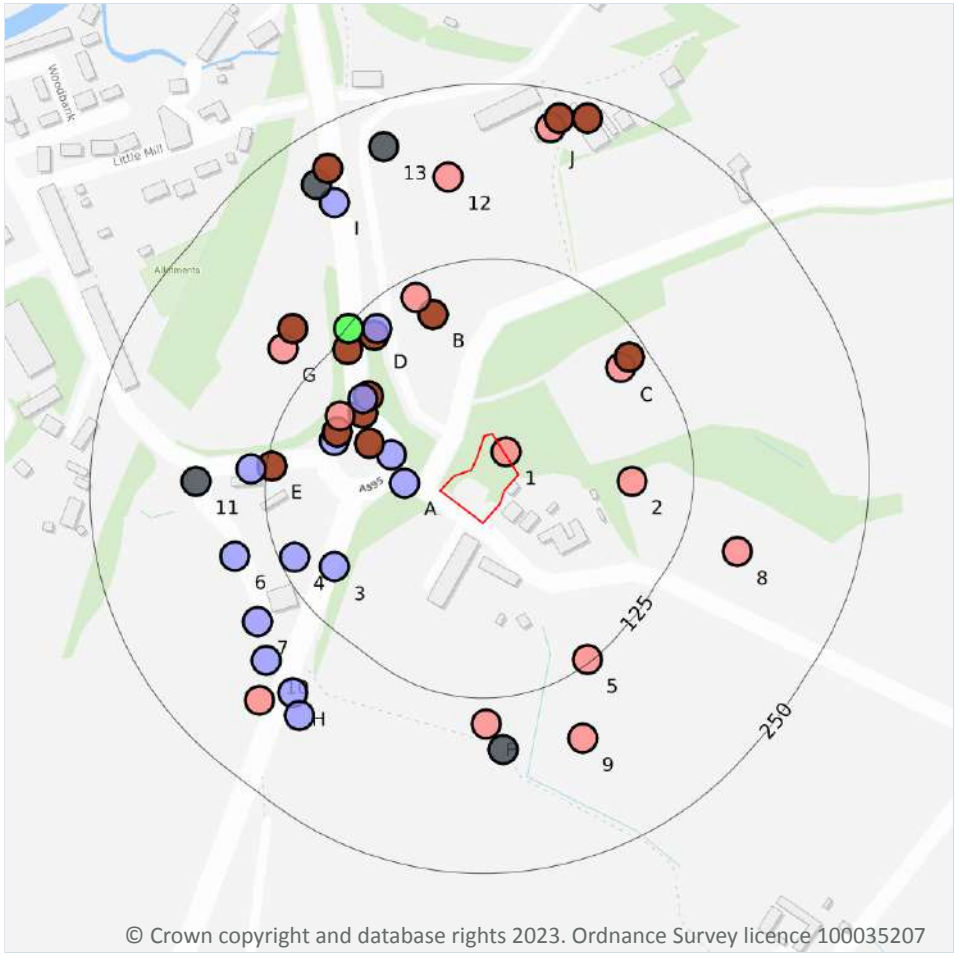
Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 18 >**

ID	Location	Category	Description
2	16m W	FAULT	Fault, inferred, displacement unknown
3	240m SW	FAULT	Fault, inferred, displacement unknown
5	418m N	FAULT	Fault, inferred, displacement unknown
8	494m N	FAULT	Fault, inferred, displacement unknown
10	500m N	FAULT	Fault, inferred, displacement unknown

This data is sourced from the British Geological Survey.

3 Boreholes



Site Outline

Search buffers in metres (m)

Confidential

0 - 10m

10 - 30m

30m+

Unknown

3.1 BGS Boreholes

Records within 250m	46

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 20 >**

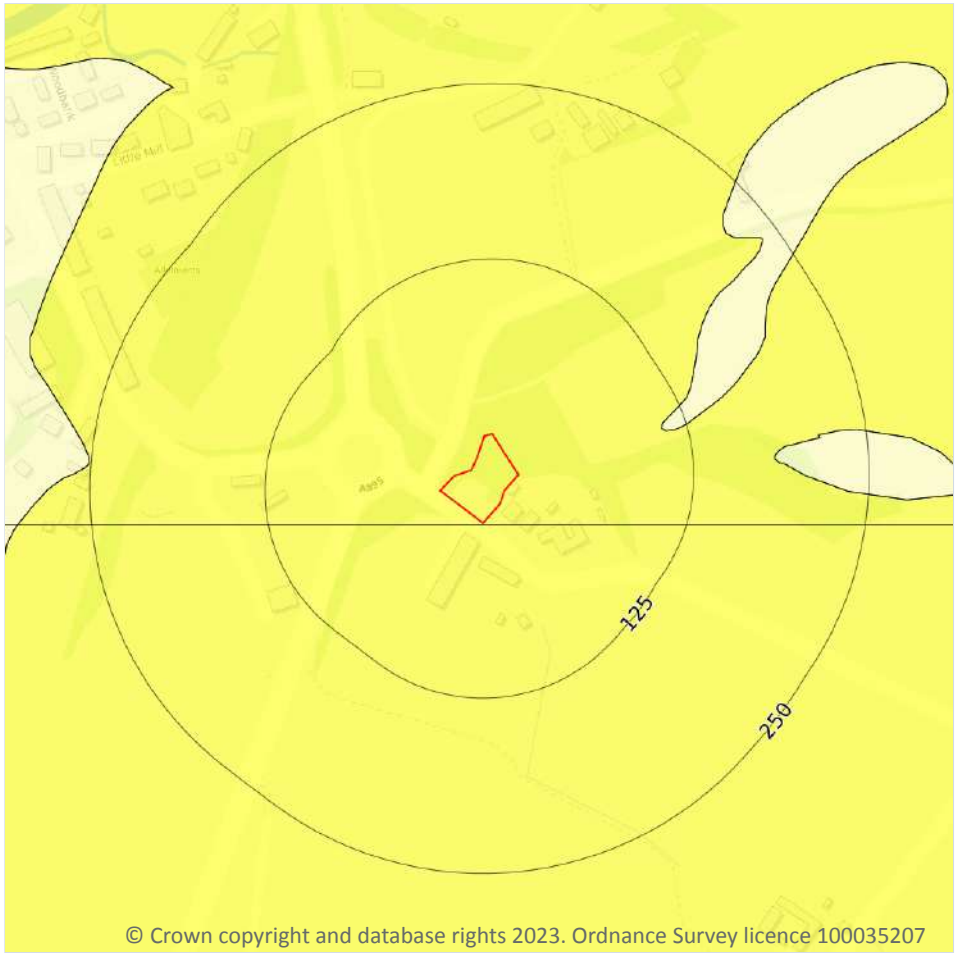
ID	Location	Grid reference	Name	Length	Confidential	Web link
1	1m NE	301702 510052	FLORENCE PIT 21	273.4	N	896352 ↗
A	26m W	301630 510030	A595 EGREMONT BYPASS TP68	1.0	N	897323 ↗
A	44m W	301620 510050	A595 EGREMONT BYPASS TP68A	1.0	N	897294 ↗

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	60m W	301605 510058	A595 (T) EGREMONT BYPASS 68H	-1.0	N	896974 ↗
A	78m NW	301600 510080	FLORENCE M8	-1.0	N	897015 ↗
2	81m E	301792 510031	FLORENCE PIT 20	255.27	N	896353 ↗
A	83m W	301580 510060	A595 EGREMONT BYPASS TP69	1.0	N	897324 ↗
A	84m NW	301604 510092	A595 (T) EGREMONT BYPASS 67	-1.0	N	896973 ↗
A	84m W	301582 510066	A595 (T) EGREMONT BYPASS 69H	-1.0	N	896975 ↗
A	85m NW	301600 510090	A595 EGREMONT BYPASS TP67	3.0	N	897322 ↗
A	89m NW	301584 510078	BH NO.8 FLORENCE	268.81	N	896529 ↗
3	93m SW	301580 509970	A595 EGREMONT BYPASS TP71	4.0	N	875388 ↗
B	94m N	301650 510150	FLORENCE M7	-1.0	N	897014 ↗
C	103m NE	301784 510112	FLORENCE PIT 22	303.58	N	896354 ↗
D	107m NW	301608 510135	A595 (T) EGREMONT BYPASS 65	-1.0	N	896971 ↗
D	109m NW	301610 510140	A595 EGREMONT BYPASS TP65	3.0	N	897321 ↗
B	110m N	301638 510162	BH NO.7 FLORENCE	272.44	N	896528 ↗
C	112m NE	301790 510120	FLORENCE NO. 1	-1.0	N	897028 ↗
4	115m W	301551 509977	A595(T) EGREMONT BYPASS TP71	4.0	N	875049 ↗
D	116m NW	301589 510125	A595 (T) EGREMONT BYPASS 66	-1.0	N	896972 ↗
E	122m W	301535 510042	A595 (T) EGREMONT BYPASS 70C	-1.0	N	896976 ↗
5	122m SE	301760 509904	NO.18 FLORENCE PIT	286.21	N	874893 ↗
D	123m NW	301590 510140	A595 EGREMONT BYPASS 66	12.6	N	897274 ↗
D	123m NW	301590 510140	A595 EGREMONT BYPASS 66A	12.6	N	897282 ↗
E	136m W	301520 510040	A595 EGREMONT BYPASS TP70	1.0	N	897325 ↗
F	143m S	301688 509858	NO.2 CARLETON	290.78	N	874913 ↗
G	151m NW	301543 510126	EGREMONT M28	275.85	N	896749 ↗
6	153m W	301509 509978	ST THOMAS'S CROSS EGREMONT 3	3.0	N	875018 ↗
G	156m NW	301550 510140	MILLOM XM28	-1.0	N	897068 ↗
7	160m SW	301525 509931	ST THOMAS'S CROSS EGREMONT TP1	2.0	N	875019 ↗
F	162m S	301700 509840	CARLETON, NO 2	-	Y	N/A

ID	Location	Grid reference	Name	Length	Confidential	Web link
8	165m E	301867 509981	NO.16 BSC 616 CARLETON	287.12	N	874993 ↗
9	169m S	301757 509848	NO.1 CARLETON FLORENCE MINE	299.01	N	874912 ↗
10	174m SW	301531 509903	ST THOMAS'S CROSS EGREMONT 2	7.1	N	875020 ↗
11	174m W	301481 510031	ST THOMAS'S CROSSEGREMONT TP4	-	Y	N/A
H	179m SW	301550 509880	A595 EGREMONT BYPASS 72	7.2	N	875383 ↗
12	186m N	301661 510248	BH NO.34 FLORENCE (MILLOM)	251.16	N	896585 ↗
H	188m SW	301555 509864	A595(T) EGREMONT BYPASS BH72	7.0	N	875050 ↗
H	198m SW	301526 509875	NO.23 FLORENCE MINES	302.41	N	874905 ↗
I	198m NW	301580 510230	A595 EGREMONT BYPASS TP65A	3.0	N	897293 ↗
I	216m NW	301567 510243	BSC 302	-	Y	N/A
13	219m N	301615 510270	South Egremont Groundwater Scheme BH109	-	Y	N/A
I	221m NW	301575 510254	A595 (T) EGREMONT BYPASS 65A	-1.0	N	896970 ↗
J	222m N	301734 510283	BSC 630 BH30 CARLETON	193.0	N	896809 ↗
J	230m N	301740 510290	FLORENCE M30	-1.0	N	897018 ↗
J	235m N	301760 510290	FLORENCE NO. 2	-1.0	N	897145 ↗

This data is sourced from the British Geological Survey.

4 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

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

4.1 Shrink swell clays

Records within 50m	2

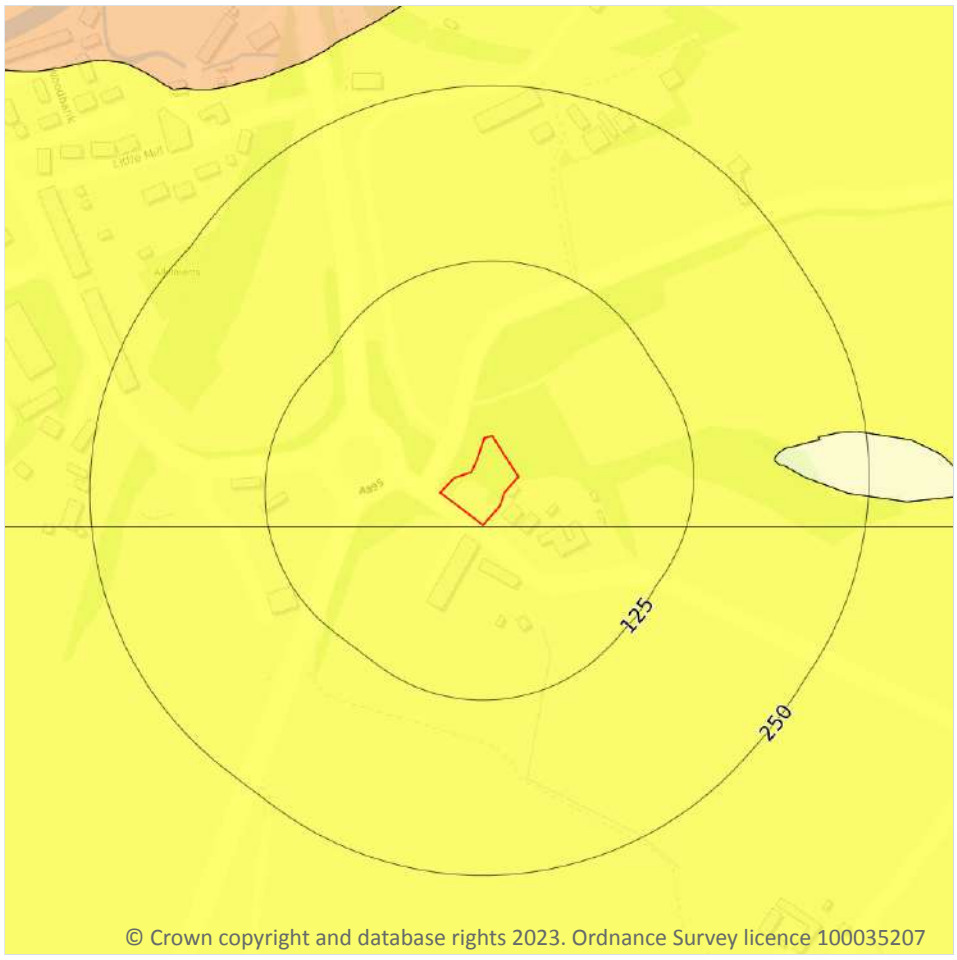
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and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

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 23 >**

Location	Hazard rating	Details
On site	**Very low**	**Ground conditions predominantly low plasticity.**
1m S	Very low	Ground conditions predominantly low plasticity.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

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

4.2 Running sands

Records within 50m	2

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.

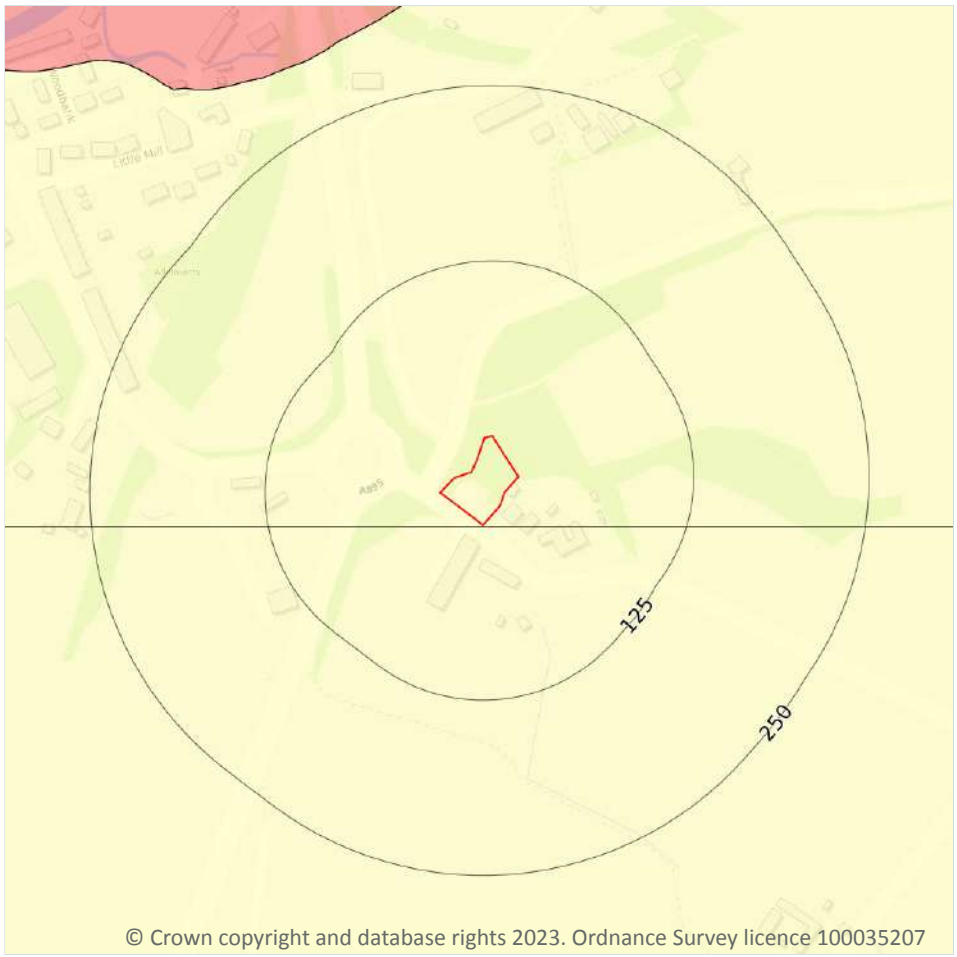
Features are displayed on the Natural ground subsidence - Running sands map on **page 24 >**

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.**

Location	Hazard rating	Details
1m S	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

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

4.3 Compressible deposits

Records within 50m	2

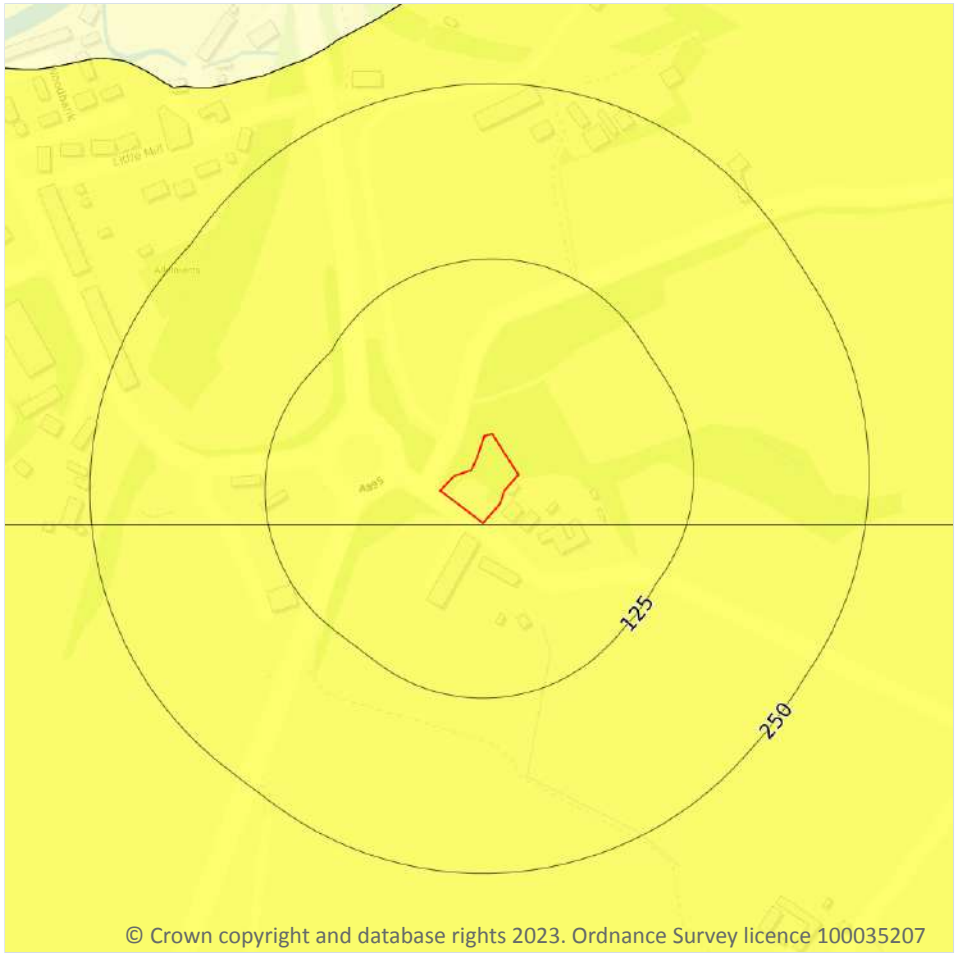
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 26 >**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**
1m S	Negligible	Compressible strata are not thought to occur.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

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

4.4 Collapsible deposits

Records within 50m	2

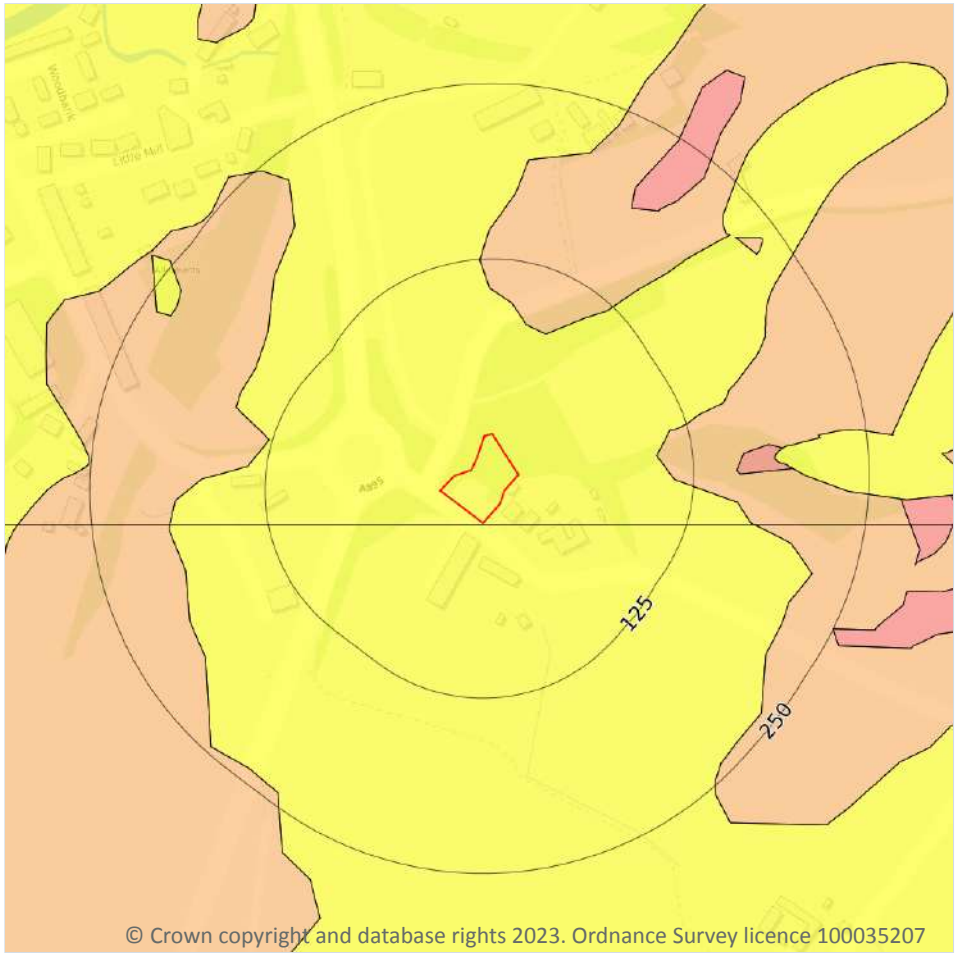
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 27 >**

Location	Hazard rating	Details
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**
1m S	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

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

4.5 Landslides

Records within 50m	2

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.

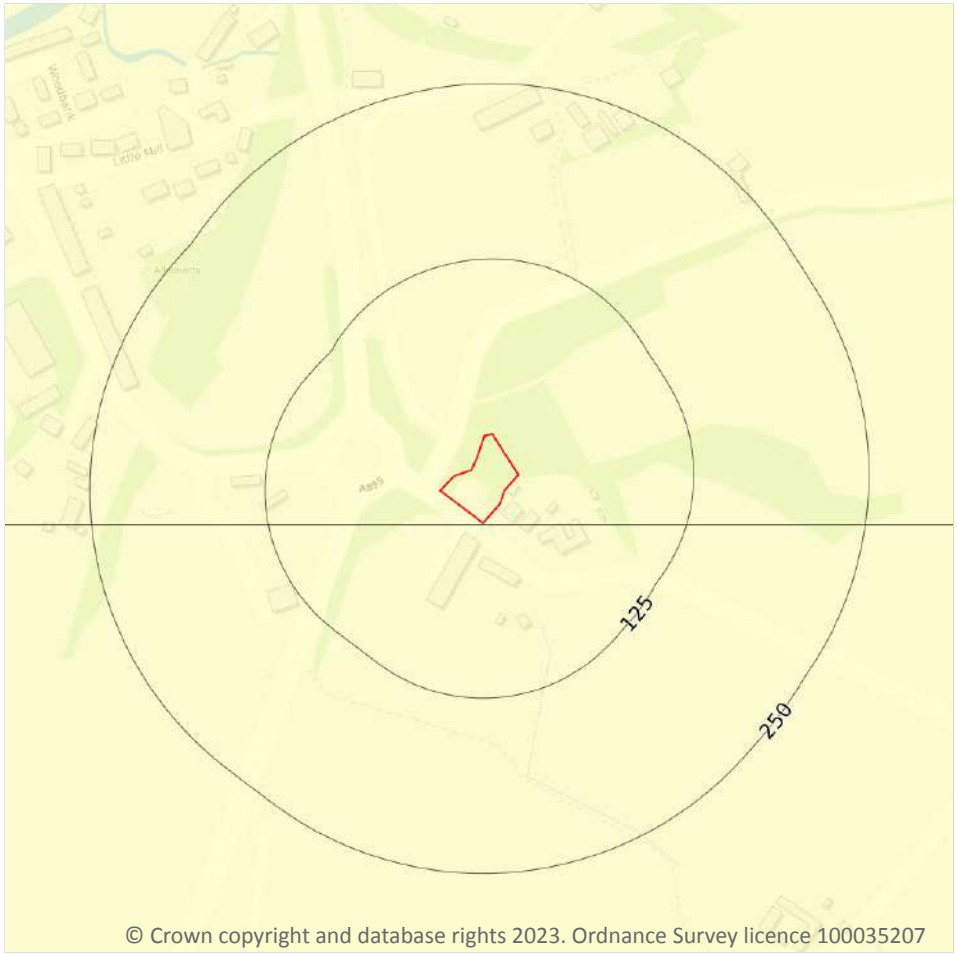
Features are displayed on the Natural ground subsidence - Landslides map on **page 28 >**

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
1m S	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.

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

4.6 Ground dissolution of soluble rocks

Records within 50m	2

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.

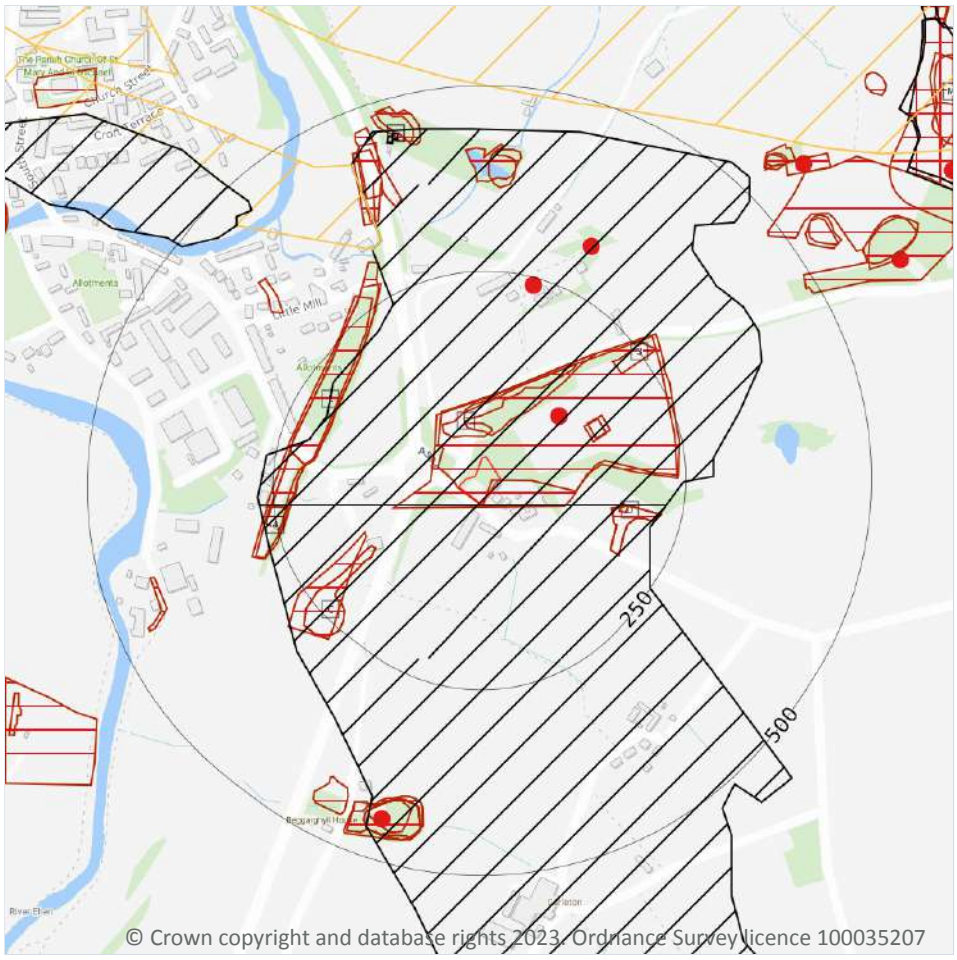
Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 30 >**

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.**

Location	Hazard rating	Details
1m S	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.

5 Mining and ground workings



Site Outline

Search buffers in metres (m)

BritPits

Surface ground workings

Underground workings

Underground mining extents

Historical mineral planning areas

TCA non-coal mining

Non Coal Mining

Sporadic underground mining of restricted extent possible

Localised small scale underground mining possible

Small scale mining possible

Underground mining known or likely within or in close proximity

Underground mining known within or in very close proximity

5.1 BritPits

Records within 500m	4

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 32 >**

ID	Location	Details	Description
A	112m NE	Name: Florence Pit No 1 Address: EGREMONT, Cumbria Commodity: Hematite (Iron Ore) Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) 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
5	239m N	Name: Florence Mine Address: EGREMONT, Cumbria Commodity: Hematite (Iron Ore) Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) 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
6	316m NE	Name: Florence Mine Address: EGREMONT, Cumbria Commodity: Hematite (Iron Ore) Status: Ceased	Type: Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots) 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
H	444m S	Name: Beggargill Quarry Address: Carleton, EGREMONT, Cumbria 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.

5.2 Surface ground workings

Records within 250m	**17**

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 32 >**

ID	Location	Land Use	Year of mapping	Mapping scale
A	**On site**	**Iron Ore Pit**	**1926**	**1:10560**
A	**On site**	**Iron Ore Pit**	**1948**	**1:10560**
B	27m N	Refuse Heap	1948	1:10560
B	30m N	Refuse Heap	1926	1:10560
A	133m NE	Reservoir	1948	1:10560
A	139m NE	Reservoir	1926	1:10560
C	139m SW	Unspecified Heap	1971	1:10000
C	139m SW	Unspecified Heap	1981	1:10000
C	140m SW	Refuse Heap	1951	1:10560
D	156m E	Refuse Heap	1971	1:10000
D	156m E	Refuse Heap	1981	1:10000
D	166m E	Reservoir	1926	1:10560
E	190m W	Cuttings	1898	1:10560
E	192m W	Cuttings	1926	1:10560
E	194m W	Cuttings	1948	1:10560
3	213m NE	Cuttings	1926	1:10560
4	234m W	Cuttings	1951	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

5.3 Underground workings

Records within 1000m	**12**

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

Features are displayed on the Mining and ground workings map on **page 32 >**

ID	Location	Land Use	Year of mapping	Mapping scale
F	441m N	Unspecified Old Shaft	1948	1:10560
F	444m N	Unspecified Old Shaft	1926	1:10560
16	684m NE	Iron Ore Mine	1948	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
M	690m NE	Iron Ore Mine	1926	1:10560
-	786m NW	Unspecified Mine	1898	1:10560
-	820m NE	Unspecified Mine	1898	1:10560
-	847m NW	Unspecified Mine	1926	1:10560
-	886m SE	Iron Ore Mine	1951	1:10560
-	886m SE	Unspecified Mine	1971	1:10000
-	891m SE	Unspecified Disused Mine	1994	1:10000
-	897m SE	Unspecified Mine	1926	1:10560
-	979m SE	Unspecified Disused Shaft	1981	1:10000

This is data is sourced from Ordnance Survey/Groundsure.

5.4 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.

5.5 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.

5.6 Non-coal mining

Records within 1000m	**8**

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).

Features are displayed on the Mining and ground workings map on **page 32 >**

ID	Location	Name	Commodity	Class	Likelihood
1	**On site**	**Not available**	**Iron Ore (Non Vein)**	**E**	**Underground mining is known or considered likely within or very close to the area. The location, extent and nature of mining should be considered in any site investigation. Potential for difficult ground conditions should be considered.**
2	1m S	Not available	Iron Ore (Non Vein)	E	Underground mining is known or considered likely within or very close to the area. The location, extent and nature of mining should be considered in any site investigation. Potential for difficult ground conditions should be considered.
7	317m NW	Not available	Iron Ore (Non Vein)	B	Underground mine workings may have occurred in the past or current mines may be working at significant depth to modern engineering standards. Potential for difficult ground conditions are unlikely and are at a level where they need not be considered.
11	455m NW	Not available	Iron Ore (Non Vein)	E	Underground mining is known or considered likely within or very close to the area. The location, extent and nature of mining should be considered in any site investigation. Potential for difficult ground conditions should be considered.
12	491m N	Not available	Vein Mineral	B	Underground mine workings may have occurred in the past or current mines may be working at significant depth to modern engineering standards. Potential for difficult ground conditions are unlikely and are at a level where they need not be considered.
15	659m NW	Not available	Vein Mineral	B	Underground mine workings may have occurred in the past or current mines may be working at significant depth to modern engineering standards. Potential for difficult ground conditions are unlikely and are at a level where they need not be considered.
-	865m SE	Not available	Iron Ore (Non Vein)	E	Underground mining is known or considered likely within or very close to the area. The location, extent and nature of mining should be considered in any site investigation. Potential for difficult ground conditions should be considered.
-	892m NW	Not available	Iron Ore (Non Vein)	E	Underground mining is known or considered likely within or very close to the area. The location, extent and nature of mining should be considered in any site investigation. Potential for difficult ground conditions should be considered.

This data is sourced from the British Geological Survey.

5.7 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.

5.8 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.

5.9 Researched mining

Records within 500m	6

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.

Location	Mineral type
157m N	Unspecified
222m N	Unspecified
354m N	Unspecified
361m N	Unspecified
429m N	Unspecified
487m NW	Unspecified

This data is sourced from Groundsure.

5.10 Mining record office plans

Records within 500m	**9**

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.

Location	Mineral
On site	**Iron ore**
3m N	Iron ore
20m NE	Iron ore
32m SE	Iron ore
80m NE	Iron ore
156m SE	Iron ore
199m N	Iron ore
346m N	Hematite
359m NE	Iron ore

This data is sourced from Groundsure.

5.11 BGS mine plans

Records within 500m	**7**

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.

Location	Mineral
On site	**Ironstone**
114m NE	Iron ore
309m N	Iron ore
395m NE	Ironstone
441m NE	Ironstone
487m NW	Iron ore
488m NE	Ironstone

This data is sourced from Groundsure.

5.12 Coal mining

Records on site	0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

5.13 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.

5.14 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

5.15 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

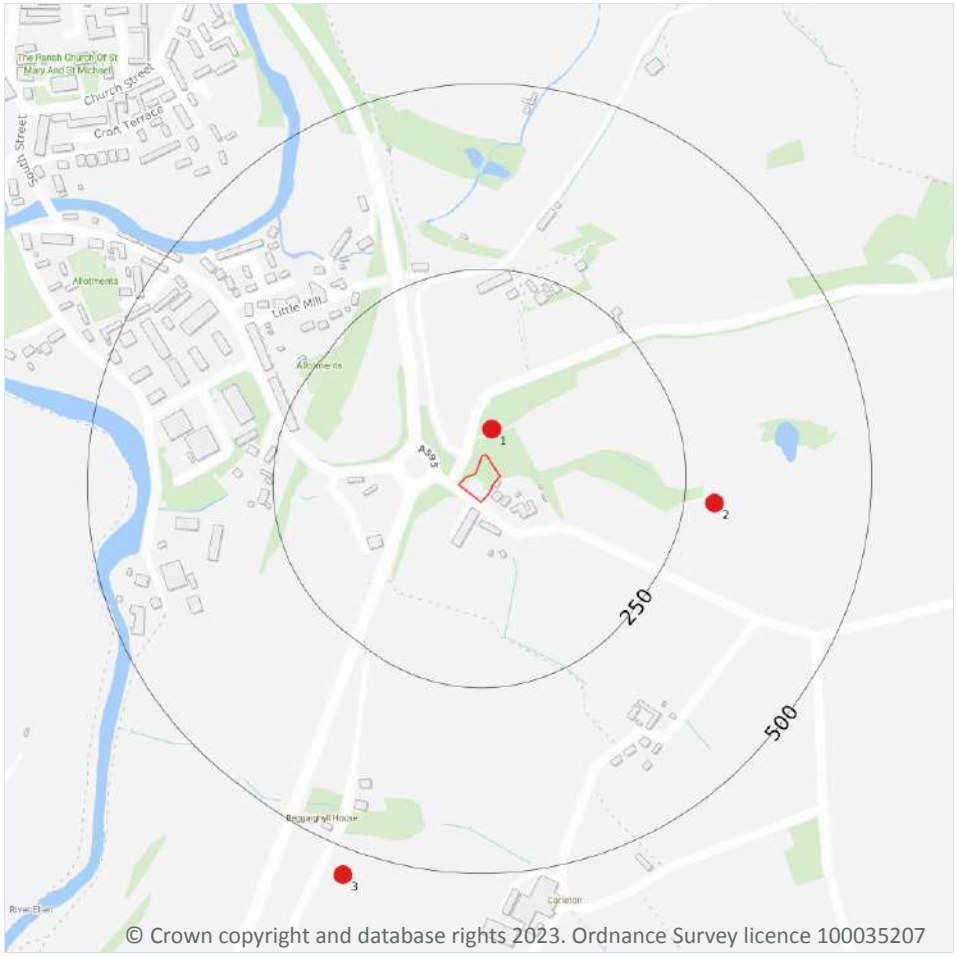
5.16 Clay mining

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).

6 Ground cavities and sinkholes



Site Outline

Search buffers in metres (m)

Natural cavities (Area)

Natural cavities (Point)

Mining cavities

Reported recent incidents

Historical incidents

BGS karst database (Point)

BGS karst database (Line)

BGS karst database (Area)

6.1 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.

6.2 Mining cavities

Records within 1000m	4

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.

Features are displayed on the Ground cavities and sinkholes map on **page 40 >**

ID	Location	Mine Address	Mineral	Data source	Publisher
1	36m N	Florence Mine, Cumbria	Hematite	CATALOGUE OF MINING INFORMATION (OTHER THAN COAL, FIRECLAY & SLATE) FOR THE L.D	BGS
2	291m E	Ullbank Mine, Cumbria	Hematite	CATALOGUE OF MINING INFORMATION (OTHER THAN COAL, FIRECLAY & SLATE) FOR THE L.D	BGS
3	535m S	Florence, Cumbria	Hematite	DIRECTORY OF MINES AND QUARRIES	BRITISH GEOLOGICAL SURVEY
-	935m N	St Helena, Cumbria	Bornite, Chalcocite, Copper, Malachite, Native Copper, Tetrahedrite	SHEET 26, WOLSINGHAM, 1:50 000	BRITISH GEOLOGICAL SURVEY

This data is sourced from Stantec UK Ltd.

6.3 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.

6.4 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.

6.5 National karst database

Records within 500m	0

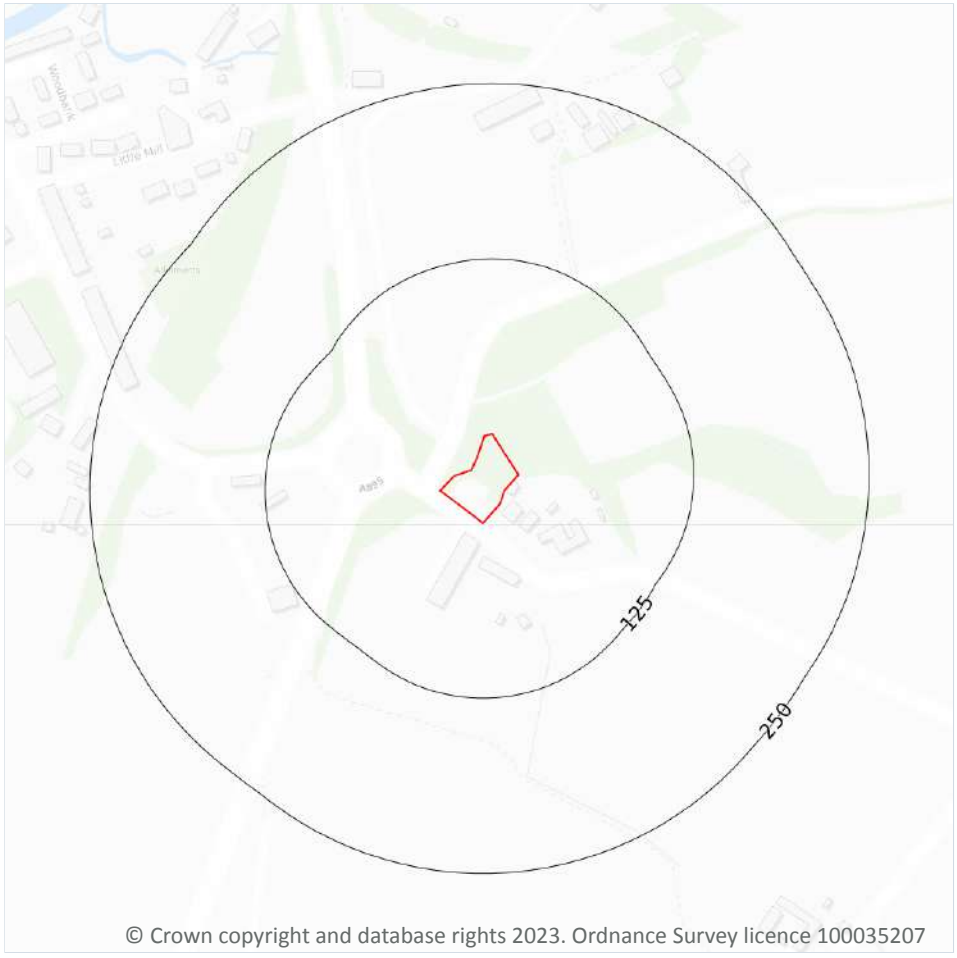
This is a comprehensive database of national karst information gathered from a wide range of sources. BGS have collected data on five main types of karst feature: Sinkholes, stream links, caves, springs, and incidences of associated damage to buildings, roads, bridges and other engineered works.

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.

7 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%

7.1 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 43 >**

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.

8 Soil chemistry

8.1 BGS Estimated Background Soil Chemistry

Records within 50m	3

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 mg/kg**
1m S	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 mg/kg
1m S	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 mg/kg

This data is sourced from the British Geological Survey.

8.2 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.

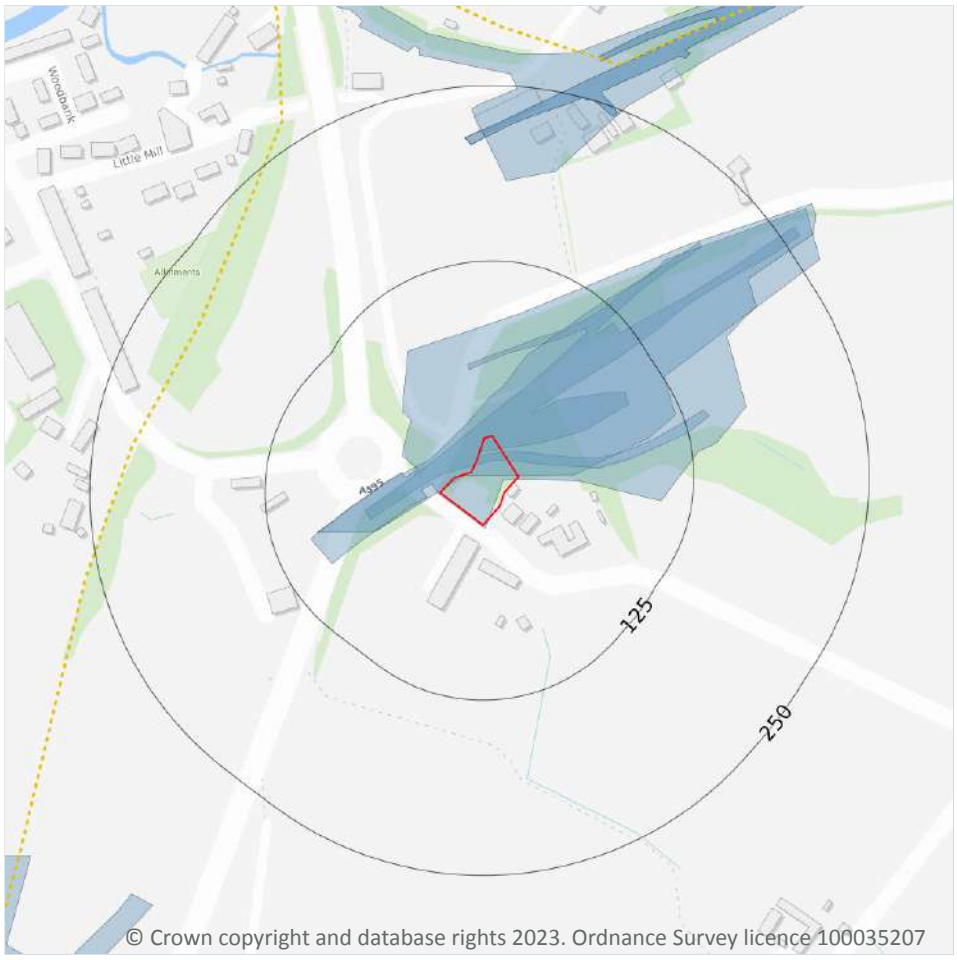
8.3 BGS Measured Urban Soil Chemistry

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.

9 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

9.1 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.

9.2 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.

9.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

9.4 Historical railway and tunnel features

Records within 250m	6

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 46 >**

Location	Land Use	Year of mapping	Mapping scale
On site	**Railway Sidings**	**1924**	**2500**
On site	**Railway Sidings**	**1948**	**10560**
On site	**Tramway Sidings**	**1926**	**10560**
182m N	Railway Sidings	1948	10560
208m N	Mineral Railway Sidings	1968	2500
208m N	Mineral Railway Sidings	1961	2500

This data is sourced from Ordnance Survey/Groundsure.

9.5 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.

9.6 Historical railways

Records within 250m	1

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 46 >**

Location	Description
209m NW	Abandoned

This data is sourced from OpenStreetMap.

9.7 Railways

Records within 250m	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

9.8 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.

9.9 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.

9.10 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.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference ↗.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: https://www.groundsure.com/terms-and-conditions-april-2023/ ↗.

Appendix IV

- Soil Validation Criteria For Imported Soil

Soil Validation Criteria for Imported Soils

		Generic Assessment Criteria Residential With Plant Uptake			
Determinand	**Unit**	**GAC at 1% SOM**	**GAC at 2.5% SOM**	**GAC at 6% SOM**	**GAC Ref:**
Arsenic (total)	mg/kg	37	37	37	LQM S4UL
Cadmium (total)	mg/kg	10	10	10	CLEA SGV
Chromium (III)	mg/kg	910	910	910	LQM S4UL
Chromium (VI)	mg/kg	6	6	6	LQM S4UL
Copper (total)	mg/kg	2400	2400	2400	LQM S4UL
Lead (total)	mg/kg	200	200	200	LQM C4SL
Mercury (total)	mg/kg	40	40	40	LQM S4UL
Nickel (total)	mg/kg	130	130	130	LQM S4UL
Selenium (total)	mg/kg	250	250	250	LQM S4UL
Zinc (total)	mg/kg	3700	3700	3700	LQM S4UL
pH	N/A	<6.5	<6.5	<6.5	BRE
Sulphate (2:1 water soluble)	mg/l	>500	>500	>500	BRE
Cyanide (total)	mg/kg	34	34	34	ATRISK SSV
Phenols (total)	mg/kg	120	200	380	LQM S4UL
Total Organic Carbon (TOC)	% w/w C	-	-	-	-
PAH					
Naphthalene	mg/kg	2.3	5.6	13.0	LQM S4UL
Acenaphthylene	mg/kg	170	420	920	LQM S4UL
Acenaphthene	mg/kg	210	510	1100	LQM S4UL
Fluorene	mg/kg	170	400	860	LQM S4UL
Phenanthrene	mg/kg	95	220	440	LQM S4UL
Anthracene	mg/kg	2400	5400	11000	LQM S4UL
Fluoranthene	mg/kg	280	560	890	LQM S4UL
Pyrene	mg/kg	620	1200	2000	LQM S4UL
Benzo(a)anthracene	mg/kg	7	11	13	LQM S4UL
Chrysene	mg/kg	15	22	27	LQM S4UL
Benzo(b)fluoranthene	mg/kg	2.6	3.3	4	LQM S4UL
Benzo(k)fluoranthene	mg/kg	77	93	100	LQM S4UL
Benzo(a)pyrene	mg/kg	2.2	2.7	3.0	LQM S4UL
Indeno(123cd)pyrene	mg/kg	27	36	41	LQM S4UL
Dibenz(ah)anthracene	mg/kg	0.24	0.28	0.30	LQM S4UL
Benzo(ghi)perylene	mg/kg	320	340	350	LQM S4UL
PAH (total of USEPA 16)	mg/kg	-	-	-	-
BTEX & TPH					
MTBE	mg/kg	49	84	160	CL:AIRE GAC (2010)
Benzene	mg/kg	0.087	0.17	0.37	LQM S4UL
Toluene	mg/kg	130	290	660	LQM S4UL
Ethylbenzene	mg/kg	47	110	260	LQM S4UL
m & p-Xylene	mg/kg	56	130	310	LQM S4UL
o-Xylene	mg/kg	56	140	310	LQM S4UL
VPH Aromatic (>EC5-EC7)	mg/kg	70	140	300	LQM S4UL
VPH Aromatic (>EC7-EC8)	mg/kg	130	290	660	LQM S4UL
VPH Aromatic (>EC8-EC10)	mg/kg	34	83	190	LQM S4UL
EPH Aromatic (>EC10-EC12)	mg/kg	74	180	380	LQM S4UL
EPH Aromatic (>EC12-EC16)	mg/kg	140	330	660	LQM S4UL
EPH Aromatic (>EC16-EC21)	mg/kg	260	540	930	LQM S4UL
EPH Aromatic (>EC21-EC35)	mg/kg	1100	1500	1700	LQM S4UL
EPH Aromatic (>EC35-EC44)	mg/kg	1100	1500	1700	LQM S4UL
VPH Aliphatic (>C5-C6)	mg/kg	42	78	160	LQM S4UL
VPH Aliphatic (>C6-C8)	mg/kg	100	230	530	LQM S4UL
VPH Aliphatic (>C8-C10)	mg/kg	27	65	150	LQM S4UL
EPH Aliphatic (>C10-C12)	mg/kg	130	330	760	LQM S4UL
EPH Aliphatic (>C12-C16)	mg/kg	1100	2400	4300	LQM S4UL
EPH Aliphatic (>C16-C35)	mg/kg	65000	92000	110000	LQM S4UL
EPH Aliphatic (>C35-C44)	mg/kg	65000	92000	110000	LQM S4UL
Subcontracted analysis					
Asbestos (qualitative)	-	Present	Present	Present	Presence

Notes: Results to be reviewed against approriate SOM value.

Appendix V

- YALPAG - Verification Requirement For Cover Systems; Technical Guidance For Developers, Landowners and Consultants

VERIFICATION REQUIREMENTS FOR COVER SYSTEMS

Technical Guidance for Developers, Landowners and Consultants

Yorkshire and Lincolnshire Pollution Advisory Group

Version 4.1 – June 2021

The purpose of this guidance is to promote consistency and good practice for development on land affected by contamination. The Local Authorities in Yorkshire, Lincolnshire, the North East of England, East Anglia, Greater Manchester and St Helens who have adopted this guidance are shown below:

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Key Points *3*

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Disclaimer

This guidance is intended to serve as an informative and helpful source of advice. YALPAG will review this guidance every three years, but readers must note that legislation, guidance and practical methods are inevitably subject to change and therefore should be aware of current UK policy and best practice. This note should be read in conjunction with prevailing legislation and guidance, as amended, whether mentioned here or not. Where legislation and documents are summarised this is for general advice and convenience, and must not be relied upon as a comprehensive or authoritative interpretation. Ultimately it is the responsibility of the person/company involved in the development or assessment of land to apply up-to-date working practices to determine the contamination status of a site and the remediation and verification requirements.

Acknowledgments

YALPAG would like to thank North Lincolnshire Council, Leeds City Council, City of Bradford Metropolitan District Council, Barnsley Metropolitan Borough Council, Rotherham Metropolitan Borough Council, Wakefield Council, and Tameside Metropolitan Borough Council, for producing this guidance.

YALPAG would also like to acknowledge Liverpool City Council's Contaminated Land Team, Coopers Consulting Engineers for allowing us to use their guidance document and photographs and WSP Environmental Ltd for also donating photographs.

Consultation

39 Local Authorities and 6 Environmental Consultants were consulted over a four week period in 2010 during the production of the initial guidance. At that time, consultation comments were considered by the review panel and a number of revisions were made to the guidance to reflect these comments.

49 Local Authorities and 25 Environmental Consultants were consulted in 2021, during the production of this version [4.1] of the guidance. Consultation comments were considered by the review panel and a number of revisions were made to the guidance to reflect these comments.

Introduction

This guidance has been produced to help developers ensure that they can demonstrate that material brought onto a development site for gardens or areas of soft landscaping are suitable for use and do not present harm to people, the environment and/or property. It is intended to improve the quality of reports submitted to Local Authorities on this matter and to give contractors/consultants a point of reference to obtain approval for such work from their client. This guidance does not cover the geotechnical suitability of soils or materials, chemical suitability that does not affect human health e.g. sulphates, or importing soils contaminated with invasive (or injurious) plants.

The verification of cover systems should be an integral part of the remediation project and agreed between developers and regulators at an early stage in the project.

UK guidelines for remediation verification are set out within Land Contamination Risk Management[1] (LCRM) and the document on Verification of Remediation of Land Contamination[2]. This guidance note should be considered as supplementary advice in conjunction with these documents.

This guidance relates to the remediation of land contamination by using cover systems; however, the verification of the quality of imported material is equally important in other situations, such as raising levels for flood prevention or general landscaping works. This guidance could also be used in such instances.

The Process of Verification

Implementation plans for remedial works should always be site specific. Where a cover system and potentially, excavation, is the main remedial method or a component of an overall site remediation, specific goals will need to be set that are linked directly to the risk management strategy for the site in question.

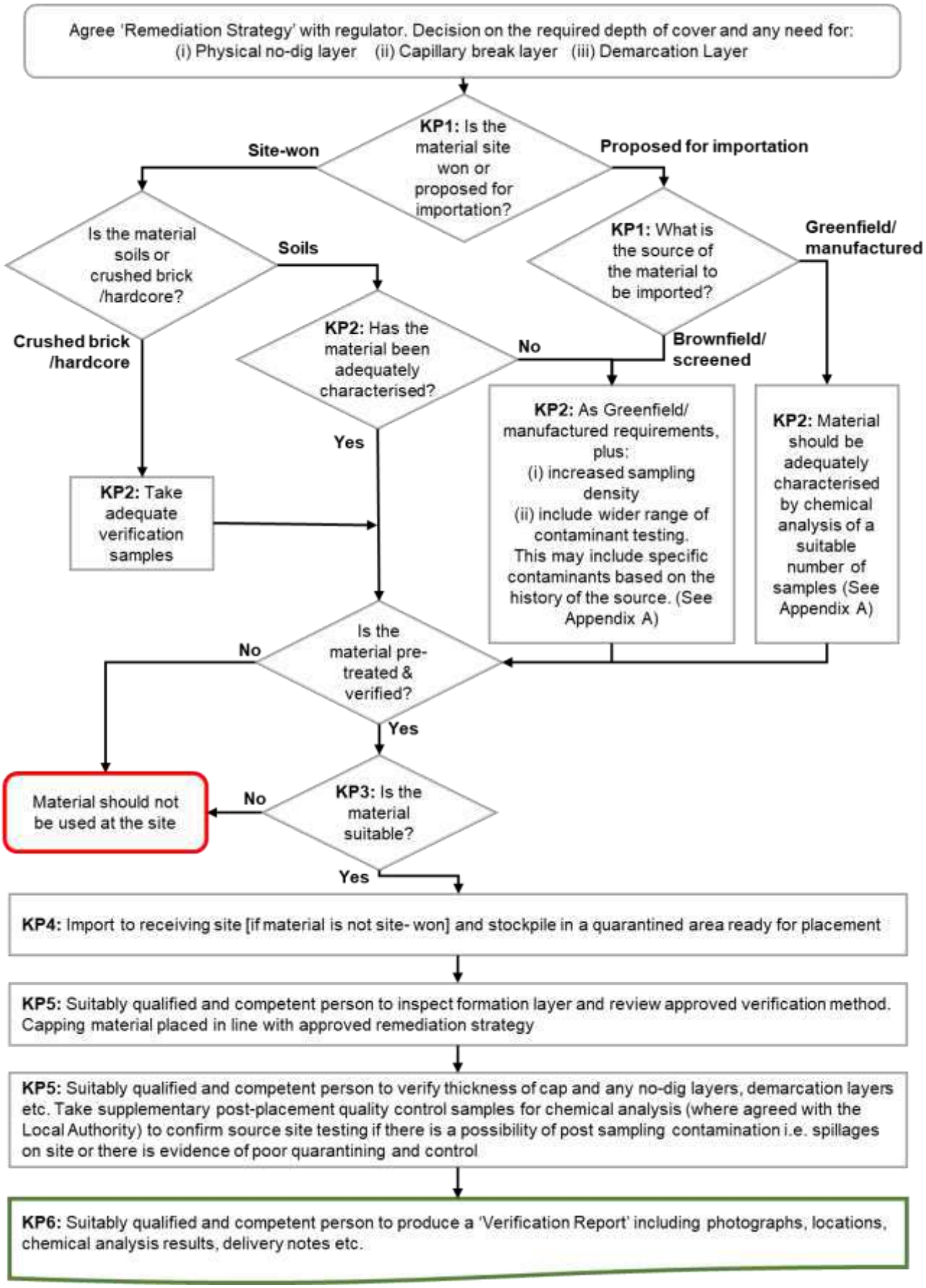
For cover and containment systems, verification will normally depend upon the provision of defensible measurements, observations and records. Critical factors to be considered are:

- What should be measured?
- When should they be measured?
- Where measurements need to be taken, what is the appropriate monitoring regime i.e. number and frequency of samples?
- Statistical constraints on sampling.

National Planning Policy Framework (NPPF) states that “planning policies and decisions should ensure that after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990”. The Verification Report is a key document to demonstrate compliance with NPPF, and the responsibility rests with the developer/applicant to submit the required Verification Report to complete the remediation and to discharge any planning conditions.

[1] Land Contamination Risk Management, Environment Agency, Oct 2020
[2] Verification of Remediation of Land Contamination. Environment Agency, Feb 2010

Overview Flowchart



Key Points

KP1: Source of Material

Material can be sourced from site won material i.e. crushed brick/hardcore or site-won soils from existing open or landscaped areas. In the interest of sustainability, Local Authorities promote the use of such site-won material providing that they are suitable for the intended end use of the site.

Alternatively, material can be sourced from other developments and commercial companies. Dependent on the source of the material it can be classified as either from a 'Greenfield/Manufactured' or 'Brownfield/Screened' source.

Broadly speaking material can be classified as follows:

Greenfield – Where documentary evidence is provided confirming that the source site has not been developed and that no past contaminative uses have occurred. Should evidence not be provided or approved by the Local Authority, please note that the source would be expected to be assessed as though it were a brownfield source.

Manufactured – from a commercial company who manufacture material by mixing or blending mineral soils (subsoil or sand) with an organic amendment (compost). If other soil component sources are used, documentary evidence should be provided confirming that the source site has not been developed and that no past contaminative uses have occurred. Should documentary evidence not be provided or approved by the Local Authority, please note that the source would be expected to be assessed as though it were a brownfield source.

Brownfield – material from a donor site that has previously been developed

Screened – material from a company who deal with skip/demolition waste which is screened for unsuitable material i.e. bricks, wood, plastic etc.

KP2: Characterisation of Material

It is essential that material is suitable for its intended use. Documentary evidence of the source of the material should be provided to the Local Authority. This may include desk study or site investigation reports. A defensible method is required to ensure the verification proposals are site specific and that the level of sampling reflects the need to ensure that imported material are suitable for their intended use.

Due to the diminishing supply of suitable Greenfield topsoil sources it has been found that the chemical quality of Greenfield sources is less reliable in certain areas. As a result the recommended analytical rate for the intended use of the development may vary between Local Authorities [see **Appendix 1a**].

When should this be done?

Sampling of material should be undertaken as early as possible i.e. prior to placement [for site won material] and prior to importation [for imported material]. This is to avoid the costly exercise of re-excavating unsuitable material and the possibility of cross contamination. Where the assessor has confidence that the material is of sufficient quality (i.e. tested by supplier, used previously) it is acceptable to test the material on site. Although, if it is deemed unsuitable it would have to be either removed off site or pre-treated at the cost and time of the developer. It is recommended that some verification samples are also taken once this material has been delivered to site to confirm suitability for use. Soils can become contaminated during transportation or when stockpiled on site.

What about certificates from commercial suppliers?

Where the material is provided by a commercial company, certificates or other industry Quality Protocol compliance i.e. WRAP, DoWCoP, will normally be accepted. This is on the proviso that it: (i) relates to the actual material being imported to the site and the type and amount of analysis is in line with what is prescribed in Appendix 1a; and, (ii) the certificates are less than two months old.

It is recommended that some additional verification samples are taken once this material has been delivered to site. Soils can become contaminated during transportation or when stockpiled on site.

Extreme caution should be given to importing material that has been recycled from demolition or skip waste as they could easily be contaminated e.g. asbestos containing materials. Please refer to "questions you should be asking your supplier" in **Appendix 1b** and include the responses in your report.

British Standard

Imported soils should be as specified in BS 3882:2015 for topsoil and BS8601:2013 for subsoil as 'suitable for their intended purpose'. Both British Standards relate mostly to nutrient content of topsoil and phytotoxic contamination and they do not consider contaminants that pose a risk specifically to human health. Soils should be tested for contaminants that are considered to pose a risk to human health in addition to those specified in the relevant British Standards to ensure that they are suitable for their intended use.

Initial screening

A visual / olfactory inspection of the material should be carried out by a suitably qualified and competent person to ensure that:

- It is a suitable growing medium;
- It is free from obvious contamination i.e. staining/free product etc.;
- It has not come from areas where Japanese Knotweed or other invasive or injurious plants, as specified by the Environment Agency, are suspected to have been growing;
- It is not odorous (could be considered a statutory nuisance);
- It is free from unsuitable material i.e. bricks, brick ties, timber and glass etc.); and,
- There are no visible signs of asbestos containing material (ACMs).

Testing schedule & number of samples

Chemical testing will normally be required on any materials that are to be used as cover material, even where this includes first generation quarried material. This should be carried out by a suitably qualified and competent person.

Appendix 1a explains in detail the sampling and testing requirements for a typical residential development. These are only guidelines and it may be necessary to deviate away from them depending on local and site-specific factors. It is recommended that the developer discusses any deviation with the Local Authority.

The following criteria sets out the requirements for sampling and testing:

- **Virgin Quarried Material** sampling needs to be 1 or 2 samples depending on the type of stone utilised, to confirm the inert nature of the material. Testing to include standard metals/metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn).

- **Crushed Hardcore, Stone, Brick (excluding asphalt)** a minimum of 1 sample per 500m^3. Testing to include standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, total TPH. Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).

- **Greenfield/ Manufactured Soils** a minimum of 3 samples or, dependent on source and receptor, between 1 per 50m^3 and 1 per 250m^3. Testing to include standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, pH and soil organic matter (SOM) (or calculated from total organic carbon (TOC)).

- **Brownfield/ Screened Soils** a minimum of 6 samples or dependent on source and receptor, between 1 per 50m^3 and 1 per 100m^3. Standard metals/ metalloids (as above), PAH (16 USEPA speciation), TPH (CWG banded), asbestos, pH and SOM (or calculated from TOC). Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).

The assessment criteria need to be UK based, e.g. LQM S4ULs, Defra C4SLs or other similarly derived GACs.

KP3: Suitability of Material

Based on the characterisation of material above, the material should be either deemed suitable or unsuitable. Obviously unsuitable material should not be used (unless it is treated to reduce levels of contaminants below agreed target levels i.e. bioremediation – this would have to be agreed and included within the Remediation Strategy) and an alternative source of material should be sought by the developer. If the material is considered suitable it can be imported (if not site won) and stockpiled in a suitably quarantined area [refer to **KP4**].

KP4: Stockpiling & Quarantining of Material

It is essential that the 'suitable' material is either placed in its intended area straight away i.e. soft/landscaped areas or stockpiled in a suitable quarantine area to prevent on-site contamination.

In the event that an assessor finds material has been stored in an unsuitable area, samples should be taken to confirm that no cross contamination has occurred (including a visual/olfactory check of the material). The material should then be suitably quarantined or placed at its intended location immediately.

KP5: Verification of Required Depth

In line with the agreed Remediation Strategy, it is important to establish that the required depth has been achieved and is consistent across the site. There are two main ways to achieve this:

Depth testing in situ – small trial pit excavated to allow measurement of its depth by standardised tape measure or measuring staff.

Topographical surveys – accurate survey of the base and final formation layer height to establish the depth of cover.

Specific Local Authority Policy

Please check with the local Contaminated Land Officer to establish:

- Which type of method for testing depth is accepted; and,
- The number of verification areas per property, plot, landscaped area or garden area (some Local Authorities recommend at least 2 per plot for residential developments).

Important Note: Where demarcation, physical no-dig and capillary break layers exist they should be verified for their thickness and presence during the time of their installation. Details of the demarcation layer should be agreed with the Contaminated Land Officer prior to placement. This will include the design, type and strength of the geotextile separator or visual warning membrane. The verification of depth and confirmation of such layers should be carried out by a suitably qualified and competent person.

KP6: Reporting

The purpose of verification documentation is to provide transparent reasoning why the remediation was required, a methodology about how it was to be undertaken and proof that the specified works have been undertaken and to provide confirmation that the site is "suitable for its intended use".

The document is utilised not only to satisfy conditions of planning permissions but also is to be kept on record by the Local Authority should queries be raised during the lifetime of the development and to confirm to future purchasers that the site is suitable for use.

National Planning Policy Framework (NPPF) states that "planning policies and decisions should ensure that after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990". The Verification Report is a key document to demonstrate compliance with NPPF, and the responsibility rests with the developer/applicant to submit the required Verification Report to complete the remediation and to discharge any planning conditions.

It is also essential that other supporting documentation is included within a report carried out by a suitably qualified and competent person e.g. laboratory analysis results, delivery tickets for material, certificates for imported material (or if unavailable, documented evidence of the source of the Greenfield material), trial pit logs etc. A checklist has been included in **Appendix 2** to give an idea on what information should be recorded.

Additionally, any reporting should include details of any measures required to maintain the cover system integrity in the future e.g. successive construction phases (management plans) and longer term (restrictive covenants on title deeds).

Photographic evidence for validating the depth of cover

The Local Authority ideally would recommend the following programme of photographs to be taken of the placement of inert cover:

- Photographs of any stockpiles and quarantine areas
- Proof that the depth of inert cover has been installed
- Proof of the quality of the material to be used as inert cover
- Proof there is a geotextile separator and visual warning membranes if used between the underlying material and suitable for use soils.
- Proof of the method of placement and different layers if appropriate
- Proof of the completed project
- Inclusion of background features which will aid locating the photograph
- Inclusion of site identification boards within the photos which show the date, position taken i.e. corner of plot 3 and the site name.
- Inclusion of photographs of site stockpiles and quarantine areas.

The presence of good quality photographs is essential to prove beyond doubt that the remediation has been done as specified both by method and position, and that the images have been taken from the specific area stated.

Refer to **Appendix 3** for examples of good photographic evidence.

Appendix 1a – Sampling & Testing Matrix

Type	Number of Samples	Testing Schedule	Assessment Criteria
	Please note that these guidelines apply to a typical residential development, and relaxation of the guidelines or more stringent requirements may apply dependent on local and site specific factors. Therefore, <u>all parameters need to be agreed with the Local Authority</u>.		
Virgin Quarried Material	1 or 2 depending on the type of stone utilised, to confirm the inert nature of the material.	Standard metals/metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn)	The assessment criteria need to be UK based, e.g. LQM S4ULs, Defra C4SLs or other similarly derived GACs.
Crushed Hardcore, Stone, Brick (excluding asphalt)	Minimum 1 per 500m^3	Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, total TPH. Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).	
Greenfield/ Manufactured Soils	Minimum 3 Dependent on source and receptor, between 1 per 50m^3 and 1 per 250m^3	Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, pH and soil organic matter (SOM) (or calculated from total organic carbon (TOC)).	
Brownfield/ Screened Soils	Minimum 6 Dependent on source and receptor, between 1 per 50m^3 and 1 per 100m^3	Standard metals/ metalloids (as above), PAH (16 USEPA speciation), TPH (CWG banded), asbestos, pH and SOM (or calculated from TOC). Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).	

Appendix 1b – Questions to Ask Your Soil Supplier Relating to Soil Quality

- What is the source of the material (refer to KP1)? If the source is Greenfield, can they provide evidence of this?
- Will all of the material be coming from the same source?
- Are you satisfied that the material is a suitable growing medium for the proposed end use?
- Has the supplier used an appropriate sampling protocol to ensure a representative sample is analysed? What volume of soil is represented by the analysis and does it comply with Appendix 1a?
- Does the testing include analysis of contaminants identified in Appendix 1a?
- Does the laboratory conducting the analysis have UKAS and MCERTS accreditation for the tests they are carrying out?
- Does the material comply with relevant waste regulations?
- Can I have a copy of the whole analysts report and does it include an interpretive section?
- Will the provided certificate be dated within the last 2 months?

Appendix 2 – Checklist for Verification Reports

Example only. Not to be considered as typical minimum requirements. Additional information should be included for non-cover systems aspects of the remediation i.e. gas protection measures etc.

Site Details	
Site Name / location	
Developer name	
Development use	
Plot No / description of landscaped area (inc plan of inspection areas)	
National Grid Reference	
Inspection visit date	
Supporting Evidence	
Description of remediation (as per agreed Remediation Method Statement including depths / thickness checks, topographical readings)	
Material tracking information (including way tickets etc.)	
Name of groundwork's remediation contractor	
Name of supervising environmental consultant	
Site Specific chemical analysis results	
Verification Photographs (inc. remarks)	
Recommendations	
Pass/fail	
If material fails, how will this be managed i.e. removed, treated	
Detail any further remedial works and/or inspection	
Signed off	

Failure to provide any of the above information may prevent planning conditions from being discharged.

Appendix 3 – Examples of Good Quality Photographs

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Photograph 1:
Depth check of inert cover within area of public open space. Physical break layer and topsoil visible.

© WSP

Photograph 2:
Depth check of inert cover with Site & Location Information Board.

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Photograph 3:
Depth check of inert cover within areas of front gardens.

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Photograph 4:
Depth check of inert cover within areas of front gardens.

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Photograph 5:
Depth check of inert over within rear gardens. Taut string ne spans across excavation.

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Photograph 6: Depth check of inert cover within rear gardens. Taut string line spans across excavation.

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Photograph 7: Shows the spatial location of the verification pit.

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Photograph 8: Excavation within public open space and verification pit showing the presence of a remediation break layer at the base, a crushed sandstone inert fill overlain by topsoil.

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Photograph 9: Inert crushed sandstone being delivered. The spatial area of the remediation can be observed from these photographs (old terrace housing).

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Photograph 10: Inert crushed sandstone being delivered with visible remediation break layer. The spatial area of the remediation can be observed from these photographs (traffic lights).

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Photograph 11:
Shows the remediation of the rear garden, with a significant depth (1.0m) of inert cover. This photograph has been stitched to form a panoramic photograph and hence there is slight distortion

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Photograph 12:
Shows the remediation of the rear garden, with a significant depth (1.0m) of inert cover. Remediation break layer visible at the base of the excavation.

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