Contaminated Land Review

FORMER GREENSIDE MILLS SKELMANTHORPE

for

Lovell Partnerships Limited

Report Number 4493

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1 INTRODUCTION

1.1 Lovell Partnerships Limited are currently in the process of redeveloping the former Greenside Mills at Skelmanthorpe. At the request of Lovell Partnerships Limited, this report is intended to address two outstanding planning conditions 6 and 7, and concerns raised by Kirklees Environmental Health, namely;

The site was identified as potentially contaminated by Environmental Health (our reference 139/17). An intrusive investigation conducted by Sirius Group has confirmed contamination. On 17th April 2024, during a meeting with Sirius Group regarding the discharge of condition applications (2022/93965 and 2023/93622), Environmental Health raised concerns about demolition and clearance activities carried out by third-party contractors in the Summer of 2023.

In April 2024, Environmental Health was informed of significant alterations to the site's topography, compared to that described in the Sirius reports reviewed to date. There is potential mixing and disturbing of materials due to uncontrolled stockpiling and material management of demolition wastes, which could present risks and introduce new sources of contamination. Several soil stockpiles were identified across different areas of the site. This included black-stained soils stockpiled in an area to the east of the site. We question whether this black-stained soils is from the pond which was identified in the pond in, flagged by Sirius Group and Environmental Health as needing additional ground investigation work.

For Environmental Health to recommend the discharge of contaminated land conditions, we must be satisfied, at all the relevant stages, that satisfactory reports have been submitted to demonstrate that the development is suitable for use. We

acknowledge a verification report received in support of the current application, despite pre-commencement conditions not being discharged for this site. We will not consider a validation report until a suitable Phase 2 and where necessary a suitable remediation strategy has been received and approved. The site must be fully characterised in its current state.

Under the National Planning Policy Framework, it is the developer's responsibility to confirm that the site is safe and suitable for its intended use. Moving forward, in the first instance, we expect a detailed risk assessment and thorough investigation of the site in its current condition to confirm there is no risk to the end-users. Any reports must be authored by a competent person and adhere to legislation and good practice guidance. This information must be submitted to the Local Planning Authority for approval in writing. The Planning Officer will re-consult Environmental Health when new reports are authored.

1.2 Michael D Joyce Associates LLP first became involved with this development project in January 2025, by which time construction had begun. The brief was therefore to address the abovementioned concerns of Kirklees Council, in order that Conditions 6 and 7 are complied with.

1.3 In order to do so, this document includes a review of the findings of the original investigation and the original remediation strategy for the site. The current stage of development is summarised, together with photographs showing the site as of 15th August 2025.

1.4 The original remediation strategy outlined a number of remedial measures necessary. Some of these have been carried out, and verification reports have been issued.

These have also been included in this document in so far as they demonstrate the satisfactory remediation carried out to date.

1.5 In order to further clarify the present condition of the site, additional sampling and testing has been carried out. These findings are also included in this document.

1.6 Based upon the preceding work, this document also includes an up-to-date risk assessment and Conceptual Site Model and an updated/revised remediation strategy necessary for the safe completion of the residential development. This sets out the procedures necessary to satisfy the outstanding planning conditions.

1.7 This document also provides proposals for further investigation, sampling and testing. This is to better define the site in its present state. The intention is to use this additional information in order to further refine the risk assessment and Conceptual Site Model, and provide any amendments necessary to the Remediation Strategy.

2 EXISTING INFORMATION

2.1 The site has been considered in detail in previous reports, as follows. It should be noted that these were applicable to the site prior to commencement of construction.

- *Geo-environmental Phase 1 Desk Study report dated May 2016 by Adeptus Consulting (report ref: 163-11).*
- *Preliminary Remediation Strategy, Land at Greenside Mill, Skelmanthorpe (Ref: 4319/1), dated February 2022 by Lithos Consulting Limited.*
- *Geo-environmental Appraisal of Land at Greenside Mills, Skelmanthorpe (Ref. C7340) dated December 2020.*
- *Gas Risk Assessment Letter Report (Ref. C7340/GH/9548) dated April 2021.*
- *Supplementary Site Investigation Letter Report (Ref. C7340/RC/9607) dated June 2021.*
- *Supplementary Contamination Appraisal Letter Report (Ref. C9297/AEC/10326) dated November 2023.*
- *Strategy for Remedial and Preparatory Works - Former Greenside Mills, Skelmanthorpe (Ref. C9297/RS) dated November 2023 by Sirius Geotechnical Limited.*

2.2 The Remediation Strategy by Sirius was submitted to Kirklees Council on 7th December 2023 via its planning portal. It provides a useful executive as follows;

Site Description

The overall site comprises an irregularly shaped parcel of land covering an area of approximate 2 hectares, located to the north of Saville Road and west of Marsden Street in the village of Skelmanthorpe. In general, the site slopes downward from northwest to southeast/east, with levels of approximately 156.5 mAOD adjacent to the northwestern site boundary, and 138 mAOD to the eastern site boundary, and is formed by approximately four development plateaus.

The western and central site areas formerly comprised a number of mill buildings and associated structures, with areas of asphalt hardstanding and roughly overgrown areas of landscaping. The site has recently undergone demolition and clearance leaving concrete slabs and crushed demolition hard-surfaced ground/remnant asphalt hardstand elsewhere. Steep vegetated slopes are present along the western site boundary retaining the off site adjacent highway (Saville Road), with level changes of c. 6m within the northwest and c. 2m within the southwest, sloping down towards the east/southeast. An approximately 3m high concrete retaining wall is located to the north of the slope, orientated approximately east-west. Land along the northern perimeter of the site slopes down to an overgrown ditch c. 1.0m to 3.0m below site levels, with wire mesh and concrete post fencing currently separating it from the main site area.

The eastern area of the site comprises a former mill pond (which has recently undergone infilling with crushed demolition materials) and an unlined reservoir/pond feature to the east with water levels at 137.5 mAOD. The reservoir/pond feature is largely filled with sediment and vegetation, with an unnamed stream recorded to run from south to north, within the locality of the pond. An overgrown stockpile of soils arisings (c. 1m to 2m high and covering an area of c. 0.06 hectares) is present within

the northwest of the eastern site area. Overhead cables run northwest-southeast across the site area, with associated wooden pylons located within the stockpile. Newly constructed overhead electricity cables and an associated temporary wooden pole is located within the southeast of the site, orientated approximately southwest-northeast. A former above-ground storage tank (AST) was present in the southeast of the site. An open surface water culvert is located within the southeast, fed by on and off site surface water drains.

Site History

The site has been known as "Green Side Mills" since the late 1800s and appears to have remained in use as a cloth/textile mill throughout its history with associated mill ponds. Demolition of the site has recently been undertaken (2023), with all above-ground structures demolished and cleared.

Ground Conditions

Reinforced concrete hardstand is located across the former building footprints to depths of up to 0.30 bgl. Black bund asphalt was also encountered at ground surface in the external investigation locations during the pre-demolition site investigations.

Made Ground was generally encountered to maximum depths of c. 1.0m to 1.5m bgl across the western and central site areas (locally deeper to c.2 – 3m bgl), typically including yellow-red-brown slightly clayey sandy gravels of sandstone, limestone and brick with occasional concrete obstructions. In the eastern area, Made Ground was encountered to proven depths of up to 2.6m bgl comprising grey-brown-black-yellow clayey gravel/gravelly clays, with low to moderate cobble and boulder content, and

fragments of ash, glass, plastic, brick, concrete, sandstone, rebar, timbers and clothing/carpet fibres. In the reservoir/pond area, saturated very soft black silts with gravels and cobbles of brick, sandstone with fabrics, wood fragments and decomposing plant and leaf waste was recorded, the base of which was not proven. Made Ground within both the stockpile and the pond sediments are entrained with anthropogenic materials including potentially degradable woollen fabrics, brick, glass, plastic and ash, and may be considered as geotechnically unsuitable for re-use within the site in their current condition.

Softened natural clays comprising low strength grey-brown slightly sandy slightly gravelly silty (on occasion organic-rich), clays were locally encountered in the eastern site area between approximately 2.6m to 3.5m bgl. Residual/de-structured bedrock, comprising firm to stiff, medium to high strength slightly sandy slightly gravelly silty clay to sandy gravel was encountered from depths of between 0.2m and 3.5m bgl. Lower Coal Measures (LCM) Formation bedrock, generally comprising very weak sandstone and mudstone with localised coal bands was encountered from depths of between 0.45m and 3.90m bgl.

The site comprises three conjectured fault blocks, with evidence of shallow coal and associated mine workings within the central fault block. The possibility of encountering unrecorded mine entries within the site (including bell pits and crop workings), cannot be discounted.

Sub Surface Obstructions

A number of exploratory hole locations identified subsurface concrete and brick obstructions at depths of between 0.7m and 2.0 - 3.0m bgl. There is the potential for other unrecorded obstructions across the site associated with relict foundations and other substructures.

Groundwater

Perched water ingress was noted within Made Ground soils within a number of exploratory hole locations, at depths of between 0.2m and 2.0m bgl, with deeper groundwater recorded at depths of between 11m and 18m within LCM bedrock. Moderate to rapid groundwater ingress was noted within the eastern site area at an approximate depth of 2m bgl, at a similar level to the adjacent pond.

Ground Gas

In accordance with the ground gas risk assessment, the site is considered to fall within CS2 conditions, as defined in BS8485. Gas protection measures are therefore required for new buildings. No radon protective measures are required for the site.

Identified Contamination

Heavy metals and PAHs have been identified within Made Ground soils across the site. Localised asbestos fibres have also been identified within Made Ground soils in TP06, and within the stockpile and pond sediments in the east of the site.

Hydrocarbon odours and staining has been identified locally in the former AST and mill pond areas in TP218 and TP223, and within the locality of TP04/TP226. Any potential hydrocarbon sources were recommended to be identified, with appropriate remedial measures undertaken.

A significantly elevated concentration of naphthalene was recorded within a sample of pond sediment (obtained from the eastern most pond). It was recommended that additional testing of the pond sediment be undertaken as part of enabling works to confirm the characteristic naphthalene concentration of the soils. Subject to further assessment, consideration of the excavation and off-site removal of all impacted materials, or alternative remedial options to treat the impacted soils, such as biological or chemical remedial techniques, should be considered.

It was noted that the pond contains a substantial quantity of sediments which have been demonstrated to include elevated concentrations of heavy metals and PAHs. It has been strongly recommended that a suitable strategy for management of surface waters is developed for this area of the site to prevent harmful mobilisation and release of sediments into adjacent watercourses.

Whilst no evidence of hydrocarbon contamination has been noted within the surface water culvert sample, the presence of the black oily substance should be further

assessed, with appropriate remedial measures taken to avoid mobilisation to the adjacent surface water feature.

2.3 In order that this be a comprehensive document, the Geo-environmental Appraisal and Remediation Strategy by Sirius have been included as Appendices 1 and 2 respectively.

3 ORIGINAL REMEDIATION STRATEGY

3.1 The original Remediation Strategy from Sirius is presented in full in Appendix 2. The strategy anticipated a number of requirements in respect of the initial site preparatory works, namely;

Consolidation of Shallow Mine Workings/
Earthworks to Create Development Platforms

- *Service location, disconnection and/or protection.*

- *Erection of temporary tree protection measures for retained trees within the site, or adjacent to the site boundary (if applicable).*

- *The presence or absence of invasive plant species should be confirmed by a qualified consultant and their advice taken on appropriate treatment if necessary.*

- *Removal of remaining existing vegetation (trees, hedges, etc) from the proposed development area necessary to facilitate the works.*

- *Breaking out areas of hardstanding and intact substructures. Excavations resulting from removal of underground structures should be prepared to be backfilled with selected fill materials in accordance with a suitable Earthworks Specification. The extent of the earthworks should also be suitable to facilitate the chosen foundation solution(s) where applicable.*

- *On-site crushing, screening and classification of all suitable construction materials won from the above works, to provide a secondary aggregate for re-use.*

- *Undertake a cut/fill earthworks operation across the development area to create required levels, with excavation and re-engineering of the full depth of Made Ground (where applicable and feasible). Excavated materials will be processed and screened (as required) to produce suitable engineering fill and placed in accordance with an appropriate earthwork specification. Prior to filling, the base of the excavation shall be proof-rolled, and any soft/hard spots encountered investigated, removed as necessary and replaced with suitable fill materials.*

- *Stripping, stockpiling, sampling and analysis of shallow natural subsoils for potential re-use within proposed soft landscaped areas.*

- *Treatment of shallow mine workings by drill and grout methods, in accordance with a specification agreed with the Coal Authority.*

Identified Contamination Remediation

- *Asbestos impacted soils identified locally within Made Ground in TP06 (<0.001%), the on-site stockpile (HDTP101(<0.001%) and TP217 (0.015%)) and pond sediment (Sediment 1 (<0.001%)) should be excavated and either (subject to geotechnical suitability), be re-used on site (below hardstand where they will not be later disturbed), below a suitable capping layer, or be removed, for off-site disposal at a suitable licensed landfill facility.*

- *If the excavated material does not contain visible ACMs, and the asbestos concentration is <0.1%, as currently recorded within each positive sample, the material could potentially be retained on site, placed beneath the bulk fill material ((≥1m bgl), or beneath hardstanding (not not beneath highways, or where underground services are to be installed). The potentially degradable nature of the stockpile and pond sediment materials should be taken into consideration.*

- *Should the excavated material contain visible ACMs and/or asbestos in concentrations >0.1%, the material should be removed from site as hazardous waste.*

- *Excavation and on-site treatment/off-site disposal of hydrocarbon sources/impacted soils and perched waters identified in the vicinity of TP04/TP206 and in the vicinity of the former tank/mill pond area (TP218/TP223).*

- *Additional assessment of naphthalene within pond sediments, to assess the characteristic concentrations of the material, with subsequent excavation and on-site treatment/off-site disposal, as necessary.*

- *The black oily substance identified within the surface water culvert within the southeast of the site should be recovered, treated (if applicable) and removed from site to an appropriate disposal facility.*

- *The re-use of site-won soils, and/or importation of soils from another development site for use on the site, should be undertaken in accordance with a Materials Management Plan (MMP).*

Technical Support by a Suitably Qualified Geoenvironmental Engineer (GE)

- *Carry out a watching brief during all of the above, to identify previously unidentified sources of contamination and unrecorded mining features (such as bell pits or crop workings).*

- *Supervision of earthworks to address geotechnical constraints, including directing the earthworks contractor to ensure that the earthworks facilitate the chosen foundation solution(s) where practicable.*

- *Arrange and interpret laboratory analysis as required throughout the earthworks.*

- *Prepare a verification report following completion of the works. This initial report will provide a record of the remediation works the results of testing to demonstrate the integrity of the work and confirm the work has been carried out in accordance with the relevant legislation, planning conditions and this Remediation Strategy. Production of a suitable verification report is a strict requirement for works undertaken under the CL:AIRE DoWCoP.*

Post Remediation Works

- *Detailed foundation design, based on the as-built earthworks.*

- *Importation of suitable clean topsoil, and if necessary, subsoil for reuse in 'clean' cover layers (chemical analysis should be undertaken prior to importation to confirm suitability).*

- *Placement of a clean cover layer within all areas underlain by existing Made Ground and not otherwise covered by buildings or hardstanding. The thickness of the capping layer should be 600mm in residential gardens and a minimum of 450mm in soft landscaped areas and comprise at least 150mm of suitable clean topsoil underlain by suitable clean subsoil.*

- *If asbestos is found to be present where a risk of exposure to asbestos soil contamination exists following development, the clean cover layer outlined above should be upgraded to include either a geotextile separator or 150mm dense granular 'hard dig' layer at the base.*

- *Where the site is underlain directly by natural ground a nominal 100mm depth of clean suitable topsoil should be provided in gardens or soft landscaped areas to provide a suitable medium for plant growth.*

- *Construction of clean cover soil capping to be validated by a suitably qualified Geoenvironmental Engineer. The thickness of the capping layer should be verified physically on site, and a programme of laboratory testing should be implemented to confirm chemical suitability. Clean cover verification reports should be produced by a suitable qualified Geoenvironmental Engineer as gardens/landscaped areas are completed/verified.*

- *Design and installation of appropriate gas protection measures in accordance with the requirements of BS8585: 2015 + A1: 2019. Installation of appropriate gas protection measures to be suitably validated on completion, in accordance with an agreed gas verification plan.*

- *Provision of a suitably protected water supply pipes.*

- *Specification for suitable protection measures for buried concrete.*

The scope of the works above may have to be amended to suit final design levels, adoptable highway and foundation design/construction.

3.2 It is acknowledged that the control of the site preparatory works in the Summer of 2023 was haphazard and poorly documented. As a consequence, Kirklees Council issued the statement in Section 1.2 of this document. The following sections describe the current conditions of the site, the remedial works to date and provides recommendations for further investigation to fully characterise the site following the initial preparatory works.

4 CURRENT SITE CONDITIONS

4.1 In order to address the concerns of Kirklees Council, this section describes the current site conditions as of mid August 2025. The site was last inspected on 15th August 2025 by the Author and follows a site meeting with representatives of Kirklees Councils' Environmental Health Department.

4.2 Development has progressed in accordance with the Lovell Project Management Plan (PMP), which is presented in full in Appendix 6.

4.3 At present, the individual plots are at the following stages of construction;

Plot No.	Stage of Construction
1	Completed
2	Virtually Complete
5 - 6	Completed
7	Foundations piled
8 - 9	Virtually Complete
10 - 13	Foundations in place/slab
14	Foundations piled
15	Not started
16	Foundations in place/slab
17 - 23	Roofing stage
24	Foundations in place/slab
25 - 29	Superstructure in place
30 - 34	Not started
35 - 37	Foundations in place/slab
38 - 46	Not started

4.4 In respect of the access roads, these are all in place (subject to wearing course).

4.5 The following photographs illustrate the current site conditions.

View of current site - Parking/cabins covering Plots 30 and 46

View of current site - Parking/cabins covering Plots 30 and 46

View of Plots 25 to 29 looking to the east

View of stockpile material to be removed looking west and covering Plots 40 to 46

Completed site access off Saville Road looking north

Plot 10 in foreground, with Plots 8 and 9 rear gardens

Access road looking east with Plots 16 to 18 on the left and Plots 10 to 13 on the right

Access road looking west towards POS and Plot 25

5 REMEDIATION CARRIED OUT TO DATE

5.1 In respect of the specific potential issues identified in the original Remediation Strategy, remedial works have been carried out, and these are documented as follows;

Mineworkings

5.2 Proof drilling has been carried out by Sirius Geotechnical Limited. No evidence was found of former workings. This is presented in Report C9297 C/D&G – Completion Report for the Proof Drilling of Potential Shallow Mine Workings, dated September 2024, which is presented in full in Appendix 3. In summary it states;

A total of 50 No. boreholes were drilled on site to depths of between 3.5m and 12.0m bgl, using a domino-5 pattern across centrally located proposed plots to assess the presence/absence of any shallow mine workings associated with the outcrop of the Whinmoor Coal (Top and/or Low Whinmoor) coal seams). No evidence of workings was recorded in the Whinmoor Coal seams, and the outcrop was proven to the north of the original area of loss of flush (which was initially attributed to possible shallow mine workings). The loss of flush initially noted within a rotary borehole located to the south of the site is likely to be attributable to naturally occurring geological features (i.e. faulting/fractured sandstone etc), rather than related to shallow mine workings.

2 tonnes of OPC was utilised to backfill the boreholes upon completion to ensure each drill location was adequately sealed.

The site observations and drilling records indicate that the proof drilling has been

carried out to a satisfactory standard in accordance with the requirements of the Coal Authority permit and the Specification, and that no shallow coal mine workings have been encountered below the site which are considered to pose a risk to surface stability.

In addition, a site strip was carried out by Sirius Geotechnical Limited in order to identify any evidence of former mine entries on the site. None were found. The findings were presented in Report C9297/CP/10804 - Site Strip Verification Letter Report - Former Greenside Mills, Skelmanthorpe. This is also presented in full in Appendix 3. In summary it states;

Previous site investigations identified a potential risk to surface stability from localised possible unrecorded shallow mine workings underlying the central area of the site. This potential risk indicated that a programme of proof drilling of boreholes, followed by stabilisation where / if necessary was required. A Completion Report detailing the proof drilling undertaken has been provided under separate cover (Completion Report for the Proof Drilling of Potential Shallow Mine Workings for land at the Former Greenside Mills, Skelmanthorpe, report ref. C9297C/D&G dated September 2024).

In addition to shallow coal mine workings, the possibility of encountering unrecorded mine entries, including bell pits and crop workings, could not be discounted, and a site strip down to natural subsoil to observe for evidence of crown holes, mine entries and bell pits within the central site area was recommended.

Site observations indicate that the site strip has been carried out to a satisfactory standard in accordance with the requirements of the Specification, and that no evidence of mine entries have been encountered below the areas investigated which

were previously considered to pose a risk to surface stability. It should be noted that a number of remnant obstructions remained within the locality of plots 22-26, which prevented full unobstructed observations to be made, and it is recommended that any excavations into natural ground made during any subsequent works within the locality of these plots are inspected for evidence of crown holes, mine entries and bell pits etc.

Identified Contamination Remediation –
Asbestos and Hydrocarbon Impacted Soils

5.3 Michael D Joyce Associates LLP was commissioned by Lovell Partnerships Limited to undertake validation testing and reporting in accordance with specific remediation issues on the above named site. The validation letter report (included in Appendix 4) covers the testing of three specific hotspots, and is in accordance with the Remediation Strategy for the site, "Strategy for Remedial and Preparatory Works - Former Greenside Mills, Skelmanthorpe" - Sirius Geotechnical Report Ref: C9297, November 2023. The inspection and sampling took place on 28th January 2025.

The specific brief and scope of works was to verify that 3 "hotspots" of contamination (as identified in the Remediation Strategy) have been removed. These hotspots were as follows;

- **i.** Hydrocarbon Impacted Soils (in the vicinity of TP04/TP206)
- **ii.** Hydrocarbon Impacted Soils (in the vicinity of TP218/TP223)
- **iii.** Asbestos Impacted Soils (in the vicinity of TP06).

The report concluded;

Three near surface samples were obtained from each of these locations, by way of shallow excavation. In respect of the potentially asbestos impacted soils, much of the area is now covered by future access roads.

No asbestos was detected. Slightly elevated levels of Benzo (a) anthracene, Benzo (b) fluoranthene, Benzo (a) pyrene and Dibenzo (a,h) anthracene were detected. These were slightly above their respective Maximum Permitted Concentrations. Nevertheless, the 600mm clean cover is considered adequate to afford the necessary protection to end-users.

No further remediation is considered necessary in respect of the three hotspots, although the clean cover across the whole of the site will continue to apply, as do the other recommendations made in the Sirius Remediation Strategy.

The full report is presented in Appendix 4. Michael D Joyce Associates LLP Report No. 4446 (Ref: ADJ/DJM/11458).

Hydrocarbon Contamination - Eastern Pond Silts

5.4 LK Consult Limited (LKC) was commissioned to carry out a Validation Report detailing the 'translocation' of pond silt and hydrocarbon contamination at a surface water feature. LKC stated;

LKC have reviewed the following documents by Sirius Geotechnical;

- *'Supplementary Contamination Assessment Letter Report', ref. C9297/AEC/10326, dated 15th November 2023.*
- *'Strategy for Remedial and Preparatory Works', ref. C9297/RS, dated November 2023.*

These documents in turn reference several previous reports and investigations carried out by Sirius and others.

This document refers to the translocation of silts from pond and around the surface water feature located at the eastern site boundary. The location of this former pond and surface water feature (hereafter referred to as the 'eastern pond') is illustrated on Sirius "Site Features Plan", ref. C9297/RS/02 and "Proposed Remediation Plan", ref; C9297/RS/04 reproduced in Appendix A.

LKC understand that Lovell Partnerships Limited instructed Caldwell Construction Limited to place these pond silts in the central area of Public Open Space (POS), located to the south of Plots 25-29. LKC have assumed that Lovell Partnerships Limited have obtained suitable permits or exemptions for this activity. The location of the POS can be seen on Sten Architecture "Planning Layout", ref. 2156.01 Rev. N.

Remedial excavations in the eastern pond area and translocation in the POS were carried out by Caldwell Construction Limited between 22nd March 2024 and 5th July 2024.

During the works a visual and olfactory assessment of the excavated materials was carried out by UKATA trained operatives. The works were carried out under Caldwell

Construction Limited Construction Health and Safety plan which includes measures for control of potential dust and fibre release.

Based upon the available information LKC conclude the following;

The removal of silts in the eastern area has been successfully completed and no remnant contamination was noted in the residual natural clay strata.

Testing of the silts in situ in the central POS at an approximate sampling rate of 1 sample per 830m^3 of material did not identify the presence of ACM or elevated naphthalene and lead as noted by Sirius in their testing. The LKC results indicate that the soil does not comprise an unacceptable risk to future site users from direct contact or inhalation. This suggests the Sirius test results are an anomaly or very localised. However, due recourse should be given to these results.

Leaching tests undertaken on the silts has not identified an unacceptable risk to the underlying Secondary A Aquifer.

LKC therefore conclude the remedial works of the eastern pond silts has been carried out appropriately. The moisture content will have reduced risk of any asbestos fibre release and the material is suitable for retention in the central POS area. Notwithstanding this, recourse should be given to the proposed landscaping of this material, the soft consistency of the material and the previous Sirius results.

The POS area has currently been left c. 450mm below finish levels in order to accommodate the capping layer as outlined in the Sirius Remediation Strategy. LKC

consider that placing this capping layer would be a suitably conservative approach given the existing Sirius testing data.

Suitable topsoil and subsoil shall be imported for use in the capping layer and validation of the imported soils and the depth and construction of the capping layer shall be carried out as per Section 8 of the Sirius Remediation Strategy.

Previously Stockpiled Material

5.5 Kirklees Council has previously raised the issue of material that was stockpiled on site during the initial site clearance. These stockpiles are no longer present, and it is understood that they have been removed from site. At present, there is a large stockpile of spoil material from across the site in the northwestern corner of the site, just to the south of the site cabins. This comprises predominately arisings and is to be removed from site.

5.6 It should also be noted that the area below this stockpile, the site parking and the site cabins represents a part of the site which has yet to be disturbed as part of the initial site preparatory works. As such, these areas fall within the original scope of the Remediation Strategy, and which will apply in default. The area affected is illustrated on figure 3.

Additional Contamination Testing

5.7 In April 2025, Michael D Joyce Associates LLP was commissioned by Lovell Partnerships Limited to carry out additional testing and reporting to address concerns regarding remediation on the above named site.

The recommendation was to carry out surface sampling across the site (excluding the remediated pond) now that the site had been reduced to anticipated final level.

The sampling locations were specifically chosen from the rear gardens of plots that are accessible at present, namely Plots 1, 3, 7, 8, 17, 20, 23, 24, 28, 38 and three samples of Public Open Space (POS). All were from the near surface. As such, these areas were considered to constitute the greatest risk to future residents.

The western part of the site was inaccessible due to spoil and materials being stockpiled, and also concrete hardstanding which has yet to be removed. Further testing was proposed for this area in due course.

All the results for the metals fell within their Maximum Permitted Concentrations (thresholds) for a residential end-use (with home-grown vegetables).

One result for Benzo (b) fluoranthene marginally exceeded the threshold for garden areas. It recorded 3.34 mg/kg. However, the sample (POS2) was of future Public Open Space, and fell within the threshold for Residential POS of 7.1 mg/kg.

Two results for Dibenz (a,h) anthracene marginally exceeded the threshold for a residential end-use. However, these were also from POS. Only one result exceeded the threshold for Residential POS of 0.57 mg/kg, recording 0.91 mg/kg.

Loose Asbestos fibres of Chrysotile were recorded in three of the samples. The asbestos contents as a percentage of the sample as a whole were therefore determined. These recorded <0.001%, 0.002% and 0.026%.

In addition, one of the samples contained insulation board. The asbestos content comprised Chrysotile and Amosite and represented 0.001% of the total mass.

5.8 The report concluded that the recommendations of the Remediation Strategy continue to apply.

Site Inspections by Michael D Joyce Associates LLP

5.9 Since its instruction in January 2025, Michael D Joyce Associates LLP have made several visits to the site. During each visit, any ground surface excavations for foundations or services were inspected for visual evidence of contamination or sub-surface structures. None have been observed.

6 GAS PROTECTION MEASURES

6.1 The original Remediation Strategy stated the following;

Characteristic Situation 2 (CS2) gas conditions should be adopted within new houses and garages on site.

Table 4 of BS8485 states that CS2 conditions require a minimum gas protection score of 3.5 points for a low-rise residential end-use (Type A buildings).

The required gas protection score could be achieved by utilising a suitable combination of gas-resistant membrane and sub-floor ventilation measures, installed and verified in accordance with CIRIA Report C735[4]*.*

This may include:

- *A beam and block floor, which achieves 0 points.*
- *A minimum 150mm ventilated sub-floor void, which achieves at least 'good performance' and 1.5 points.*
- *A ground gas protection membrane (meeting the requirements of BS8485 Table 7), installed above the ventilated void with beam and block floor system in accordance with the recommendations provided within Table 7 of BS8485. Subject to the satisfactory installation of the membrane, plus independent verification of selected plots, this would achieve a protection score of 2 points.*

([4] CIRIA. 2014. Good Practice on the Testing and Verification of Protection Systems for Buildings against Hazardous Ground Gases).

Hydrocarbon and naphthalene impacted soils, including those identified in pond sediments and TP4/TP206 and TP218/TP223, should not be placed beneath proposed buildings.

Prior to undertaking any construction works on the site, the proposed design of gas protection measures, and strategy for verification should be confirmed in the form of a Gas Protection Verification Plan. This should be agreed with the Local Authority and if applicable the NHBC or relevant warranty provider.

The site is recorded to be located within a lower probability radon area (where <1% of homes are estimated to be at or above the action level). Therefore, no radon protection measures are required for the proposed development.

Installations to Date

6.2 Gas protection measures to Characteristic Situation 2 (CS2) have been installed to the properties listed below. The membrane being used is Juta GP1. This is a proprietary multi-layer low density polyethylene membrane with an integral aluminium foil. As such, it protects against methane, carbon dioxide, radon and volatile liquids such as diesel, xylene, toluene and petrol. Although not stated, longer carbon chain hydrocarbon VOC will also be protected against. The full specification is attached as Appendix 7.

Validation of Gas Protection Measures

6.3 The gas protection measures are being installed by Keytec Installation Services of Royle House, Cowm Top Business Park, Cowm Top Lane, Rochdale, OL11 2PU.

Inspection and validation is being carried out by GeoShield Limited of Icon Business Centre, 4100 Park Approach, Thorpe Park, Leeds.

The available validation reports to date are presented in Appendix 8. It should be noted that these will be provided separately on completion.

7 REVISED CONCEPTUAL SITE MODEL

7.1 Based upon the original Ground Investigation, Remediation Strategy and subsequent work described in Section 4, a revised quantitative health and environmental risk assessment has been carried out as part of this review. The process of risk assessment is set out in Contaminated Land Report 11 (2014) "Model Procedures for the Management of Land Contamination" and in Part IIA of the Environment Protection Act 1990 and amended in part by The Water Act 2003. This defines contaminated land as *"any land which appears to the local authority in whose area it is situated to be in such a condition by reason of substances in, on or under the land, that there is a significant possibility of significant harm being caused, or that significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused".*

7.2 The Act introduces the concept of a pollution linkage. This linkage consists of a pollution (contaminative) source or hazard and a receptor, together with an established pathway between the two. For land to be contaminated, a pollution linkage (hazard-pathway-receptor) must exist. This forms a so-called 'Conceptual Model' (CSM) of the site.

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

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

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

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

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

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

7.4 Buildings (Pathways 7 and 8)

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

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

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

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

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

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

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

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

7.7 The original Sirius CSM identified the following residual contamination linkages, with the model, which are illustrated on figure 2.

- *Inhalation and ingestion of, and dermal contact with, Made Ground in which elevated concentrations of arsenic and benzo (a) pyrene are present. These linkages are assessed as posing a* ***Moderate*** *risk to future site users and construction workers unless the impacted soils are placed below hardstanding or clean cover soils. Based upon subsequent investigation, this is considered to remain* ***Moderate.***

- *Inhalation of localised asbestos fibres/ACMs, posing a Moderate to High risk to future residential end-users, adjacent site users and construction workers unless the impacted soils are below hardstanding or clean cover soils.* ***This is considered to remain as Moderate to High.***

- *Ingestion, inhalation and dermal contact of locally elevated concentrations of naphthalene and TPH detected within Made Ground and shallow natural soils*

posing a Moderate risk to future residential end-users, adjacent site users and construction workers. ***This is considered to remain as Moderate.***

- *Migration of metals and ammonia within groundwater posing a Low to Moderate risk to controlled waters (including underlying Secondary A Aquifer and on-site surface water features).* ***This is considered to be Low now that the pond and identified hydrocarbon hotspots have been remediated.***

- ***The risk from ground gases is considered to remain as Moderate.***

7.8 **In conclusion, the original Remediation Strategy remains applicable and suitable for use. Given that the concerns regarding the initial site works, Lovell Partnerships Limited shall adopt a precautionary approach in that the clean cover, described in Section 8 of the Remediation Strategy, is to be applied to all garden and soft landscaped areas. Basic gas protection measures are to be applied to all properties, with the membrane affording protection against methane, carbon dioxide, VOCs (including BTEX) and radon.**

8 PROPOSED INTRUSIVE INVESTIGATION

8.1 As stated in Section 7, a precautionary approach is to be adopted, namely clean cover to all garden and landscaped areas, and basic gas protection measures to be incorporated in all properties.

Rationale

8.2 This is considered to be the correct approach, based upon the knowledge of the site. Nevertheless, additional intrusive investigation is proposed in order to fully characterise the nature of the site following the initial ground preparatory works. This will comprise window sampling boreholes at the locations shown on figure 3. These will extend to natural ground with sampling and testing predominantly of near surface Made Ground materials. Should any other areas of contamination be identified, sampling and testing will also be carried out of these materials also.

8.3 The purpose is to determine if the initial site preparatory works have changed the site, such that changes are required to the risk assessment and Conceptual Site Model.

8.4 On completion, the findings will be reported separately. This will include a site characterisation, revised risk assessment, Conceptual Site Model and an up-to-date Remediation Strategy.

8.5 The original Sirius Remediation Strategy requires a separate Remediation Strategy for Ground Gases. This has been issued as a separate document, namely;

- *"Remediation and Verification Strategy for Ground Gases - Former Greenside Mills, Skelmanthorpe", on behalf of Lovell Partnerships Limited - Michael D Joyce Associates LLP Report No. 4494, dated August 2025.*

Verification Reports

8.6 Following the additional investigation, and as the construction works proceed, verification reports shall be issued for the clean cover and gas protection measures. These will be in accordance with;

- *"Verification Requirements for Cover Systems" - YALPAG Version 4.1.*
- *"Verification Requirements for Gas Protection Systems" - YALPAG Version 1.1.*

Contingency Planning

8.7 Should any unforeseen or unexpected ground conditions or contamination be encountered during construction, this shall be brought to the attention of Michael D Joyce Associates LLP, and appropriate advice sought. Kirklees Council shall also be informed.

Dust Suppression

8.8 The dust suppression measures being used by the Contractor are presented in Appendix 10. It is also confirmed that none of the road gulleys are connected to external watercourses. This is to address issues raised by Kirklees Council.

A D Joyce

BSc MSc ARSM CEng CGeol CEnv MICE FGS SiLC SQP

August 2025

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Procedure Notes

The desk study and/or ground investigation have been carried out using reasonable skill and care in accordance with the principles of Ground Investigation and Testing", BS5930: 2015 + A1: 2020 and BS10175: 2011 + A2: 2017, and the terms of the client's brief. The report has been prepared for the specific purposes notified at the time of the initial enquiry. It is not fully compliant with Eurocode 7 (EC7) and the report does not constitute a Ground Investigation Report or Geotechnical Design Report as defined by Eurocode 7.

By its very nature any ground investigation only encounters and samples a small percentage of the ground. Consequently changes in ground conditions, soil properties and contamination can occur between any two exploratory points, for example local features such as soft ground, pockets of contamination and faults. This is also true of the exploration of mineworkings and such features can extend beneath parts of the site not investigated. Unrecorded bell pits and shafts can also exist between exploratory points. The ground investigation is designed to minimize such risks with budgetary constraints. Conclusions and recommendations are based on the information presented in this report, but unforeseen features may exist. No liability can be accepted for ground conditions not revealed by the exploratory holes or for contamination not sampled or tested for. Therefore, actual ground conditions should be noted during construction and further advice sought if they differ from those predicted. Michael D. Joyce Associates LLP reserves the right to amend the conclusions and recommendations in the light of further information. Actual methods of construction or alternative designs should be notified to Michael D. Joyce Associates LLP, such that the recommendations made can be reconsidered in the light of any changes.

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

It is assumed that groundlevels will not change significantly from those at present. The groundwater conditions are based on observations made at the time of the investigation, unless stated otherwise. It should be noted that the observations are subject to the method of the boring or excavation and that groundwater levels will vary due to seasonal or other effects.

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

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

Greenside Mills, Skelmanthorpe
Development Proposals

Michael D Joyce Associates LLP
Geotechnical and Geoenvironmental Consultants

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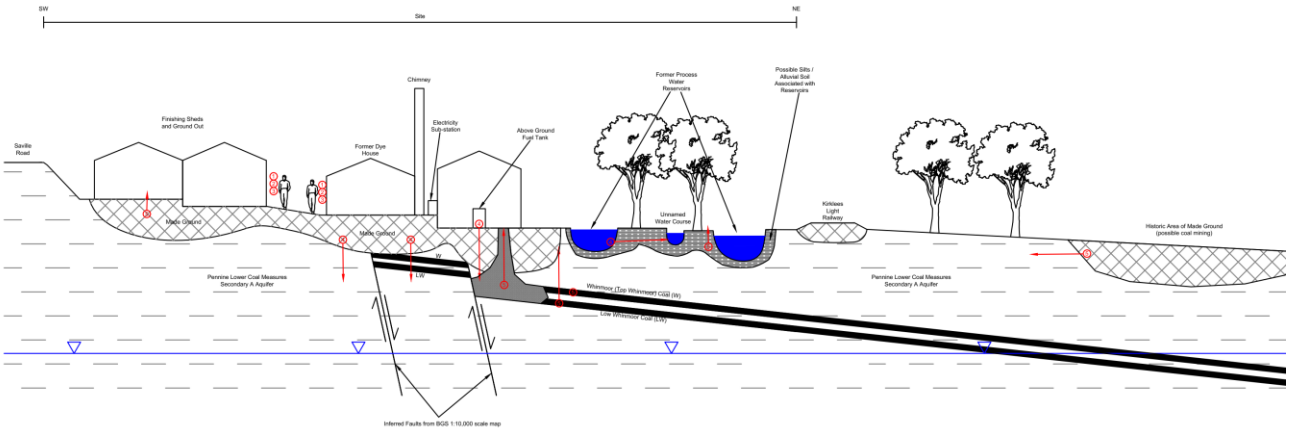
Scale: NTS

Figure: 1



Contamination Source	Contamination Pathway	Potential Receptors	Risk of Significant Contamination Linkage
Elevated concentrations of arsenic, benzo(a)pyrene, TPH and naphthalene present in made grounds and locally elevated concentration of naphthalene within natural soils at the site.	1) Direct and Indirect ingestion 2) Inhalation of contaminated particles and dust 3) Dermal contact	Construction workers, site end users and adjacent land users	Moderate
Localised ACMs and asbestos fibres in made ground soils.	2) Inhalation of contaminated particles and dust	Construction workers, site end users and adjacent land users	Moderate to High
Locally elevated metals and ammonia in perched/shallow groundwater.	4) Migration via groundwater flow	Underlying Secondary A Aquifer and on-site surface watercourses	Low to Moderate
Hazardous permanent ground gases resulting from areas of potentially deep made ground on and off site, possible alluvial soils in the east of the site and coal mine related gas emissions.	5) Gas migration	Construction workers, site end users and adjacent land users	Moderate

Greenside Mills, Skelmanthorpe
Conceptual Site Model

Michael D Joyce Associates LLP
Geotechnical and Geoenvironmental Consultants

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Figure: 2

WS Borehole

Near surface sample

Greenside Mills, Skelmanthorpe

Proposed Borehole and Sampling Locations

Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

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Figure: 3

APPENDIX 1

Geoenvironmental Appraisal Report - Sirius

REPORT C7340
DECEMBER 2020

GEOENVIRONMENTAL APPRAISAL REPORT for land at GREENSIDE MILLS, SKELMANTHORPE

prepared for
PARAMOUNT RETAIL GROUP HOLDCO LTD

REPORT TYPE:	Geoenvironmental Appraisal Report	**REPORT STATUS:**	Final
REPORT NUMBER:	C7340		
REPORT DATE:	December 2020		
SITE NAME:	Greenside Mills, Skelmanthorpe		
PREPARED FOR:	Paramount Retail Group Holdco Limited		
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APPROVED BY:	Rob Howells Director		

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GEOENVIRONMENTAL APPRAISAL

of land at

GREENSIDE MILLS, SKELMANTHORPE

Prepared for

PARAMOUNT RETAIL GROUP HOLDCO LIMITED

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Drawing No.	Title	Scale
C7340/01	Site Location Plan	1:25,000 @ A4
C7340/02	Site Features Plan	NTS
C7340/03	Site Photos	NTS
C7340/04	Preliminary Conceptual Site Model	NTS
C7340/05	Exploratory Hole Location Plan	NTS
C7340/06	Coal Risk Plan	NTS
C7340/07	Revised Conceptual Site Model	NTS
SK02 (STEN Architects)	Draft Layout	1:500@A2

NTS: Not to Scale

APPENDIX B ADEPTUS GROUNDSURE REPORT

APPENDIX C COAL AUTHORITY MINING REPORT

APPENDIX D QUALITATIVE RISK ASSESSMENT METHODOLOGY

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EXECUTIVE SUMMARY

Introduction	Sirius Geotechnical Ltd was commissioned by Paramount Retail Group Holdco Ltd to undertake a geoenvironmental appraisal of land at the former Greenside Mills, to the north of Saville Road, Skelmanthorpe (the site). It is understood that consideration is being given to the redevelopment of the site with 55 low rise residential properties (not exceeding three storey) with associated gardens, areas of soft landscaping, hard surfaced roadways / hardstanding and public open space.
Site Details	The site is irregularly shaped and comprises a number of unoccupied mill buildings and associated structures, with areas of asphalt hardstanding and roughly overgrown areas of landscaping. The buildings and structures on site have been constructed and expanded over time since the late 1800's. Features including a brick-built mill pond, an above ground storage tank and an electricity sub-station are located within the south of the site. In general, the site slopes downward from northwest to southeast / east, with levels of approximately 157m Above Ordnance Datum (m AOD) adjacent to the north western site boundary, and 138m AOD to the extreme eastern site boundary. Level changes have been accommodated on site by a series of retaining features and vegetated slopes. Access was not possible within the eastern overgrown vegetated site area, which includes two historic reservoirs and a surface water feature.
Site History	The site has been known as "Green Side Mills" since the late 1800's, and appears to have remained in use as a cloth / textile mill throughout its history; demolition and construction has continued at the site until the mid-1980's.
Fieldwork	The ground investigation, which was supervised by a Sirius Geoenvironmental Engineer, took place over five days between 15th and 29th October and comprised seven machine-excavated trial pits, thirteen window sample boreholes and three rotary open hole boreholes. Permanent monitoring installations for combined groundwater and ground gas monitoring were installed in eight selected window sample boreholes and all three of the rotary open hole boreholes.
Laboratory Testing	Selected samples of soils and groundwater were tested for a range of potential contaminants under subcontract with Chemtest Ltd, a UKAS and MCERTS-accredited laboratory. Geotechnical laboratory testing on selected samples was carried out under subcontract by Professional Soils Laboratory (PSL), a UKAS-accredited laboratory.
Ground Conditions	The investigation has identified made ground across the accessible parts of the site, typically to depths less than 1m bgl, in turn underlain by a variable thickness of natural residual Lower Coal Measures (LCM) soils, to depths of between 0.95m and >2.7m bgl. The weathering profile of the LCM was generally found to comprise medium to high strength clays underlain by destructured siltstone bedrock. Areas of deeper made ground (locally exceeding a depth of 3.0m bgl) were encountered within southwestern and central/eastern site areas. Deeper made ground within the southwest may be representative of backfilled former basements associated with historical residential properties located in that area. Deeper made ground in the central/eastern parts of the site may be associated with shallow coal workings/historical cut and fill earthworks. Additional post-demolition site investigation is recommended to be undertaken once access permits to investigate ground conditions within the currently inaccessible eastern site area.
Mining & Surface Stability	The site is split into three fault blocks as shown on Drawing No. C7340/06, included in Appendix A. Currently a high risk to surface stability from mining is considered to exist in the two fault blocks to the east (a significant part of which was inaccessible as part of this

	investigation). The risk is the western fault block is currently considered to be low. It is recommended that a series of rotary probeholes is undertaken across the site, post demolition and clearance, to confirm the underlying stratigraphy and location of the inferred faults, and to better determine the extent of shallow mine workings within each geological fault block. Mine stabilisation works will be required within identified areas of mine workings. The possibility of encountering unrecorded mine entries within the site (including bell pits and crop workings), cannot be discounted. It is therefore recommended at this stage that the footprints of proposed plots and highways are stripped back to natural strata and examined for evidence of mine entries.
Soakaways	Based on the proven ground conditions, soakaway drainage is considered unlikely to be viable across the majority of the site.
Foundations and Floor Slabs	The viability of spread foundations will depend on the presence / absence of bell pits / crop workings, coal, and the thickness of competent roof material above workings following treatment and stabilisation. This should be assessed on completion of an additional rotary probing investigation, and shallow site investigation works in the east of the site, when access allows. Suspended floor slabs will be required where soil swelling may occur (i.e. within the zone of influence of existing or proposed trees or hedges), where the ground has insufficient bearing capacity, and/or if made ground in excess of 600mm thick is encountered. It would be prudent at this stage to give consideration to any gas protection measures required to be incorporated into the floor slab design.
Sulphate Class	DS-1 and ACEC-1.
Contamination	Made ground across the site has been found to contain elevated concentrations of arsenic and benzo(a)pyrene. The presence of asbestos fibres has also been locally recorded within made ground in TP06. Shallow hydrocarbon (and locally naphthalene) contaminated soils in the central area of the site are considered to pose a risk to site end users and should be excavated and either treated on-site or be removed from site to a suitably licensed landfill. It is recommended that additional investigation be undertaken within the localities of exploratory holes WS07, WS09 and WS13 to assess the presence / extent of any possible hydrocarbon sources. A minimum 600mm of clean cover should be placed in areas proposed for private gardens and a minimum 450mm of clean cover within proposed soft landscaping across the development area (comprising suitable topsoil and subsoil), where made ground is present. Deep rooted plants would need to be 'potted'. Elsewhere, where the site is underlain directly by natural ground, a nominal 150mm depth of suitable topsoil should be provided. Further samples should be tested for the presence of asbestos to delineate the identified area in TP06, with appropriate subsequent remedial measures taken.
Asbestos	A pre-demolition asbestos survey will be required of buildings and structures on site prior to commencing demolition works.
Ground Gas	Characteristic Situation 2 (CS2). A further two ground gas monitoring visits are planned and the full results, and an interpretation of these, will be issued as an addendum letter on completion of the monitoring programme. Radon protection measures are not required by current guidance for the proposed development on this site.
Invasive Species	It is recommended that an updated ecological survey is undertaken by a qualified consultant ecologist to assess the presence or absence of any invasive plant species.

The executive summary is an overview of the key findings and conclusions of the report. There may be other information contained in the body of the report which puts into context the findings of the executive summary. No reliance should be placed on the executive summary in isolation, particularly when deriving design detail/abnormal costs.

1. INTRODUCTION

Sirius Geotechnical Ltd (Sirius) was commissioned by Paramount Retail Group Holdco Ltd (Paramount) to undertake a geoenvironmental appraisal of land at the former Greenside Mills, to the north of Saville Road, Skelmanthorpe (the "site"), as defined by the red line shown on the Site Features Plan in Appendix A (Drawing No. C7340/02).

It is understood that consideration is being given to the redevelopment of the site with 55 low rise residential properties (not exceeding three storey) with associated gardens, areas of soft landscaping, hard surfaced roadways / hardstanding and areas of public open space (POS). A proposed development layout has been provided by Paramount (Drawing ref. SK02, Draft Layout, dated November 2016) which is included in Appendix A. The area of proposed development is approximated by the blue line boundary shown on the Site Features Plan (Drawing No. C7340/02).

The objectives of this appraisal were to:

- Review and summarise the historical development and environmental setting of the site and surrounding area from a review of a previous desk study report (undertaken by a third party) and update where necessary;
- Investigate shallow soil and groundwater conditions;
- Determine the potential risks posed by any ground contamination and provide recommendations on remedial measures to manage such risks;
- Establish the risks associated with hazardous ground gas;
- Evaluate whether past mining or other extractive industries could have an influence on the site;
- Provide advice relating to geotechnical issues associated with the site.

The following reports have been made available to Sirius for review:

- Geo-environmental Phase 1 Desk Study report, dated May 2016 by Adeptus Consulting (report ref. 163-11).
- Coal mining risk assessment, by CMRA UK Limited in February 2016 (report ref. 1057).

- Preliminary Ecological Appraisal dated May 2016 by Brooks Ecological (report ref. R-2586-01).

- Flood Risk Assessment, Level 1 Screening Study dated May 2016, by Adeptus Consulting (report ref. 163-11FR).

It is recommended that these reports are read in conjunction with this report.

The previous desk study element included an assessment of information provided by a Groundsure environmental data report, the British Geological Survey (BGS), and available online information provided by the Environment Agency (EA). A Coal Authority (CA) mining report was procured in 2016 by CMRA UK Limited. For reference purposes, copies of the 2016 Groundsure environmental data and CA mining reports are included within Appendices B and C of this report, respectively. It should be noted however that the site boundary within the Groundsure report differs to that referred to within this report.

A site inspection (walk over survey) was undertaken by a Sirius geoenvironmental engineer on 28th September 2020.

Fieldwork was undertaken over five days between 15th and 29th October 2020 and comprised the excavation of seven trial pits, the drilling of thirteen window sample boreholes and three rotary open hole boreholes. Of the thirteen window sample boreholes, eight were installed with ground gas and groundwater monitoring standpipes, along with all three of the rotary open hole boreholes. Subsequent return gas and groundwater monitoring, comprising six visits over a three-month period, is ongoing.

This report, which was designed to meet the requirements of relevant current guidance, presents the factual information available during this appraisal, an interpretation of the data obtained and recommendations relevant to the defined objectives.

It has been assumed in the production of this report that the site is to be redeveloped for a low-rise residential with consumption of homegrown produce end use. Whilst it is acknowledged that cut and fill earthworks are likely to be required to provide development levels, in the absence of any proposed levels, it has been assumed at this stage that ground levels will not change significantly from those as existing. Amendments to the interpretation and conclusions in this report may therefore be required following derivation of final layouts and levels.

Where the report refers to the potential presence of invasive plants (such as Japanese Knotweed) or asbestos-containing materials (ACMs), such observations are for information only and should be verified by a suitably qualified expert.

The comments and opinions presented in this report are based on the findings of the Adeptus desk study, ground conditions encountered during intrusive investigation works performed by Sirius and the results of tests carried out within one or more laboratories. There may be other conditions prevailing on the site which have not been revealed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for any conditions not revealed by this investigation. Any diagram or opinion on the possible configuration of strata, contamination or other spatially variable features between or beyond investigation positions is conjectural and given for guidance only. Confirmation of ground conditions between exploratory holes should be undertaken if deemed necessary. Evaluation of ground gas and groundwater is based on observations made at the time of the investigation and monitoring visits. It should be noted that ground gas and groundwater levels and quality may vary due to seasonal and other effects.

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2. SITE DETAILS AND DESCRIPTION

Table 2.1 Current Site Overview

Location	The site comprises an irregularly shaped plot of land, located to the north of Saville Road and west of Marsden Street, in the village of Skelmanthorpe, approximately 10km southeast of Huddersfield town centre. A site location plan is provided as Drawing No. C7340/01 within Appendix A.
National Grid Reference (NGR)	423390mE, 410930mN
Topography and Features	In summary, the site comprises a number of unoccupied mill buildings and associated structures, with areas of asphalt hardstanding and roughly overgrown areas of landscaping. The buildings and structures on site have been constructed and expanded over time since the late 1800's. Buildings and structures on site have been numbered 1-13 for reference; these are detailed further below and are shown on the Site Features Plan (Drawing C7340/02 in Appendix A). The site has been recently subject to trespassing and vandalism, and as a result, many access entries into mill buildings have been welded shut, thereby preventing pedestrian access. These areas are detailed further below. No topographical survey is available for the site, and therefore AOD levels described below have been approximated from online satellite imagery / surveyed exploratory hole locations. In general, the site slopes downward from northwest to southeast / east, with levels of approximately 157m Above Ordnance Datum (m AOD) adjacent to the northwestern site boundary, and 138m AOD to the extreme eastern site boundary. A track is located off Saville Road to the northwest, running adjacent to the northern boundary to the central site area. The track is at a level of c.157m AOD in the northwest sloping down to c.149m AOD centrally within the site. In addition, a moderately steep vegetated slope runs down from Saville Road towards the western most building on site (ref. building 8), where a c. 2.0m to 4.0m high concrete retaining wall is present, wrapping around the west and north of buildings 7 and 8. Site levels slope gently to the east, towards building 6, where a c.1.0m high brick built retaining wall is present to the immediate west of the building. Site levels continue to slope gently to the east from building 6 towards building 2, which is partly at a lower level and retains c.2.0 to 3.0m of the ground to its west. The western and central site areas are assumed to have been subjected to previous cut and fill earthworks to form

generally level development plateaus.

Although access was not possible within the eastern site area, it is assumed that levels slope gently towards the eastern most point.

There are fourteen buildings / structures on-site, which are summarised below (the numbers relate to those on the Site Features Plan, Drawing No. C7340/02 within Appendix A):

1. This building is one of the older original mill buildings, ranging between one and three storeys in height, with cavity stone walls and slate tile and glass north-light style roof, which satellite imagery shows to be in poor condition. No internal access was gained.

   It is understood that the eastern portion of this building comprised the original boiler house. The previous Adeptus desk study refers to the boiler room, and the presence of '*a large tank potentially contains oil, but the floor slab appeared free from signs of spillage or staining. Some gas cylinders and smaller oil containers also remain, with minor staining of the slab in places. In front of the boiler itself a small patch of viscous black oily residue was noted…. Relatively small quantities of chemicals including dyes remain in the stores next to the boiler house; some are labelled harmful to the environment'*. Access was not possible into this area during the Sirius site walkover and site investigation.

2. This building retains the topographically higher footpath running to its west and extends beneath building 3. The building is constructed of brick-built walls and a multi-pitched northern light roof, which is in poor condition. The internal area is predominantly filled with bails of cloth and sewing machines, and the remnants of a conveyor enters the northwestern corner of the building. Access is via a sliding door in the southeast of the building.

3. This building is one of the older original factory buildings with cavity stone walls and slate tile roof. The internal area houses a number of metal working machines and a service pit for a forklift truck. Access is via a set of stairs inside building 2 or an external door (currently bolted shut) off the footpath to the west.

4. This is a sub-station, with brick walls and a flat roof, which ties into building 3. No internal access was gained.

5. This building has brick and metal clad walls, and a metal sheet roof, and has previously been used as the fabric dyeing area. The internal area houses a number of dying vats and associated machinery. The building remains in use

for storage of numerous IBCs (including acetic acid and caustic soda), and boxes of dyes. Access is via a roller shutter door in the south of the building.

6. This building is one of the older original factory buildings with cavity stone walls and slate tile and glass north-light style roof. It partially retains the land to the west. No internal access was gained.
7. This building has cavity stone walls and slate tile and glass multi pitched north-light style roof; a sub-floor void is present beneath this building. A number of looms are present inside the building, in addition to frequent stacked rolls of fabric. Access is gained via a roller shutter door in the north of the building.
8. This is the newest building on-site, comprising brick and metal clad walls, and a metal sheet roof. A number of looms are present inside the building, again in addition to rolls of fabric. Access is gained via a roller shutter door or a set of stairs in the south of the building. This building is understood to have been constructed in the 1980's, with significant cut and fill earthworks within the western area of the site to form a level development plateau.
9. This is one of the original mill buildings, it is three storeys tall, with brick walls and stone flag roof. No internal access was gained.
10. This is one of the original mill buildings, it is a single storey high, with brick walls and felt roof. No internal access was gained.
11. This is one of the original mill buildings, it is 2-3 storeys tall with brick walls and stone flag roof. No internal access was gained. A walkway runs from this building, over building 10, connecting to building 9. It is understood that this building was in use as offices for the site.
12. It is understood that the tanks in this area contained water for a fire suppression system.
13. An above ground brick bunded metal fuel storage tank (AST). No evidence of fuel spillages / leakages were noted.

c. A brick-built chimney, c. 20-30m tall.

Suspect asbestos-containing materials (ACMs) were identified within a number of the on-site buildings.

According to information provided by the site owners, buildings 2, 3 and 4 comprised the former knitting shed, buildings 5 and 6 comprised the former dye works, buildings 7 and 8 comprised the finishing and goods out warehouse, and buildings 1, 9, 10 and 11 comprised the former offices. A padlocked gate runs between buildings 1 and 5,

	preventing access to the body of the site. Services on-site generally run overhead between buildings or in metal covered services trenches. A public footpath runs between buildings 2, 3 and 4, and building 5; this footpath crosses the light railway to the immediate north of the site. To the east of building 2 is an overgrown vegetated undeveloped area, which was not accessible at the time of the site walkover or investigation. A footpath to the north of building 2 historically provided pedestrian access to the eastern site area, however this was found to have been blocked by fencing and dense overgrown brambles, preventing access. Historic reservoirs are recorded to have been present in this area (and LIDAR data shows two depressions are still present), and a stream is recorded to be running through it; the approximate location of these features is shown on Drawing No. C7340/02. Information included within the preliminary ecological appraisal undertaken by Brooks in 2016, indicates the following: '*A small stream…flows through a mix of culverts and open channels to pass through an overgrown channel in land within the east of the Site. Much of this course is through what used to be a detention basin or settling pond. It appears that water levels in this feature have fallen and the basin has infilled with sediment, it now presents a large area of wet unconsolidated silt colonised by reedmace….*' A brick sided mill pond / reservoir is located within the southeast of the site. Access was unavailable to the pond, as it was located behind a wire and metal security fence. The site can be accessed via Marden Street, which leads to an open area of hardstanding. Alternatively, the site can be accessed via two padlocked gates off Saville Road, the first, in the south of the site leads to a parking area, located to the south of building 8, the second, in the west of the site, leads to a track which runs down to the centre of the site. Several 1,000 litre IBCs, blue drums, a lead battery, steel drums and gas canisters were noted to be present across the site and within a number of the buildings. Although the majority were thought to be empty, this could not be fully confirmed.
Approximate Site Area	c.2 hectares.
Site Boundaries	The site is bound to the north by Kirklees Light Railway and residential properties, with open fields beyond.

	The site is bound to the east by Marsden Street and residential properties, a car garage, and open fields beyond. The site is secured by wire and metal fencing within the east. The site is bound to the south and west by Saville Road, with residential properties beyond. A dry-stone wall runs along the southern and western site boundary.
Current Land Use	Disused.
Invasive Plant Species	A preliminary ecological appraisal was undertaken for the site by Brooks Ecological in May 2016 (ref. R-2586-01), which recorded the presence of *Cotoneaster hoizontalis*. An updated ecological survey is required to confirm that no new invasive plant species are present on-site.
Adjacent Land Uses	The surrounding land use is predominantly residential to the northwest and west , and predominantly agricultural to the north and east. A garage is located to the southeast of the site. Commercial properties are located to the south of Saville Road.

The main site features are shown on Drawing No. C7340/02 and selected site photos are shown in Drawing No. C7340/03, both of which are included within Appendix A.

3. SUMMARY OF PREVIOUS DESKTOP INFORMATION

3.1. Introduction

Published environmental, geological, historical data and previous reports relating to the site have been reviewed. A summary of relevant information is provided below and a copy of the Groundsure report previously included within the Adeptus Desk Study is enclosed in Appendix B. A copy of the Coal Authority Mining Report is included in Appendix C.

It should be noted that the site boundary shown within the Groundsure report varies to the Site Features Plan (as shown on Drawing No. C7340/02, included within Appendix A of this report), with the railway and area to the north of the railway not being included within this report. All relevant details and distances etc. referenced below have been updated accordingly, to correspond with the boundary shown on the Site Features Plan.

The section below is intended to provide a summary (and update where required) of the existing Adeptus desk study report, which should be referred to for further detail.

3.2. Site History

Table 3.1 below presents a summary of the site history from 1854 to date, as determined from online historical Ordnance Survey (OS) maps, the Adeptus historical Ordnance Survey (OS) maps and satellite imagery. It is not the intention of this report to describe in detail all the changes that have occurred on or adjacent to the site, only those pertinent to the proposed end use.

Table 3.1 Site History

Map Dates	On-Site Features	Offsite Features (only features within 500m that may affect the site are listed)
1854 (available online)	The site generally comprises undeveloped land, with a track located centrally through the site. Several buildings, possibly residential properties are present in the south of the site. The area is denoted as Green Side. An unnamed watercourse is shown to be present in the east of the site.	Residential properties are present to the south and southeast of the site. Green Lane Side (a track) runs along the western and southern site boundaries. The remainder of the surrounding area appears to comprise undeveloped land.
1893-1894	The buildings in the south of the site have been demolished. A single building has been built in their place. The site is now named as Green Side Mills (Fancy Shawls).	The Clayton West Branch of the London and York Railway and associated earthworks have been built to the immediate north of the site. The watercourse has been culverted

Map Dates	On-Site Features	Offsite Features (only features within 500m that may affect the site are listed)
	Buildings have been built in the south of the site, with a similar footprint to buildings 9, 10 and 11. Two buildings have been built to the north of these, within the footprint of building 1. The chimney has been built. In the north of the site, to the east of the track, a long rectangular building has been built, within the footprint of building 2.	beneath the railway. A gas works, with two circular structures (likely gas holders) has been built to the southeast of the site. Green Lane Side has been re-named Saville Road, and Marsden Street is shown leading into the east of the site. Residential properties have been developed to the west of the site.
1906	A reservoir is shown in the east of the site, with associated earthworks. The surface water feature appears to follow the line of earthworks. The building within the footprint of building 2 has been extended to the south into the footprint of building 4. Several additional buildings have been built within the footprint of building 1. Three buildings have been built in the footprint of buildings 5 and 6. Two newly constructed structures are shown along the southern site boundary. An area of earthworks is shown within the northwest of the site.	The watercourse appears to have been culverted to the south of the gas works. Emley Moor Colliery is shown c. 200m northwest of the site.
1916	Two rectangular reservoirs have been built c. 15m to the west of the 1906 reservoir. A watercourse is shown to run between the new and old reservoirs, before being diverted eastwards and being culverted beneath the railway. The buildings within the footprint of buildings 5 and 6 have been extended to cover the footprint of building 5.	The gas works is no longer shown. A tank is shown c. 20m south of the site.
1959	The smaller building in the south of the site have been demolished. Two residential properties are shown in the footprint of the second building. Building 7 has been constructed. Two small buildings are shown to the south of this building. The buildings within the footprint of buildings 5 and 6 have been consolidated into a single structure. The outline of buildings 1, 9, 10 and 11 match their current outline. The watercourse appears to be partially culverted on-site.	Two circular features are shown in the area of the former gas works, now labelled as works. The residential properties to the southeast of the site have been demolished, except for two. A railway siding is shown to lead to Emley Moor colliery. A number of buildings and material stockpiles are shown to be present within the footprint of the colliery.
1969-1978	Buildings 2 and 4 have been constructed. An electricity sub-station is shown in its current location.	The works to the southeast of the site is now labelled as gasholders.

Map Dates	On-Site Features	Offsite Features (only features within 500m that may affect the site are listed)
1980	An area of earthworks is shown to the west of building 7. A tank is shown adjacent to the small reservoirs.	The gasholders have been cleared, with development of a gas distribution station.
1986-1995	One of the small reservoirs and the original larger reservoir are no longer shown. The watercourse is shown to flow through the eastern part of the site. The residential properties in the south of the site have been demolished. Building 8 has been built. A slope is shown to the west of this building, leading to Saville Road.	The railway to the north of the site is shown as being dismantled. A garage is shown to the southeast of the site from 1993.
2020	No significant changes noted. LIDAR information shows two depressions are still present in the east of the site, in the area of the former reservoirs.	The gas distribution station is no longer shown. The former railway line to the north of the site is in use as the Kirklees Light Railway. Residential and commercial properties have been built on the site of the former Emley Moor colliery.

The site has been known as “Green Side Mills” since the late 1800s, and appears to have remained in use as a cloth / textile mill throughout its history; demolition and construction has continued at the site until the mid-1980s.

A gas works was present to the east of the site from at least 1893 until at least 1980, from when the area is noted as a “Gas Distribution Station”. Emley Moor Colliery was present c.200m to the northwest of the site from at least 1904.

3.3. Published Geological Information

A summary of available published geological information is provided in Table 3.1.

Table 3.1 Geological Summary

Sources of Information	BGS 1:10,000 scale geological map (Sheet name, SE21SW). BGS 1:50,000 scale geological map (Glossop, Sheet 86). The Geology of the Country around Holmfirth and Glossop, Memoirs of the Geological Survey, Explanation of Sheet 86, dated 1933.

	Geology of the Glossop District, a brief explanation of the geological map Sheet 86 Glossop, dated 2012. BGS Geology of Britain Viewer (on-line service). BGS Lexicon of Named Rock Units (on-line service). BGS borehole records (on-line service). Coal Authority (CA) Interactive Map Viewer (on-line service). Non-Residential Coal Authority Mining Report (ref. 51001106919001), dated 24th February 2016.
Made Ground	None recorded on the published maps, but localised made ground is expected associated with possible infilling of the reservoirs/ponds, and historical development on-site. The railway to the immediate north of the site is shown as made ground. Two large areas of made ground are shown on the 1:10,000 scale geological map to the north of the light railway, one is located c. 55m north of the site, which appears to relate to opencast working of the Whinmoor coal seam. The second is located c. 135m northeast of the site and appears to relate to coal mining, though no seam name is given.
Superficial Deposits	No superficial deposits are recorded to underlie the site. Alluvial deposits maybe present in the east of the site associated with the surface water course.
Solid Geology	The site is shown to be underlain by Carboniferous Pennine Lower Coal Measures (LCM) strata, comprising undifferentiated 'mudstones, siltstones and sandstones with subordinate coal, ironstone and fireclay' in the centre and southwest of the site. An unnamed sandstone unit is recorded to be present in the northeast of the site. The site is shown to be located within three fault blocks. Two conjectured faults, orientated northwest-southeast, with a downthrow to the northeast are recorded to cross the central and eastern areas of the site, as shown on Drawing No. C7340/06 in Appendix A. A conjectured fault orientated northeast-southwest, with a downthrow to the southeast, is located to the immediate northwest of the site. The strata in the vicinity of the site are recorded to be dipping c. 5° to the northeast.
BGS Borehole Records	Two BGS borehole records are located on-site, recording the following ground conditions: • SE21SW1 (drilled in January 1924, located in the centre of the site, for use as

	a groundwater abstraction borehole) recorded clay to 4.27m bgl, then interbedded shales and 'hard stone' to 114.3m bgl. Coal and shale were recorded from 84.27 to 86.41m bgl. • SE21SW28 (drilled in June 1977, located in the west of the site) recorded clay to 6m bgl, then interbedded sandstone and shale to 75m bgl. Water was struck at 6.1m, 25m and 65m bgl. This hole was drilled at 200mm diameter to allow groundwater to be abstracted.
Quarries	Online historical OS maps indicate a quarry to have been located c. 300m southwest of the site, between at least 1854 to at least 1949. There is no evidence of quarrying within the site on historical OS maps.
Coal Mining Risk Assessment	
Coal Seams	The BGS map conjectures the presence of a 'thin' coal seam c. 30m northwest of the site (dipping to the south), beyond the northeast-southwest fault. The Whinmoor (Top Whinmoor) and Low Whinmoor coal seams are conjectured to outcrop c. 10m north and c. 15m northeast of the site respectively, dipping to the northwest. The Whinmoor (Top Whinmoor) and Low Whinmoor coal seams are shown to outcrop beyond the northern most conjectured northwest-southeast orientated fault on site. The seams are recorded to be between 0.4m-0.8m and 0.2m-0.6m in thickness, respectively. The stratigraphical column included on the BGS 1:10,000 geological map indicates the Low Whinmoor to be approximately 10m stratigraphically below the Whinmoor (Top Whinmoor). The Cumberworth Thin Coal (recorded to be c.0-0.4m in thickness) is recorded to be 20m below the Whinmoor (Top Whinmoor) coal. The 1933 geological memoir notes that *'the Whinmoor Coal…has been or is being worked wherever present at shallow depth…it is usually in three bands being separated by dirt partings…*' The memoir notes that the Cumberworth Thin Coal is seldom over 1ft 3in thick (37cm), but commonly has up to 4ft (1.2m) of fireclay, and locally gannister, associated with it.
Coal Mining	The CA report states that the site is not within the zone of likely physical influence on the surface from past underground or opencast workings, but that the property is in an area where the Coal Authority believe there is coal at or close to the surface; this coal may have been worked at some time in the past. In the northeast of the site the CA online viewer shows there is a risk of 'probable unrecorded shallow workings'; the same area of the site is recorded as a 'development

	high risk area'. Correspondence with the CA indicates '*Our information indicates the Whinmoor and an unnamed coal seal crop in the vicinity of the site. Records of surface workings in the wider locality to the north of the site show the Whinmoor as three leafs at that location'*. The 1:10,000 scale geological map shows two areas of made ground, one located c. 55m north of the site where the Whinmoor Coal seam appears to have been worked from surface and c. 135m northeast of the site, where an unknown seam has been worked from surface.
Mine Entries	The CA Mining Report states that there are no known mine entries within 20m of the site. The online CA interactive viewer shows no recorded shafts are present within 250m of the site, the nearest shaft is shown c. 455m northwest of the site.
Coal Geology	The CA's Mining Report states that it is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.
Gas Emissions	Within the CA's Mining Report, there is no record of a mine gas emission requiring action by the CA within the boundary of the property.
Surface Hazard	The CA's Mining Report states that the property has not been subject to remedial works by, or on behalf of, themselves, under its Emergency Surface Hazard Call Out procedures.

3.4. Hydrology and Hydrogeology

A summary of available information pertaining to hydrology and hydrogeology is presented in Table 3.4 to Table 3.6, inclusive.

Table 3.4 Surface Water Features

	Presence/location	**Comments**
Classified Watercourses (within 500m)	Parkgate Dike (flowing west to east) is present c. 240m to the north of the site.	The local catchment "Dearne from Source to Bentley Brook" is recorded to have a moderate ecological and fail chemical classification in 2019.

	Presence/location	Comments
Unclassified Watercourses (within 500m)	An existing flood risk assessment (Adeptus, dated May 2016, ref. 163-11FR) notes that a surface water course runs beneath Saville Road, through the east of the site, and is then culverted beneath the railway.	
Licensed Surface Water Abstractions (within 1000m)	NR	
Other Surface Water Features (Canals, Ponds, Lakes, etc.) (within 250m)	One large and two smaller reservoirs (noted as "water" on the historical maps) were formerly located in the east of the site. One brick sided reservoir remains.	Anecdotal evidence (provided by a local resident who was a former employee of the mill) suggests that the reservoirs collected process water from the dye house, before it flowed via the unnamed watercourse to Parkgate Dike, then to the local water processing plant. Chemicals are noted to have been added to the process water to neutralise any harmful products present. This information was anecdotal only and has not been substantiated.
Flood Risk Status	The EA record the site to lie within a Flood Zone 1.	

NR – None recorded.

Table 3.5 Groundwater Occurrence and Abstraction

	Presence/location	Comments
Licensed Abstractions (within 1000m)	Five groundwater abstractions are recorded on-site, all of which appear to relate to the same borehole (licence no. 2/27/08/091, start date 27/09/1977). No expiry date is given. Two further abstractions are located 260m southeast of the site, again,	The on-site groundwater abstraction is recorded to be used for general cooling (high loss), general use relating to secondary category (medium loss) and process water. The offsite borehole was used as a 'raw water supply' and 'drinking / cooking /

	Presence/location	Comments
	referring to the same borehole.	sanitary / washing / household', last dated from 1994. No expiry date is provided.
Private Wells	Anecdotal evidence provided by a passer-by suggests that up to four private groundwater abstraction boreholes are present on-site, although this has not been substantiated.	The EA should be contacted regarding the groundwater abstraction licence on-site, to determine if it requires surrendering prior to the site being developed. The abstraction borehole(s) may require decommissioning in accordance with current EA specifications. Further guidance should be sought from the EA.
Source Protection Zones (within 500m)	NR	
Springs	NR	

NR - none recorded.

Table 3.6 Groundwater Vulnerability Status

	Environment Agency Classification
Groundwater Classification	The bedrock beneath the site is classified as a Secondary A Aquifer, which is defined as "*having permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers….*".

3.5. Landfilling and Waste Management

Information on waste management and related activities that could impact upon the site is summarised in Table 3.7.

Table 3.7 Waste Management Activities

	Presence / Location	Comments
Historical Landfills (within 1000m)	Three registered historic landfills have been recorded	The closest record is located 344m to the southwest of the site, registered as accepting commercial and inert waste. The licence was

	Presence / Location	Comments
	within 1km of the site.	surrendered on 15th February 1988. The second closest record is located approximately 448m southwest of the site and is recorded to have been a derelict quarry, accepting inert and commercial waste. The licence was surrendered on 3rd June 1988. The remaining record is located 989m to the southwest of the site, registered as accepting commercial and inert waste. The licence was surrendered on 22nd April 1994.
Recorded Landfills (within 1000m)	NR	
Other Licensed Waste Management Facilities (within 500m)	NR	
Evidence of Fly-Tipping on Site?	General commercial and industrial wastes associated with the former textile works left on site.	Several piles of general waste were noted to the rear of the garage to the southeast of the site.
Ground Gas Risk Assessment Required?	Yes.	There may be localised areas of deep made ground within the site, which may have the potential for generation of hazardous ground gas. There may also be possible localised alluvial soils in the east of the site associated with the former reservoir / ponds and stream. Subject to the presence of coal mine workings, mine gases may also be present. It is recommended that a ground gas monitoring programme is undertaken to characterise the risk to the proposed development.

NR - none recorded

3.6. Radon Risk

The assessment contained within the Adeptus Groundsure Report, indicates that the site lies within an area in which less than 1% of properties are above the action level and therefore **no radon protective measures are required**.

3.7. Ecological Receptors

The site is recorded to be located within a nitrate vulnerable zone. Areas of ancient and semi-natural woodland are recorded 248m and 311m to the east of the site.

3.8. Other

Other potentially contaminative activities or environmental constraints are listed below. The entries relate to activities within approximately 250m of the site.

- One active trade directory entry is located 208m to the northeast, registered to a gate manufacturer.
- Two discharge consents are located c. 220m northeast of the site, relating to sewer storm overflow.
- A pollution incident, relating to inert construction and demolition materials and waste is recorded 51m to the south of the site, the water impact is classified as category 3 (minor); no impact is recorded for land or air.
- The closest industrial land use is AV Motors, a vehicle repair, testing and servicing centre, which is recorded to the immediate southeast of the site; four further industrial land uses are recorded within 250m of the site.

4. PREVIOUS INVESTIGATION FINDINGS

The details and findings of the previous desk study, flood risk assessment and coal mining risk assessment are discussed in Sections 2 and 3 above.

5. PRELIMINARY CONCEPTUAL SITE MODEL

Based on the desk study information, a combined preliminary conceptual site model and conceptual exposure model (CSM) has been developed for the proposed future land use (low rise residential with gardens). This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors to assess potential contaminant linkages.

A qualitative risk assessment has also been made of each contaminant linkage operating following the methodology described in Appendix D. The preliminary CSM is presented in schematic form in Drawing No. C7340/04 in Appendix A.

In summary, the following potential contaminant linkages have been assessed as posing a potentially unacceptable level of risk (defined as being greater than “low” risk) in the proposed end-use:

- Inhalation and ingestion of, and dermal contact with, any localised topsoil, made ground or shallow natural soils in which asbestos-containing materials (ACMs) (inhalation only) or elevated concentrations of metals, metalloids or organic contaminants (including hydrocarbons, PCBs and PAHs) are present. These linkages are assessed as posing a **moderate** risk to future site users, construction workers and adjacent land users;

- Attack of construction materials (concrete and plastic) by sulphates and organic contaminants; this linkage is considered to pose a **low to moderate** risk to the built environment;

- Phytotoxic effects of heavy metals (e.g. zinc) within made ground and natural soils on planting and landscaping within the proposed development, posing a **low to moderate** risk;

- Leachable and mobile metals and metalloids, other inorganics and/or organic contaminants from made ground and/or shallow natural soils posing a **moderate** risk to controlled waters (including underlying Secondary A Aquifer and on-site surface water features); and,

- Hazardous ground gases (including VOC’s) resulting from areas of possible deep made ground on and off-site, any potential fuel spillages associated with the existing AST, possible alluvial soils in the east of the site associated with the former reservoir / ponds and stream, and coal mine related gas emissions posing a **moderate** risk to end users, adjacent site users and construction workers.

Invasive plant species may be present on or adjacent to the site but will pose a low risk to the built environment provided that an appropriate survey and, if required, a method of treatment/removal has been/will be undertaken.

ACMs within the infrastructure of the existing buildings located on-site, pose a **low** risk to construction/demolition workers and adjacent site users, providing an appropriate method of removal is undertaken by a suitably qualified contractor.

6. FIELDWORK

6.1. Scope of Investigation

The information contained in this report is limited to areas of land accessible during the investigation within the site boundary, as indicated on the site plans presented in Appendix A as Drawing No's. C7340/02 and C7340/05. Access was not possible within the eastern site area (to the east of building 2), due to overgrown dense brambles / vegetation and fencing.

The investigation, which was supervised by a Sirius Geoenvironmental Engineer, took place over five days between 15th and 29th October 2020 and comprised:

- Excavation of seven machine-excavated trial pits (TP01 to TP07), dug to a maximum depth of 2.9m below ground level (bgl);
- Drilling of thirteen window sample boreholes (WS01 to WS13), advanced to a maximum depth of 4.0m bgl.
- Drilling of three rotary open hole boreholes (RO01 to RO03), advanced to a maximum depth of 30.0m bgl.

Permanent monitoring installations for combined groundwater and ground gas monitoring were installed in eight window sample boreholes and three rotary open hole boreholes (WS01, WS03, WS05 to WS07, WS09, WS12, WS13, and RO01 to RO03).

In order to avoid damage to underground services (and risk to workers) all test hole locations were scanned and "cleared" by a service avoidance specialist prior to drilling. Proposed exploratory hole locations were re-located away from any service restrictions.

6.2. Exploratory Hole Locations

The exploratory hole locations were selected using the findings of the preliminary conceptual site model in order to achieve general site coverage, target specific areas of interest and resolve key uncertainties, as detailed in Table 6.1.

Table 6.1 Exploratory Hole Rationale

Exploratory Hole	Rationale
TP02, TP03, WS02, WS03	Investigate the area of historic residential development in the south of the site and assess the potential for possible basements / former substructures.
WS07, WS10, TP07	Investigate the area of the chimney and sub-station
WS13	Investigate the area of the above ground fuel tank
WS04, WS11, WS12	Provide general coverage within accessible internal areas of existing buildings.
WS08, WS09	Located internally within the former dye mill.
WS01, WS05, WS06, TP01, TP04, TP05, TP06	Provide general coverage within accessible external areas of the site.
RO01 – RO03	Coverage across the site to investigate for shallow coal seams or associated historical workings within each conjectured fault block.

No access was available within a number of historic buildings and in the vegetated area in the east of the site; inaccessible areas and exploratory hole locations are shown on Drawing No. C7340/05 in Appendix A.

6.3. Strata Description

Sirius strata descriptions were logged in accordance with BS EN ISO 14688-1&2:2018 and BS EN ISO 14689:2018. Detailed descriptions of strata and groundwater observations made during investigation works, together with samples recovered and the results of in-situ field testing, are presented on the Engineer's records in Appendix E of this report. Exploratory hole locations have been surveyed in using GPS equipment, with levels provided on record sheets given to Above Ordnance Datum.

6.4. Geotechnical Testing

Geotechnical laboratory testing on selected samples was carried out under subcontract by Professional Soils Laboratory (PSL), a UKAS-accredited laboratory. Geotechnical test results are included within Appendix F of this report.

6.5. Chemical Testing

Selected samples of the made ground, natural soils and groundwater were tested for a range of potential contaminants under subcontract with Chemtest, a UKAS and MCERTS accredited laboratory.

The potential contaminants of concern identified by the preliminary conceptual site model were selected as the analytes for the samples recovered from the site. The results of soil and groundwater analysis, as received from the laboratory, are presented in Appendix F of this report.

7. GROUND CONDITIONS AND MATERIAL PROPERTIES

7.1. Strata Profile

A summary of the strata profile encountered is provided in Table 7.1.

Table 7.1 Strata Profile

Strata	Depth Range (Thickness Range)	Description and Comments
Hardstanding (macadam)	Ground Level (0.02m to 0.27m)	Black bound macadam/asphalt was encountered at surface in each external investigation location.
Hardstanding (concrete)	Ground Level to 0.12m (0.10 to 0.21m)	Concrete with reinforcing bars and a DPC at the base was encountered within all internal areas. Unreinforced concrete was encountered beneath bound macadam in WS03, WS10 and WS13.
Reworked Topsoil	Ground Level (0.20m)	Reworked topsoil was encountered in TP02, comprising brown clay with common rootlets. A buried topsoil was also encountered in TP02 at a depth of 1.0m bgl comprising dark brown slightly gravelly clay with rootlets and a low cobble content.
Made Ground (Sub-base)	0.03m to 0.27m (0.03m to 0.40m)	Sub-base comprising occasionally clayey sandy gravel of limestone and sandstone was encountered within the majority of external and internal exploratory holes, directly underlying hardstanding. Sub-base was not encountered beneath the floor slab of the dye house or the knitting shed (WS08, WS09 and WS11).
Made Ground (Cohesive and Granular)	0.15m to 0.5m (0.15m to >2.75m)	Varying thicknesses of both granular and cohesive made ground were encountered across the majority of the site beneath the hardstanding / topsoil and granular sub-base layer. No made ground was encountered in WS04 or WS10. Made ground was generally encountered to depths not exceeding 1.0m bgl, except for exploratory holes TP02 (2m), WS03 (>3m), WS08 (2.8m), WS09 (>1.05m) and WS11 (1.7m). TP02 and WS03 are located within the southwestern site area, formerly developed with residential properties and un-named mill buildings. WS08, WS09 and WS11 are located towards the eastern area of the site which was subjected to varying historical earthworks and development prior to the current site layout. Cohesive made ground across the site generally comprised locally soft, firm to stiff, low to high strength, re-worked residual LCM soils, with gravels of siltstone, mudstone, sandstone and occasional brick, concrete, clinker, and metal. Granular made ground generally comprised demolition style material with sand and gravels of sandstone, siltstone, brick and concrete, with frequent cobbles and boulders. Occasional thin granular bands of ash and clinker / burnt mudstone were recorded.

Strata	Depth Range (Thickness Range)	Description and Comments
Residual LCM soils	0.40m to 2.80m (0.45m to 2.15m)	Residual LCM siltstone bedrock was generally encountered beneath hardstand and / or made ground across the site, although not encountered within exploratory holes WS04 and WS12 (where made ground was found to be directly underlain by competent LCM bedrock, anticipated to be located within historic areas of 'cut' to form current development levels). Residual soils were typically recorded to comprise locally soft, firm, becoming stiffer with depth, medium to high strength, pale grey to grey, mottled orangish brown slightly gravelly to gravelly clay of intermediate to high plasticity. Clayey gravel of siltstone was recorded within TP01.
LCM Bedrock	0.25m to >3.0m Proven to 30m bgl	Extremely weak, destructured LCM bedrock was identified across the site, comprising thinly laminated siltstone, recovered as clayey gravels. Exploratory holes were excavated / drilled to refusal or where hard strata led to slow progress, which varied at depths of between 1.0m and 4.0m bgl. Rotary boreholes drilled across the site identified LCM bedrock comprising bands of mudstone, siltstone and sandstone to a depth of 30m bgl. Rotary borehole RO01 did not encounter any coal or evidence of mine workings to a depth of 30m bgl (c.125.6m AOD). Rotary borehole RO02 encountered broken ground from 3.8m to 6.0m bgl (137.0m - 139.2m AOD). Rotary borehole RO03 encountered intact coal from 2.4m to 3.4m bgl (141.7m - 142.7m AOD) and from 4.2m to 5.5m bgl (139.6m - 140.9m AOD). A band of 'clay' was recorded between 16.0m - 16.3m bgl (128.8m - 129.1m AOD).

7.2. Material Properties

Made Ground

Water soluble sulphate (SO_4^{2-}) analyses performed on fourteen samples of made ground and one sample of reworked topsoil recorded concentrations of between <10mg/l and 440mg/l, together with recorded pH ranging from 7.1 to 10.0. These results indicate a design sulphate class of DS-1 and an ACEC class of AC-1 in accordance with BRE Special Digest 1 (2005) for the design of buried concrete, based on brownfield site designation and mobile groundwater conditions.

Nine hand shear vanes were undertaken within the cohesive made ground, which identified undrained shear strengths typically ranging between Cu = 16kN/m^2 and 105kN/m^2 (with mean and median values of 45 and 34kN/m^2 respectively), indicative of generally low to medium strength material.

Two SPTs undertaken within the cohesive made ground recorded N values of 2 and 16, indicative of very low and high strength soils, while an SPT N value of 3 was recorded in granular made ground in WS08, indicative of very low loose granular soil.

Residual / Competent LCM

Residual LCM

Water soluble sulphate (SO_4^{2-}) analyses performed on six samples of residual LCM strata recorded concentrations of between <10mg/l and 330mg/l and recorded pH ranging from 6.6 to 8.2. These results indicate a design sulphate class of DS-1 and an ACEC class of AC-1, in accordance with BRE Special Digest 1 (2005) for the design of buried concrete, based on natural ground designation and mobile groundwater conditions.

Eight Atterberg limit determinations undertaken on samples of cohesive residual LCM soils revealed liquid limits of between 39% and 65%, plastic limits of between 20% and 29%, and plasticity indices of between 16% and 36%. This data indicates the cohesive material to typically be of intermediate to high plasticity.

The Consistency Indices (Ic) of the samples obtained indicate Ic values of between 0.75 and 1.40, indicative of firm to very stiff consistency residual soils. Calculation of the modified Plasticity Index, in accordance with NHBC standards, indicates the material tested to have a typically low to medium volume change potential.

Nine SPTs undertaken within the cohesive residual soils recorded N values of between 12 and 43. Indicative undrained shear strengths of cohesive soils can be derived by applying a correlation to SPT 'N' values according to the material's plasticity, after Stroud (1975). Based on an average plasticity index of approximately 25% for the cohesive soils a conservative correlation factor of 5 can be derived. Using Stroud's correlation, the SPT 'N' values indicates undrained shear strengths of between 60kN/m^2 and 215kN/m^2 (with mean and median values of 112kN/m^2 and 100kN/m^2, respectively), indicating the cohesive soils to be of generally high strength.

Twenty-four hand shear vanes were undertaken within the cohesive residual soils, which identified undrained shear strengths typically ranging between Cu = 41kN/m^2 and 147kN/m^2 (with mean and median values of 80 and 69kN/m^2 respectively), indicative of generally medium to high strength material.

California Bearing Ratio (CBR) testing was undertaken on bulk samples of the residual soils, following re-compaction in the laboratory using a 2.5kg rammer. The results of laboratory CBR testing are summarised in Table 7.2.

Table 7.2 Summary of CBR Testing

Sample Ref.	Depth (m bgl)	Moisture Content (%)	Bulk Density (Mg/m^3)	Dry Density (Mg/m^3)	CBR Value Top (%)	CBR Value Bottom (%)
TP01	0.8-0.9	11.0	2.15	1.93	27.1	26.6
TP03	1.0-1.2	25.0	1.97	1.57	0.4	0.4
TP06	0.7-0.9	12.0	1.91	1.71	2.0	2.0

LCM Bedrock

Water soluble sulphate (SO_4^{2-}) analyses performed on one sample of LCM bedrock recorded a concentration of <10mg/l and recorded pH of 7.7. These results indicate a design sulphate class of DS-1 and an ACEC class of AC-1, in accordance with BRE Special Digest 1 (2005) for the design of buried concrete, based on natural ground designation and mobile groundwater conditions.

Thirteen in-situ SPTs undertaken within the highly weathered bedrock, comprising siltstone, recorded N values of between 23 and >50 for 235mm penetration, with extrapolated N values of between 51 and 64. These SPT N values indicate the material to comprises extremely weak rock.

7.3. Obstructions

WS03 and WS09 refused on unidentified obstructions within made ground at depths of 3.0m and 1.05m bgl, respectively. No other sub-surface obstructions were encountered during the Sirius site investigation, although window sample boreholes were found to refuse within competent siltstone bedrock at depths of between approximately 1.0m and 4.0m bgl.

7.4. Ground Stability

Trial pits and boreholes were recorded to be stable during excavation/drilling.

7.5. Subsurface Mine Workings

The locations and depths where coal / associated mine workings has been identified at the site are summarised in Table 7.3 below.

Table 7.3 Coal Seams Encountered

Borehole Ref.	Depth Coal / Workings Encountered (m bgl)	Elevation Encountered (m AOD)	Thickness of Coal / Workings Encountered (m)	Thickness of Overlying Competent Strata (m)
RO02	3.8*	139.27	2.2*	2.8
RO03	2.4	142.73	1.0	NA^
RO03	4.2	140.93	1.3	1.8

*Broken ground
^Overlain by weathered, residual LCM

Published geological information conjectures the site to be located within three fault blocks. Two conjectured faults, orientated northwest-southeast, with a downthrow to the northeast are recorded to cross the central and eastern areas of the site, as shown on Drawing No. C7340/06 in Appendix A. A conjectured fault orientated northeast-southwest, with a downthrow to the southeast, is located to the immediate northwest of the site.

Published BGS maps conjecture the presence of a 'thin' coal seam c. 30m northwest of the site (dipping to the south), beyond the northeast-southwest fault. The Whinmoor (Top Whinmoor) and Low Whinmoor coal seams are conjectured to outcrop c. 10m north and c. 15m northeast of the site respectively, dipping to the northwest, away from the site. Both the Whinmoor and Low Whinmoor are shown to outcrop to the north of the conjectured faults located on site.

The rotary probing undertaken as part of this investigation has identified two seams / leaves of intact coal in RO03 in the north of the site at a depth of 2.4m and 4.2m bgl (at respective thicknesses of 1.0m and 1.3m), whilst broken ground was identified in RO02 in the southeast of the site at a depth of 3.8m bgl. No other coal / evidence of mine workings was recorded.

No coal or associated evidence of workings was identified in RO01 in the west of the site, which is inferred to the west of the two on-site faults, as shown on Drawing No. C7340/06 in Appendix A. Two BGS borehole logs drilled within central and western areas of the site did not identify any shallow coal seams (i.e. less than c.80m bgl), although their locations cannot be verified on site.

As coal / workings have were only encountered in two boreholes, the seam dip could not be triangulated.

7.6. Groundwater

Groundwater strikes recorded during the Sirius ground investigation are summarised in Table 7.4 and groundwater levels recorded during the subsequent gas / groundwater monitoring are summarised in Tables 7.5 and 7.6.

Table 7.4 Summary of Groundwater Encountered during Sirius Ground Investigation

Exploratory Hole	Depth Encountered During Fieldworks (m bgl)	Depth Encountered Post Fieldworks (m bgl)	Description	Stratum
RO03	16.0	2.83 - 5.51	Minor seepage	Sandstone bedrock
WS08	2.7	N/A	Minor seepage	Made Ground
WS10	3.0	N/A	Minor seepage	Siltstone bedrock

N/A - Not Applicable
NR - None recorded

Table 7.5 Summary of Groundwater Monitoring (m bgl)

Exploratory Hole	Depth to Groundwater (m bgl)				Well Depth (m bgl)
	29/10/20	12/11/20	24/11/20	08/12/20	
RO01	6.40	8.92	8.87	8.32	11.22
RO02	4.21	4.19	4.27	4.19	5.55
RO03	2.83	5.51	3.14	5.32	10.33
WS01	Dry	Dry	Dry	Dry	1.06
WS03	2.15	2.14	2.19	2.15	2.52
WS05	1.23	1.50	1.73	1.52	3.05
WS06	1.47	1.43	1.37	1.29	4.05
WS07	2.47	2.49	2.55	2.24	3.03
WS09*	Dry	Dry	1.08	Dry	1.12
WS12*	1.44	1.59	1.44	1.25	1.69
WS13	1.78	1.67	1.24	1.72	2.64

Table 7.6 Summary of Groundwater Monitoring (m AOD)

Exploratory Hole	Depth to Groundwater (m AOD)				Top of BH (m AOD)
	29/10/20	12/11/20	24/11/20	08/12/20	
RO01	149.20	146.68	146.73	147.28	155.60
RO02	138.86	138.88	138.80	138.88	143.07
RO03	142.30	139.62	141.99	139.81	145.13
WS01	Dry	Dry	Dry	Dry	153.99
WS03	145.60	145.61	145.56	145.60	147.75
WS05	146.09	145.82	145.59	145.80	147.32
WS06	146.25	146.29	146.35	146.43	147.72
WS07	146.57	146.55	146.49	146.80	149.04
WS09*	Dry	Dry	NA	Dry	

Exploratory Hole	Depth to Groundwater (m AOD)				Top of BH (m AOD)
	29/10/20	12/11/20	24/11/20	08/12/20	
WS12*	NA	NA	NA	NA	
WS13	140.72	140.83	141.26	140.78	142.50

* Drilled inside so not possible to GPS coordinates and elevation.

It should be noted that the water levels are likely to fluctuate with the seasons/rainfall and therefore may be higher / lower at different periods of the year, compared to those recorded during this investigation.

7.7. Visual / Olfactory Evidence of Contamination

A hydrocarbon odour was noted in granular made ground soils in TP04 from 0.5 to 0.9m bgl.

Localised ash and clinker and demolition type made ground was encountered across the site; such soils commonly contain elevated concentrations of metals/metalloids, polycyclic aromatic hydrocarbons (PAHs), plus asbestos containing materials (ACMs).

7.8. Ground Gas

Ground gas monitoring has been undertaken in general accordance with the guidance given in CIRIA Report 151 “Interpreting Measurements of Gas in the Ground” (1995), CIRIA Report 655 “Assessing Risks Posed by Hazardous Ground Gases to Buildings”, (2007) and the British Standards BS 8485:2015+A1:2019 “Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings”.

For the purposes of gas risk assessment, the proposed development is considered to be characterised as comprising a Type A building (residential properties), as defined in Table 3 of BS 8485:2015+A1:2019.

The ground gas monitoring has been undertaken over four visits to date, the results of which are summarised in Table 7.7. Full details of the ground gas monitoring results are included in Appendix G.

Table 7.7 Summary of Gas Monitoring (4 visits only)

Well	Methane Peak (range) %v/v	Carbon Dioxide Steady State (range) %v/v	Oxygen (range) %v/v	Peak Flow (range) litres/hr	Steady Flow (range) litres/hr
RO01*	ND	2.7 - 7.2	2.3 - 12.7	ND	ND
RO02*	ND	1.1 - 2.0	4.1 - 9.8	ND	ND
RO03*	ND	ND - 10.2	1.5 - 20.1	4.0 - 103.0	ND - 2.8

WS01	ND	0.7 - 1.8	17.5 - 18.0	ND	ND
WS03	ND	ND - 0.4	20.0 - 20.3	ND	ND
WS05	ND	0.2 - 4.1	8.1 - 19.6	ND - 5.5	ND
WS06	ND	1.1 - 5.6	11.2 - 17.4	-6.0 - 23.0	ND - 0.7
WS07	ND	ND - 0.4	19.7 - 19.9	ND	ND
WS09	ND	ND - 1.7	15.9 - 20.6	ND - 100.1	ND
WS12	ND	ND	17.2 - 18.6	ND - 178.0	ND
WS13	ND	0.6 - 2.2	16.0 - 17.7	ND	ND

ND - Not Detected
*Not recorded on visit one, as they were drilled on the same day monitoring was undertaken.

No significant VOCs (>1ppm) were encountered. Carbon monoxide and hydrogen sulphide concentrations of up to 5ppmv were detected in all monitoring wells during visit no. 4 (8th December 2020).

The monitoring programme comprises six visits over a three-month period. On completion of this monitoring, a full set of results will be issued in an addendum letter.

8. RESULTS OF CHEMICAL TESTING

The results of chemical analysis are provided in full within Appendix F.

8.1. Assessment Methodology

Soil Data

The laboratory test data for the relevant soil strata were reviewed for completeness and consistency. Those determinands that represent potential contaminants of concern were subject to further evaluation.

For each potential contaminant of concern, analytical data for soil samples were evaluated against the relevant Generic Assessment Criterion (GAC), taking account of the Soil Organic Matter (SOM) content. For this site, measured values were compared to GACs derived for a residential with plant uptake end use. Source data for all GACs are provided in Appendix H.

If any samples recorded contaminant concentrations that exceeded that GAC, then consideration was given to the applicability of statistical data evaluation in line with the methods described for the Planning Scenario in CL:AIRE “Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration”, 2020.

Where the relative ratio of concentrations of genotoxic PAH compounds to benzo(a)pyrene falls within the range suitable for use of the surrogate marker approach, such an approach is used as an initial screening tool for genotoxic PAH concentrations in soil. Calculations show that the soil PAH analyses obtained for the site generally conform to the distribution requirements for the use of the surrogate marker approach.

Water Data

The Sirius GAC values for controlled waters risk assessment, included within Appendix H are based on two sets of criteria; Environmental Quality Standards (EQS) values for surface water ecosystem receptors, and Drinking Water Standards (DWS) for potable groundwater and surface water sources.

The site is located over a Secondary A Aquifer but is not within a groundwater Source Protection Zone or within 1km of any licensed surface water abstraction points. However, a groundwater abstraction point is located on-site, and a surface water course is recorded to be present in the

east of the site. Therefore, groundwater analysis results have been evaluated against GAC values based on both EQS and DWS values.

8.2. Soil Analysis

Made Ground

Table 8.1 presents a summary of the analytical results obtained from fourteen samples of made ground and their evaluation against the applicable GACs. Determinands recorded to exceed their relevant GACs have subject to further assessment and evaluation.

In this instance, GACs have been conservatively applied based on 1.0% SOM, as shown within Table 8.1.

Table 8.1 Summary of Total Soil Concentrations - Made Ground

Determinand	No. of Samples Tested	Range of Results (mg/kg unless specified)	Home Grown Produce	No. of Samples >GAC	Samples Exceeding GAC
			1% SOM		
Metals					
Arsenic (Inorganic)	14	<1 - 93	37	4	WS03 1.6-1.8 WS07 0.4-0.6 TP01 0.6 TP02 1.5
Cadmium	14	<0.1 - 3.2	11	0	
Chromium (III)	14	12 - 92	910	0	
Copper^	14	6.6 - 110	200	0	
Lead	14	10 - 290	200	2	WS09 1.0-1.05 TP02 1.5
Mercury (Inorganic)	14	<0.1 - 0.47	40	0	
Nickel	14	9.8 - 49	130	0	
Selenium	14	<0.2 - 1.4	250	0	
Zinc^	14	21 - 580	450	1	WS09 1.0-1.05
Inorganics					
pH	14	7.3 - 10	5-9	3	Detailed below
Water Sol. Sulphate (g/l)	14	<0.01 - 0.44	0.5	0	
Speciated PAHs					
Acenaphthene	14	<0.1 - 22	200	0	
Acenaphthylene	14	<0.1 - 2.5	170	0	
Anthracene	14	<0.1 - 20	2300	0	
Benzo(a)anthracene*	14	<0.1 - 43	B(a)P	B(a)P	
Benzo(a)pyrene	14	<0.1 - 56	2.1	5	WS01 0.35-0.5 WS07 0.4-0.6 TP04 0.5-0.6 TP06 0.1-0.2

					TP07 0.3-0.5
Benzo(b)fluoranthene*	14	<0.1 - 70	B(a)P	B(a)P	
Benzo(g,h,i)perylene*	14	<0.1 - 32	B(a)P	B(a)P	
Benzo(k)fluoranthene*	14	<0.1 - 28	B(a)P	B(a)P	
Chrysene*	14	<0.1 - 44	B(a)P	B(a)P	
Dibenzo(a,h)anthracene*	14	<0.1 - 10	B(a)P	B(a)P	
Fluoranthene	14	<0.1 - 89	280	0	
Fluorene	14	<0.1 - 17	170	0	
Indeno(1,2,3-cd)pyrene*	14	<0.1 - 39	B(a)P	B(a)P	
Naphthalene	14	<0.1 - 7.4	1.0	3	TP02 1.5 TP04 0.5-0.6 TP06 0.1-0.2
Phenanthrene	14	<0.1 - 86	95	0	
Pyrene	14	<0.1 - 86	620	0	
Organics					
Aliphatic EC 5-6	7	<1	24	0	
Aliphatic EC >6-8	7	<1	53	0	
Aliphatic EC >8-10	7	<1 - 49	13	3	WS07 0.4-0.6 WS13 0.2-0.4 TP04 0.5-0.6
Aliphatic EC >10-12	7	<1 - 20	62	0	
Aliphatic EC >12-16	7	<1 - 74	510	0	
Aliphatic EC >16-35	7	2 - 400	41000	0	
Aromatic EC 5-7	7	<1	53	0	
Aromatic EC >7-8	7	<1	100	0	
Aromatic EC >8-10	7	<1 - 170	20	3	WS07 0.4-0.6 WS09 1.0-1.05 WS13 0.2-0.4
Aromatic EC >10-12	7	<1 - 64	63	1	WS13 0.2-0.4
Aromatic EC >12-16	7	<1 - 220	140	1	TP04 0.5-0.6
Aromatic EC >16-21	7	<1 - 710	260	2	WS13 0.2-0.4 TP04 0.5-0.6
Aromatic EC >21-35	7	<1 - 3000	1100	2	WS13 0.2-0.4 TP04 0.5-0.6
Benzene	7	<1	0.063	0	
Toluene	7	<1	100	0	
Ethylbenzene	7	<1	26	0	
Xylenes (total)	7	<1	28	0	
MTBE	7	<1	31	0	
Other					
Phenol	14	<0.3	110	0	
TOC (%)	14	<0.2 - 12	3	9	Detailed below
Asbestos (%)	14	NAD - Chrysotile	NAD	1	TP06 0.1-0.2

Table based on a Residential with Gardens end use (with consumption of home-grown produce). GAC - Stage 1 generic assessment criteria. * Assessed using benzo(a)pyrene as a surrogate marker, except where stated in text. # GAC has been derived in line with Sirius standard GAC. NAD – No Asbestos Detected.

Metals and Metalloids

Arsenic was recorded at concentrations in exceedance of the relevant GAC of 37mg/kg within four samples of the made ground (two granular and two cohesive). Statistical analysis of the dataset indicates three of the four samples obtained from TP01 at 0.6m bgl (74mg/kg), WS07 0.4 to 0.6m bgl (75mg/kg) and TP02 at 1.5m bgl (93mg/kg) to be outliers. The statistical outliers have been incorporated within the dataset on this occasion however, given the variable made ground matrix and absence of identifiable associated hotspots. Statistical analysis of the dataset indicates 95% and 99% upper confidence levels exceeding the relevant GAC. On this basis, arsenic within made ground soils is therefore considered to pose a potentially unacceptable risk during normal site occupancy.

Lead was recorded at concentrations in exceedance of the relevant GAC of 200mg/kg within two samples of granular made ground. Statistical analysis of the dataset shows a log-symmetric distribution, with no samples considered to be outliers; the dataset has a 95% upper confidence interval of 159mg/kg and a 99% upper confidence interval of 180 mg/kg. Given the upper confidence intervals are below the GAC, the localised elevated concentrations of lead are considered to pose a low risk to human health.

A concentration of zinc was recorded to exceed the relevant threshold value within a granular made ground sample. The equivalent GAC value for zinc with respect of human health protection is 665,000mg/kg. Consequently, the risk to human health from the elevated levels of zinc in made ground is considered to be low.

No other metals recorded concentrations above the relevant GAC.

Other Inorganic Analytes

Concentrations of pH were recorded outside of the acceptable range in three made ground soil sample tested. The slightly alkaline pH value may have the potential to cause skin irritation. Exposure of construction workers during enabling works can be mitigated through the use of appropriate personal protective equipment (PPE) and good hygiene practices. The results are considered further in Section 10.5, as part of the risk to the built development.

Total organic carbon (TOC) was recorded at a concentration exceeding the relevant GAC within several made ground samples. TOC does not pose a potential risk to human health and is specified at the ‘Inert’ waste threshold for information purposes only.

No other inorganics recorded concentrations above the relevant GAC.

Organics

Five samples of both granular and cohesive made ground recorded concentrations of benzo(a)pyrene in excess of the Stage 1 (2.1mg/kg) and Stage 2 (4.9mg/kg) GACs for residential use (with homegrown produce). Recorded statistical outliers have been incorporated within the dataset given the variable made ground matrix and absence of identifiable associated hotspots. Calculation of both the 95% and 99% upper confidence interval levels also indicates exceedances of the relevant GACs. Benzo(a)pyrene within made ground soils is therefore considered to pose a potentially unacceptable risk during normal site occupancy.

The sample for which the surrogate marker approach was not valid for chrysene (TP02 at 1.5m bgl) recorded a concentration of 1.4mg/kg. The non-surrogate marker GAC for chrysene is 57mg/kg, indicating the made ground sample does not pose a risk to human health.

Three samples of granular made ground recorded elevated concentrations of naphthalene in excess of the Stage 1 and Stage 2 GAC of 1mg/kg for a residential use (with homegrown produce). Statistical analysis of the dataset indicates one sample obtained from TP04 0.5-0.6m bgl (7.4mg/kg) to be an outlier. The sample obtained from TP04 at 0.5-0.6m bgl was noted with a corresponding hydrocarbon odour, and should be considered as a hotspot, requiring remediation. The two remaining samples displaying marginally elevated concentrations of naphthalene (TP02 at 1.5m (1.4mg/kg) and TP06 at 0.1m-0.2m (2.1mg/kg), did not have any corresponding hydrocarbon odours.

A re-assessment of the concentrations of naphthalene within TP02 at 1.5m and TP06 at 0.1-0.2m against the relevant GAC based on a 2.5% SOM, indicates concentrations to below the GAC of 2.3mg/kg. This is considered acceptable in this instance, given the relatively high TOC contents recorded within the made ground. Naphthalene within made ground soils is therefore not considered to pose a potentially unacceptable risk during normal site occupancy (with the exception of the identified hotspot within TP04 at 0.5-0.6 bgl).

Selected made ground soil samples were submitted for speciated TPH analyses where there was visual or olfactory evidence for hydrocarbon contamination and to also achieve a general site coverage. Concentrations of TPH fractions were above the relevant GAC's in four of the seven samples analysed. The elevated TPH fractions comprised aliphatic carbon band C8-C10 and aromatic carbon bands C8-C35, within samples obtained from WS07 at 0.4m-0.6m, WS09 at 1.0m-1.05m, WS13 at 0.2m-0.4m and TP04 at 0.5m-0.6m depth. These samples should be considered

as potential hotspots, requiring further consideration and / or remediation, albeit only the sample from TP04 at 0.5-0.6m displayed any corresponding hydrocarbon odours.

The total risk from the sum of TPH fractions present within the three remaining samples was assessed by means of a Hazard Index (HI) calculation. This involves calculation of the HI for each component and summing these values for all TPH fractions. A total HI value of <1 indicates that exposure is below a value that could be considered to pose a potential risk to human health, whereas values of >1 indicate potentially unacceptable exposures. The calculated HI values were less than 1, and as such indicate that the identified TPH concentrations identified within the three remaining made ground samples do not represent a potential risk to human health.

One sample of made ground soil obtained from TP07 at 0.3 to 0.5m bgl (located in close proximity to the existing sub-station) was analysed for a PCB WHO 12 suite. All concentrations were below the laboratory limits of detection.

Asbestos

Chrysotile fibres / clumps were recorded in granular made ground soils obtained from TP06 at 0.1m-0.2m depth. Quantification analysis on the sample indicates a mass asbestos volume of <0.001%. The granular made ground sample from TP06 was described as comprising gravels of brick, asphalt, concrete, sandstone and rare clinker, indicative of demolition rubble type material.

No asbestos fibres were detected within the remainder of the made ground soil samples tested.

Volatile Organic Compounds (VOCs)

Four samples of made ground were analysed for a suite of 53 individual VOC compounds; none were present in concentrations greater than the laboratory's limits of detection (LoD).

Combustibility Screening Test

One sample of ash and clinker / coal type made ground (WS02 0.5 to 0.6m bgl) was subjected to Cairney combustion susceptibility classification testing, which involves exposing a subsample of the material to temperatures of 650 – 700^0c and recording the behaviour of the sample. The combustion susceptibility is graded from A (most susceptible) to F (least susceptible), (samples classified as C to F above are considered not susceptible to combustion) as follows:

A) Sample ignites and continues to burn vigorously after heat withdrawn.
B) Sample ignites and burns weakly or smoulders after heat withdrawn.

C) Sample ignites but does not persist burning after heat withdrawn.
D) Volatiles (e.g., gaseous fumes) emitted, some bubbling, material does not ignite (inert material).
E) Sample glows but does not ignite (inert material).
F) Sample does not glow – slight crackling (inert material).

The sample analysed was classified as D, i.e., not susceptible to combustion.

Bound Macadam / Asphalt Hardstanding

Two samples of bound macadam / asphalt hardstanding were submitted for coal tar laboratory analysis. The results indicate the absence of a coal tar base within both samples. The TPH interpreted the binder to be heavy oil in one sample and PAH in the other; no gasoline or diesel was recorded to be present.

Reworked Topsoil

No determinants recorded at concentrations above the relevant GAC within the sample of reworked topsoil tested.

Natural Ground

A marginally elevated concentration of naphthalene was encountered (1.3mg/kg vs a GAC of 1.0 mg/kg) in TP04 within natural soils sampled from a depth of 1.3m-1.5m bgl (obtained below the sample removed as an outlier from the made ground dataset). It is considered that the natural soils in the area of TP04 should also be assessed as a hotspot, requiring further consideration and / or remediation.

One sample of natural soil obtained from WS10 at 0.7m to 0.9m bgl (located in close proximity to the existing sub-station) was analysed for a PCB WHO 12 suite. All concentrations were below the laboratory limits of detection.

No other determinants recorded concentrations above the relevant GAC within the natural soils tested.

Combustibility Screening Test

Four samples of residual LCM soil and a sample of LCM bedrock were subjected to Cairney combustion susceptibility classification testing; the samples analysed were classified as E and F, i.e., not susceptible to combustion.

8.3. Groundwater Analysis

Groundwater samples were obtained from rotary boreholes RO01, RO02 and RO03 and window sample boreholes WS06 and WS13. All samples were collected directly from the standing groundwater within the borehole with a disposable bailer following purging; no odour, sheens or free phase product was encountered during the purging or sampling.

It should be noted that due to insufficient volumes of groundwater retrieved from WS13, the sample was not collected in the full suite of containers, and as such, it is noted as deviating in the chemical results.

The results of the groundwater analyses and the outcome of screening are summarised in Table 8.2. Where there is no applicable GAC for a given contaminant / parameter, it is excluded from the table for brevity.

Table 8.2 Summary of Groundwater Results

Determinand	No. of Samples Tested	Range of Results (µg/l unless specified)	GAC value (µg/l unless specified)		No. of Samples Above EQS GAC	No. of Samples Above DWS GAC
			EQS	DWS		
Metals						
Arsenic	5	<1 - 1.7	50	10	0	0
Cadmium +	5	0.08 - 0.3	0.08	5	2	0
Chromium	5	1.2 - 9.8	4.7	50	3	0
Copper	5	<1 - 2	1	2000	3	0
Lead	5	<1.0	1.2	10	0	0
Mercury*	5	<0.5	0.07	1	0*	0
Nickel	5	1.7 - 18	4	20	2	0
Zinc	5	7.5 - 54	10.9	5000	4	0
Inorganics						
Total ammonia (as N) + (mg/l)	5	<0.05 - 5.7mg/l	0.3mg/l	NA	2	NA
Sulphate	5	97 - 190mg/l	NA	250mg/l	0	0
Organics						
Anthracene	5	<0.1	0.1	NA	0*	NA
Benzo(a)pyrene*	5	<0.1	0.00017	0.01	0*	0*
Fluoranthene*	5	<0.1	0.0063	NA	0*	NA
Sum of benzo(b)fluoranthene and benzo(k)fluoranthene	5	<0.1	NA	Sum of 4 = 0.1	NA	0*
Sum of benzo(ghi)perylene and indeno(1,2,3-	5	<0.1	NA			

cd)pyrene						
Naphthalene	5	<0.1	2	NA	0	0
Phenol (mg/l)	5	<0.03	7.7	NA	0	0
TPH (speciated analysis) per fraction^	5	<10	10	10	0	0
BTEX and MTBE compounds						
Benzene	5	<1	10	1	0	0
Toluene	5	<1	74	700	0	0
Ethylbenzene	5	<1	20	300	0	0
Xylenes (sum)	5	<1	NA	500	0	0
Methyl tert-Butyl Ether (MTBE)	5	<1	2600	200	0	0

N/A - Not Applicable. + - EQS is hardness related; in the absence of surface water data, assessment criteria are based on most conservative groundwater hardness value of <40mg/l for cadmium and <10mg/l for ammonia. * - Laboratory detection limits are higher than GAC value; only positively identified concentrations above limit of detection are considered as potential exceedances in this assessment. ^ - No sample returned TPH concentrations in excess of the limit of detection (LoD) per fraction.

Metals and Metalloids

Elevated concentrations (when compared to EQS values) of cadmium, chromium, nickel and zinc were recorded in a number of groundwater samples (obtained from both the rotary and window sample borehole installations). In addition, very marginally elevated concentrations of copper (when compared to EQS values) were recorded in three groundwater samples.

Inorganic Analytes

Elevated concentrations of ammonia (when compared to the EQS) were recorded in two of the five samples analysed. The highest concentration (5.7mg/l) was encountered in RO01 in the west of the site.

Organic Analytes

No concentrations of PAHs or TPH fractions above the LoD were encountered.

9. REVISED CONCEPTUAL SITE MODEL

The preliminary combined conceptual site model and conceptual exposure model, developed from the desk study information and presented in Section 5, has been revised in light of the ground investigation and the chemical analysis results presented above.

The revised conceptual model has been developed for the proposed future land use (residential with consumption of homegrown produce). This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors. The revised conceptual model is presented in schematic form in Appendix A, Drawing No. C7340/07.

9.1. Summary of Residual Contaminant Linkages

The qualitative risk assessment of identified contaminant linkages has also been revised, following the methodology described in Appendix D. In summary, the revised CSM has identified the following residual contaminant linkages (defined as being greater than “low” risk) that could result in an unacceptable risk in the proposed end-use:

- Inhalation and ingestion of, and dermal contact with, made ground in which elevated concentrations of arsenic and benzo(a)pyrene are present. These linkages are assessed as posing a **moderate** risk to future site users and construction workers unless the impacted soils are placed below hardstanding or clean cover soils.

- Inhalation of localised asbestos fibres / ACMs, posing a **moderate to high** risk to future residential end-users, adjacent site users and construction workers unless the impacted soils are below hardstanding or clean cover soils.

- Ingestion, inhalation and dermal contact of locally elevated concentrations of naphthalene and TPH detected within made ground and shallow natural soils posing a **moderate** risk to future residential end-users, adjacent site users and construction workers.

- Migration of metals and ammonia within groundwater posing a **low to moderate** risk to controlled waters (including underlying Secondary A Aquifer and on-site surface water features).

An assessment of the risk to the proposed development from hazardous ground gases is yet to be finalised following completion of the ground gas monitoring programme.

10. CONCLUSIONS AND RECOMMENDATIONS

10.1. General

Sirius was commissioned by Paramount Retail Group Holdco Ltd to undertake a geoenvironmental appraisal of land at the former Greenside Mills, Skelmanthorpe, as defined by the red line shown on the Site Features Plan in Appendix A (Drawing No. C7340/02).

It is understood that consideration is being given to redevelopment of the site with 55 low rise residential properties (not exceeding three storey) with associated gardens, areas of soft landscaping, hard surfaced roadways / hardstanding and areas of POS. A proposed development layout has been provided by the client (Drawing ref. SK02, Draft Layout, dated November 2016 by STEN Architecture) which is included in Appendix A. The area of proposed development is approximated by the blue line shown on the Site Features Plan (Drawing No. C7340/02).

Whilst it is acknowledged that cut and fill earthworks are likely to be required to provide development levels, in the absence of any proposed levels, it has been assumed at this stage that ground levels will not change significantly from those as existing. Amendments to the interpretation and conclusions in this report may therefore be required following derivation of final layouts and levels.

10.2. Flood Risk

The EA record the site to lie within a Flood Zone 1. An updated flood risk assessment may be required to support a planning application for development of the site.

10.3. Geotechnical

Mining and Quarrying

Published geological information conjectures the Whinmoor (Top Whinmoor) and Low Whinmoor coal seams to outcrop to the north of the site, dipping to the northwest, beyond the northern most conjectured fault on site. The site is conjectured to lie within three geological fault blocks.

The site investigation undertaken has identified two seams / leaves of intact coal within the north of the site (R03) at depths of 2.4m and 4.2m bgl, with evidence of mine workings towards the south (R02) at a depth of 3.8m bgl (likely representative of the Whinmoor (Top Whinmoor) and / or Low Whinmoor coal seams). No coal or evidence of mine workings were identified within the western

area of the site, inferred to the west of the two on-site faults, as shown on Drawing No. C7340/06 in Appendix A.

The ground investigation has confirmed that insufficient rock cover exists above the identified coal seams / mine workings within **central and eastern site areas**, and as such are considered to pose a **high risk** to surface stability, requiring further investigation, assessment, and subsequent treatment / stabilisation. Further investigation is also required to assess the risk of shallow mine workings to western site areas, although the risk is presently considered as low.

It is recommended that a series of rotary probeholes are undertaken across the site post demolition and clearance, to confirm the underlying stratigraphy and location of the inferred faults, and to better determine the extent of shallow mine workings within each geological fault block. Mine stabilisation works will be required within identified areas of mine workings. The scope of any required treatment works would need to be approved by the regulatory and other relevant authorities (i.e. local highways department, Coal Authority, building control and NHBC).

Consideration could be given to the mass extraction of coal and remnant mine workings prior to development. This would be subject to the proven extent of mine workings (and subsequent volumes of remnant workable coal) and a cost value / feasibility assessment of extraction vs the current economic value of coal.

No mine entries are known to exist on the site. However, the possibility of encountering unrecorded mine entries, including bell pits and crop workings, cannot be discounted. It is therefore recommended at this stage that the footprints of proposed plots and highways are stripped back to natural strata and examined for evidence of mine entries. If a mine entry/disturbed ground is suspected, advice regarding treatment/foundation precautions should be sought immediately from a suitably qualified engineer.

Inspection of historical OS plans has not revealed any evidence of quarrying or pitting beneath the site. The possibility of encountering unrecorded quarries / pits cannot however be wholly discounted. It is recommended that excavations be examined for evidence of such features. If evidence of an infilled quarry / pit is suspected, works should cease, and the advice sought of a suitably qualified consultant.

Foundations

The recommendations provided below assume that further investigation and subsequent appropriate treatment of shallow mine workings and any identified mine entries (i.e. drilling

and pressure grouting) will be undertaken. It also assumes additional post-demolition site investigation is undertaken once access permits to prove ground conditions within the currently inaccessible eastern site area. If these assumptions are not proven to be the case, or significantly different ground conditions are encountered than those described herein, then modification to foundation design may be required.

The following discussion is based on development of the site with low rise (two and three storey) residential properties with private gardens. Proposed development loads were not available to Sirius at the time of writing, though these are expected to be relatively light.

No proposed development levels have been provided to Sirius to date.

The investigation has identified made ground across the site typically to depths less than 1m bgl, in turn underlain by a variable thickness of natural residual LCM soils, to depths of between 0.95m and >2.7m bgl. The weathering profile of the LCM was generally found to comprise medium to high strength clays underlain by destructured siltstone bedrock.

Areas of deeper made ground (locally exceeding a depth of 3.0m bgl) were encountered within southwestern and central / eastern site areas which is considered representative of potential cut and fill exercises / localised shallow coal extraction previously on site. Deeper made ground within the southwest may be representative of backfilled former basements associated with historical residential properties located in that area. Other substructures (including possible relict foundations) should be anticipated to be locally encountered during earthworks.

Ground conditions are currently unknown within the eastern, inaccessible site area.

Made ground may be locally encountered at formation level; it is considered that this stratum is unsuitable to support structural loads associated with this development owing to the possibility of bearing capacity failure and excessive total/differential settlements. It is therefore recommended that the most suitable foundation solution would comprise spread foundations (strip and trench fill) taken down through the made ground into the underlying natural ground of adequate strength. It is considered for the proposed development, formations on natural materials are expected to predominantly comprise medium strength cohesive residual soils. Where made ground exceeds a depth of approximately 2.5m bgl, alternative foundations such as piles or vibro-compaction techniques could be considered.

The underlying cohesive residual soils (at least firm in consistency and medium in strength) are considered to have a characteristic undrained shear strength (Cu) of 60kPa, at a founding depth of

1.0m bgl. By way of example, calculations indicate a 0.60m wide strip, bearing on the cohesive residual soils (at least medium, to high strength) at a depth of 0.90m bgl, can impose a maximum line load of 75kN/m run. It is anticipated, in view of the nature of this material, that the application of such a pressure would keep settlements to 25mm or less.

The cohesive residual soils on this site have been found to be of low to medium shrinkability as defined in NHBC Standards, Chapter 4.2. Foundations placed into cohesive residual soils should be a minimum of 900mm deep (below finished or original ground levels, whichever is the lower), locally deepened within the zone of influence of existing or proposed trees.

A tree survey was beyond the scope of this investigation but should be undertaken to enable production of a detailed foundation schedule. The removal of trees during development of the site may cause heave of cohesive soils and heave protection measures should be adopted in foundation design where appropriate.

Based on data from this investigation, granular residual soils are not widely present. Notwithstanding the above, in the event granular soils are encountered, foundations bearing upon granular residual soils should be placed a minimum of 500mm below finished ground level to alleviate any effects arising from frost heave beneath the foundation.

It is anticipated that weathered / competent bedrock may be encountered at shallow depth. If foundation excavations encounter bedrock, it is recommended that all of the foundation be placed onto a consistent stratum in order to limit the potential for unacceptable differential settlements. The recommended line load provided above is unlikely to exceed the bearing resistance of weathered siltstone. Should the depth to rock be found to slope below proposed foundations, foundations may need to be stepped down to ensure that the foundation bears entirely onto the weathered rock.

The above calculations are based on theoretical foundations. Settlements of foundations upon cohesive residual soils and rock are dependent on foundation loading and dimensions. It is therefore recommended that foundation settlements are reviewed once final loading arrangements and foundation sizes are known.

The Whinmoor (Top Whinmoor) and Low Whinmoor coal seams are recorded to outcrop to the north of the site. Two seams / leaves of coal have been identified near surface below the site, assumed to represent the Whinmoor coals. Very shallow coal seams were often historically exploited. In view of this, the viability of spread foundations will depend on the presence / absence of bell pits / crop workings, coal, and the thickness of competent roof material above workings

following treatment and stabilisation. This should be assessed on completion of the recommended post demolition rotary probing investigation.

If coal is encountered at normal formation depth within foundation excavations, the excavation should be extended through the coal seam into competent strata below. If the depth to the base of coal increases to greater than 2.5m bgl within the foundation excavation, then an alternative engineer-designed foundation (e.g. deep trench fill) may be required. In addition, foundations extending through any shallow coal seams will require protection from potential spread of fire; this typically involves the installation of a sacrificial concrete barrier to the external faces of foundations. Advice should be sought from a suitably qualified structural engineer.

Consideration should be given to the reinforcement of foundations within the vicinity of the geological faults, recorded to cross the eastern areas of the site, in order to mitigate potential differential settlement/residual movement which may be caused from mine workings. If any evidence of the conjectured faults crossing the site are encountered as part of enabling / foundation excavation works, advice should be sought from a suitably qualified engineer.

Piled / Vibro Foundations

Should it be considered that spread foundations are not feasible within parts of the site because of the excessive depth required for excavation, it is recommended that piled foundations are used, terminating within the underlying LCM bedrock. Piling contractors have their own proprietary methods of working. It is therefore recommended that consultation with a specialist piling contractor takes place at an early stage in the construction process.

Alternatively, consideration could also be given to stabilisation of the made ground by vibro replacement. Similarly, it would be prudent to seek the advice of specialist ground improvement contractors to ascertain the effectiveness of their particular propriety treatment methods for these ground conditions. It should be noted however that foundations placed upon/ within vibro compacted ground must extend to the same depth as spread foundations where within the influence of trees.

It must be ensured that piles/vibro columns do not introduce any preferential pathways for the migration of contaminants and the guidance given in the Environment Agency document ‘Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention’ should be followed and discussed with the Environment Agency prior to undertaking any piling/vibro operations.

General Foundation Considerations

Foundations should be taken below a line drawn up at 45° from the base of any existing or proposed services.

Given the site's historical uses, the potential for substructures and / or localised contaminated soils (and / or associated perched water / groundwater) should not be discounted. Any such constraints may require deep excavation and removal, with local dewatering. The layout of foundations should consider any relic foundations, structures or other potential obstructions that are present within the site. These foundations/substructures would need to be removed to avoid forming obstructions to piling or hardspots beneath spread foundations.

Foundation arrangements will need to consider the location of the existing surface water feature (recorded to be locally culverted) to ensure that no undue loading is placed onto these structures. Additionally, the EA should be consulted to determine what, if any, restrictions they may impose on development over/adjacent to the surface water stream (or culvert).

Groundworks, Excavation Stability and Groundwater Dewatering

It is acknowledged that earthworks (including cut and fill operations) will be required at the site in order to create level development platforms. It is recommended that any made ground generated as part of the cut and fill operations proposed for re-use is sorted, classified and compacted in a controlled manner in accordance with an approved earthworks specification (including chemical and geotechnical verification). The quantity and type of earthwork testing will be dependent on final development levels.

Excavations into the made ground or natural soils should be assumed to be unstable. No personnel entry into unsupported excavations shall be allowed without an appropriate risk assessment. Reference to CIRIA report 97 (1983) should be made to establish suitable means of support or battering of excavation sides.

Parts of the site are covered by reinforced concrete and tarmacadam hardstanding, with deeper concrete / foundations / structures associated with relic features anticipated. Shallow rockhead will also likely be encountered within parts of the site during excavation works. In view of this the use of hydraulic or pneumatic breakers is recommended.

Based on the results of this investigation, minor groundwater seepages or inflows within shallow excavations (<1.0m) are considered unlikely across the site. However, if groundwater is

encountered at shallow depth then it should be possible to deal with seepages through normal site pumping practices for any shallow excavations open for short periods of time. For deeper excavations, a point dewatering system may be required. Disposal / discharge of water will require appropriate treatment / consent.

It is recommended that an adequate drainage system for surface water be installed by a competent contractor in order to prevent surface water ponding or collecting both during and post construction, as this may lead to deterioration of the founding stratum.

To reduce the possibility of softening or swelling of cohesive soils at the base of foundation trenches, these should be suitably blinded with concrete in the event foundation concrete is not placed immediately.

If greater structural loads are anticipated, alternative foundation solutions may be required.

Slope Stability / Existing Retaining Wall

Assessment of the suitability / stability of the existing retaining structures (if to be maintained and incorporated into the proposed development), located within the northwest of the site, within context of the proposed development levels and proposed foundation loads was outwith the remit of this investigation.

The presence of slopes / embankments around the site should be considered, within the context of the proposed development layout and levels. Some regrading / retaining is anticipated at this stage.

It is recommended that as part of the detailed design a site inspection and preliminary slope assessment be undertaken of the slopes when final development levels and layout are known. Detailed quantitative slope stability assessment maybe required by the NHBC / Local Authority as part of detailed design proposals.

Should any cut and fill earthworks be undertaken at the site, then consideration will have to be given to the potential risk of undermining existing neighbouring buildings, infrastructure, adjacent highways and existing slopes.

Floors

Suspended floor slabs will be required where soil swelling may occur (i.e. within the zone of influence of existing or proposed trees or hedges), where the ground has insufficient bearing capacity, and/or if made ground in excess of 600mm thick is encountered.

It would be prudent at this stage to give consideration to any gas protection measures required to be incorporated into the floor slab design.

Sulphate Attack

Based on the samples tested, a Design Sulphate Class of DS-1 and an ACEC Class of AC-1 should be used for buried concrete structures.

Pavements and Highways

Should any evidence of shallow mine workings (for example, bell pits) be encountered beneath the alignment of proposed roads / pavements, these features will normally require grout consolidation / treatment, and/or consider the incorporation of reinforcement, such as layers of geogrid to stiffen the highway to mitigate any subsidence of the subgrade.

At this stage the sub grade is likely to comprise natural residual clays; remoulded CBR testing of this stratum has returned CBR values of between 0.4 and 2.0%. Using geotechnical data including Atterberg Limit results and Table 5.1 from IAN 73/06, a preliminary design CBR of 2.0% could be assumed for natural residual clay soils which form the sub grade. Notwithstanding the above, it is recommended that in-situ CBR testing be carried out along the alignment of proposed highways, following completion of the enabling works and when final site levels will be known.

All road design should be discussed with the relevant local authority if highways are to be subject to a Section 38 Agreement.

Soakaways

Based on the proven ground conditions (i.e. natural deposits predominantly comprising low permeability clay), soakaway drainage is considered unlikely to be viable across the majority of the site. Should consideration be given to the use of soakaway drainage into natural materials, in situ infiltration tests will be required to assess the suitability of the underlying soils for soakaways.

Should soakaway drainage be utilised on site, it is recommended that the Local Authority and the Environment Agency are consulted.

Reservoirs and Surface Watercourse

Reservoirs for process water were recorded to be historically present in the east of the site and LIDAR information suggests that depressions associated with these features still remain on-site. Access into the eastern site area was not possible as part of this investigation as a result of dense overgrown vegetation.

The former reservoirs will require consideration as part of any earthworks; their construction and current condition are unknown. The existing mill pond was noted to be brick-lined, which should be considered as part of foundation design. Substructures would need to be removed to avoid forming obstructions to piling or hardspots beneath spread foundations.

A surface watercourse is recorded to be present in the east of the site, which should be considered as part of development proposals.

Services

Existing live services are present within the site area, including an electricity sub-station. Currently it is unknown which services are proposed to be either retained or diverted as part of the proposed development.

10.4. Asbestos-Containing Materials

Asbestos-containing materials were identified within made ground soils in TP06. These will not pose a risk to end users if left undisturbed and covered by hardstanding. However, if it is to be disturbed and/or is located within proposed gardens or areas of soft landscaping, then it is recommended that appropriate remedial measures are adopted, as detailed below in Section 10.5.

The possibility of asbestos sheeting used as shuttering, and/or further fragments of asbestos-containing materials within made ground or fill materials beneath concrete slabs cannot be discounted. If encountered, advice should be sought from an appropriately qualified asbestos specialist and an appropriate strategy developed for the safe removal/disposal of the material.

Construction workers involved in the groundworks and demolition/construction during the site redevelopment are at high risk from asbestos given their more intensive exposure. These risks can be reduced by appropriate PPE and hygiene precautions and good working practices. Similarly,

during earthworks and construction of foundations all reasonable measures, which may include the wetting of the impacted material, air monitoring etc., shall be put in place in order to minimise, as far as practicable, the release of asbestos fibres.

As part of any future redevelopment works, the existing buildings on site are expected to be demolished. A pre-demolition asbestos survey will be required (if not already undertaken) prior to commencing demolition works.

10.5. Soil and Groundwater Contamination

Risk Evaluation for the Proposed Land Use (residential with consumption of homegrown produce)

The revised conceptual site model indicates that potentially unacceptable contaminant linkages exist for site end-users and controlled waters. Contaminant linkages assessed as a Low or Negligible risk are not considered significant or requiring remedial action and are not discussed further.

Human Health Receptors

Elevated concentrations of arsenic and benzo(a)pyrene have been detected within made ground soils across the site, which are considered to pose a risk to human health through dermal contact, dust inhalation and soil ingestion pathways.

In addition, asbestos fibres / clumps were locally identified within one sample of made ground from TP06 (with fibres recorded at a mass concentration of <0.001%). Asbestos impacted made ground soils are considered to present an unacceptable risk to human health should these materials be used in areas of private gardens, adoptable highways and soft landscaping. However, it is considered that should the localised asbestos impacted made ground soils be placed beneath proposed buildings or hardstanding, the pathway would be broken and the risk to site end users would be adequately reduced. A higher risk to human health is noted for construction and maintenance personnel during the construction phase of the development.

Localised hydrocarbon impacted made ground soils were detected within shallow made ground (<1m) within WS07, WS09, WS13 and TP04. In addition, locally elevated concentrations of naphthalene have been recorded within the made ground in TP04 which are considered to pose a risk to human health through vapour inhalation pathways.

No associated visual or olfactory evidence of hydrocarbon contamination was noted within exploratory holes WS07, WS09 and WS13. It is recommended that additional investigation be undertaken within these localities to assess the presence / extent of any possible hydrocarbon source.

Made ground soils are considered to pose a potentially unacceptable risk to site end users in a residential with consumption of homegrown produce end use post-development scenario, and require remedial action, as discussed below.

Controlled Waters Receptors

Marginally elevated concentrations of ammonia and metals were recorded within groundwater sampled below the site. This is currently considered to pose a low to moderate risk to controlled waters, however, this could be assessed further by means of sampling and testing the on-site surface water feature, once access permits.

On the basis that identified hydrocarbon hotspots are to be appropriately remediated, no other significant contaminant linkages have been identified which are considered to pose a significant risk to controlled waters.

Utilities

It is recommended that the results of the chemical testing and details of the proposed remedial works are provided to the appropriate utility companies to determine the necessity for service protection.

The likely local presence of shallow coal seams should also be highlighted to utility companies, to ensure utilities are protected, and the risk of combustion mitigated.

Construction and Maintenance Workers

Contamination may pose a short-term (acute) or long-term (chronic) risk to workers during construction and maintenance. The potential risks must be specifically assessed as part of the health and safety evaluation for the works to be performed in accordance with prevailing legislation. Site practices must conform to the specific legislative requirements and follow appropriate guidance (e.g., HSE, 1991; CIRIA, 1996).

On the basis of the results obtained, the principal potential exposure risks to workers may arise from arsenic, PAH’s, TPH and localised asbestos in made ground soils.

Outline Remediation Requirements

Shallow hydrocarbon (and locally naphthalene) contaminated soils (<1m) in the central area of the site (encountered within Sirius exploratory hole TP04) are considered to pose a risk to site end users and should be excavated and either treated on-site or be removed from site to a suitably licensed landfill. It is recommended that an experienced geoenvironmental engineer be in attendance during excavation and removal of grossly hydrocarbon-contaminated soils. It is recommended that additional investigation be undertaken within the localities of exploratory holes WS07, WS09 and WS13 to assess the presence / extent of any possible hydrocarbon sources.

Made ground across the site has been found to contain elevated concentrations of arsenic and benzo(a)pyrene. The presence of asbestos fibres has also been locally recorded within made ground in TP06.

At this stage it is recommended that a minimum 600mm of clean cover be placed in areas proposed for private gardens and a minimum 450mm of clean cover within proposed soft landscaping across the proposed development area (comprising suitable topsoil and subsoil), where made ground is present. Deep rooted plants would need to be 'potted'.

Elsewhere, where the site is underlain directly by natural ground, a nominal 150mm depth of suitable topsoil should be provided in gardens and areas of public open space to provide a suitable medium for plant growth.

In view of the asbestos identified locally within made ground in TP06, it is recommended that as part of the enabling works further samples be tested for the presence of asbestos to delineate this area and appropriate remedial measures taken. Identified ACMs in shallow made ground soil in TP06 should be excavated and subject to verification, with excavated materials removed from site or placed at depth below hardstanding and away from areas of subsequent excavation (i.e. service/utility trenches).

It is recommended that any visible ACMs should be picked from exposed made ground soils, should they be encountered during any remediation and enabling works. Any visible asbestos fragments should be carefully picked by a CAT B trained operative, double bagged and placed into a secure area for subsequent disposal.

PCB testing in close proximity to an existing sub-station has recorded concentrations below the laboratory limit of detection. If development proposals allow for the removal or replacement of the

sub-station, then supplementary PCB testing is recommended below the sub-station footprint to confirm whether additional local remediation is required.

Potential areas of geoenvironmental concern at the site include the former reservoirs in the east of the site, the locations of which were inaccessible as part of this site investigation. A supplementary post-demolition phase of investigation is recommended to assess the extent, ground conditions and any contamination present in the area of these features, and to confirm / update the findings and recommendations made within this report. The surface water feature within this area should be sampled and tested for a suite of metals and inorganics, should this be possible.

Any enabling / cut and fill works completed at the site should be undertaken under a CL:AIRE Development Industry Code of Practice Materials Management Plan (MMP); the MMP will need to be declared to CL:AIRE prior to commencement of earthworks.

It is possible that areas of more significant contamination, not identified to date, may be encountered on site during excavation and construction works. If any areas of noxious, odorous, brightly coloured, fibrous, liquid or other potential contamination are encountered, then further advice should be sought from a suitably qualified consultant.

Any soils removed from site should be undertaken in accordance with the current Duty of Care regulations, the EC Landfill Directive and the EA Technical Guidance Document WM3, dated 2015. Chemical results should be forwarded to suitably licensed soil treatment centre and/or landfill operators to determine disposal options.

10.6. Ground Gas

Summaries of the gas results to date within the site are provided below. Calculated Q_{hg} (Quantity of Hazardous Gas) and Gas Screening Values (GSVs) are provisional only and may be subject to change based on future monitoring data.

The results to date have revealed no detectable methane concentrations and maximum steady state carbon dioxide concentrations of 10.2% v/v. A steady flow rate of 2.8 litre/hour was recorded in RO03 on one occasion. A peak flow rate of 178.0 litre/hour has been recorded within WS12 on one occasion.

Based on these data, worst case Q_{hg} values of 0.1780 litres/hour for methane and 0.2856 litres/hour for carbon dioxide have been calculated. If these values are applied as provisional

GSVs for the site, then the results are indicative of a low hazard potential, characterised as Characteristic Situation 2 (CS2), as defined in Table 2 of BS8485:2015+A1:2019 (BS8485).

Table 4 of BS8485 indicates that CS2 conditions require a minimum gas protection score of 3.5 for a low rise residential end-use. This score may be achieved, for example, by a passive sub-floor void of suitable design and installation of a suitable gas resistant membrane, installed and verified in accordance with the requirements of BS8485.

The above indicative assessment must be regarded as interim. A further two ground gas monitoring visits are planned and the full results, and an interpretation of these, will be issued as an addendum letter on completion of the monitoring programme.

Radon protection measures are not required by current guidance for the proposed development on this site.

10.7. Invasive Plants

It is recommended that an updated ecological survey is undertaken by a qualified consultant ecologist to assess the presence or absence of any additional invasive plant species. The treatment of any invasive species should take place in advance of the proposed demolition and development works.

10.8. Disposal of Soils

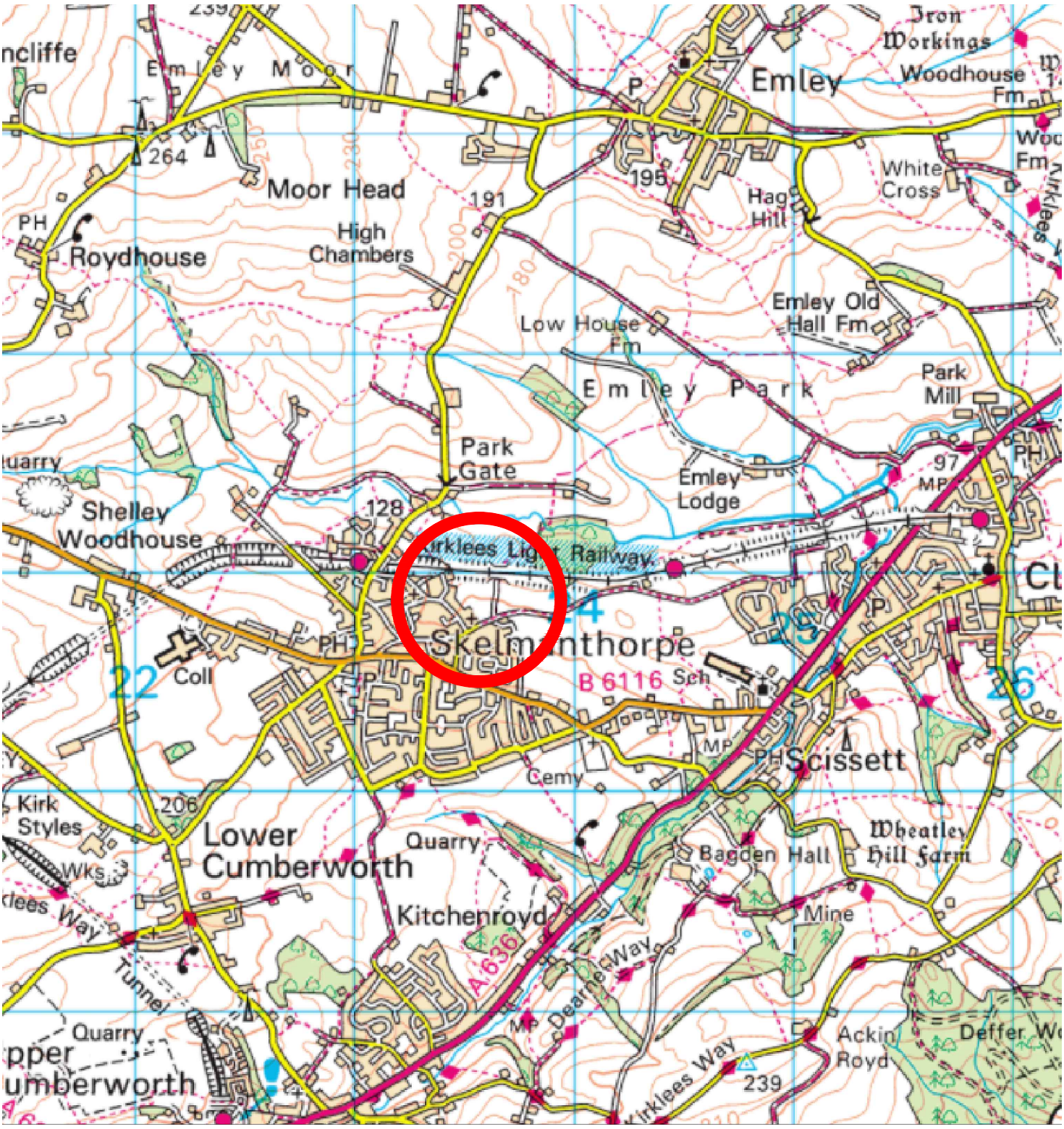
Any materials removed from site should be undertaken in accordance with current Duty of Care requirements and the Environment Agency Technical Guidance Document WM3, dated 2015. The waste may also be subject to Waste Acceptance Criteria (WAC) testing. In light of the regulations, it is recommended that discussion with landfill operators takes place at an early stage.

11. REGULATORY APPROVALS

The conclusions and recommendations presented above are considered reasonable based on the findings of the site investigation. However, these cannot be guaranteed to gain regulatory approval and, therefore, the report should be passed to the appropriate regulatory authorities and/or other relevant organisations for their comment and approval prior to undertaking any works on site.

APPENDIX A

DRAWINGS



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NOTES

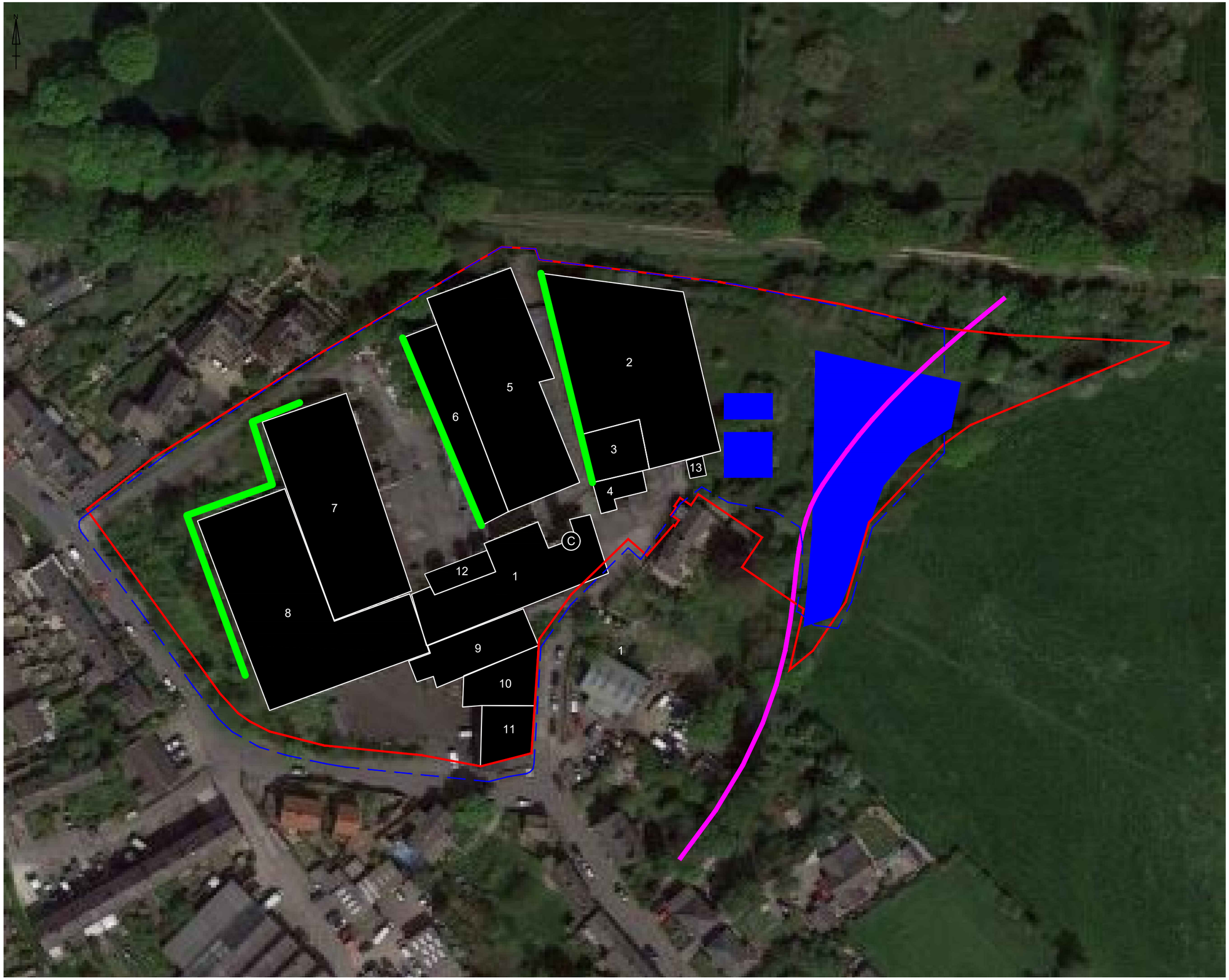
○ Site Location

REVISION	
0	For Information
A	>>
B	>>
C	>>
D	>>

SIRIUS GEOTECHNICAL LTD
4245 Park Approach, Thorpe Park, Leeds LS15 8GB
www.thesiriusgroup.com
TEL: 0113 264 9960
FAX: 0113 264 9962

CLIENT	DRAWING NO.	REVISION NO.
Paramount Retail Group Holdco Limited	C7340/01	0
SITE: Greenside Mills, Skelmanthorpe	DRAWN BY: MF	APPROVED BY: GH
DRAWING TITLE: Site Location Plan	DATE: December 2020	SCALE: 1:25,000

A4



NOTES

- Site Boundary
- Site Layout Boundary
- Building on-site (number relates to Site Details and Description Section of the GAR)
- Historical reservoirs
- Approximate position of watercourse from historical mapping
- Approximate line of retaining wall

REVISION		BY	DATE
0	For Information	RC	10/11/20
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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CLIENT

Paramount Retail Group Holdco Limited

SITE

Greenside Mills, Skelmanthorpe

DRAWING TITLE

Site Features Plan

DRAWING NO.	REVISION NO.
C7340/02	0
DRAWN BY: RC	APPROVED BY: GH
DATE: December 2020	SCALE: NTS
PAPER SIZE: A3	

1. Photo of pond within east of the site, looking southeast.

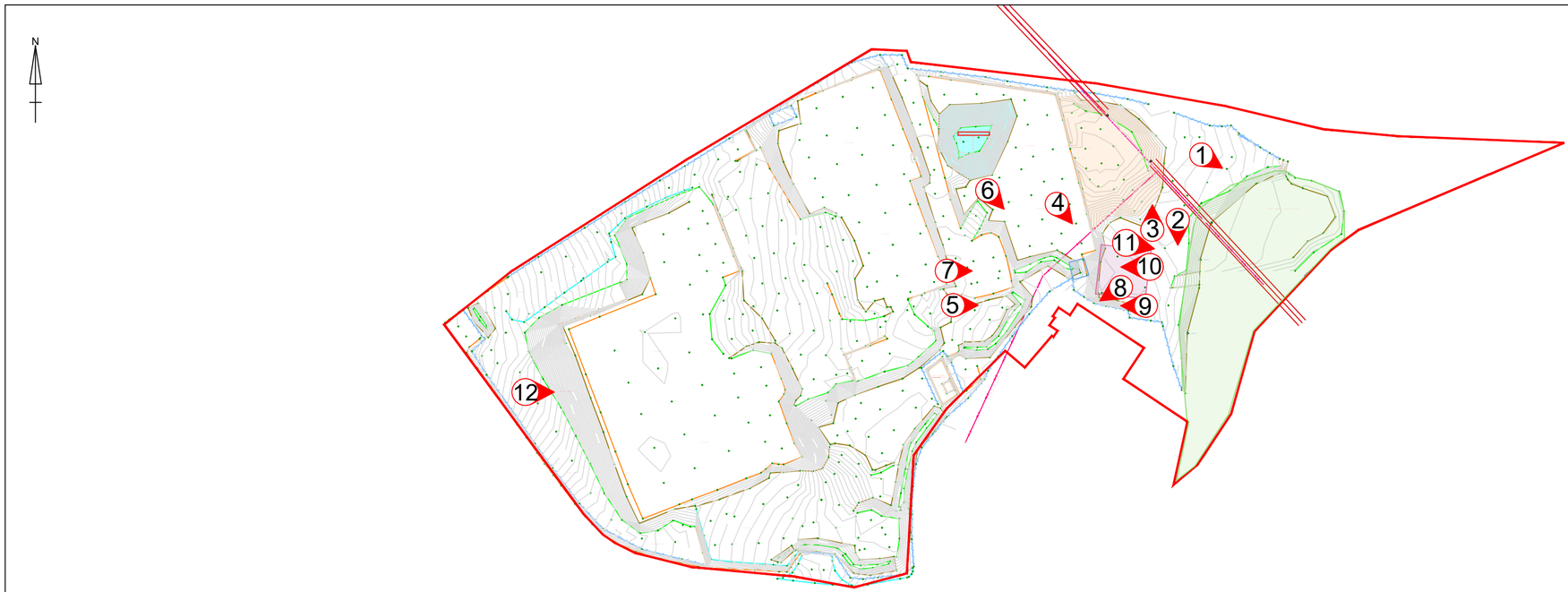
2. Photo of pond and surface water feature looking south.

3. Photo of stockpile within east of site, including wooden pole, with area of former infilling and pond beyond to the east.

4. Evidence of former brick lined mill pond and adjacent structures prior to backfilling / clearance.

5. Newly constructed overhead cables and wooden pole, located in close proximity to former AST and sub-station.

6. View of former AST, prior to demolition and clearance.



NOTES

- Site boundary
- Photo Location and Direction
- Existing pond and surface water feature
- Former brick lined mill pond
- Existing stockpile
- Former above ground storage tank

Topographical survey reproduced from Sirius Remediation Ltd, Post Demolition Survey, ref. SR4358-TS-001, dated October 2023

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
3. All marked site features (including historical features, potential contaminant constraints, and any other potential constraint or feature of note) shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

REVISION		BY	DATE
0	For Information	MF	08/11/23
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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CLIENT

Lovell Partnerships Ltd

SITE

Former Greenside Mills, Skelmanthorpe

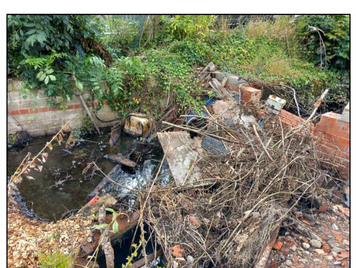
DRAWING TITLE

Site Features Plan

DRAWING NO.	REVISION NO.
C9297/DG/02	0
DRAWN BY: MF	APPROVED BY: GH
DATE: November 2023	SCALE: 1:1000
PAPER SIZE: A2	

7. View of former sub-station prior to demolition and clearance.

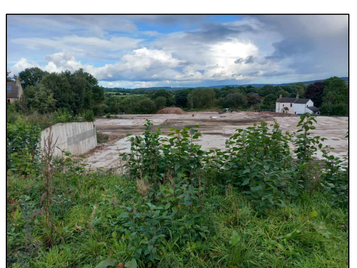
8. Surface water culvert located in southeast, with black oily substance noted.



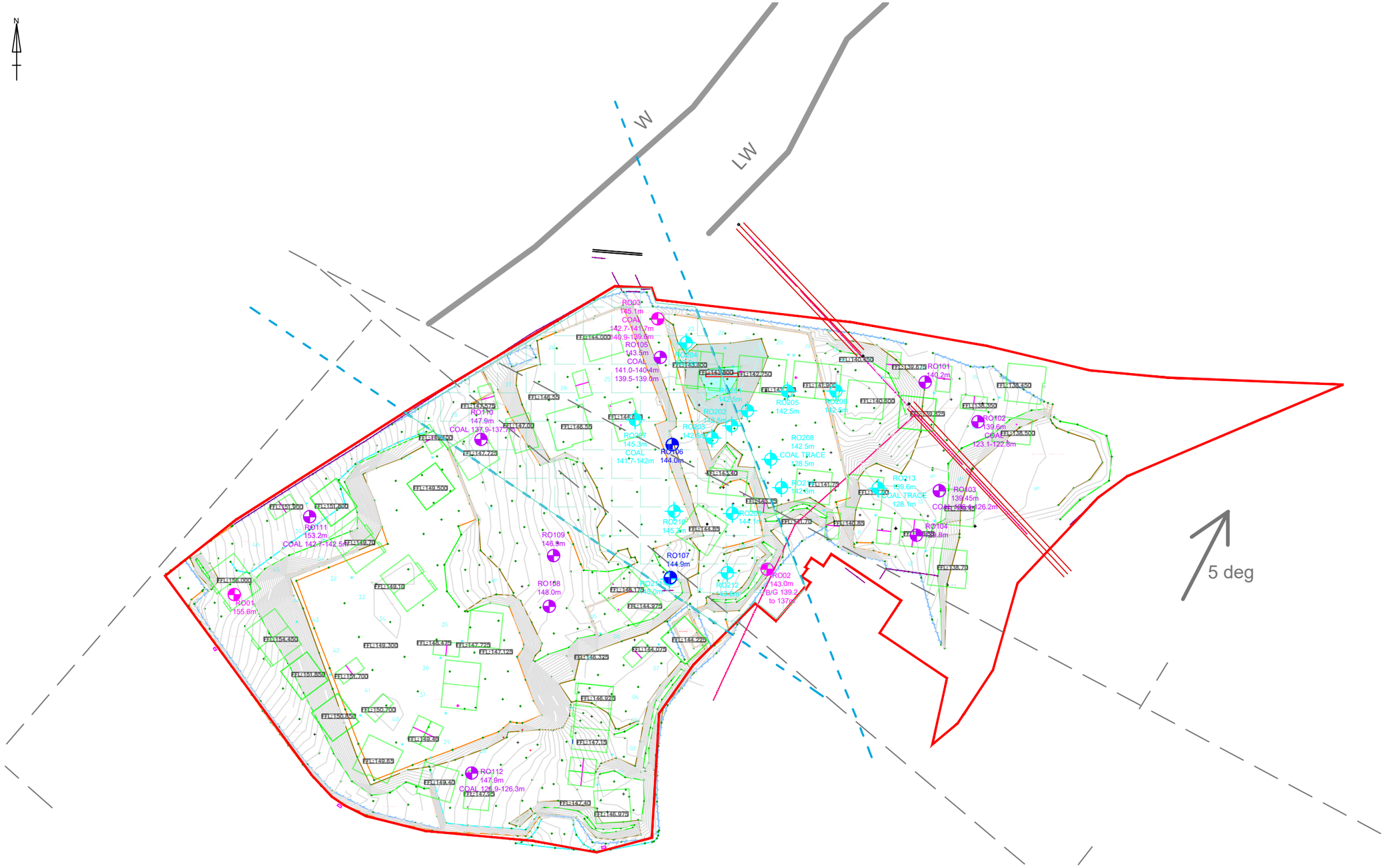
9. View of surface water culvert with discarded containers.

10. Evidence of hydrocarbon staining within backfilled mill pond (trial pit TP218).

11. View of black saturated pond sediments during trial pitting.



12. View of varying topography of the site, looking east.



NOTES

Site boundary

2023 Site Investigation

Rotary Borehole (RO200 series)

2021 Site Investigation

Rotary Borehole (RO100 series)

2020 Site Investigation

Rotary borehole location (RO01 series)

Inferred fault lines (based on findings of site investigation undertaken to date).

Conjectured fault lines (based on published BGS data

Conjectured coal outcrops (based on published BGS data

Approximate extent of area required for inspection of mine entries.

Existing overhead electricity cables

Topographical survey reproduced from Sirius Remediation Ltd, Post Demolition Survey, ref. SR4358-TS-001, dated October 2023

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. All exploratory hole locations are approximate and based on handheld GPS coordinates unless stated otherwise on the exploratory hole logs.
3. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
4. All marked site features shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

REVISION		BY	DATE
0	For Information	MF	20/11/23
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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CLIENT

Lovell Partnerships Ltd

SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Indicative Mining Risk Plan

DRAWING NO.	REVISION NO.
C9297/DG/03	0
DRAWN BY	APPROVED BY
MF	GH
DATE	SCALE	PAPER SIZE
November 2023	1:1000	A3

NOTES

Development site boundary

Proposed borehole grid pattern

Proposed plots for drill and subsequent grout stabilisation, where necessary.

Proposed extent of site for stripping for the inspection of unrecorded mine entries (such as bell pits / crop workings etc).

Notes

1. This drawing should not be viewed in isolation from the accompanying report.

2. All marked site features shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

REVISION		BY	DATE
0	For Information	MF	20/11/23
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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CLIENT

Lovell Partnerships Ltd

SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Proposed Shallow Mine Workings Investigation and Treatment Plan

DRAWING NO.	REVISION NO.
C9297/DG/04	0
DRAWN BY	APPROVED BY
MF	GH

DATE	SCALE	PAPER SIZE
November 2023	1:1000	A3

Notes:

This drawing, design and concept are copyright of STEN Architecture.

All Dimensions are to be verified on site before any work commences. If any discrepancies, errors or emissions are noted, these are to be reported to STEN Architecture immediately.

If any other drawings are referenced within this layout, please refer to the specific detailed drawing for design, materials and specific working practices.

PLANNING LAYOUT KEY:

Boundary treatments (see separate drawing for details)

- Bin collection point (bin collection day only)
- Secure 6ft (length) x 2ft (width) x 4ft (height) timber cycle store on 8no. 450sq.flags (900mm x 1800mm). Dwellings with garages to have bicycle hook within for storage.
- Bin storage area on 6no. 450sq.flags (900mm x 1350mm)
- Wall mounted - Mode 3, Type 2, 7kW Electric Vehicle Charging Point
- Post mounted - Mode 3, Type 2, 7kW Electric Vehicle Charging Point

REV:	DESCRIPTION:	BY:	DATE:
N	plot 09 moved east by 0.5m	BMS	21.06.23
M	'Puttenham' house type renamed as 'Newbury'	BMS	23.03.23
L	EV charging point locations added	BMS	15.03.23
K	Tweaks to bin and cycle store positions as per client mark up	BMS	10.01.23
J	Cycle stores, bin store areas and patios added. Central path added between parking spaces.	BMS	06.01.23
H	'AS' and 'OP' notes added to blocks, 1747 type handing corrected and side door added. Plot 1 amended to client's comments.	DS	08.11.22
G	Bin collection point serving plots 30-34 relocated closer to adoptable highway as per clients comments.	LS	20.07.22
F	Turning head serving plots 12-15 amended., positions of plots 12 and 14 amended to suit. Knee railing introduced to edge of turning head. All as per clients comments.	LS	01.07.22
E	Garage for plot 1 moved away from Saville Road. Plots 35-37 re-orientated to enable adjacent road to be reduced to private drive. Plots 33-34 moved forward to reduce height of retaining walls at rear. Other minor updates to Planning Officer comments.	BMS	17.06.22
D	Green walls moved back from footpath	BMS	31.03.22
C	Semi detached plots handed so entrance doors are on the high side	BMS	24.03.22
B	Plots to Saville Road amended to provide more rontage and opportunities for landscaping. Detached Osbourne removed. Additional footpaths and visitor parking added	BMS	18.03.22
A	Parking arrangement amended for plot 45	BMS	25.11.21

LOVELL

Client	LOVELL
Project	Skelmanthorpe
Job Number	CAD

STEN ARCHITECTURE

Type	Floor Area Sq Ft	Bed	Total Units	Total	% Used
OPEN MARKET					
3 BEDS					
Lansdown	898	3	7	6286	15.2
Lansdown detached	898	3	2	1796	4.3
Newbury semi	1016	3	1	1016	2.2
Newbury detached	1016	3	4	4064	8.7
Osbourne	1205	3	13	15665	28.3
					58.7
4 BEDS					
Tattenham	1530	4	7	10710	15.2
Grassington	1747	4	12	20964	26.1
					41.3
Total			**46**	**60501**	

	ACRES	Hectares
Approx gross area	4.6	1.86
Approx nett area	3.78	1.53
Coverage per Acre	**16006**	**30**

STEN ARCHITECTURE
STEN Architecture Ltd
The Studio
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Tel: 01924 950955
Web: www.sten-architecture.co.uk
Twitter: @STEN_arch
Facebook: stenarchitectureltd
Linkedin: Sten Architecture

CLIENT: LOVELL PARTNERSHIPS

SITE: Greenside Mills
Skelmanthorpe

TITLE: Planning Layout

SCALE AT A1:	DATE:	DRAWN:	CHECKED:
1:500	29.09.21	BMS	--

PROJECT NO:	DRAWING NO:	REVISION:
2156	2156.01	N

N

Scaled @ 1:500

0 10m 20m 50m

NORTH

KIRKLEES LIGHT RAILWAY

LAUREL BANK

PD PLOTS 25-29

PD PLOT 24

POS

PD PLOTS 30-35

ROAD 1 TH

MARSDEN ST

ROAD 1

SAVILLE ROAD

150.9m

144.8m

Hall

Garage

FFL: 151.625
FFL: 151.775
FFL: 150.25
FFL: 149.50
FFL: 148.90
FFL: 148.45
FFL: 147.10
FFL: 146.95
FFL: 147.55
FFL: 147.85
FFL: 155.750
FFL: 155.300
FFL: 154.450
FFL: 154.000
FFL: 151.60
FFL: 151.85
FFL: 150.60
FFL: 150.85
FFL: 149.65
FFL: 149.90
FFL: 149.90
FFL: 149.05
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FFL: 146.925
FFL: 145.625
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FFL: 143.025
FFL: 143.025
FFL: 142.575
FFL: 142.10
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FFL: 140.800
FFL: 140.575
FFL: 139.80
FFL: 140.025
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FFL: 138.75
FFL: 142.150
FFL: 141.00
FFL: 143.875
FFL: 141.925
FFL: 140.775
FFL: 139.70
FFL: 138.80
FFL: 138.95
FFL: 144.45
FFL: 144.30
FFL: 146.325
FFL: 146.85
FFL: 147.15
FFL: 147.15
FFL: 147.15
FFL: 146.850
FFL: 146.850
FFL: 138.375

REFER TO NOTE 2 REQUIREMENTS FOR METER BOXES IN THE VICINITY OF

REFER TO NOTE 2 REQUIREMENTS FOR METER BOXES IN THE VICINITY OF

REFER TO NOTE 2 REQUIREMENTS FOR METER BOXES IN THE VICINITY OF

FOR MORE DETAIL ON THE WATERCOURSE DIVERSION PLEASE SEE DRAWING 180

12 STEPS
11 STEPS
12 STEPS

DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS DRAWING HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

1. THIS DRAWING IS BASED FROM:
   1.1. TOPO SURVEY – 2456/001 (MAR 21)
   1.2. ARCHITECT LAYOUT – 2156.01 K (12/01/23)
2. DO NOT SCALE FROM THIS DRAWING AS IT MAY NOT BE REPRODUCED TO SCALE.
3. THIS DRAWING IS TO BE REPRODUCED IN COLOUR.
4. PLEASE REPORT ANY DISCREPA DUDLEY'S CONSULTING ENGINEE CONSTRUCTION.

KEY

+31.940 PROPOSED LEVELS
38.909 EXISTING TOPO SURVEY LEVELS
FFL: 30.000 FINISHED FLOOR LEVEL
1:4 EMBANKMENT SLOPE
RW 0.75m TRADITIONAL BRICK RETAINING WALL (WITH WEEPHOLES)
OB 0.15m OVERBUILD RETAINING WALL DETAIL
RW 0.15m INDICATES THAT EXTERNAL GL IS THE SAME AS THE FFL – DETAIL TO BE CONFIRMED BY ARCHITECT
WATERCOURSE DIVERSION
(ROOT LOCK – GEOGROW) OR (FLEX M RETENTION TBC.
RW 0.15m TANKING (DETAIL TBC)

Date	Revision	By	Chkd	Ref
27.01.23	TANKING ADDED TO GARAGES	MDJ	PD	P10
12.01.23	PLOT 1 UPDATED TO SUIT NEW LAYOUT	MDJ	PD	P9
09.01.23	REVIEWED AT DETAILED DESIGN	MDJ	PD	P8
29.11.22	UPDATED TO SUIT COMMENTS	MDJ	PD	P7
28.06.22	UPDATED TO SUIT NEW LAYOUT	MDJ	PD	P6
08.04.22	UPDATED TO SUIT NEW LAYOUT	MDJ	PD	P5
25.11.21	UPDATED TO SUIT NEW LAYOUT	MDJ	PD	P4
24.11.21	UPDATED TO SUIT CLIENT COMMENTS	MDJ	PD	P3
08.11.21	REVIEWED INTERNALLY	MDJ	PD	P2
05.11.21	INITIAL ISSUE	SR	PD	P1

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Project
LOVELL HOMES
SAVILE ROAD, SKELMANTHORPE
HD8 9EF

Title
EXTERNAL LEVELS PLAN

Scale	Paper	Drawn	Check
1:250	A0	SDR	PD
Date	Status		
NOV. 21	PRELIMINARY		
Job No.	Drg. No.	Rev.	
21374	155	P10	

APPENDIX B
Rotary Borehole Logs

TRIAL PIT RECORD

TP No. **TP206** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C9297

Client: Lovell Partnerships Ltd

Date: 18/05/2023

Method: 20 Tonne excavator with 6ft bucket.

Scale: 1:25

Logged By: J.C Checked By: G.H

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Light grey reinforced CONCRETE.	0.20	142.87		
ES	0.30			MADE GROUND: Reddish brown slightly clayey sandy GRAVEL with low cobble content. Gravel is angular to subangular fine to coarse of brick and concrete. Cobbles are angular of brick with slight solvent odour.	0.40	142.67		
ES	0.50			*At 0.20m bgl: Standing water noted to have sheen and slight solvent odour.* *From 0.20 to 0.80m bgl: Intact wall in eastern and southern wall of trial pit - potential sump?*	0.60	142.47		
				MADE GROUND: Firm dark orangish brown slightly sandy gravelly CLAY. Low plasticity (field description). Gravel is angular to subangular fine to coarse of brick, mudstone and sandstone.				
				Bed of weak black COAL encountered dipping from south to north in eastern wall of trial pit. Encountered at 0.40m bgl shallowest and 2.00m bgl deepest. Approx 0.50m thick.				
ES	1.20			Weak orangish brown SANDSTONE. Recovered as angular to subangular fine to coarse gravel.				
				End of trial pit at 2.80m	2.80	140.27		

1 2 3 4 5

Remarks and Groundwater Observations

1. Trial pit complete at 2.80m bgl in bedrock. 2. Trial pit remained stable throughout excavation. 3. Perched water encountered at 0.20m bgl. 4. Backfilled with arisings upon completion.

GL (m AOD) 143.07

Easting: 423359.07

Northing: 410976.79

Fig No. TP206

TRIAL PIT RECORD

TP No. **TP209** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C9297

Client: Lovell Partnerships Ltd

Date: 18/05/2023

Method: 20 Tonne excavator with 6ft bucket.

Scale: 1:25

Logged By: J.C Checked By: G.H

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Light grey reinforced CONCRETE.				
					0.20	150.74		
ES	0.40			MADE GROUND: Yellow sandy GRAVEL with low cobble content. Gravel is angular to subangular fine to coarse of sandstone and occasional brick. Cobbles are angular of sandstone.				
					0.90	150.04		
		74.0	1	Firm to stiff medium to high strength bluish grey slightly sandy gravelly CLAY. Medium plasticity (field description). Gravel is angular to subangular fine to coarse gravel of mudstone.				
		82.0						
D	1.20	90.0						
					1.80	149.14		
D	1.90		2	Weak black COAL. Recovered as angular to subangular fine to coarse gravel.				
					2.50	148.44		
				Moderately weak light grey MUDSTONE. Recovered as angular to subangular fine to coarse gravel.				
			3	End of trial pit at 3.00m	3.00	147.94		
			4					
			5					

Remarks and Groundwater Observations

1. Trial pit complete at 3.00m bgl in bedrock. 2. Trial pit remained dry and stable throughout excavation. 3. Backfilled with arisings upon completion.

GL (m AOD) 150.94

Easting: 423373.56

Northing: 410995.50

Fig No. TP209

BOREHOLE RECORD

BH No. **RO01**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340

Client: Paramount Retail Group Holdco Ltd
Date(s): 28/10/2020

Method: Rotary Top Hammer Drill Rig
Scale: 1:150

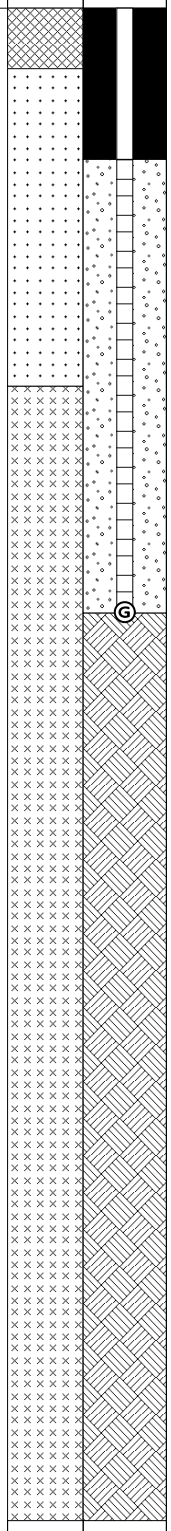
Logged By: SDS
Checked By: GH

Driller: SDS

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)
						MADE GROUND: Brown CLAY.		
						Brown SANDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	1.20	154.40
						Grey SILTSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	7.50	148.10
						End of Borehole at 30.00m	30.00	125.60

Legend | Well



Remarks and Groundwater Observations:

1. The borehole was drilled using water flush. 2. No visual or olfactory evidence of hydrocarbon contamination was encountered. 3. Due to the drilling method, no groundwater strikes were recorded. 4. The hole was installed with 63mm standpipe as detailed above.

GL (m AOD) 155.60
Eastings: 423281.28
Northings: 410941.26

Fig No. RO01

BOREHOLE RECORD

BH No. **RO02**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340
Client: Paramount Retail Group Holdco Ltd
Date(s): 29/10/2020
Method: Rotary Top Hammer Drill Rig
Scale: 1:150
Logged By: SDS
Checked By: GH
Driller: SDS

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						MADE GROUND: Black bound macadam / concrete.	0.20	142.87		
					1	MADE GROUND: Brown CLAY.	1.00	142.07		
					2	Brown MUDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]				
					3					
					4	Broken Ground (worked COAL). [PENNINE LOWER COAL MEASURES FORMATION]	3.80	139.27		
					5					
					6	Brown SANDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	6.00	137.07		
					7					
					8					
					9					
					10					
					11					
					12					
					13					
					14					
					15					
					16					
					17	SILTSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	16.50	126.57		
					18					
					19					
					20					
					21					
					22					
					23					
					24					
					25					
					26					
					27					
					28					
					29					
					30	End of Borehole at 30.00m	30.00	113.07		
	TCR	SCR	RQD	FI						

Remarks and Groundwater Observations:

1. The borehole was drilled using water flush. 2. No visual or olfactory evidence of hydrocarbon contamination was encountered. 3. Due to the drilling method, no groundwater strikes were recorded. 4. The hole was installed with 63mm standpipe as detailed above.

GL (m AOD) 143.07
Eastings: 423411.82
Northings: 410937.02

Fig No. RO02

BOREHOLE RECORD

BH No. **RO03**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340
Client: Paramount Retail Group Holdco Ltd
Date(s): 28/10/2020
Method: Rotary Top Hammer Drill Rig
Scale: 1:150
Logged By: SDS
Checked By: GH
Driller: SDS

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						MADE GROUND: Black bound macadam.	0.20	144.93		
					1	MADE GROUND: Brown CLAY.	1.20	143.93		
					2	Weathered SANDSTONE / MUDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	2.40	142.73		
					3	COAL (intact). [PENNINE LOWER COAL MEASURES FORMATION]	3.40	141.73		
					4	MUDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	4.20	140.93		
					5	COAL (intact) [PENNINE LOWER COAL MEASURES FORMATION]	5.50	139.63		
					6	SANDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	6.00	139.13		
					7	SILTSTONE. [PENNINE LOWER COAL MEASURES FORMATION]				
					8					
					9		9.50	135.63		
					10	SANDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]				G
					11					
					12					
					13					
					14					
					15					
					16		16.00	129.13		
					17	CLAY band. [PENNINE LOWER COAL MEASURES FORMATION]	16.30	128.83		
					18	MUDSTONE / SILTSTONE. [PENNINE LOWER COAL MEASURES FORMATION]				
					19					
					20					
					21					
					22					
					23					
					24					
					25					
					26					
					27					
					28					
					29					
					30	End of Borehole at 30.00m	30.00	115.13		
	TCR	SCR	RQD	FI						

Remarks and Groundwater Observations:

1. The borehole was drilled using air mist. 2. No visual or olfactory evidence of hydrocarbon contamination was encountered. 3. Groundwater was encountered at 16m bgl. 4. The hole was installed with 63mm standpipe as detailed above.

GL (m AOD) 145.13
Eastings: 423384.51
Northings: 410999.08

Fig No. RO03

BOREHOLE RECORD

BH No. **RO101**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340A
Client: Paramount Retail Group HoldCo
Date(s): 13/05/2021
Method: C6 XP 4 Casagrande Rotary Rig
Scale: 1:150
Logged By: Driller
Checked By: GH
Driller:

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN				
						MUDSTONE / SANDSTONE BANDS	2.60	137.68		
						End of Borehole at 30.00m	30.00	110.28		

Remarks and Groundwater Observations:

1. No significant groundwater strikes recorded. 2. Borehole drilled to 30m depth using water flush methods.
3. Rotary borehole backfilled with arisings / gravel and bentonite seal upon completion.

GL (m AOD) 140.29
Eastings: 423451.52
Northings: 410986.00

Fig No. RO101

BOREHOLE RECORD

BH No. **RO102**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340A
Client: Paramount Retail Group HoldCo
Date(s): 13/05/2021
Method: C6 XP 4 Casagrande Rotary Rig
Scale: 1:150
Logged By: Driller
Checked By: GH
Driller:

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN / MADE GROUND				
						MUDSTONE	4.60	135.05		
						COAL	16.50	123.15		
						MUDSTONE / SANDSTONE BANDS	16.80	122.85		
						End of Borehole at 30.00m	30.00	109.65		

Remarks and Groundwater Observations:

1. No significant groundwater strikes recorded. 2. Borehole drilled to 30m depth using water flush methods.
3. Rotary borehole backfilled with arisings / gravel and bentonite seal upon completion.

GL (m AOD) 139.65
Eastings: 423464.40
Northings: 410976.33

Fig No. RO102

BOREHOLE RECORD

BH No. **RO103**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340A
Client: Paramount Retail Group HoldCo
Date(s): 13/05/2021
Method: C6 XP 4 Casagrande Rotary Rig
Scale: 1:150
Logged By: Driller
Checked By: GH
Driller:

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						ORANGE CLAY				
						MUDSTONE	3.50	135.95		
						COAL	13.00	126.45		
						MUDSTONE / SANDSTONE BANDS	13.20	126.25		
						End of Borehole at 30.00m	30.00	109.45		

Remarks and Groundwater Observations:

1. No significant groundwater strikes recorded. 2. Borehole drilled to 30m depth using water flush methods.
3. Rotary borehole backfilled with arisings / gravel and bentonite seal upon completion.

GL (m AOD) 139.45
Eastings: 423454.96
Northings: 410959.41

Fig No.
RO103

BOREHOLE RECORD

BH No. **RO104**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340A
Client: Paramount Retail Group HoldCo
Date(s): 13/05/2021
Method: C6 XP 4 Casagrande Rotary Rig
Scale: 1:150
Logged By: Driller
Checked By: GH
Driller:

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						MADE GROUND				
						MUDSTONE / SANDSTONE BANDS	4.00	135.80		
						End of Borehole at 30.00m	30.00	109.80		

Remarks and Groundwater Observations:

1. No significant groundwater strikes recorded. 2. Borehole drilled to 30m depth using water flush methods.
3. Rotary borehole backfilled with arisings / gravel and bentonite seal upon completion.

GL (m AOD) 139.81
Eastings: 423449.34
Northings: 410948.57

Fig No.
RO104

BOREHOLE RECORD

BH No. **RO105**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340A
Client: Paramount Retail Group HoldCo
Date(s): 12/05/2021
Method: C6 XP 4 Casagrande Rotary Rig
Scale: 1:150
Logged By: Driller
Checked By: GH
Driller:

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						MADE GROUND				
					1	CLAY	1.00	142.50		
					2		2.50	141.00		
					3	COAL	3.10	140.40		
						MUDSTONE	4.00	139.50		
					4	SOFT COAL	4.50	139.00		
						MUDSTONE / SANDSTONE BANDS				
					5					
					6					
					7					
					8					
					9					
					10					
					11					
					12					
					13					
					14					
					15					
					16					
					17					
					18					
					19					
					20					
					21					
					22					
					23					
					24					
					25					
					26					
					27					
					28					
					29					
					30	End of Borehole at 30.00m	30.00	113.50		
	TCR	SCR	RQD	FI						

Remarks and Groundwater Observations:

1. No groundwater strikes recorded. 2. Borehole drilled to 30m depth using air / air mist methods. 3. Rotary borehole backfilled with arisings / gravel and bentonite seal upon completion.

GL (m AOD) 143.50
Eastings: 423386.64
Northings: 410992.08

Fig No.
RO105

BOREHOLE RECORD

BH No. **RO106**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340A
Client: Paramount Retail Group HoldCo
Date(s): 12/05/2021
Method: C6 XP 4 Casagrande Rotary Rig
Scale: 1:150
Logged By: Driller
Checked By: GH
Driller:

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						CLAY				
						MUDSTONE / SANDSTONE BANDS	2.50	141.50		
						End of Borehole at 30.00m	30.00	114.00		
	TCR	SCR	RQD	FI						

Remarks and Groundwater Observations:

1. No groundwater strikes recorded. 2. Borehole drilled to 30m depth using air / air mist methods. 3. Rotary borehole backfilled with arisings / gravel and bentonite seal upon completion.

GL (m AOD) 144.00
Eastings: 423389.56
Northings: 410970.72

Fig No.
RO106

BOREHOLE RECORD

BH No. **RO107**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340A

Client: Paramount Retail Group HoldCo
Date(s): 14/05/2021

Method: C6 XP 4 Casagrande Rotary Rig
Scale: 1:150

Logged By: Driller | Checked By: GH

Driller:

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						ORANGE CLAY				
						MUDSTONE / SANDSTONE BANDS	5.00	139.97		
						End of Borehole at 30.00m	30.00	114.97		
	TCR	SCR	RQD	FI						

Remarks and Groundwater Observations:

1. No significant groundwater strikes recorded. 2. Borehole drilled to 30m depth using water flush methods.
3. Rotary borehole backfilled with arisings / gravel and bentonite seal upon completion.

GL (m AOD) 144.97
Eastings: 423389.13
Northings: 410938.16

Fig No. RO107

BOREHOLE RECORD

BH No. **RO108**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340A
Client: Paramount Retail Group HoldCo
Date(s): 12/05/2021
Method: C6 XP 4 Casagrande Rotary Rig
Scale: 1:150
Logged By: Driller
Checked By: GH
Driller:

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						CLAY				
						MUDSTONE / SANDSTONE BANDS	2.00	146.03		
						End of Borehole at 30.00m	30.00	118.03		
	TCR	SCR	RQD	FI						

Remarks and Groundwater Observations:

1. No groundwater strikes recorded. 2. Borehole drilled to 30m depth using air / air mist methods. 3. Rotary borehole backfilled with arisings / gravel and bentonite seal upon completion.

GL (m AOD) 148.03
Eastings: 423359.49
Northings: 410931.17

Fig No.
RO108

BOREHOLE RECORD

BH No. **RO109**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340A
Client: Paramount Retail Group HoldCo
Date(s): 12/05/2021
Method: C6 XP 4 Casagrande Rotary Rig
Scale: 1:150
Logged By: Driller
Checked By: GH
Driller:

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						MADE GROUND				
					1	MUDSTONE / SANDSTONE BANDS	1.00	145.94		
					2					
					3					
					4					
					5					
					6					
					7					
					8					
					9					
					10					
					11					
					12					
					13					
					14					
					15					
					16					
					17					
					18					
					19					
					20					
					21					
					22					
					23					
					24					
					25					
					26					
					27					
					28					
					29					
					30	End of Borehole at 30.00m	30.00	116.94		
	TCR	SCR	RQD	FI						

Remarks and Groundwater Observations:

1. No groundwater strikes recorded. 2. Borehole drilled to 30m depth using air / air mist methods. 3. Rotary borehole backfilled with arisings / gravel and bentonite seal upon completion.

GL (m AOD) 146.94
Eastings: 423360.54
Northings: 410943.55

Fig No.
RO109

BOREHOLE RECORD

BH No. **RO110**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340A
Client: Paramount Retail Group HoldCo
Date(s): 14/05/2021
Method: C6 XP 4 Casagrande Rotary Rig
Scale: 1:150
Logged By: Driller
Checked By: GH
Driller:

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN				
						MUDSTONE	2.00	145.93		
						COAL	10.00	137.93		
						MUDSTONE	10.20	137.73		
						End of Borehole at 30.00m	30.00	117.93		

Remarks and Groundwater Observations:

1. No significant groundwater strikes recorded. 2. Borehole drilled to 30m depth using water flush methods.
3. Rotary borehole backfilled with arisings / gravel and bentonite seal upon completion.

GL (m AOD) 147.93
Eastings: 423342.74
Northings: 410972.01

Fig No. RO110

BOREHOLE RECORD

BH No. **RO111**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340A
Client: Paramount Retail Group HoldCo
Date(s): 14/05/2021
Method: C6 XP 4 Casagrande Rotary Rig
Scale: 1:150
Logged By: Driller
Checked By: GH
Driller:

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						MADE GROUND				
					1	MUDSTONE	1.00	152.27		
					2					
					3					
					4					
					5					
					6					
					7					
					8					
					9					
					10		10.50	142.77		
					11	COAL	10.70	142.57		
						MUDSTONE				
					12					
					13					
					14					
					15					
					16					
					17					
					18					
					19					
					20					
					21					
					22					
					23					
					24					
					25					
					26					
					27					
					28					
					29					
					30	End of Borehole at 30.00m	30.00	123.27		
	TCR	SCR	RQD	FI						

Remarks and Groundwater Observations:

1. No significant groundwater strikes recorded. 2. Borehole drilled to 30m depth using water flush methods.
3. Rotary borehole backfilled with arisings / gravel and bentonite seal upon completion.

GL (m AOD) 153.27
Eastings: 423300.82
Northings: 410953.09

Fig No. RO111

BOREHOLE RECORD

BH No. **RO112**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340A
Client: Paramount Retail Group HoldCo
Date(s): 14/05/2021
Method: C6 XP 4 Casagrande Rotary Rig
Scale: 1:150
Logged By: Driller
Checked By: GH
Driller:

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						CLAY				
						MUDSTONE	3.00	144.93		
						COAL	21.00	126.93		
						MUDSTONE	21.60	126.33		
						End of Borehole at 30.00m	30.00	117.93		

TCR SCR RQD FI

Remarks and Groundwater Observations:

1. No significant groundwater strikes recorded. 2. Borehole drilled to 30m depth using water flush methods.
3. Rotary borehole backfilled with arisings / gravel and bentonite seal upon completion.

GL (m AOD) 147.93
Eastings: 423340.49
Northings: 410890.34

Fig No. RO112

BOREHOLE RECORD

BH No. **RO201**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C9297
Client: Lovell Partnerships Ltd
Date(s): 09/10/2023
Method: Tracked open hole rotary drilling rig.
Scale: 1:150
Logged By: JC
Checked By: G.H
Driller: Sirius Drilling Services

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN (** Driller's description)				
						Yellowish brown SANDSTONE (** Driller's description).	2.00	140.56		
						Grey MUDSTONE (** Driller's description).	7.00	135.56		
						Strong yellowish brown SANDSTONE (** Driller's description).	9.50	133.06		
						Grey MUDSTONE (** Driller's description).	11.50	131.06		
						Grey MUDSTONE with SANDSTONE bands (** Driller's description).	15.00	127.56		
						Yellowish brown SANDSTONE (** Driller's description).	21.00	121.56		
						Grey MUDSTONE with SANDSTONE bands (** Driller's description).	23.00	119.56		
						End of Borehole at 30.00m	30.00	112.56		

Remarks and Groundwater Observations:

1. Drilled using air flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 142.56
Eastings: 423408.00
Northings: 410979.01

Fig No. RO201

BOREHOLE RECORD

BH No. **RO202**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C9297
Client: Lovell Partnerships Ltd
Date(s): 09/10/2023
Method: Tracked open hole rotary drilling rig.
Scale: 1:150
Logged By: JC
Checked By: G.H
Driller: Sirius Drilling Services

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN (** Driller's description).				
						Yellowish brown SANDSTONE (** Driller's description).	2.00	140.54		
						Grey MUDSTONE (** Driller's description).	7.50	135.04		
						Yellowish brown SANDSTONE (** Driller's description).	12.00	130.54		
						End of Borehole at 15.00m	15.00	127.54		

Remarks and Groundwater Observations:

1. Drilled using air flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 142.54
Eastings: 423404.15
Northings: 410975.32

Fig No.
RO202

BOREHOLE RECORD

BH No. **RO203**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C9297
Client: Lovell Partnerships Ltd
Date(s): 09/10/2023
Method: Tracked open hole rotary drilling rig.
Scale: 1:150
Logged By: JC
Checked By: G.H
Driller: Sirius Drilling Services

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN (** Driller's description).				
						Yellowish brown SANDSTONE (** Driller's description).	2.00	140.54		
						Grey MUDSTONE (** Driller's description).	8.00	134.54		
						Yellowish brown SANDSTONE (** Driller's description).	10.00	132.54		
						End of Borehole at 12.00m	12.00	130.54		

Remarks and Groundwater Observations:

1. Drilled using air flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 142.54
Eastings: 423399.30
Northings: 410972.32

Fig No. RO203

BOREHOLE RECORD

BH No. **RO204**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C9297
Client: Lovell Partnerships Ltd
Date(s): 09/10/2023
Method: Tracked open hole rotary drilling rig.
Scale: 1:150
Logged By: JC
Checked By: G.H
Driller: Sirius Drilling Services

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN (** Drillers description).				
						SANDSTONE (** Drillers description).	2.00	140.59		
						End of Borehole at 12.00m	12.00	130.59		

Remarks and Groundwater Observations:

1. Drilled using air flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 142.59
Eastings: 423393.01
Northings: 410995.64

Fig No. RO204

BOREHOLE RECORD

BH No. **RO205**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C9297
Client: Lovell Partnerships Ltd
Date(s): 09/10/2023
Method: Tracked open hole rotary drilling rig.
Scale: 1:150
Logged By: JC
Checked By: G.H
Driller: Sirius Drilling Services

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN (** Drillers description).				
						SANDSTONE (** Drillers description).	2.50	140.04		
						GREY MUDSTONE (** Drillers description).	7.50	135.04		
						SANDSTONE with alternating mudstone bands (** Drillers description).	12.00	130.54		
						SANDSTONE (** Drillers description).	21.00	121.54		
						End of Borehole at 30.00m	30.00	112.54		
	TCR	SCR	RQD	FI						

Remarks and Groundwater Observations:

1. Drilled using air flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 142.54
Eastings: 423417.79
Northings: 410983.81

Fig No.
RO205

BOREHOLE RECORD

BH No. **RO206**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C9297

Client: Lovell Partnerships Ltd
Date(s): 09/10/2023

Method: Tracked open hole rotary drilling rig.
Scale: 1:150

Logged By: JC | Checked By: G.H

Driller: Sirius Drilling Services

SAMPLE DETAILS					STRATA RECORD				
Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend / Well
						OVERBURDEN (** Drillers description).			
						SANDSTONE (** Drillers description).	2.20	140.33	
						GREY MUDSTONE with alternating sandstone bands (** Drillers description).	9.00	133.53	
						SANDSTONE (** Drillers description).	13.00	129.53	
						GREY MUDSTONE (** Drillers description).	21.00	121.53	
						SANDSTONE with alternating mudstone bands (** Drillers description).	25.50	117.03	
						End of Borehole at 30.00m	30.00	112.53	
	TCR	SCR	RQD	FI					

Remarks and Groundwater Observations:

1. Drilled using air flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 142.53
Eastings: 423429.65
Northings: 410983.84

Fig No.
RO206

BOREHOLE RECORD

BH No. **RO207**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C9297

Client: Lovell Partnerships Ltd
Date(s): 10/10/2023

Method: Tracked open hole rotary drilling rig.
Scale: 1:150

Logged By: JC
Checked By: G.H

Driller: Sirius Drilling Services

SAMPLE DETAILS

STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN (** Drillers description).				
						SANDSTONE (** Drillers description).	2.00	143.31		
						COAL (** Drillers description).	3.30	142.01		
						GREY MUDSTONE (** Drillers description).	3.60	141.71		
						End of Borehole at 4.60m	4.60	140.71		

Remarks and Groundwater Observations:

1. Drilled using air flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 145.31
Eastings: 423375.53
Northings: 410990.96

Fig No.
RO207

BOREHOLE RECORD

BH No. **RO208** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C9297

Client: Lovell Partnerships Ltd

Date(s): 10/10/2023

Method: Tracked open hole rotary drilling rig.

Scale: 1:150

Logged By: JC | Checked By: G.H

Driller: Sirius Drilling Services

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN (** Drillers description).				
						SANDSTONE (** Drillers description).	2.00	140.57		
						GREY MUDSTONE (** Drillers description).	7.00	135.57		
						SANDSTONE with alternating mudstone bands (** Drillers description).	12.00	130.57		
						COAL TRACE (** Drillers description).	14.00	128.57		
						GREY MUDSTONE (** Drillers description).	14.10	128.47		
						SANDSTONE with alternating mudstone bands (** Drillers description).	16.00	126.57		
						End of Borehole at 30.00m	30.00	112.57		

TCR SCR RQD FI

Remarks and Groundwater Observations:

1. Drilled using water flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 142.57

Eastings: 423413.69

Northings: 410967.14

Fig No. RO208

BOREHOLE RECORD

BH No. **RO209**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C9297

Client: Lovell Partnerships Ltd
Date(s): 10/10/2023

Method: Tracked open hole rotary drilling rig.
Scale: 1:150

Logged By: JC | Checked By: G.H

Driller: Sirius Drilling Services

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN (** Drillers description).				
						SANDSTONE (** Drillers description).	2.00	142.17		
						GREY MUDSTONE (** Drillers description).	9.00	135.17		
						SANDSTONE (** Drillers description).	11.00	133.17		
						GREY MUDSTONE (** Drillers description).	16.00	128.17		
						DARK MUDSTONE (** Drillers description).	19.00	125.17		
						GREY MUDSTONE (** Drillers description).	19.40	124.77		
						End of Borehole at 21.00m	21.00	123.17		

TCR SCR RQD FI

Remarks and Groundwater Observations:

1. Drilled using water flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 144.17
Eastings: 423404.30
Northings: 410953.90

Fig No.
RO209

BOREHOLE RECORD

BH No. **RO210**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C9297
Client: Lovell Partnerships Ltd
Date(s): 10/10/2023
Method: Tracked open hole rotary drilling rig.
Scale: 1:150
Logged By: JC
Checked By: G.H
Driller: Sirius Drilling Services

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN (** Drillers description).				
						SANDSTONE (** Drillers description).	2.00	143.35		
						GREY MUDSTONE (** Drillers description).	10.00	135.35		
						SANDSTONE (** Drillers description).	12.00	133.35		
						End of Borehole at 15.00m	15.00	130.35		

Remarks and Groundwater Observations:

1. Drilled using water flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 145.36
Eastings: 423390.03
Northings: 410954.42

Fig No.
RO210

BOREHOLE RECORD

BH No. **RO211**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C9297

Client: Lovell Partnerships Ltd
Date(s): 10/10/2023

Method: Tracked open hole rotary drilling rig.
Scale: 1:150

Logged By: JC | Checked By: G.H

Driller: Sirius Drilling Services

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN (** Drillers description).				
						SANDSTONE (** Drillers description).	2.00	143.00		
						GREY MUDSTONE (** Drillers description).	8.00	137.00		
						SANDSTONE (** Drillers description).	12.00	133.00		
						End of Borehole at 15.00m	15.00	130.00		

TCR SCR RQD FI

Remarks and Groundwater Observations:

1. Drilled using water flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 145.00
Eastings: 423388.90
Northings: 410937.80

Fig No. RO211

BOREHOLE RECORD

BH No. **RO212**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C9297

Client: Lovell Partnerships Ltd
Date(s): 10/10/2023

Method: Tracked open hole rotary drilling rig.
Scale: 1:150

Logged By: JC | Checked By: G.H

Driller: Sirius Drilling Services

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN (** Drillers description).				
						SANDSTONE (** Drillers description).	1.50	142.14		
						GREY MUDSTONE (** Drillers description).	9.00	134.64		
						SANDSTONE (** Drillers description).	13.00	130.64		
						End of Borehole at 15.00m	15.00	128.64		

Remarks and Groundwater Observations:

1. Drilled using water flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 143.64
Eastings: 423403.08
Northings: 410939.32

Fig No. RO212

BOREHOLE RECORD

BH No. **RO213**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C9297

Client: Lovell Partnerships Ltd
Date(s): 10/10/2023

Method: Tracked open hole rotary drilling rig.
Scale: 1:150

Logged By: JC | Checked By: G.H

Driller: Sirius Drilling Services

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN (** Drillers description).				
						SANDSTONE (** Drillers description).	2.00	137.69		
						GREY MUDSTONE (** Drillers description).	9.00	130.69		
						COAL TRACE (** Drillers description).	11.50	128.19		
						GREY MUDSTONE with alternating sandstone bands (** Drillers description).	11.60	128.09		
						End of Borehole at 15.00m	15.00	124.69		

TCR SCR RQD FI

Remarks and Groundwater Observations:

1. Drilled using water flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 139.69
Eastings: 423439.97
Northings: 410960.08

Fig No.

RO213

BOREHOLE RECORD

BH No. **RO214**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C9297
Client: Lovell Partnerships Ltd
Date(s): 10/10/2023
Method: Tracked open hole rotary drilling rig.
Scale: 1:150
Logged By: JC
Checked By: G.H
Driller: Sirius Drilling Services

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						OVERBURDEN (** Drillers description).				
						SANDSTONE (** Drillers description).	2.50	140.09		
						GREY MUDSTONE (** Drillers description).	7.00	135.59		
						SANDSTONE (** Drillers description).	11.50	131.09		
						End of Borehole at 15.00m	15.00	127.59		

Remarks and Groundwater Observations:

1. Drilled using water flush. 2. Backfilled with gravel and capped with bentonite. 3. Co-ordinates and elevations surveyed on site using survey grade GPS

GL (m AOD) 142.59
Eastings: 423416.34
Northings: 410960.20

Fig No. RO214

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www.thesiriusgroup.com

Yorkshire
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Matthew Killip
Lovell Partnership Ltd
Unit 3 Turnberry Park
Gildersome
Leeds
LS27 7LE

Date: 28th February 2025

Our ref: C9297/CP/10804

Dear Matthew,

SITE STRIP VERIFICATION LETTER REPORT – FORMER GREENSIDE MILLS, SKELMANTHORPE

INTRODUCTION

It is understood that Lovell Partnerships Limited (Lovell) are proposing re-development of land at the former Greenside Mills, off Saville Road, Skelmanthorpe (the "site"). The re-development will comprise 46 no. low rise (2-3 storey) residential properties with private gardens and associated infrastructure, including areas of hardstanding, access roads and public open space (POS). A proposed development layout has been provided to Sirius (STEN Architecture drawing ref. 2156.01 Rev S, last dated April 2024), a copy of which is included in Attachment A of this report.

Previous site investigations identified a potential risk to surface stability from localised possible unrecorded shallow mine workings underlying the central area of the site. This potential risk indicated that a programme of proof drilling of boreholes, followed by stabilisation where / if necessary was required. A Completion Report detailing the proof drilling undertaken has been provided under separate cover (Completion Report for the Proof Drilling of Potential Shallow Mine Workings for land at the Former Greenside Mills, Skelmanthorpe, report ref. C9297C/D&G dated September 2024).

In addition to shallow coal mine workings, the possibility of encountering unrecorded mine entries, including bell pits and crop workings, could not be discounted, and a site strip down to natural subsoil to observe for evidence of crown holes, mine entries and bell pits within the central site area was recommended.

This letter report includes the findings of a series of site strip inspections undertaken within targeted areas of the site, and includes the following information:

- A summary of the works undertaken, including provision of drawings and photographic evidence of site strips; and,
- Confirmation that the works have been undertaken in general accordance with the Specification for the Investigation and Stabilisation by Drilling and Grouting of Shallow Mineworkings.

PERTINENT SOURCES OF INFORMATION

The following pertinent sources of information produced by Sirius Geotechnical Ltd (SGL) should be read in conjunction with this report.

- Geo-environmental Appraisal Report of Land at Greenside Mills, Skelmanthorpe (ref. C7340 dated December 2020).
- Supplementary Site Investigation Letter Report for land at the former Greenside Mills, Skelmanthorpe (Ref. C7340/RC/9607, dated June 2021).
- Geotechnical Assessment Letter Report for land at the former Greenside Mills, Skelmanthorpe (Ref. C9297/10330/AEC) dated December 2023).
- Strategy for Remedial and Preparatory Works for land at the Former Greenside Mills, Skelmanthorpe (ref. C9297/RS dated November 2023).
- Specification for the Investigation and Stabilisation by Drilling and Grouting of Shallow Mineworkings for land at the Former Greenside Mills, Skelmanthorpe (ref. C9297/D&G dated November 2023)(the Specification).
- Completion Report for the Proof Drilling of Potential Shallow Mine Workings for land at the Former Greenside Mills, Skelmanthorpe (ref. C9297C/D&G dated September 2024).

This document should be read in conjunction with the previous reports for the site, which present in detail the site setting and the findings of the previous phases of intrusive investigation. Salient details are summarised in this document.

REPORT LIMITATIONS

This report has been prepared for the sole use of Lovell Partnerships Limited. No other third party may rely upon or reproduce the contents of this report without the written approval of Sirius. If any unauthorised third party comes into possession of this report, they rely on it entirely at their own risk and the authors do not owe them any Duty of Care or Skill.

BACKGROUND INFORMATION

Pertinent site details are summarised in Table 1, below.

Table 1 - Summary of Current Site Description and Site Details

Location	The overall site comprises an irregularly shaped parcel of land covering an area of approximately 2 hectares, located to the north of Saville Road and west of Marsden Street in the village of Skelmanthorpe. The location of the site is shown on Drawing No. C9297C/DG/01, presented in Attachment A.
National Grid Ref.	423390mE, 410930mN
Topography and Features	In general, the site slopes downward from northwest to southeast / east, with levels of approximately 156.5m AOD adjacent to the northwestern site boundary, and 138m AOD to the eastern site boundary, and is formed by approximately four development plateaus. The site is currently undergoing earthworks (by third party contractors), to enable residential development by Lovell.

Published Geology	The site is shown on geological mapping to be underlain by Carboniferous Pennine Lower Coal Measures (LCM) strata, comprising undifferentiated 'mudstones, siltstones and sandstones with subordinate coal, ironstone and fireclay' in the centre and southwest of the site. An unnamed sandstone unit is recorded to be present in the east of the site. Published geological information indicates that the site is located within three fault blocks. Two conjectured faults, orientated northwest-southeast, with a downthrow to the northeast, are recorded to cross the central area of the site. The Whinmoor (Top Whinmoor) and Low Whinmoor coal seams are conjectured to outcrop c. 10m north and c. 15m northeast of the site respectively, dipping to the northwest. The Whinmoor (Top Whinmoor) and Low Whinmoor coal seams are shown to outcrop beyond the northernmost conjectured fault on site. The seams are recorded to be between 0.4m-0.8m and 0.2m-0.6m in thickness, respectively.
Mining and Quarrying	The Coal Authority (CA) report for the site states that the site is not within the zone of likely physical influence on the surface from recorded past underground or opencast workings, but that the property is in an area where the CA believes there is coal at or close to the surface; this coal may have been worked at some time in the past. In the northeast of the site the CA online viewer shows there is a risk of 'probable unrecorded shallow workings'; the same area of the site is recorded as a 'development high risk area'. Correspondence with the CA indicated 'Our information indicates the Whinmoor and an unnamed coal seam crop in the vicinity of the site. Records of surface workings in the wider locality to the north of the site show the Whinmoor as three leaves at that location'. The CA Mining Report states that there are no known mine entries within 20m of the site. The online CA interactive viewer shows no recorded shafts are present within 250m of the site, with the nearest shaft shown c. 280m south of the site.

Previous Site Investigations

The above-referenced reports for the site present in detail the findings of the previous phases of intrusive investigation. Salient details are summarised below.

Several phases of rotary drilling have been undertaken to investigate the presence of shallow coal seams and any associated shallow mine workings beneath the site, and to confirm the two central conjectured fault locations. Drawing No. C9297/DG/03, included within Attachment A, indicates the locations of the inferred faults and coal outcrops, based on both published geological information and site investigation observations.

Central Fault Block

Evidence of shallow mine workings, in the form of broken ground, were recorded in one borehole in the south of the central fault block (RO02) between 3.8m and 6.0m below ground level (bgl). Up to two seams / leaves of intact coal were encountered in two boreholes (RO03 and RO105) within the central fault block. The upper seam was recorded from top depths of between 2.4m and 2.5m bgl and the lower seam was recorded from top depths of between 4.0m and 4.2m bgl. Single seams of intact coal were recorded at top depths of between 0.4m bgl and 3.3m bgl in several trial pits. A single thin intact seam (0.2m thickness) was identified at a depth of 10.0m bgl within one rotary borehole.

The coal appeared to only locally be split into two seams / leaves, and inconsistent in thickness across the central site area. Insufficient rock cover was considered to exist above the identified coal seam(s) to mitigate the risk of surface instability from localised shallow mine workings however, and as such it was recommended that this area be subject to further plot specific investigation / assessment, and subsequent treatment, as necessary.

Eastern and Western Fault Blocks

Sufficient rock cover was considered to exist above identified inconsistent coal seam(s) across the western and eastern fault blocks to mitigate the risk of surface instability if unrecorded mine workings were to be present, and as such was considered to pose a low risk to surface stability, not requiring treatment.

Proof Drilling and Stabilisation Works

Lovell appointed Sirius Drilling Limited (SDL) in July 2024 to undertake proof drilling of plots within the central areas of the proposed development. SGL was appointed to act as Supervising Engineer for the works.

A series of boreholes was drilled to depths of between 3.5m and 12.0m bgl, to target the Whinmoor (Top and / or Low Whinmoor) coal, where present. The layout of boreholes, together with the presence of solid coal or absence of coal (due to faulting) is shown on Drawing No. C9297C/DG/03 included within Attachment A. No evidence of mine workings was recorded. Plots within the inferred central fault block included plot refs. 8, 9, 22-28 and the detached garage of plot 29.

The rotary boreholes encountered intact coal below plots 22 to 26, inferred to represent the Top Whinmoor coal. A second deeper seam was encountered within rotary borehole locations 22/23.1 and 25.2, possibly representing the Low Whinmoor coal seam within the northern most area of the site. No coal was encountered within plots 8 and 9, indicating the Whinmoor coal seam(s) outcrop is to the north of these plots (and dipping to the north, away from plots 8 and 9). The coal was also not encountered within plots 27 to 29, indicating these plots lie to the west of the conjectured fault (i.e. located within the western fault block).

The loss of flush initially noted within a rotary borehole located to the south of the site was considered likely to be attributable to naturally occurring geological features (i.e. faulting / fractured sandstone etc), rather than related to shallow mine workings. This was based on a reinterpretation of the previous site investigation data, following the proof drilling.

Mine Entries

Given the presence of shallow coal, the possibility of encountering unrecorded mine entries, including bell pits and crop workings, could not be discounted, and a site strip down to natural subsoil under the supervision of a suitably experienced consultant, to observe for evidence of crown holes, mine entries and bell pits was recommended. All other excavations into natural ground site wide made during enabling and earthworks were also recommended to be inspected for evidence of such mining features.

A plan showing the proposed areas of mineworkings treatment, including a site strip, together with the development proposals, is included as Drawing No. C9297/DG/04 in Attachment A. It should be noted that the position of the on-site faults marked within the drawings were in parts inferred from BGS mapping. The specific alignment of both faults was therefore considered subject to change during drilling / treatment works.

On the basis of the apparent outcrop of the Whinmoor Coal towards the north of the site and the absence of coal within the southern central site area, the site strip was principally targeted to affected plots, including plot refs. 20 to 28 and plot 29 garage.

SITE SOIL STRIP INVESTIGATION FINDINGS

Several inspection visits were conducted by SGL between February and March 2024 and subsequently in January 2025 to assess the natural subsoils, where access permitted, within the central fault block. The site visits were undertaken periodically as areas were undergoing clearance of former structures and hardstanding by Lovell's third party contractors.

Site visits undertaken by SGL during February and March 2024 included the majority of the inferred central fault block area, although as the site was actively undergoing clearance, extents of the central site areas were found to be inaccessible due to the presence of stockpiles or intact structures such as retaining walls and column bases. A site strip inspection plan, showing photographs and observations taken during the visits between February and March 2024 is included as Drawing No. C9297B/DG/01, within Attachment A. No visual evidence of shallow coal mining features was observed within the areas of visible soil strip.

Concrete retaining walls which stepped the previous development downwards to the east remained in-situ between plots 23 to 24, and a brick wall was noted running southeast to northwest through proposed plot 27. Plots 20-23 were partly covered by a stockpile of demolition arisings during the 2024 site visits, and so were unable to be fully inspected at this time. Remnant concrete and metal column bases were noted within the localities of plots 26 and 27.

The proof drilling works were undertaken in July 2024 across plot refs. 8, 9, 22-28 and the detached garage of plot 29. The proof drilling confirmed the outcrop of the Whinmoor Coal to be located towards the north of the central site area in an approximate northeast-southwest orientation, and so subsequent site visits were targeted to the northern central site area.

No evidence of coal (or associated mine workings) was encountered within plots 8-9 and 27-29, indicating these plots were to the south of the outcrop and to the west of the fault block respectively.

Drawing No. C9297C/DG/03, included within Attachment A indicates, the conjectured coal outcrops and fault traces, based on the findings of the proof drilling.

A visit undertaken on 23rd January 2025 included an inspection of plots 22-26, which were proven as part of the proof drilling works to be underlain by shallow intact coal. The area of proposed plots 20 and 21 was also included within the site strip inspection. No visual evidence of shallow coal mining features was observed. The extent of the site strip showing photographs and observations taken is shown in Drawing No. C9297B/DG/02 within Attachment A.

Several relic column bases were evident within the area of proposed plots 24-26, and Heras fence panels were locally present to protect pedestrian access routes. These locally constrained the soil strip observations.

CONCLUSIONS AND RECOMMENDATIONS

Site observations indicate that the site strip has been carried out to a satisfactory standard in accordance with the requirements of the Specification, and that no evidence of mine entries have been encountered below the areas investigated which were previously considered to pose a risk to surface stability. It should be noted that a number of remnant obstructions remained within the locality of plots 22-26, which prevented full unobstructed observations to be made, and it is recommended that any excavations into natural ground made during any subsequent works within the locality of these plots are inspected for evidence of crown holes, mine entries and bell pits etc.

All other excavations into natural ground made during enabling and earthworks across the site as a whole should be inspected for evidence of unrecorded mine entries.

This letter report is considered suitable and appropriate based on the works completed. However, it cannot be guaranteed to gain regulatory approval and, therefore, should be passed to the appropriate regulatory authorities and/or other organisations for their comment and approval.

CLOSING

We trust that the above and attached are acceptable and that you will forward to the appropriate regulatory authorities as appropriate. Should you have any queries, please do not hesitate to contact us.

Yours sincerely,

Connor Page
Engineer

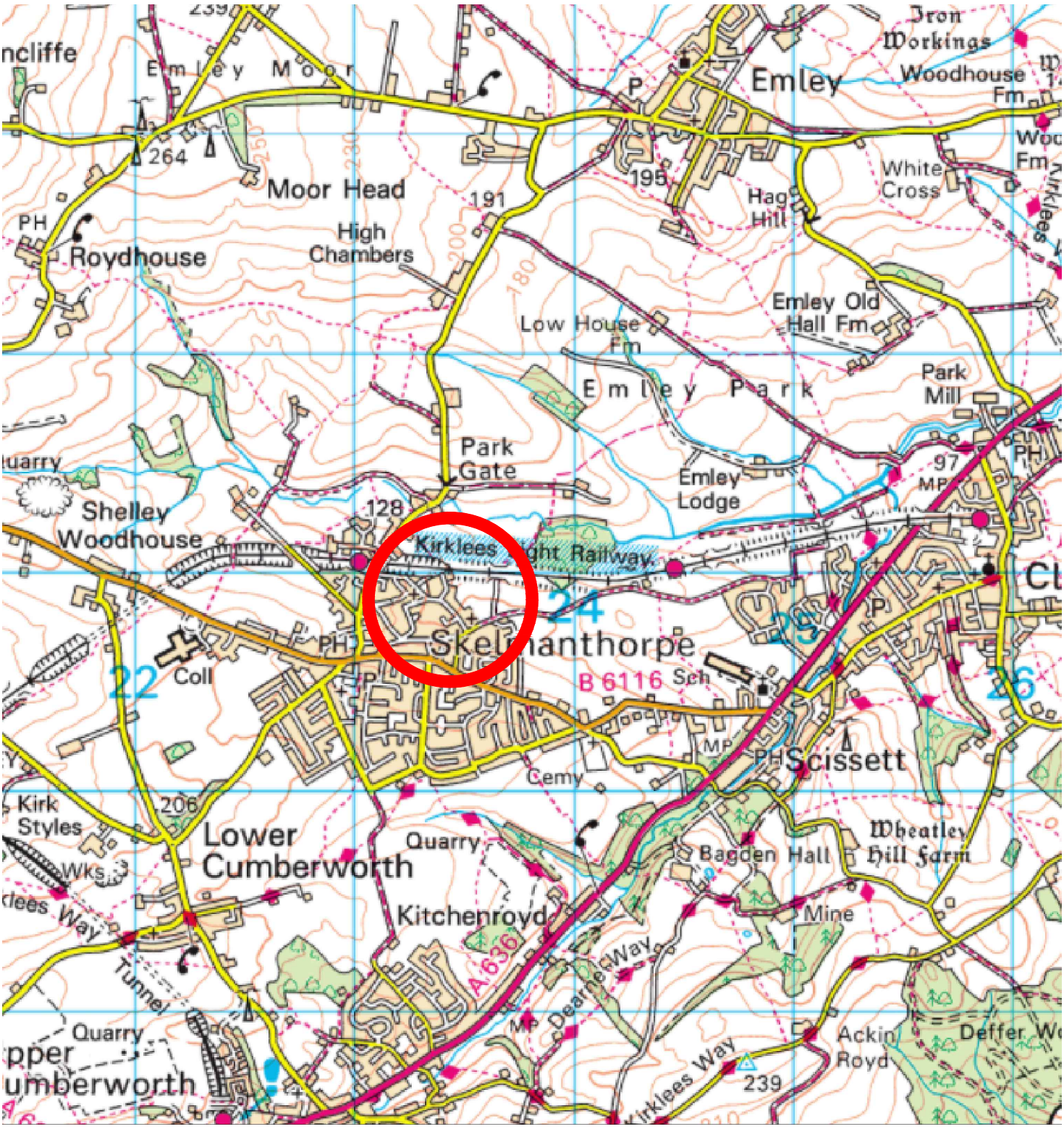
For and on behalf of Sirius Geotechnical Ltd

Enc.:
Attachment A - Drawings

- C9297C/DG/01 Site Location Plan
- C9297C/DG/02 Site Features Plan
- C9297/DG/03 Indicative Mining Risk Plan
- C9297/DG/04 Proposed Shallow Mine Workings Investigation and Treatment Plan
- C9297C/DG/03 Shallow Mine Workings Proof Drilling Location Plan
- C9297B/DG/01 Site Strip Inspection Plan, 2024 Visits
- C9297B/DG/02 Site Strip Inspection Plan, 2025 Visits
- STEN Architecture drawing ref. 2156.01 Rev S, last dated April 2024 - Proposed Development Layout

ATTACHMENT A

DRAWINGS



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NOTES

Site Location

REVISION	
0	For Information
A	>>
B	>>
C	>>
D	>>

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4245 Park Approach, Thorpe Park, Leeds LS15 8GB
www.thesiriusgroup.com
TEL: 0113 264 9960
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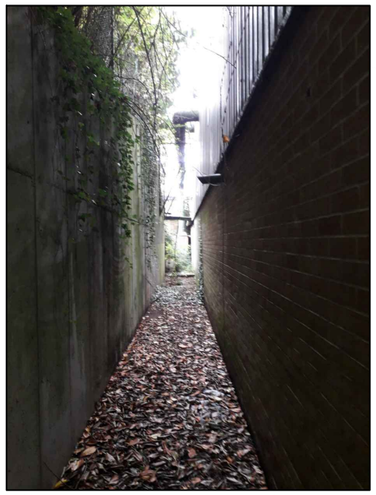
CLIENT	DRAWING NO.	REVISION NO.
Lovell Partnerships Ltd	C9297C/DG/01	0
SITE: Former Greenside Mills, Skelmanthorpe	DRAWN BY: MF	APPROVED BY: GH
DRAWING TITLE: Site Location Plan	DATE: September 2024	SCALE: 1:25,000

A4

1. Facing southeast, showing buildings 10 and 11, and the walkway between buildings 9 and 11.

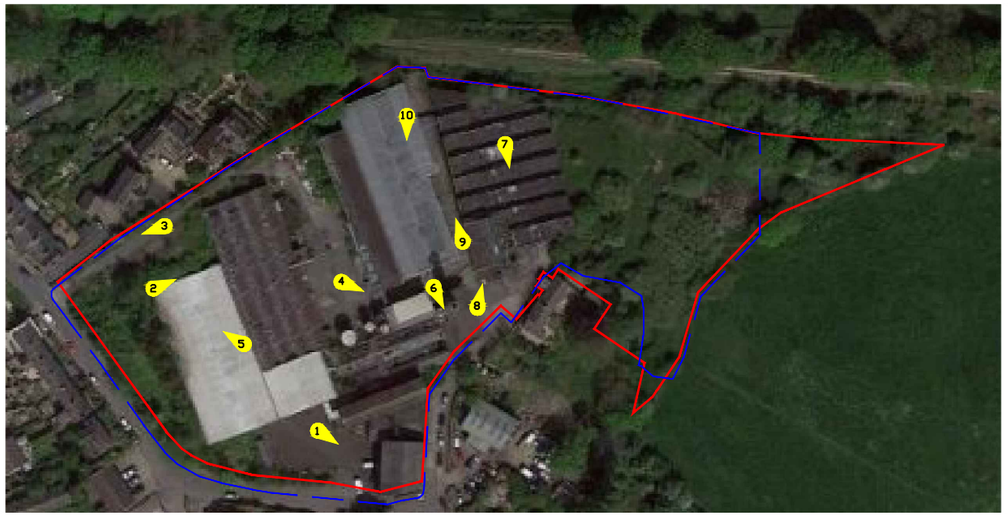


2.Facing east, showing the retaining wall to the north of building 8.

3. Facing southwest, showing the alternative access off Saville Road.

8. Facing northeast showing the sub-station.

4. Facing southeast, showing the fire water tanks, chimney and portions of buildings one and six.

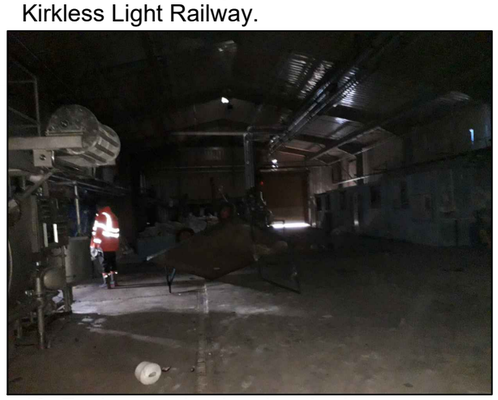


9. Facing north, showing the footpath / track leading through the site to the Kirkless Light Railway.

5. Facing northwest, showing the equipment still present within building eight.

6. Facing south, showing the base of the chimney and storage areas.

7. Showing the items present within building 2 and the condition of the building.



10. Facing south, showing the items present within building 5 and the condition of the building.

NOTES

Site Boundary

Site Layout Boundary

REVISION		BY	DATE
0	For Information	RC	10/11/20
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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CLIENT

Paramount Retail Group Holdco Limited

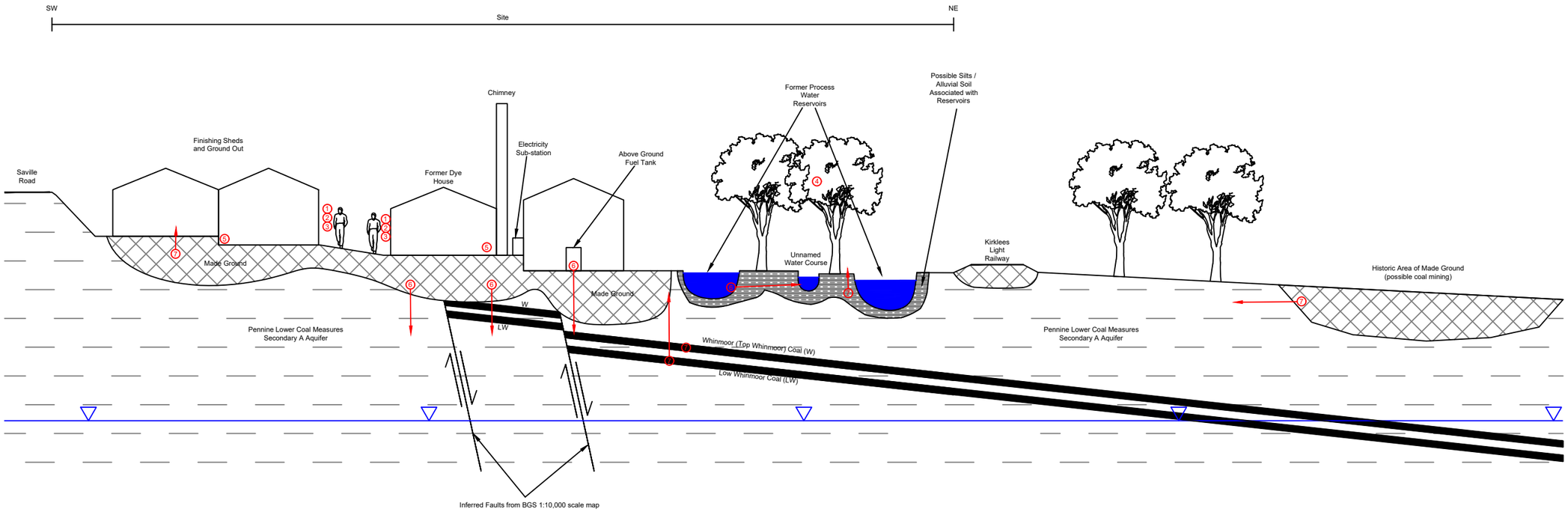
SITE

Greenside Mills, Skelmanthorpe

DRAWING TITLE

Site Photos

DRAWING NO.	REVISION NO.
C7340/03	0
DRAWN BY	APPROVED BY
RC	GH
DATE	SCALE	PAPER SIZE
December 2020	NTS	A3



Contamination Source	Contamination Pathway	Potential Receptors	Risk of Significant Contamination Linkage
Metals, metalloids, inorganic compounds (including sulphates), asbestos (inhalation only), and hydrocarbons (including PAH's and PCBs) may be present within localised topsoil, made ground and / or shallow soils at the site.	1) Direct and Indirect ingestion 2) Inhalation of contaminated particles and dust 3) Dermal contact	Construction workers, site end users and adjacent land users	Moderate
	4) Plant Uptake	Areas of private gardens and soft landscaping	Low to Moderate
	5) Sulphate Attack	Built environment	Low to Moderate
Possible leachable (and mobile) of metals, and metalloids, other inorganic and/or organic contaminates in perched/shallow groundwater.	6) Leaching via groundwater flow	Underlying Secondary A Aquifer and on-site surface watercourses	Moderate
Hazardous permanent ground gases resulting from areas of potentially deep made ground on and off site, potential VOCs associated with former fuel spillages, possible alluvial soils in the east of the site and coal mine related gas emissions.	7) Gas migration	Construction workers, site end users and adjacent land users	Moderate

NOTES

REVISION		BY	DATE
0	For Information	MF	11/11/20
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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SITE

Greenside Mills, Skelmanthorpe

DRAWING TITLE

Preliminary Conceptual Site Model

DRAWING NO.	REVISION NO.
C7340/04	0
DRAWN BY: MF	APPROVED BY: RC
DATE: December 2020	SCALE: NTS	PAPER SIZE: A3

NOTES

- Site Boundary
- Site Layout Boundary
- Rotary borehole location, with gas and groundwater monitoring installation
- Window sample borehole location
- Window sample borehole location, with gas and groundwater monitoring installation
- Trial pit location
- Approximate extent of service corridor
- Approximate extent of historic mill ponds
- Approximate line of drain
- No access available during site investigation works
- Approximate line of retaining wall

REVISION		BY	DATE
0	For Information	MF	17/09/20
A	Approximate Service Locations	RC	14/10/20
B	Final BH Positions	RC	05/11/20
C	>>	>>	>>
D	>>	>>	>>

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SITE

Greenside Mills, Skelmanthorpe

DRAWING TITLE

Exploratory Hole Location Plan

DRAWING NO.	REVISION NO.
C7340/05	0

DRAWN BY	APPROVED BY
MF	GH

DATE	SCALE	PAPER SIZE
December 2020	NTS	A3

NOTES

- Site Boundary
- Site Layout Boundary
- Rotary probe hole location
- Development high risk and probable shallow coal mining workings area (from The Coal Authority Interactive Map)
- Additional area identified at being at risk of shallow coal mining based on the findings of the site investigation.
- Area recommended to be subject to confirmatory rotary drilling to confirm absence of coal seams / associated mine workings
- Conjectured coal seam outcrops (from 1:50,000 scale map). Seams dipping to northwest.
- Inferred fault with tick showing downthrow direction (from 1:50,000 scale map)
- Dip and dip direction (from 1:10,000 scale map)

REVISION		BY	DATE
0	For Information	RC	17/11/20
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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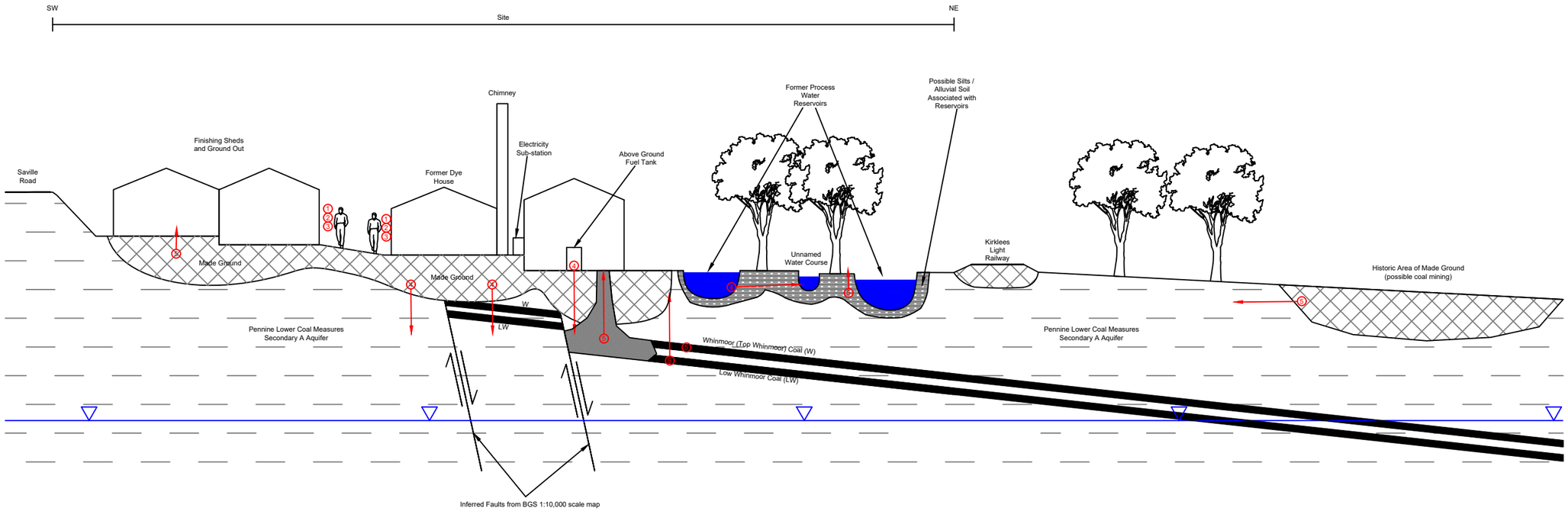
SITE

Greenside Mills, Skelmanthorpe

DRAWING TITLE

Coal Risk Plan

DRAWING NO.	REVISION NO.
C7340/06	0
DRAWN BY: RC	APPROVED BY: GH
DATE: December 2020	SCALE: NTS
PAPER SIZE: A3	



Contamination Source	Contamination Pathway	Potential Receptors	Risk of Significant Contamination Linkage
Elevated concentrations of arsenic, benzo(a)pyrene, TPH and naphthalene present in made grounds and locally elevated concentration of naphthalene within natural soils at the site.	1) Direct and Indirect ingestion 2) Inhalation of contaminated particles and dust 3) Dermal contact	Construction workers, site end users and adjacent land users	Moderate
Localised ACMs and asbestos fibres in made ground soils.	2) Inhalation of contaminated particles and dust	Construction workers, site end users and adjacent land users	Moderate to High
Locally elevated metals and ammonia in perched/shallow groundwater.	4) Migration via groundwater flow	Underlying Secondary A Aquifer and on-site surface watercourses	Low to Moderate
Hazardous permanent ground gases resulting from areas of potentially deep made ground on and off site, possible alluvial soils in the east of the site and coal mine related gas emissions.	5) Gas migration	Construction workers, site end users and adjacent land users	Moderate

NOTES

REVISION		BY	DATE
0	For Information	RC	18/11/20
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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CLIENT

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SITE

Greenside Mills, Skelmanthorpe

DRAWING TITLE

Revised Conceptual Site Model

DRAWING NO.	REVISION NO.
C7340/07	0
DRAWN BY: RC	APPROVED BY: GH
DATE: December 2020	SCALE: NTS
PAPER SIZE: A3	

Name	Floor Area Sq Ft	Bed	Description	Total Units	Total
Type A	1350	4b/8p	2 1/2 storey detached with single garage	1	1350
Type B	1200	4b/7p	2 1/2 storey semi-detached with single garage	9	10800
Type C	1350	4b/8p	3 storey semi-detached with single garage	3	4050
Type D	1100	3b/6p	2 1/2 storey semi-detached with parking spaces	6	6600
Type E	900	3b/6p	2 storey detached with integral garage	1	900
Type F	1100	4b/6p	2 storey detached with single garage	10	11000
Type G	1400	4b/8p	2 storey detached with single garage	3	4200
Type H	850	3b/5p	2 storey semi-detached with parking spaces	11	9350
Type J	950	3b/6p	2 storey detached with single garage	2	1900
Type K	1300	4b/8p	2 storey detached with integral garage	3	3900
Type L	900	3b/6p	2 storey semi-detached with parking spaces	5	4500
Type M	1100	4b/6p	2 storey detached with single garage	1	1100
Total				55	59650

	hectares		acres
approx gross area	1.86		4.6
approx nett area	1.54		3.81
POS	0.248		0.61
coverage			15656

STEN ARCHITECTURE
STEN Architecture Ltd
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Benton Office Park
Bennett Avenue
Horbury
WF4 5RA
TEL: 01924 669424

0 10 20 30 40 50

SK02 | NOVEMBER 2016 | 1:500 @ A2

SAVILLE ROAD, SKELMANTHORPE

APPENDIX B

ADEPTUS GROUNDSURE REPORT

Groundsure
LOCATION INTELLIGENCE

Adeptus Environmental

Hill Quays, 14 COMMERCIAL STREET,
MANCHESTER, M15 4PZ

Groundsure Reference:	GS-2886016
Your Reference:	160311_Greenside_Mills
Report Date	6 Apr 2016
Report Delivery Method:	Email - pdf

Groundsure Enviroinsight

Address: GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviroinsight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,

Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

Groundsure Enviroinsight

Address:	**GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE**
Date:	**6 Apr 2016**
Reference:	**GS-2886016**
Client:	**Adeptus Environmental**

NW N NE

W E

SW S SE

Aerial Photograph Capture date:	26-Mar-2012
Grid Reference:	423421,410972
Site Size:	3.76ha

Report Reference: GS-2886016
Client Reference: 160311_Greenside_Mills

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Overview of Findings

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Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	16	21	38	65
1.2 Additional Information – Historical Tank Database	9	9	10	6
1.3 Additional Information – Historical Energy Features Database	11	12	8	23
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	3	0	5
1.6 Potentially Infilled Land	7	4	14	44

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	1	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	2	0
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	7	1
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency Historic Landfill Sites	0	0	0	2	1	3
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency Licensed Waste Sites	0	0	0	0	0	0

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	3	1	6	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	Yes
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	None
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	No
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	5	0	0	2	0	18
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	1	0	2
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	3	0	0	1	Not searched	Not searched

	On-site	0-50m	51-250	251-500	501-1000	1000-1500

Section 6: Hydrogeology and Hydrology	0-500m					
6.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
6.10 Detailed River Network entries within 500m of the site	4	1	2	7	Not searched	Not searched
6.11 Surface water features within 250m of the study site	Yes	Yes	Yes	Not searched	Not searched	Not searched

Section 7: Flooding	
7.1 Are there any Enviroment Agency Zone 2 floodplains within 250m of the study site?	Yes
7.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site	Yes
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Very Low
7.4 Are there any Flood Defences within 250m of the study site?	No
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Low

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	1	1	1	5
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	1
8.14 Records of Green Belt land	1	0	0	0	1	1

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?	Moderate
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Very Low
9.1.2 What is the maximum Landslides hazard rating identified on the study site?	Low
9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Moderate
9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
9.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Very Low
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining

10.1 Are there any coal mining areas within 75m of the study site?	Yes
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	No
10.3 Are there any brine affected areas within 75m of the study site?	No

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

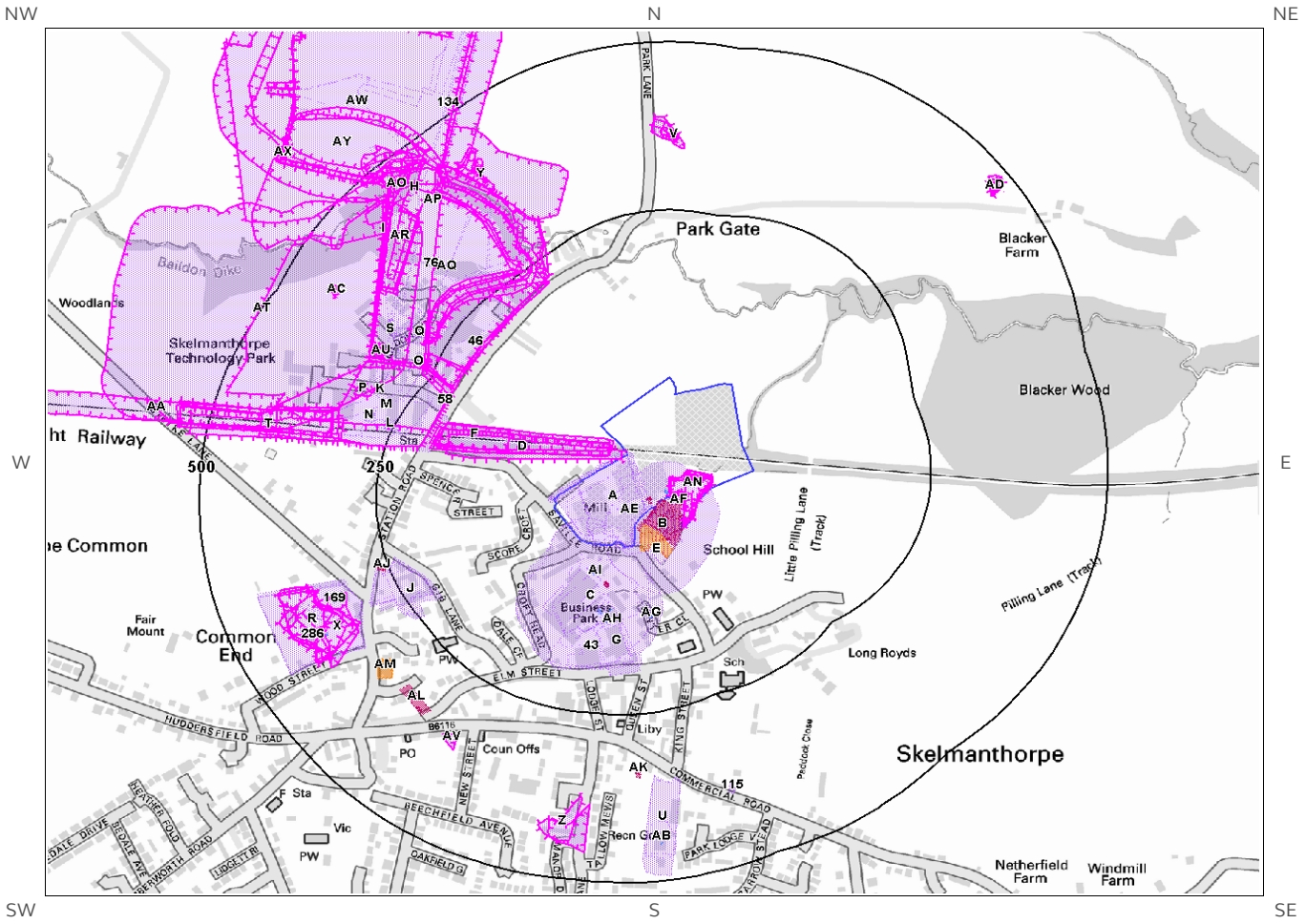
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Historical Land Use



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Site Outline

250
500
Search Buffers (m)

Historical 1:10,000 and 1:10,560 scale mapping

Industrial Land Use

Potentially Infilled Land

Historical 1:2,500, 1:1,250 and 1:500 scale mapping

Energy Features

Petrol Stations

Tanks

Garages

1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 140

ID	Distance [m]	Direction	Use	Date
1D	0	On Site	Cuttings	1892
2A	0	On Site	Unspecified Mills	1951
3A	0	On Site	Unspecified Mills	1938
4A	0	On Site	Unspecified Mill	1993
5A	0	On Site	Unspecified Mill	1979
6A	0	On Site	Unspecified Mill	1967
7A	0	On Site	Unspecified Mills	1892
8A	0	On Site	Unspecified Mills	1948
9AE	0	On Site	Unspecified Mills	1904
10B	0	On Site	Unspecified Works	1967
11B	0	On Site	Gas Works	1904
12B	0	On Site	Unspecified Commercial/Industrial	1948
13AF	0	On Site	Laundry	1951
14B	0	On Site	Unspecified Commercial/Industrial	1938
15C	0	On Site	Unspecified Mills	1948
16C	0	On Site	Unspecified Mill	1967
17B	1	W	Gas Works	1892
18D	3	SW	Cuttings	1951
19B	4	W	Unspecified Tank	1892
20B	9	W	Unspecified Tanks	1967
21B	9	W	Unspecified Tanks	1979
22B	10	W	Unspecified Tank	1951
23D	10	SW	Cuttings	1938
24B	11	SW	Unspecified Tank	1938
25D	11	SW	Cuttings	1904
26D	11	SW	Cuttings	1948
27B	12	SW	Gasometer	1904
28B	12	SW	Unspecified Tank	1948
29B	12	S	Gasometer	1892
30B	16	W	Unspecified Tank	1904
31B	16	W	Unspecified Tank	1948
32C	18	S	Unspecified Mills	1951
33E	18	E	Laundry	1948

34E	19	E	Laundry	1938
35C	31	S	Unspecified Commercial/Industrial	1993
36C	31	S	Unspecified Mill	1979
37C	49	S	Unspecified Mills	1938
38G	83	S	Unspecified Mills	1892
39F	98	NW	Cuttings	1993
40F	98	NW	Cuttings	1979
41F	98	NW	Cuttings	1967
42G	110	S	Unspecified Mills	1951
43	114	S	Unspecified Mills	1948
44G	117	S	Unspecified Mills	1938
45M	187	NW	Railway Sidings	1892
46	202	NW	Unspecified Works	1993
47H	202	NW	Collieries	1938
48H	202	NW	Collieries	1938
49AQ	202	NW	Unspecified Mine	1979
50I	203	NW	Unspecified Mine	1967
51I	203	NW	Railway Sidings	1967
52W	203	NW	Railway Sidings	1948
53I	203	NW	Collieries	1948
54S	203	NW	Collieries	1904
55K	203	NW	Railway Sidings	1904
56J	204	SW	Unspecified Mills	1892
57H	207	NW	Collieries	1951
58	208	NW	Railway Building	1892
59J	210	SW	Unspecified Mills	1951
60J	212	SW	Unspecified Mills	1938
61J	213	SW	Unspecified Mills	1948
62AR	215	NW	Railway Sidings	1938
63K	224	NW	Railway Sidings	1951
64H	227	NW	Refuse Heap	1938
65H	227	NW	Refuse Heap	1938
66L	229	NW	Railway Station	1892
67AS	238	NW	Refuse Heap	1948
68L	242	NW	Railway Station	1938
69L	243	NW	Railway Station	1948
70L	243	NW	Railway Station	1904
71AO	243	NW	Refuse Heaps	1951
72L	244	NW	Railway Station	1967
73L	244	NW	Railway Station	1979
74L	245	NW	Railway Station	1951
75AP	248	NW	Tramway Sidings	1951
76	255	NW	Railway Sidings	1979
77O	272	W	Railway Building	1892
78M	278	NW	Railway Building	1904

79N	278	NW	Railway Building	1948
80N	278	NW	Railway Building	1938
81Q	280	NW	Railway Building	1892
82O	280	NW	Railway Buildings	1892
83N	281	NW	Railway Building	1951
84AT	288	NW	Unspecified Workings	1979
85P	301	NW	Unspecified Pit	1948
86P	301	NW	Unspecified Pit	1904
87Q	303	NW	Railway Buildings	1892
88R	304	SW	Stone Sawing and Planing Mills	1951
89R	305	SW	Stone Sawing and Planing Mills	1948
90R	306	SW	Stone Sawing and Planing Mills	1938
91S	313	NW	Railway Buildings	1892
92T	313	W	Cuttings	1892
93X	320	SW	Unspecified Quarry	1892
94T	320	W	Cuttings	1951
95R	323	SW	Unspecified Pit	1951
96T	325	W	Cuttings	1948
97T	325	W	Cuttings	1904
98R	327	SW	Unspecified Ground Workings	1938
99R	327	SW	Unspecified Ground Workings	1938
100T	328	W	Cuttings	1938
101R	331	SW	Railway Sidings	1948
102R	336	SW	Unspecified Ground Workings	1967
103AV	339	SW	Unspecified Pit	1892
104R	339	SW	Railway Sidings	1951
105V	342	N	Unspecified Ground Workings	1892
106U	342	S	Unspecified Disused Works	1938
107U	347	S	Unspecified Disused Works	1948
108R	348	SW	Unspecified Quarry	1948
109V	350	N	Unspecified Ground Workings	1904
110R	351	SW	Railway Sidings	1938
111W	352	NW	Refuse Heap	1948
112V	354	N	Unspecified Pit	1951
113Y	372	NW	Unspecified Pit	1892
114Z	376	S	Unspecified Pit	1904
115	380	S	Smithy	1904
116X	381	SW	Unspecified Quarry	1904
117Y	385	NW	Unspecified Pit	1948

118Y	385	NW	Unspecified Pit	1904
119Z	385	S	Unspecified Quarry	1892
120Y	389	NW	Cuttings	1951
121AA	405	W	Cuttings	1979
122AA	405	W	Cuttings	1993
123AA	405	W	Cuttings	1967
124AB	411	S	Unspecified Mill	1993
125AB	411	S	Unspecified Works	1967
126AB	411	S	Unspecified Mill	1979
127AC	420	NW	Unspecified Old Shaft	1938
128AC	420	NW	Unspecified Old Shaft	1938
129AW	420	NW	Unspecified Workings	1979
130AC	423	NW	Unspecified Old Shaft	1948
131AC	425	NW	Unspecified Old Shaft	1951
132I	433	NW	Slurry Ponds	1979
133H	445	NW	Refuse Heap	1948
134	445	NW	Tramway Sidings	1904
135AD	460	NE	Unspecified Pit	1904
136AD	460	NE	Unspecified Quarry	1948
137AD	465	NE	Unspecified Quarry	1951
138AX	473	NW	Refuse Heap	1979
139AY	473	NW	Refuse Heap	1948
140	494	NW	Unspecified Tanks	1938

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary: 34

ID	Distance (m)	Direction	Use	Date
141B	0	On Site	Gas Works	1893
142B	0	On Site	Gas Works	1906
143AE	0	On Site	Unspecified Tank	1893
144AF	0	On Site	Unspecified Tank	1989
145AF	0	On Site	Unspecified Tank	1980
146AF	0	On Site	Unspecified Tank	1995
147AF	0	On Site	Unspecified Tank	1995
148AF	0	On Site	Unspecified Tank	1993
149AF	0	On Site	Unspecified Tank	1986
150B	9	W	Gas Holders	1959
151B	9	W	Tanks	1969
152B	10	W	Gasholders	1969

153B	15	W	Gasholders	1893
154B	16	SE	Gasometer	1906
155B	16	SE	Gasometer	1893
156B	17	SW	Gasometer	1906
157B	17	SW	Gasometer	1893
158AI	42	S	Unspecified Tank	1980
159C	95	S	Unspecified Tank	1986
160C	96	S	Tanks	1913
161AG	106	S	Unspecified Tank	1893
162AG	106	S	Unspecified Tank	1906
163AG	106	S	Unspecified Tank	1959
164AH	111	S	Unspecified Tank	1913
165AH	112	S	Unspecified Tank	1893
166AH	112	S	Unspecified Tank	1906
167AH	112	S	Unspecified Tank	1980
168AH	112	S	Unspecified Tank	1906
169	338	SW	Unspecified Tank	1913
170X	369	SW	Unspecified Tank	1893
171X	372	SW	Unspecified Tank	1913
172X	372	SW	Unspecified Tank	1906
173X	372	SW	Unspecified Tank	1906
174AB	443	S	Unspecified Tank	

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 54

ID	Distance (m)	Direction	Use	Date
175AE	0	On Site	Electricity Substation	1993
176AE	0	On Site	Electricity Substation	1995
177AE	0	On Site	Electricity Substation	1986
178AE	0	On Site	Electricity Substation	1995
179AE	0	On Site	Electricity Substation	1986
180B	0	On Site	Gas Distribution Station	1893
181B	0	On Site	Gas Works	1906
182B	0	On Site	Gas Works	1969
183AE	0	On Site	Electricity Substation	1989
184AE	0	On Site	Electricity Substation	1980
185AE	0	On Site	Electricity Substation	1989
186B	3	S	Gas Distribution Station	1980
187B	3	S	Gas Distribution Station	1993

188AF	5	SE	Gas Distribution Station	1995
189AF	5	SE	Gas Distribution Station	1995
190AF	5	SE	Gas Distribution Station	1969
191B	9	W	Gas Holders	1969
192B	10	W	Gasholders	1906
193B	15	W	Gasholders	1893
194B	16	SE	Gasometer	1893
195B	16	SE	Gasometer	1906
196B	17	SW	Gasometer	1969
197B	17	SW	Gasometer	1989
198AI	53	S	Electricity Substation	1980
199AI	54	S	Electricity Substation	1986
200AI	54	S	Electricity Substation	1993
201AI	54	S	Electricity Substation	1995
202AI	55	S	Electricity Substation	1995
203AI	57	S	Electricity Substation	1986
204AI	57	S	Electricity Substation	1993
205AI	57	S	Electricity Substation	1995
206AJ	253	W	Electricity Substation	1995
207AJ	254	W	Electricity Substation	1989
208AJ	254	W	Electricity Substation	1980
209AJ	254	W	Electricity Substation	1969
210AJ	254	W	Electricity Substation	1969
211AJ	254	W	Electricity Substation	1989
212AJ	254	W	Electricity Substation	1980
213AL	323	SW	Electricity Substation	1986
214AK	331	S	Electricity Substation	1986
215AK	333	S	Electricity Substation	1989
216AK	333	S	Electricity Substation	1980
217AK	333	S	Electricity Substation	1993
218AL	337	SW	Electricity Substation	1995
219AL	337	SW	Electricity Substation	1995
220AL	337	SW	Electricity Substation	1993
221AK	338	S	Electricity Substation	1995
222AK	338	S	Electricity Substation	1995
223AK	338	S	Electricity Substation	
224AK	338	S	Electricity Substation	
225AL	338	SW	Electricity Substation	
226AL	338	SW	Electricity Substation	
227AL	338	SW	Electricity Substation	
228AL	338	SW	Electricity Substation	

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 8

ID	Distance (m)	Direction	Use	Date
229B	7	E	Garage	1995
230B	7	E	Garage	1995
231B	7	E	Garage	1993
232AM	318	SW	Garage	1969
233AM	319	SW	Garage	1995
234AM	319	SW	Garage	1993
235AM	319	SW	Garage	1989
236AM	320	SW	Garage	

1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 69

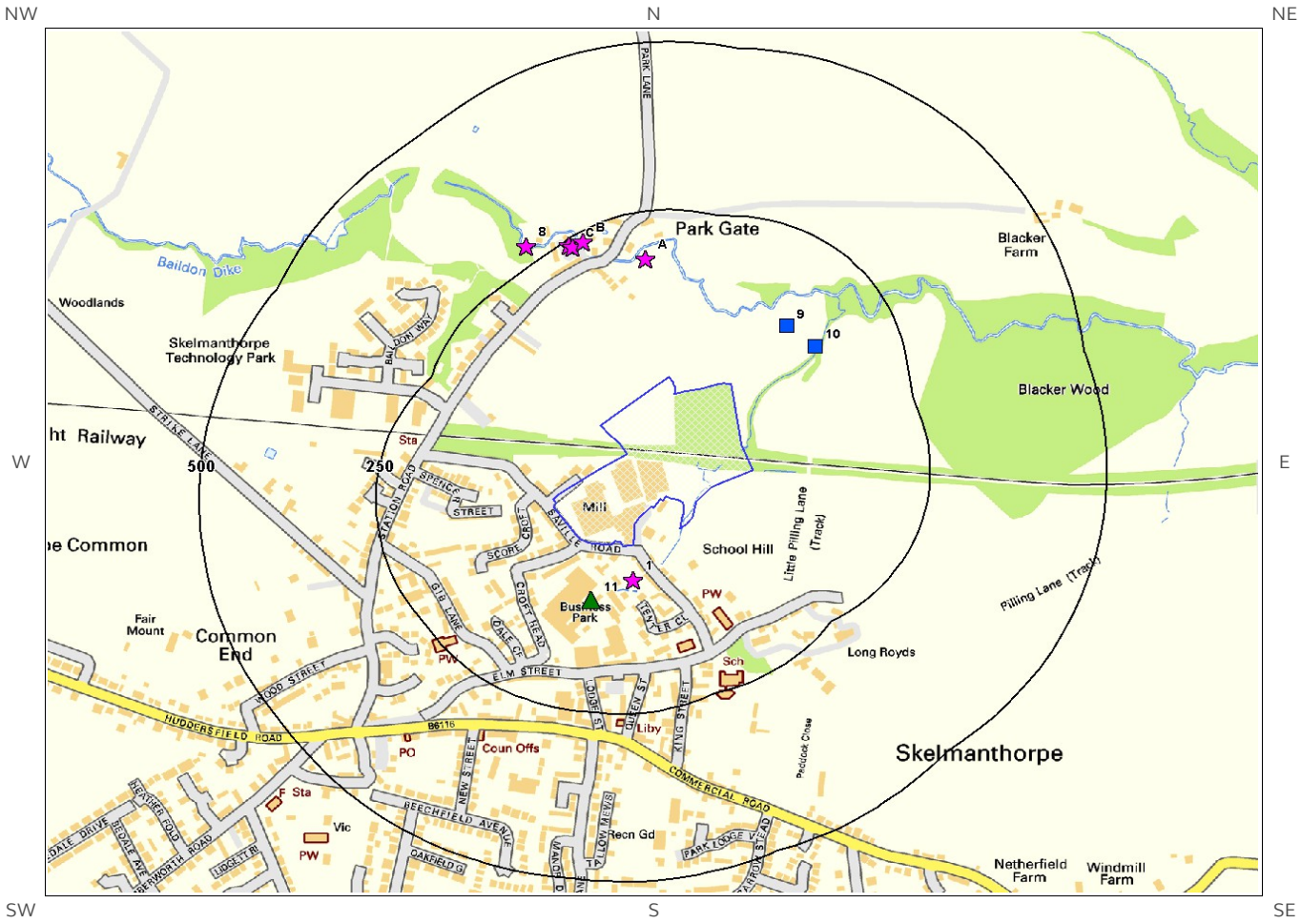
The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
237D	0	On Site	Cuttings	1892
238AF	0	On Site	Reservoir	1904
239AF	0	On Site	Reservoirs	1948
240AN	0	On Site	Ponds	1967
241AN	0	On Site	Ponds	1979
242AF	0	On Site	Reservoirs	1951
243AF	0	On Site	Reservoirs	1938
244D	3	SW	Cuttings	1951
245D	10	SW	Cuttings	1938
246D	11	SW	Cuttings	1904
247D	11	SW	Cuttings	1948
248F	98	NW	Cuttings	1967
249F	98	NW	Cuttings	1979
250F	98	NW	Cuttings	1993
251AO	202	NW	Collieries	1938

252AP	202	NW	Collieries	1938
253AQ	202	NW	Unspecified Mine	1979
254AR	203	NW	Unspecified Mine	1967
255I	203	NW	Collieries	1948
256S	203	NW	Collieries	1904
257H	207	NW	Collieries	1951
258H	227	NW	Refuse Heap	1938
259H	227	NW	Refuse Heap	1938
260AS	238	NW	Refuse Heap	1948
261H	243	NW	Refuse Heaps	1951
262AT	288	NW	Unspecified Workings	1979
263K	301	NW	Unspecified Pit	1904
264K	301	NW	Unspecified Pit	1948
265T	313	W	Cuttings	1892
266AU	319	NW	Reservoir	1938
267AU	320	NW	Reservoir	1948
268X	320	SW	Unspecified Quarry	1892
269T	320	W	Cuttings	1951
270R	323	SW	Unspecified Pit	1951
271AU	323	NW	Reservoir	1951
272T	325	W	Cuttings	1904
273T	325	W	Cuttings	1948
274R	327	SW	Unspecified Ground Workings	1938
275R	327	SW	Unspecified Ground Workings	1938
276T	328	W	Cuttings	1938
277R	336	SW	Unspecified Ground Workings	1967
278AV	339	SW	Unspecified Pit	1892
279V	342	N	Unspecified Ground Workings	1892
280R	348	SW	Unspecified Quarry	1948
281V	350	N	Unspecified Ground Workings	1904
282AR	352	NW	Refuse Heap	1948
283V	354	N	Unspecified Pit	1951
284Y	372	NW	Unspecified Pit	1892
285Z	376	S	Unspecified Pit	1904
286	381	SW	Unspecified Quarry	1904
287Y	385	NW	Unspecified Pit	1948
288Y	385	NW	Unspecified Pit	1904
289Z	385	S	Unspecified Quarry	1892
290Y	389	NW	Cuttings	1951
291AA	405	W	Cuttings	1979
292AA	405	W	Cuttings	1993
293AA	405	W	Cuttings	1967

294AC	420	NW	Unspecified Old Shaft	1938
295AC	420	NW	Unspecified Old Shaft	1938
296AW	420	NW	Unspecified Workings	1979
297AC	423	NW	Unspecified Old Shaft	1948
298AC	425	NW	Unspecified Old Shaft	1951
299I	433	NW	Slurry Ponds	1979
300H	445	NW	Refuse Heap	1948
301AD	460	NE	Unspecified Quarry	1948
302AD	460	NE	Unspecified Pit	1904
303AD	465	NE	Unspecified Quarry	1951
304AX	473	NW	Refuse Heap	1979
305AY	473	NW	Refuse Heap	1948

2. Environmental Permits, Incidents and Registers Map



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- Site Outline
- Search Buffers (m) — 250 / 500
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

1

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
11	87	S	423324 410789	Address: Nick Ryden (Motor Engineers), Skelmanthorpe Business Park, Skelmanthorpe, Huddersfield, HD8 9ED Process: Waste Oil Burner Below 0.4mw Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

2

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
9	116	NE	423600 411200	Address: SKELMANTHORPE CSO, PONKER LANE, SKELMANTHORPE, HUDDERSFIELD, WEST YORKSHIRE Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 3494 Permit Version: 1	Receiving Water: Status: TRANSFERRED FROM R(PP)A 1951-1961 Issue date: 20/10/1980 Effective Date: 20-Oct-1980 Revocation Date: 30/03/2004
10	131	NE	423640 411170	Address: SKELMANTHORPE CSO, PONKER LANE, SKELMANTHORPE, HUDDERSFIELD, WEST YORKSHIRE Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 3494 Permit Version: 2	Receiving Water: Status: MODIFIED - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 10/02/2004 Effective Date: 31-Mar-2004 Revocation Date: -

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 0

Database searched and no data found.

2.3 Environment Agency Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

8

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1	51	S	423382 410822	Incident Date: 15-Jun-2001 Incident Identification: 9497 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
2A	179	N	423400 411300	Incident Date: 21-Jul-2001 Incident Identification: 17969 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
3A	179	N	423400 411300	Incident Date: 21-Jul-2001 Incident Identification: 17969 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
4B	236	NW	423312 411326	Incident Date: 17-Aug-2001 Incident Identification: 24869 Pollutant: Contaminated Water Pollutant Description: Minewater	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

ID	Distance (m)	Direction	NGR	Details	
5B	236	NW	423312 411326	Incident Date: 17-Aug-2001 Incident Identification: 24869 Pollutant: Contaminated Water Pollutant Description: Minewater	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
6C	238	NW	423296 411318	Incident Date: 04-Mar-2002 Incident Identification: 61683 Pollutant: Agricultural Materials and Wastes Pollutant Description: Other Agricultural Material or Waste	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
7C	243	NW	423291 411320	Incident Date: 06-Sep-2002 Incident Identification: 105998 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
8	278	NW	423231 411319	Incident Date: 18-Mar-2002 Incident Identification: 64615 Pollutant: Contaminated Water Pollutant Description: Other Contaminated Water	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? 0

Database searched and no data found.

3. Landfill and Other Waste Sites Map

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Site Outline

250 Search Buffers (m)
500

E.A. Active Landfill

E.A. Historic Landfill

BGS / DoE Survey Landfill

Historic and Planned Waste Sites

E.A. Licensed Waste Site

Local Authority/Historical Mapping Landfill Records

3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

6

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
1	344	SW	422900 410700	Site Address: Station Road, Skelmanthorpe Waste Licence: Yes Site Reference: 4400/(231) Waste Type: Inert, Commercial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 11-Jun-1980 Licence Surrendered: 15-Feb-1988 Licence Hold Address: - Operator: - First Recorded: 01-Jan-1980 Last Recorded: 31-Dec-1981
2	448	SW	422800 410700	Site Address: Derelict Quarry at rear of Environmental Health Depot, Station Road, Skelmanthorpe Waste Licence: Yes Site Reference: 4400/(231) Waste Type: Inert, Commercial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 11-Jun-1980 Licence Surrendered: 03-Jun-1988 Licence Hold Address: Directorate of Technical Services, Civic Centre Phase III, Huddersfield Operator: - First Recorded: 11-Jun-1980 Last Recorded: 03-Jun-1988
Not shown	989	SW	422500 410100	Site Address: Land to the Rear of Ponker Farm and adjacent to Ponker Lane, Ponker Lane, Skelmanthorpe, Huddersfield Waste Licence: Yes Site Reference: 4700/0763, 4700/0273 Waste Type: Inert, Commercial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 06-Aug-1990 Licence Surrendered: 22-Apr-1994 Licence Hold Address: Ponker Farm, Skelmanthorpe, Huddersfield Operator: - First Recorded: 31-Aug-1990 Last Recorded: 31-Dec-1993
Not shown	1349	SW	422100 409900	Site Address: Ponker Quarry, Shelley, Woodhouse Lane, Lower Cumberworth Waste Licence: Yes Site Reference: 4400/(786) Waste Type: Inert, Industrial, Commercial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 17-Sep-1990 Licence Surrendered: Licence Hold Address: Hazlehead, Stocksbridge, Sheffield Operator: - First Recorded: 01-Jun-1991 Last Recorded: -

ID	Distance (m)	Direction	NGR	Details	
Not shown	1379	SE	424400 409900	Site Address: Wakefield Road, Bagden Bank Wood, Scissett Waste Licence: - Site Reference: 4400/(52) Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: - First Recorded: - Last Recorded: -
Not shown	1454	SW	422100 409800	Site Address: Cumberworth Common, Shelley Woodhouse Lane, Lower Cumberworth Waste Licence: - Site Reference: 4400/0259 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: - First Recorded: - Last Recorded: -

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

0

Database searched and no data found.

3.2 Other Waste Sites

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

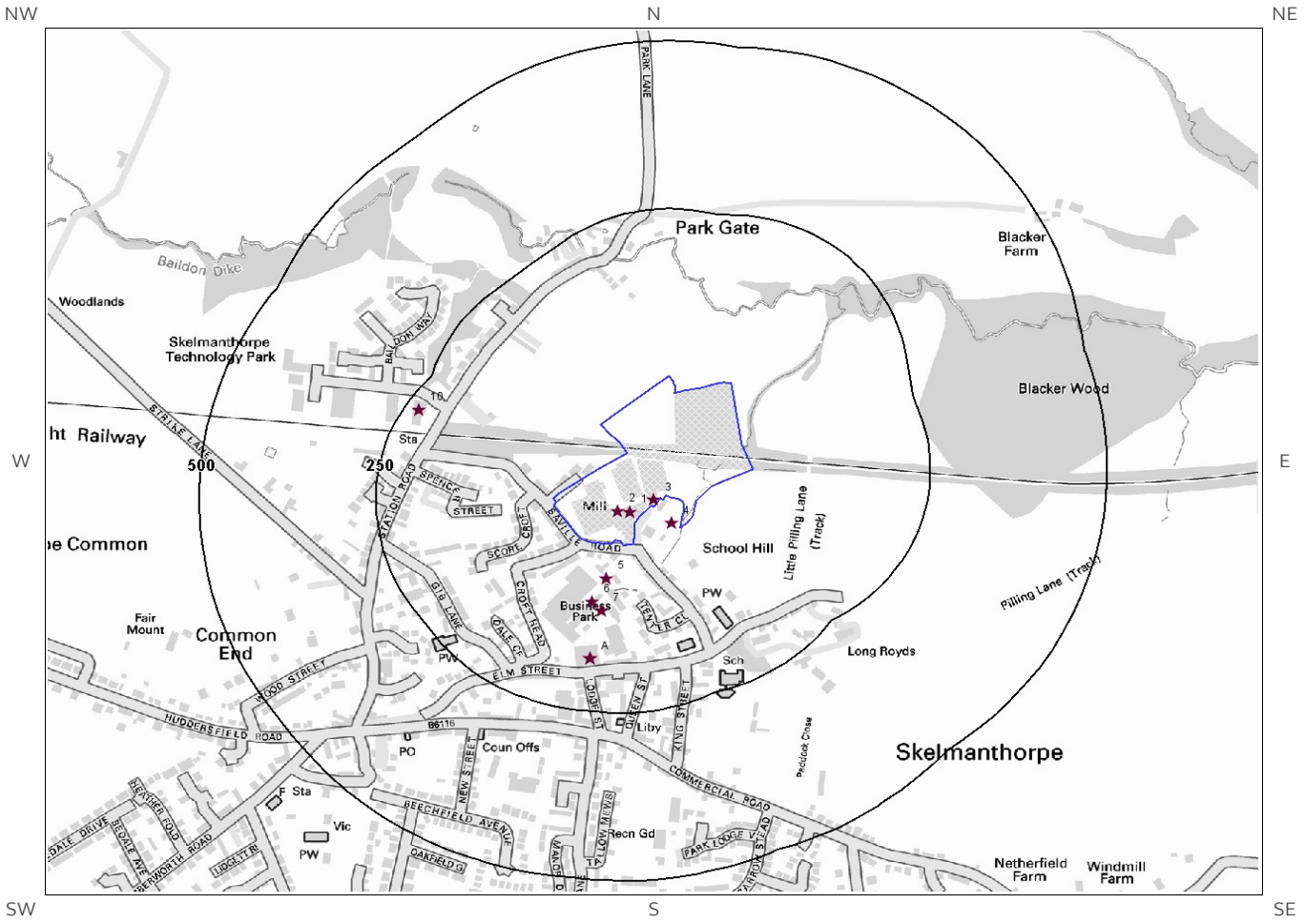
Database searched and no data found.

3.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

0

Database searched and no data found.

4. Current Land Use Map



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Site Outline

Search Buffers (m)
250
500

Current Industrial Sites

Petrol & Fuel Sites

Electricity Transmission Cables

Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 10

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	0	On Site	A V Motors	423378 410922	Marsden Street, Skelmanthorpe, Huddersfield, HD8 9EF	Vehicle Repair, Testing and Servicing	Repair and Servicing
2	0	On Site	Silo	423361 410924	HD8	Hoppers and Silos	Farming
3	0	On Site	Electricity Sub Station	423411 410941	HD8	Electrical Features	Infrastructure and Facilities
4	14	W	Gas Distribution Station	423437 410906	HD8	Gas Features	Infrastructure and Facilities
5	51	S	Electricity Sub Station	423345 410824	HD8	Electrical Features	Infrastructure and Facilities
6	87	S	Nick Ryden	423324 410789	Skelmanthorpe Business Park, Croft Head, Skelmanthorpe, Huddersfield, HD8 9EB	Vehicle Repair, Testing and Servicing	Repair and Servicing
7	99	S	Skelmanthorpe Business Park	423338 410776	HD8	Business Parks and Industrial Estates	Industrial Features
8A	172	S	Sport & Playbase Ltd	423321 410704	Unit 27 Tentercroft Mills, Elm Street, Skelmanthorpe, Huddersfield, HD8 9DZ	Hobby, Sports and Pastime Products	Consumer Products
9A	172	S	Electroparts Ltd	423321 410704	Tenter House, Elm Street, Skelmanthorpe, Huddersfield, HD8 9DZ	General Manufacturing	Industrial Products
10	232	NW	Bobby Dazzler Signs Ltd	423080 411075	Unit 1 Skelmanthorpe Technology Park, Standback Way, Skelmanthorpe, Huddersfield, HD8 9GA	Signs	Industrial Products

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: 0

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

---

5. Geology

5.1 Artificial Ground and Made Ground

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
WMGR-MGRD	INFILLED GROUND	ARTIFICIAL DEPOSIT

5.2 Superficial Ground and Drift Geology

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

5.3 Bedrock and Solid Geology

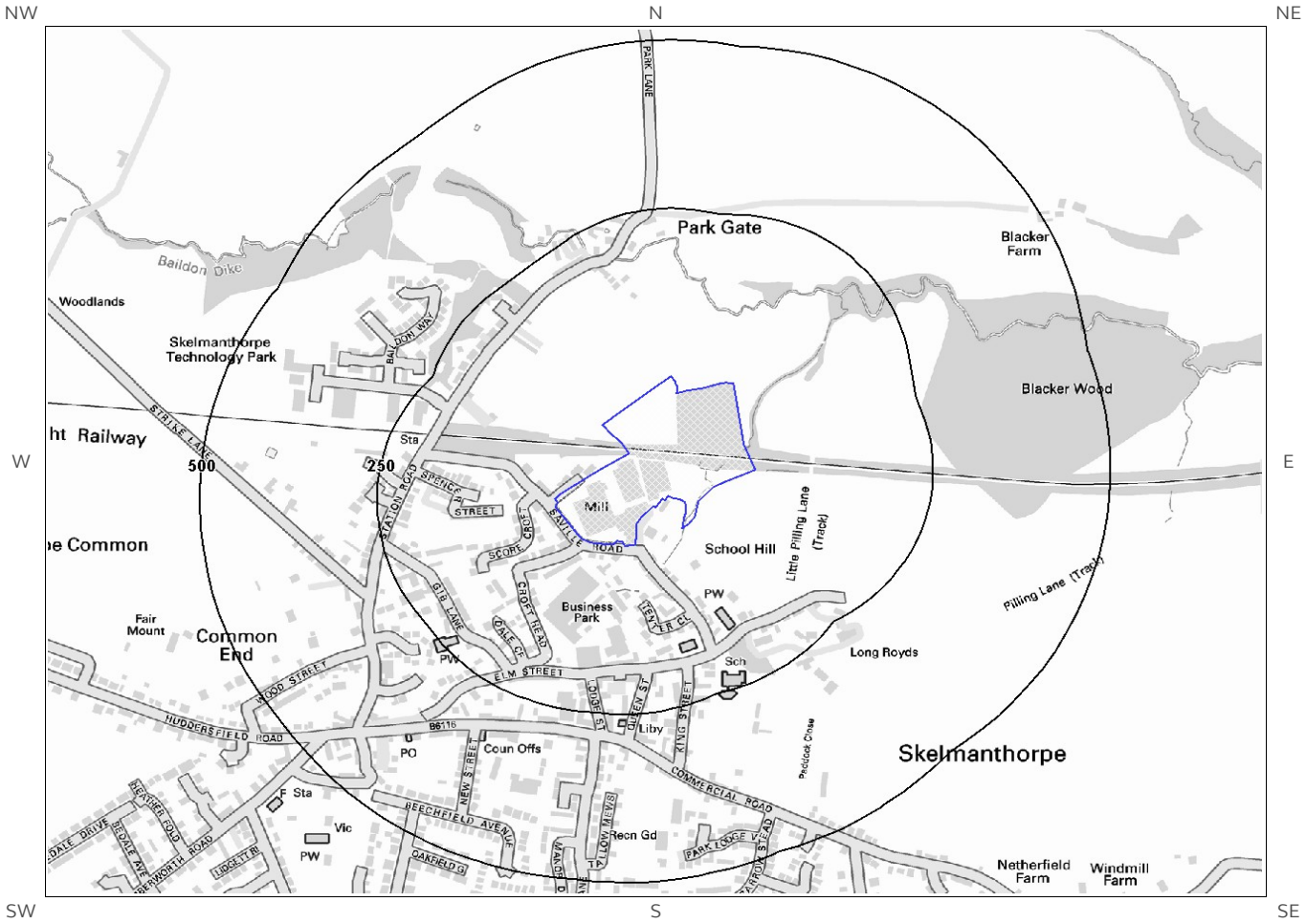
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE
PF-SDST	PENISTONE FLAGS	SANDSTONE
PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE
PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE
PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE
PF-SDST	PENISTONE FLAGS	SANDSTONE
PLCM-SDST	PENNINE LOWER COAL MEASURES FORMATION	SANDSTONE

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology



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Site Outline

250 — 500 — Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

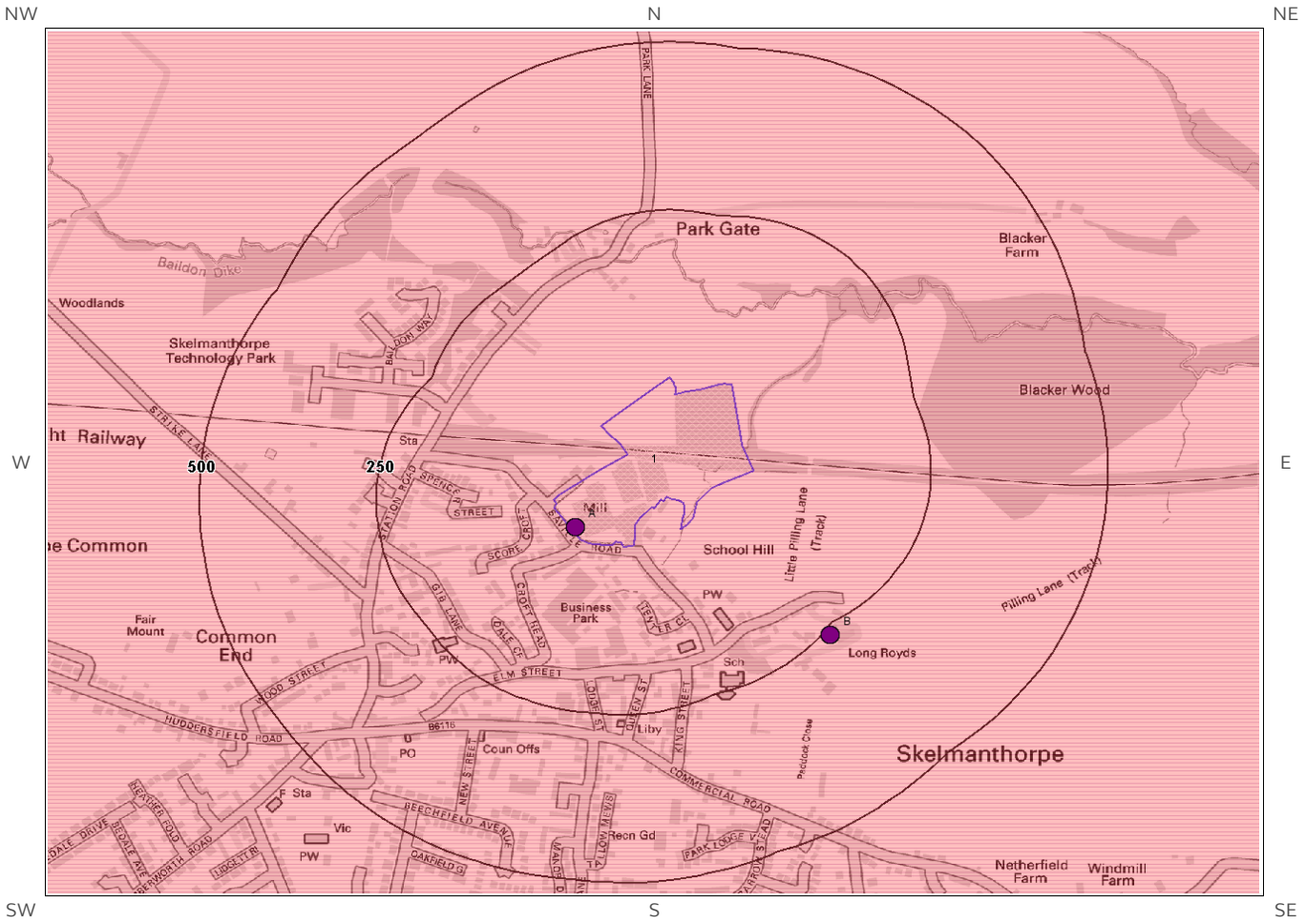
Secondary (B) Aquifer - Lower Permeability Layers

Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

6b. Aquifer Within Bedrock Geology and Abstraction Licenses



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Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Groundwater Abstraction Licence

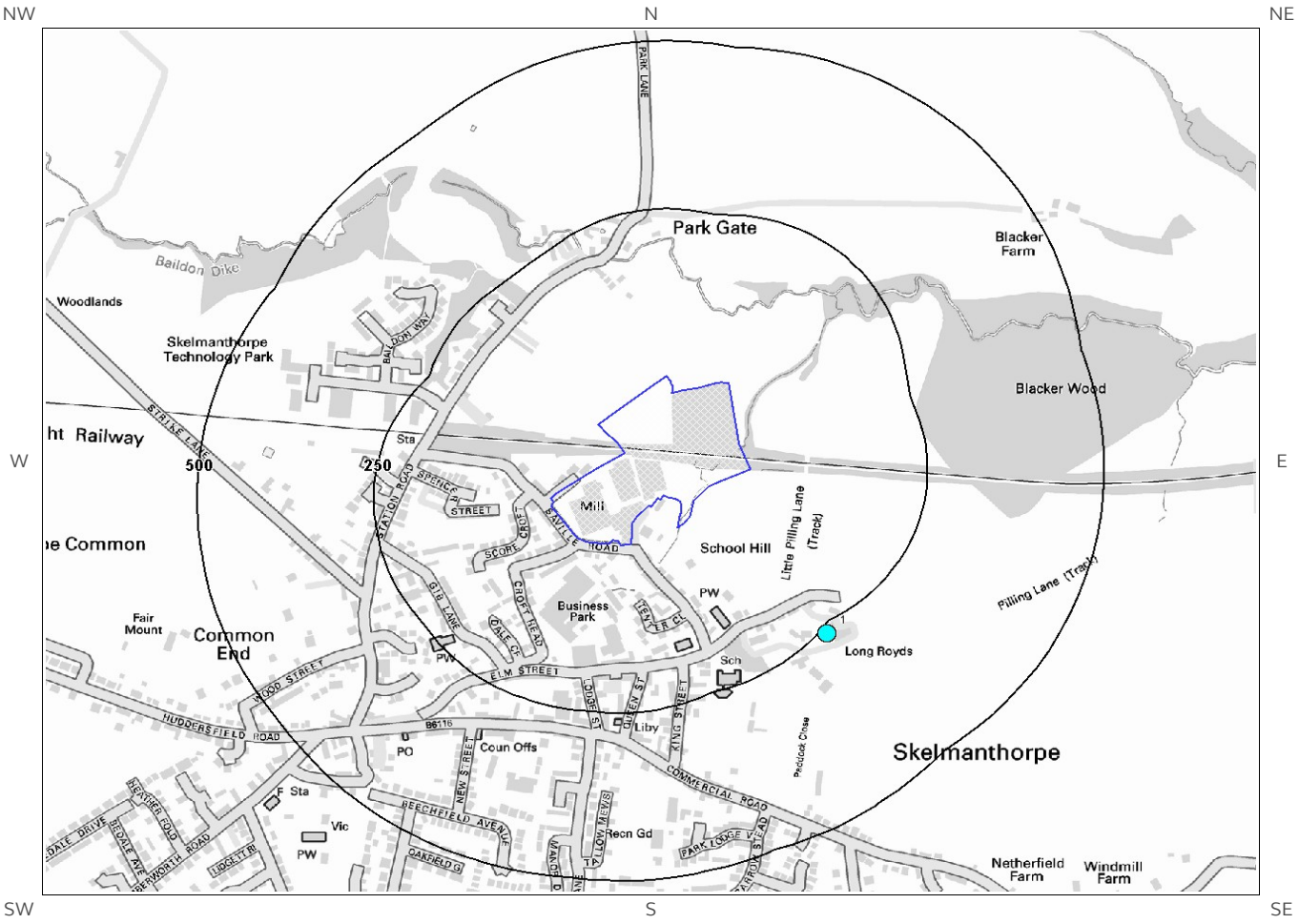
Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

Surface Water Abstraction Licence

6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



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Site Outline

250 Search Buffers (m)
500

Source Protection Zone 1 - Inner Catchment

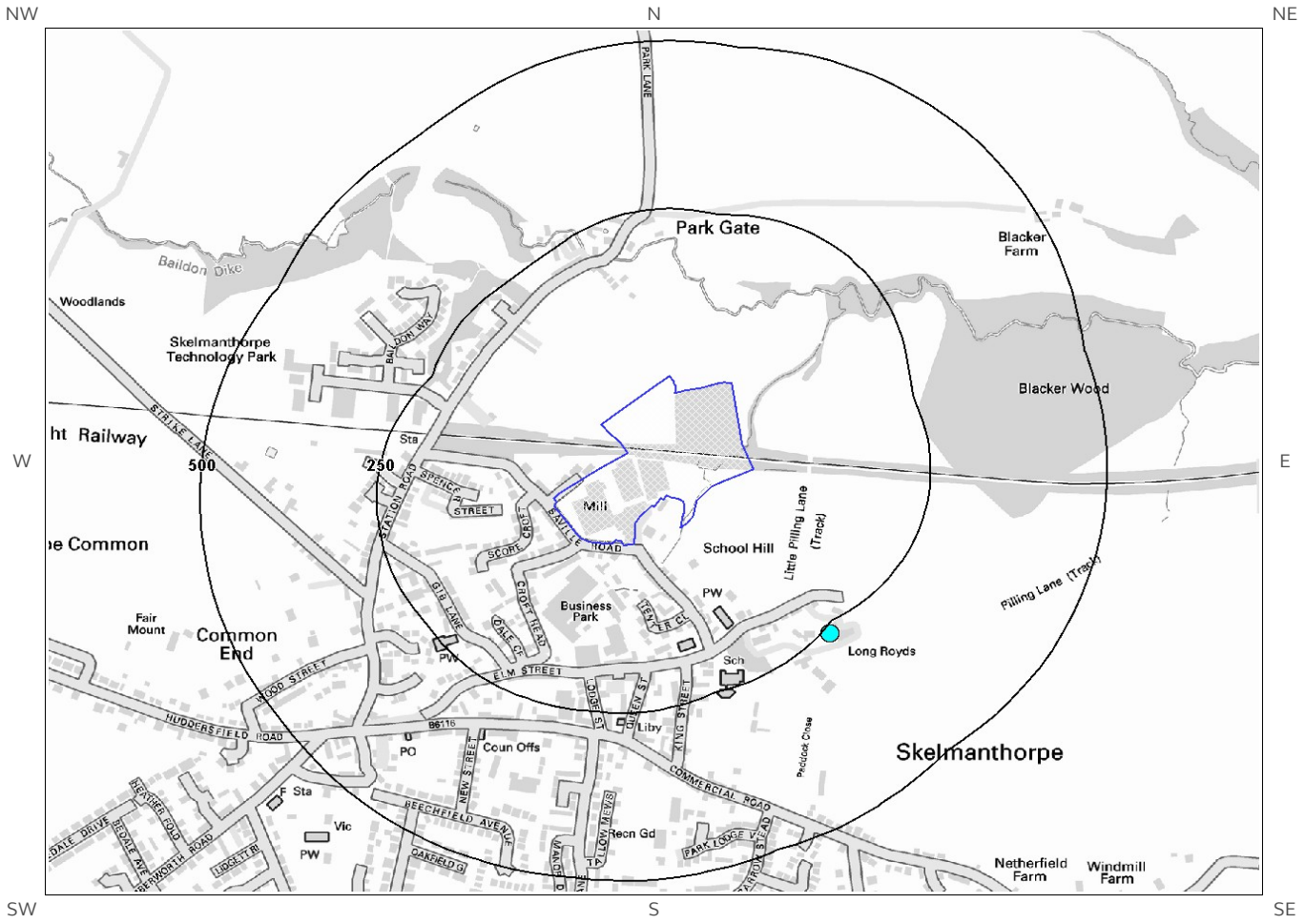
Source Protection Zone 2 - Outer Catchment

Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

6d. Hydrogeology – Source Protection Zones within confined aquifer



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Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2C - Outer Catchment within Confined Aquifer

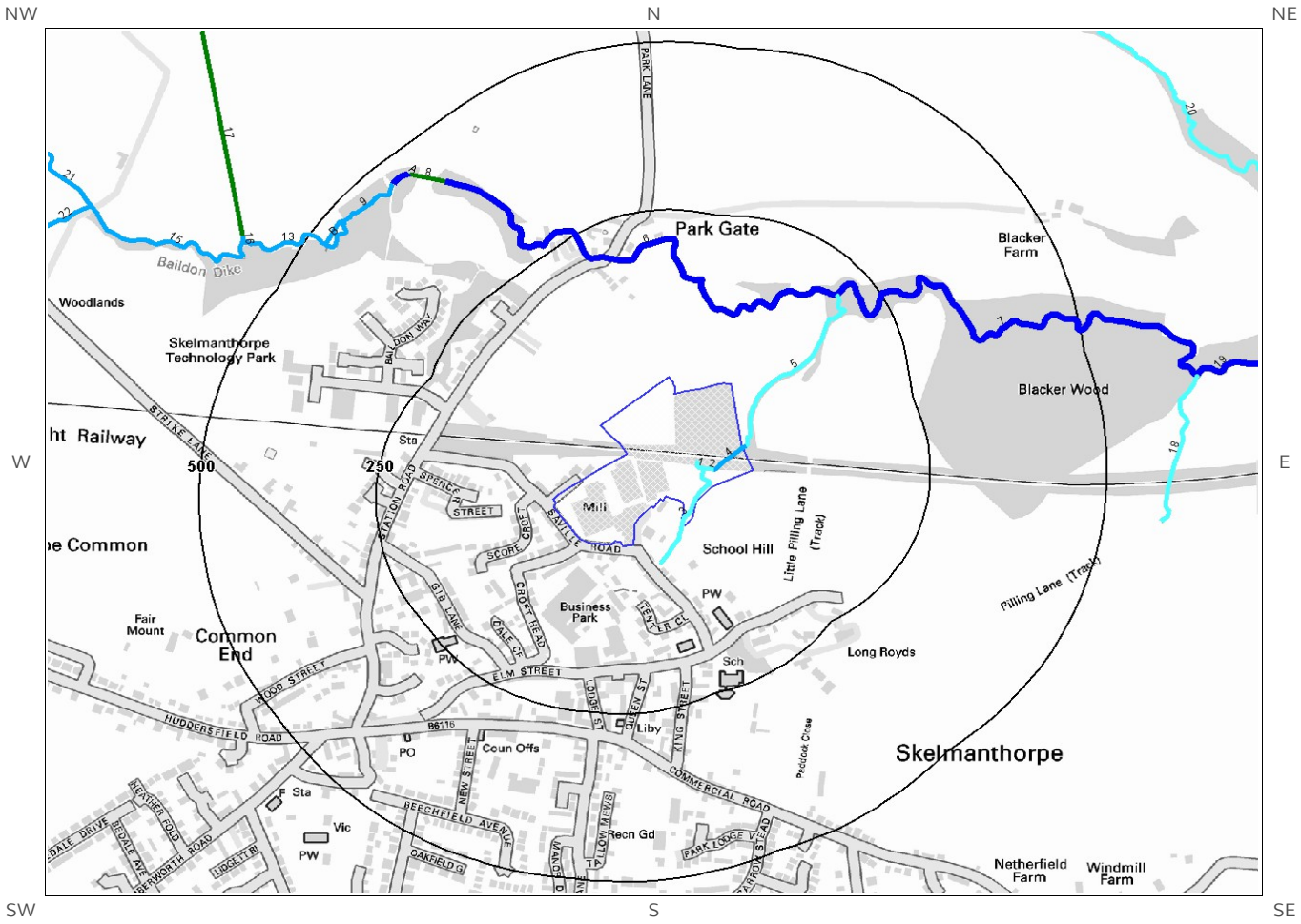
Source Protection Zone 3C - Total Catchment within Confined Aquifer

Potable Water Abstraction Licence

Site Outline

250 500 Search Buffers (m)

6e. Hydrology – Detailed River Network and River Quality



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Site Outline

250 — 500 — Search Buffers (m)

Primary River
Secondary River
Tertiary River
Lake/Reservoir
Underground River (inferred)
General Quality Assessment: Biology
General Quality Assessment: Chemistry

Canal
Canal Tunnel
Culvert
Multiple Channel Culvert
Underground River (Potential Sewer)
Underground River (local knowledge)

6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? No

Database searched and no data found.

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviroinsight User Guide.

6.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
3A	0	On Site	423300 410900	Status: Historical Licence No: 2/27/08/091 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Groundwaters Point: Borehole Data Type: Point Name: DAWSON FUR FABRICS LIMITED	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 5539 Original Start Date: 27/9/1977 Expiry Date: - Issue No: 100 Version Start Date: 27/9/1977 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
4A	0	On Site	423300 410900	Status: Historical Licence No: 2/27/08/091 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Groundwaters Point: Borehole - Coal Measures - Skelmathorpe Data Type: Point Name: FLEECE LTD INC DAWSON FABRICS	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 05539 Original Start Date: 27/9/1977 Expiry Date: - Issue No: 102 Version Start Date: 1/10/2002 Version End Date:
5A	0	On Site	423300 410900	Status: Historical Licence No: 2/27/08/091 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Groundwaters Point: Borehole Data Type: Point Name: DAWSON FUR FABRICS LIMITED	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 5539 Original Start Date: 27/9/1977 Expiry Date: - Issue No: 100 Version Start Date: 27/9/1977 Version End Date:
6A	0	On Site	423300 410900	Status: Historical Licence No: 2/27/08/091 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Groundwaters Point: Borehole - Coal Measures - Skelmathorpe Data Type: Point Name: FLEECE LTD INC DAWSON FABRICS	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 05539 Original Start Date: 27/9/1977 Expiry Date: - Issue No: 102 Version Start Date: 1/10/2002 Version End Date:
7A	0	On Site	423300 410900	Status: Historical Licence No: 2/27/08/091 Details: Process Water Direct Source: Groundwaters Point: Borehole - Coal Measures - Skelmathorpe Data Type: Point Name: TECHNIFLEECE LTD	Annual Volume (m^3): 131000 Max Daily Volume (m^3): 545 Original Application No: 5539 Original Start Date: 27/9/1977 Expiry Date: - Issue No: 103 Version Start Date: 13/3/2006 Version End Date:
8B	260	SE	423660 410740	Status: Historical Licence No: 2/27/13/174 Details: Raw Water Supply Direct Source: Groundwaters Point: Borehole-coal Measures-skelmanthorpe Data Type: Point Name: SIMMONDS	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 06654 Original Start Date: 23/12/1994 Expiry Date: - Issue No: 101 Version Start Date: 3/6/2001 Version End Date:
9B	260	SE	423660 410740	Status: Historical Licence No: 2/27/13/174 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: Groundwaters Point: Borehole Data Type: Point Name: SIMMONDS	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6654 Original Start Date: 23/12/1994 Expiry Date: - Issue No: 100 Version Start Date: 23/12/1994 Version End Date:
Not shown	1424	NE	424530 412120	Status: Historical Licence No: 2/27/08/104 Details: General Farming & Domestic Direct Source: Groundwaters Point: Borehole Data Type: Point Name: SAVILE ESTATE	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6131 Original Start Date: 17/6/1988 Expiry Date: - Issue No: 100 Version Start Date: 17/6/1988 Version End Date:
Not shown	1424	NE	424530 412120	Status: Historical Licence No: 2/27/08/104 Details: General Farming & Domestic Direct Source: Groundwaters Point: Borehole - Coal Measures - Emley Data Type: Point Name: SAVILE TRUST (1965)	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 06131 Original Start Date: 17/6/1988 Expiry Date: - Issue No: 100 Version Start Date: 17/6/1988 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1474	SE	424800 410200	Status: Historical Licence No: 2/27/08/028 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Groundwaters Point: Borehole Data Type: Point Name: PHOENOX TEXTILES LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 1029 Original Start Date: 20/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/1/1966 Version End Date:
Not shown	1474	SE	424800 410200	Status: Historical Licence No: 2/27/08/028 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Groundwaters Point: Borehole - Coal Measures - Scissett Data Type: Point Name: PHOENOX TEXTILES LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 01029 Original Start Date: 20/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 20/1/1966 Version End Date:
Not shown	1581	S	423200 409300	Status: Historical Licence No: 2/27/08/005 Details: General Farming & Domestic Direct Source: Groundwaters Point: Well X2 - Coal Measures - Denby Dale Data Type: Point Name: D M & J SHAW	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 02642 Original Start Date: 14/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 25/1/1985 Version End Date:
Not shown	1581	S	423200 409300	Status: Historical Licence No: 2/27/08/005 Details: General Farming & Domestic Direct Source: Groundwaters Point: Well X2 Data Type: Point Name: SHAW	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 2642 Original Start Date: 14/12/1965 Expiry Date: - Issue No: 100 Version Start Date: 25/1/1985 Version End Date:
Not shown	1657	E	425200 410800	Status: Historical Licence No: 2/27/08/112 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Groundwaters Point: Borehole Data Type: Point Name: AUCKLAND	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6718 Original Start Date: 20/6/1996 Expiry Date: - Issue No: 100 Version Start Date: 20/6/1996 Version End Date:
Not shown	1657	E	425200 410800	Status: Historical Licence No: 2/27/08/112 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Groundwaters Point: Borehole - Coal Measures - Scissett Data Type: Point Name: AUCKLAND	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 06718 Original Start Date: 20/6/1996 Expiry Date: - Issue No: 100 Version Start Date: 20/6/1996 Version End Date:
Not shown	1809	SE	425000 409900	Status: Historical Licence No: 2/27/08/116 Details: General Farming & Domestic Direct Source: Groundwaters Point: Borehole Data Type: Point Name: W H BROOK & SON	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6773 Original Start Date: 20/12/1996 Expiry Date: - Issue No: 100 Version Start Date: 20/12/1996 Version End Date:
Not shown	1809	SE	425000 409900	Status: Active Licence No: 2/27/08/116 Details: General Farming & Domestic Direct Source: Groundwaters Point: Borehole - Coal Measures - Clayton West Data Type: Point Name: W H BROOK & SON	Annual Volume (m^3): 9928 Max Daily Volume (m^3): 27.2 Original Application No: 6773 Original Start Date: 20/12/1996 Expiry Date: - Issue No: 100 Version Start Date: 1/4/2008 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1903	NW	421820 412200	Status: Historical Licence No: 2/27/08/126 Details: General Farming & Domestic Direct Source: Groundwaters Point: Borehole - Coal Measures - Huddersfield Data Type: Point Name: T/A T R & C HALL	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6961 Original Start Date: 11/10/2000 Expiry Date: - Issue No: 1 Version Start Date: 11/10/2000 Version End Date:
Not shown	1903	NW	421820 412200	Status: Historical Licence No: 2/27/08/126 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: Groundwaters Point: Borehole - Coal Measures - Huddersfield Data Type: Point Name: T/A T R & C HALL	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6961 Original Start Date: 11/10/2000 Expiry Date: - Issue No: 1 Version Start Date: 11/10/2000 Version End Date:
Not shown	1903	NW	421820 412200	Status: Active Licence No: 2/27/08/126 Details: General Farming & Domestic Direct Source: Groundwaters Point: Borehole - Coal Measures - Shelley Data Type: Point Name: C & M HALL	Annual Volume (m^3): 32225 Max Daily Volume (m^3): 89 Original Application No: 6961 Original Start Date: 11/10/2000 Expiry Date: - Issue No: 3 Version Start Date: 1/4/2008 Version End Date:
Not shown	1948	NW	421750 412180	Status: Historical Licence No: 2/27/08/126 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: Groundwaters Point: Borehole- Coal Measures - Huddersfield Data Type: Point Name: T/A T R & C HALL	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6961 Original Start Date: 11/10/2000 Expiry Date: - Issue No: 1 Version Start Date: 11/10/2000 Version End Date:
Not shown	1948	NW	421750 412180	Status: Historical Licence No: 2/27/08/126 Details: General Farming & Domestic Direct Source: Groundwaters Point: Borehole- Coal Measures - Huddersfield Data Type: Point Name: T/A T R & C HALL	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6961 Original Start Date: 11/10/2000 Expiry Date: - Issue No: 1 Version Start Date: 11/10/2000 Version End Date:
Not shown	1974	NW	421550 411910	Status: Historical Licence No: 2/27/08/126 Details: General Farming & Domestic Direct Source: Groundwaters Point: Underground Strata - Coal Measures Data Type: Point Name: T R & C HALL	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6961 Original Start Date: 11/10/2000 Expiry Date: - Issue No: 2 Version Start Date: 18/9/2002 Version End Date:
Not shown	1974	NW	421550 411910	Status: Active Licence No: 2/27/08/126 Details: General Farming & Domestic Direct Source: Groundwaters Point: Borehole- Coal Measures - Shelley Data Type: Point Name: C & M HALL	Annual Volume (m^3): 32225 Max Daily Volume (m^3): 89 Original Application No: 6961 Original Start Date: 11/10/2000 Expiry Date: - Issue No: 3 Version Start Date: 1/4/2008 Version End Date:
Not shown	1979	SW	421800 409600	Status: Historical Licence No: 2/27/11/124 Details: General use relating to Secondary Category (High Loss) Direct Source: Groundwaters Point: Spring - Coal Measures - Day Hole Workings Data Type: Point Name: HEPWORTH PIPE CO LTD	Annual Volume (m^3): 6819 Max Daily Volume (m^3): 27.27 Original Application No: 1593 Original Start Date: 26/5/1966 Expiry Date: - Issue No: 100 Version Start Date: 26/5/1966 Version End Date:

6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? Yes

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Licences Map (6c):

ID	Distance (m)	Direction	NGR	Details	
1	260	SE	423660 410740	Status: Historical Licence No: 2/27/13/174 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: Groundwaters Point: Borehole Data Type: Point Name: SIMMONDS	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6654 Original Start Date: 23/12/1994 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1903	NW	421820 412200	Status: Historical Licence No: 2/27/08/126 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: Groundwaters Point: Borehole - Coal Measures - Huddersfield Data Type: Point Name: T/A T R & C HALL	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6961 Original Start Date: 11/10/2000 Expiry Date: - Issue No: 1 Version Start Date: Version End Date:
Not shown	1948	NW	421750 412180	Status: Historical Licence No: 2/27/08/126 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household Direct Source: Groundwaters Point: Borehole- Coal Measures - Huddersfield Data Type: Point Name: T/A T R & C HALL	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6961 Original Start Date: 11/10/2000 Expiry Date: - Issue No: 1 Version Start Date: Version End Date:

6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site? No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	H3	Coarse textured or moderately shallow soils which readily transmit non-adsorbed pollutants and liquid discharges but have some ability to attenuate adsorbed pollutants because of their clay or organic matter content.
0	On Site	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.
0	On Site	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
352	NW	Minor Aquifer/High Leaching Potential	H3	Coarse textured or moderately shallow soils which readily transmit non-adsorbed pollutants and liquid discharges but have some ability to attenuate adsorbed pollutants because of their clay or organic matter content.

6.9 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? No

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details	
1	0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
2	0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
3	0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
4	0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
5	7	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
6	104	N	River Name: Park Gate Dike Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
7	199	NE	River Name: Park Gate Dike Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
8	423	NW	River Name: Baildon Dike Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
9	456	NW	River Name: Baildon Dike Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
10B	461	NW	River Name: Baildon Dike Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
11A	462	NW	River Name: Baildon Dike Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
12A	463	NW	River Name: Baildon Dike Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined

ID	Distance (m)	Direction	Details	
13	472	NW	River Name: Baildon Dike Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
14B	472	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined

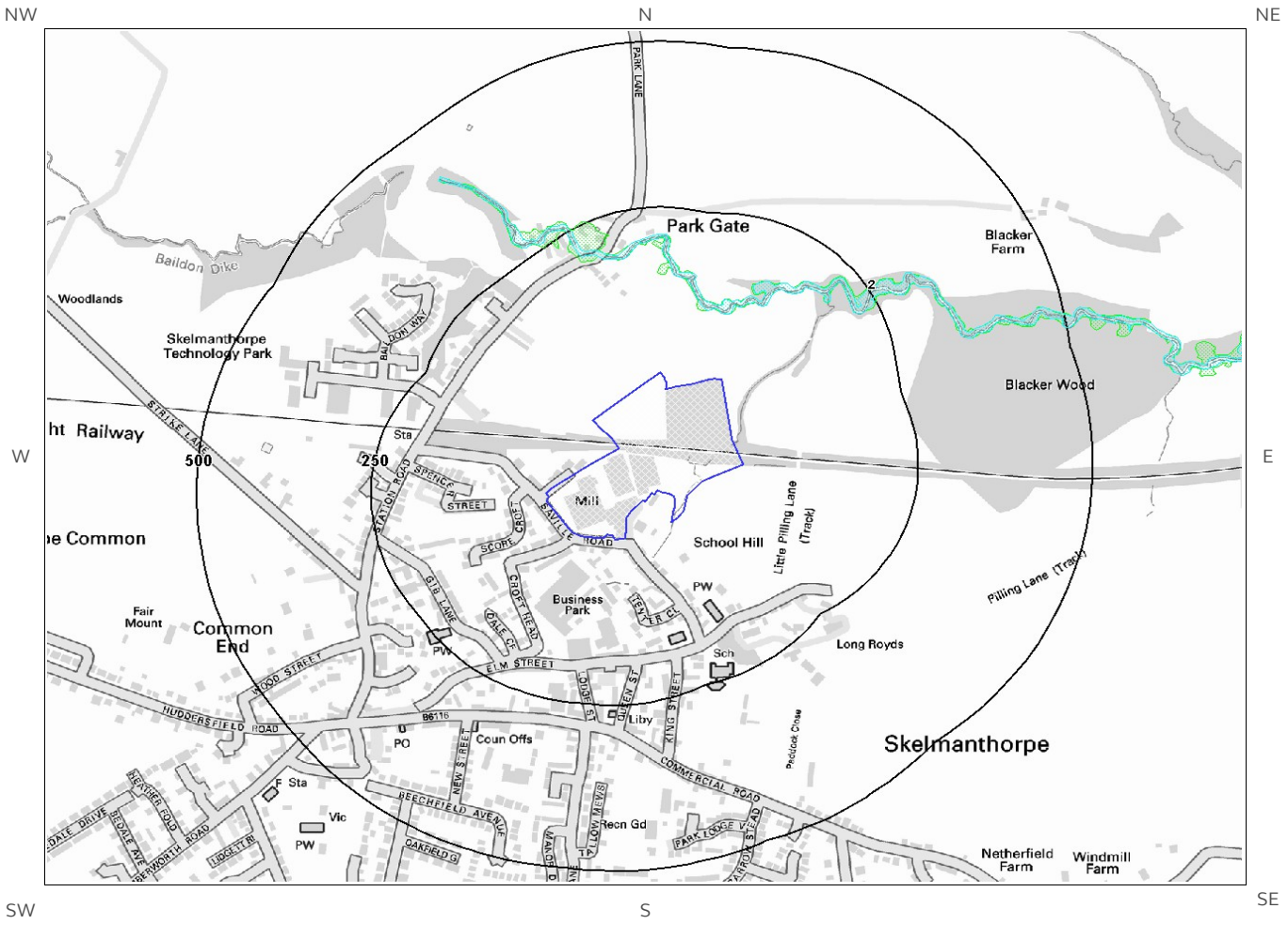
6.11 Surface Water Features

Are there any surface water features within 250m of the study site? Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
0	On Site
0	On Site
7	NE
14	E
102	N
142	NE
168	N
203	NW

7a. Environment Agency Flood Map for Planning (from rivers and the sea)



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Site Outline

100
250
Search Buffers (m)

Zone 2 Floodplain

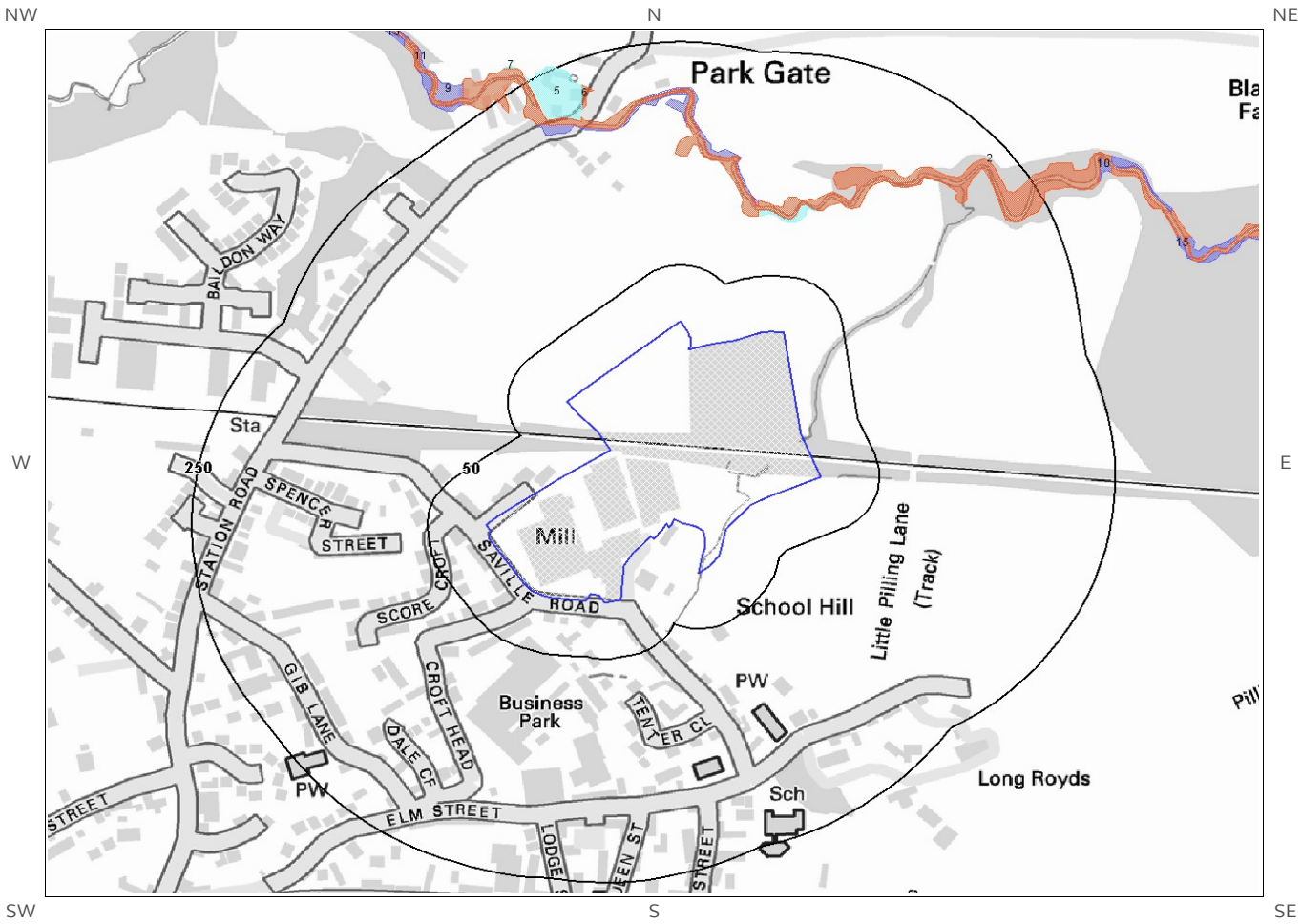
Zone 3 Floodplain

Flood Defences

Area used for Flood Storage

Area Benefiting from Flood Defences

7b. Environment Agency Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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Site Outline

100
250
Search Buffers (m)

RoFRaS Rating

- Very Low
- Low
- Medium
- High

7 Flooding

7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency Zone 2 floodplain? Yes

Environment Agency Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

ID	Distance (m)	Direction	Update	Type
1	98	N	08-Feb-2016	Zone 2 - (Fluvial /Tidal Models)

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency Zone 3 floodplain? Yes

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

ID	Distance (m)	Direction	Update	Type
1	98	N	23-Feb-2016	Zone 3 - (Fluvial Models)

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

What is the highest risk of flooding onsite? Very Low

The Environment Agency RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Clearwater Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

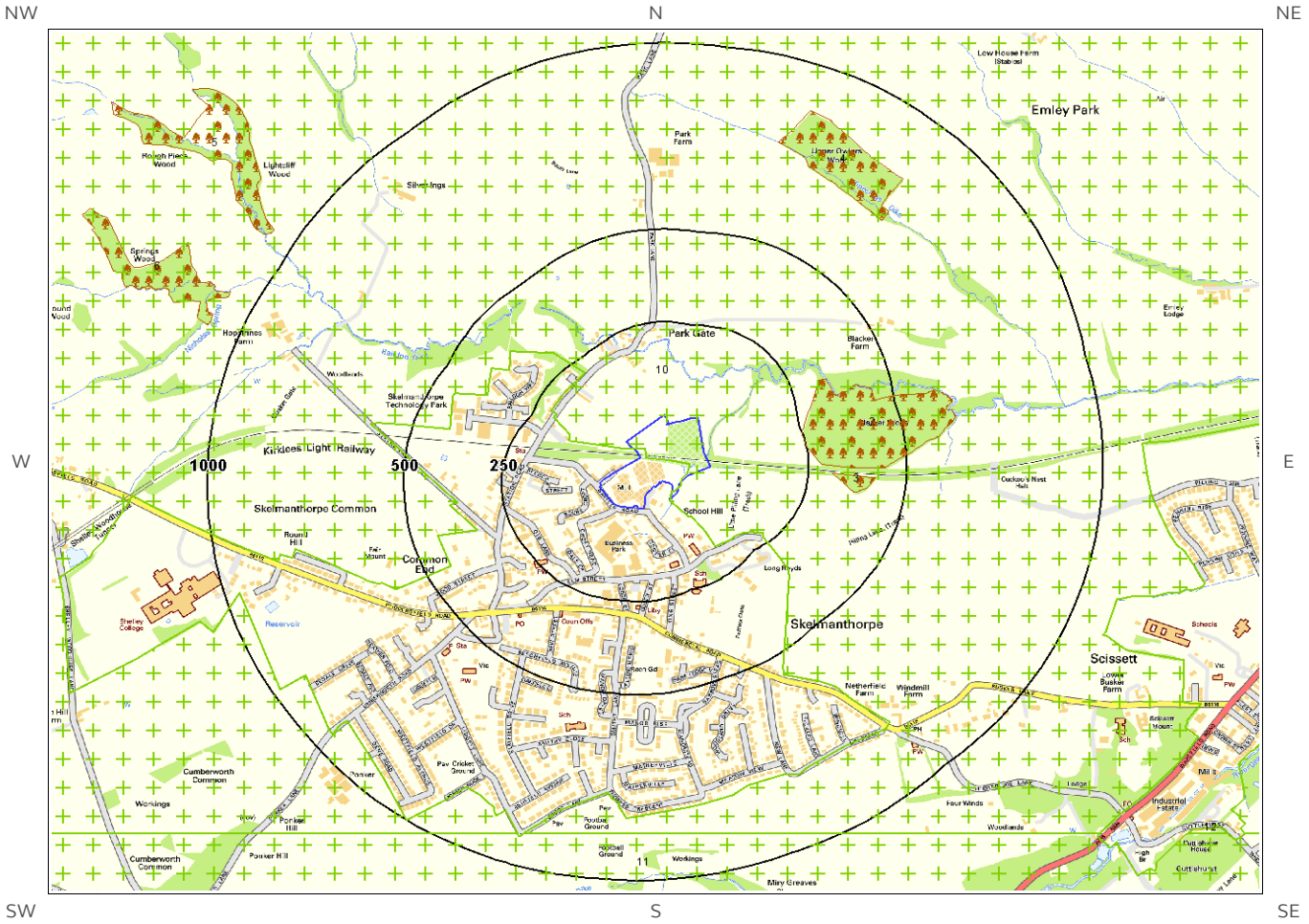
7.8 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result? Low

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

8. Designated Environmentally Sensitive Sites Map



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8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site?	Yes

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

0

Database searched and no data found.

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

8

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
2	248	E	UNKNOWN	Ancient and Semi-Natural Woodland
3	311	E	UNKNOWN	Ancient and Semi-Natural Woodland
4	708	NE	UNKNOWN	Ancient Replanted Woodland
5	1063	NW	UNKNOWN	Ancient Replanted Woodland
6	1070	NW	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1658	S	UNKNOWN	Ancient Replanted Woodland
Not shown	1844	SE	UNKNOWN	Ancient Replanted Woodland
Not shown	1960	E	UNKNOWN	Ancient and Semi-Natural Woodland

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

1

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
Not shown	1586	N	Existing	DEFRA

8.14 Records of Green Belt land within 2000m of the study site:

3

Green Belt data contains Ordnance Survey data © Crown copyright and database right [2015].

ID	Distance	Direction	Green Belt Name	Local Authority Name
10	0	On Site	Liverpool, Manchester and West Yorks Greenbelt	Kirklees District (B)
11	872	S	Liverpool, Manchester and West Yorks Greenbelt	Kirklees District (B)
12	1565	SE	Liverpool, Manchester and West Yorks Greenbelt	Kirklees District (B)

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure GeoInsight, available from our website. The following information has been found:

9.1.1 Shrink Swell

What is the maximum Shrink-Swell*[*] hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

9.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property Ö no significant increase in insurance risk due to natural slope instability problems.

9.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This indicates an automatically generated 50m buffer and site.

9.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site? Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build Ö consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property ×°ossible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

What is the maximum Running Sand*[*] hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

* This indicates an automatically generated 50m buffer and site.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing
ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Are there any coal mining areas within 75m of the study site? Yes

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary? No

Database searched and no data found.

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No
Guidance: No Guidance Required.

Contact Details

Groundsure Helpline
Telephone: 08444 159 000
info@groundsure.com

British Geological Survey Enquiries
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk

Environment Agency
National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 08708 506 506
Web:**www.environment-agency.gov.uk**
Email:**enquiries@environment-agency.gov.uk**

Public Health England
Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
www.gov.uk/phe
Email:**enquiries@phe.gov.uk**
Main switchboard**: 020 7654 8000**

The Coal Authority
200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Ordnance Survey
Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Local Authority
Authority: Kirklees Council
Phone: 01484 221 000
Web: http://www.kirklees.gov.uk/
Address: Civic Centre 3, Market Street, Huddersfield, HD1 1WG

Gemapping PLC
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444

Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, Natural England who retain the Copyright and Intellectual Property Rights for the data.
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This report has been prepared in accordance with the Groundsure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

1 Definitions

I**n these terms and conditions unless the context otherwise requires:**

"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with Groundsure.

"Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by Groundsure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

"Support Services" means Support Services provided by Groundsure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between Groundsure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

"Third Party Data Provider" means any third party providing Third Party Content to Groundsure.

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"Groundsure" means Groundsure Limited, a company registered in England and Wales under number 03421028.

"Groundsure Materials" means all materials prepared by Groundsure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

"Order" means an electronic, written or other order form submitted by the Client requesting Services from Groundsure in respect of a specified Site.

"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by Groundsure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by Groundsure.

"Services" means any Report, Mapping and/or Support Services which Groundsure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested Groundsure to provide the Services.

"Third Party Content" means data, database information or other information which is provided to Groundsure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from Groundsure and on the website (www.Groundsure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 Groundsure agrees to provide the Services in accordance with the Contract.

2.2 Groundsure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of Groundsure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, Groundsure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and Groundsure will have no liability therefor. In addition you acknowledge and agree that Groundsure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 Groundsure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure. Groundsure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by Groundsure. Groundsure's acceptance of an Order shall be binding only when made in writing and signed by Groundsure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to Groundsure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to Groundsure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as Groundsure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable Groundsure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the Groundsure Materials, or use the Groundsure Materials in a manner for which they were not intended. The Client may make the Groundsure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that Groundsure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1The Client acknowledges that the Services provided by Groundsure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by Groundsure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(i) the Beneficiary,

(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

(iv) the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by Groundsure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1Groundsure shall charge and the Client shall pay fees at the rate and

1. Photo of pond within east of the site, looking southeast.

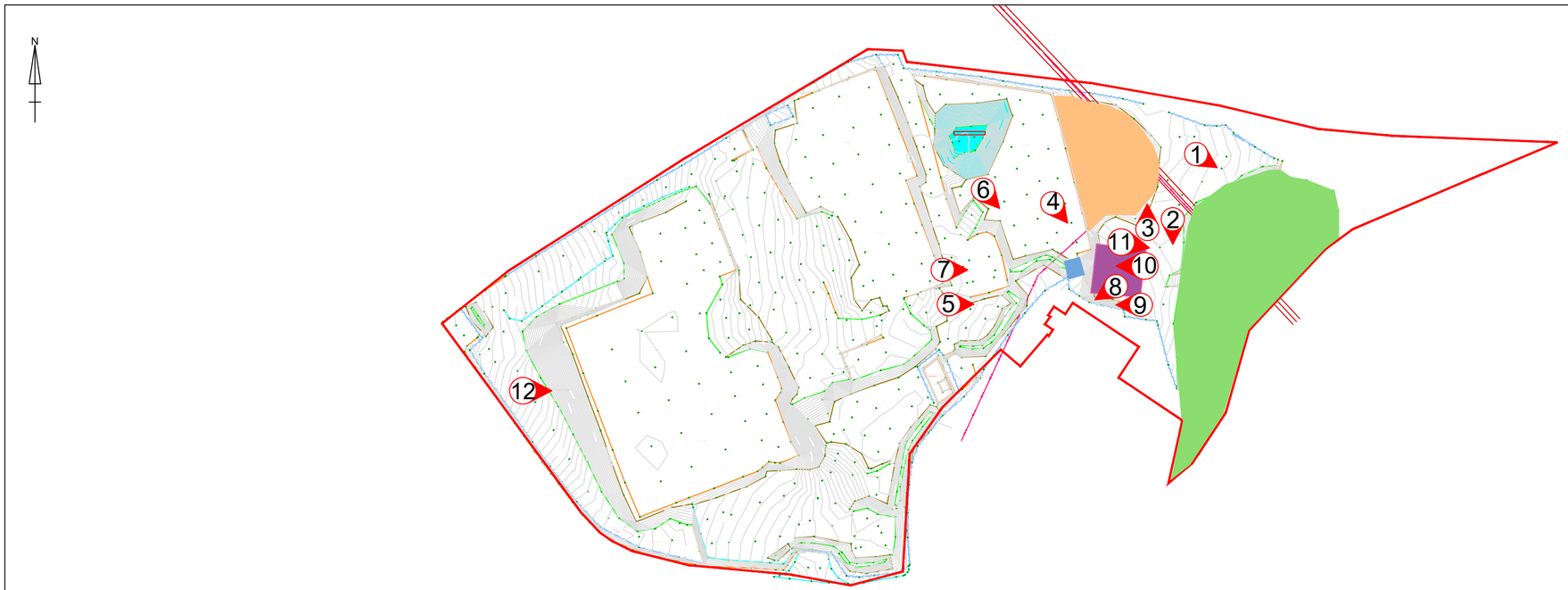
2. Photo of pond and surface water feature looking south.

3. Photo of stockpile within east of site, including wooden pole, with area of former infilling and pond beyond to the east.

4. Evidence of former brick lined mill pond and adjacent structures prior to backfilling / clearance.

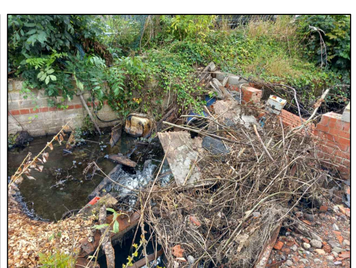
5. Newly constructed overhead cables and wooden pole, located in close proximity to former AST and sub-station.

6. View of former AST, prior to demolition and clearance.



7. View of former sub-station prior to demolition and clearance.

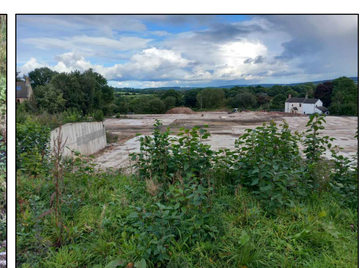
8. Surface water culvert located in southeast, with black oily substance noted.



9. View of surface water culvert with discarded containers.

10. Evidence of hydrocarbon staining within backfilled mill pond (trial pit TP218).

11. View of black saturated pond sediments during trial pitting.



12. View of varying topography of the site, looking east.

NOTES

Site boundary

Photo Location and Direction

Existing pond and surface water feature

Former brick lined mill pond

Existing stockpile

Former above ground storage tank

Topographical survey reproduced from Sirius Remediation Ltd, Post Demolition Survey, ref. SR4358-TS-001, dated October 2023

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
3. All marked site features (including historical features, potential contaminant constraints, and any other potential constraint or feature of note) shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

REVISION		BY	DATE
0	For Information	MF	08/11/23
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

SIRIUS
GEOTECHNICAL LTD
4245 Park Approach,
Thorpe Park,
Leeds
LS15 8GB
www.thesiriusgroup.com
TEL: 0113 264 9960
FAX: 0113 264 9962

CLIENT

Lovell Partnerships Ltd

SITE

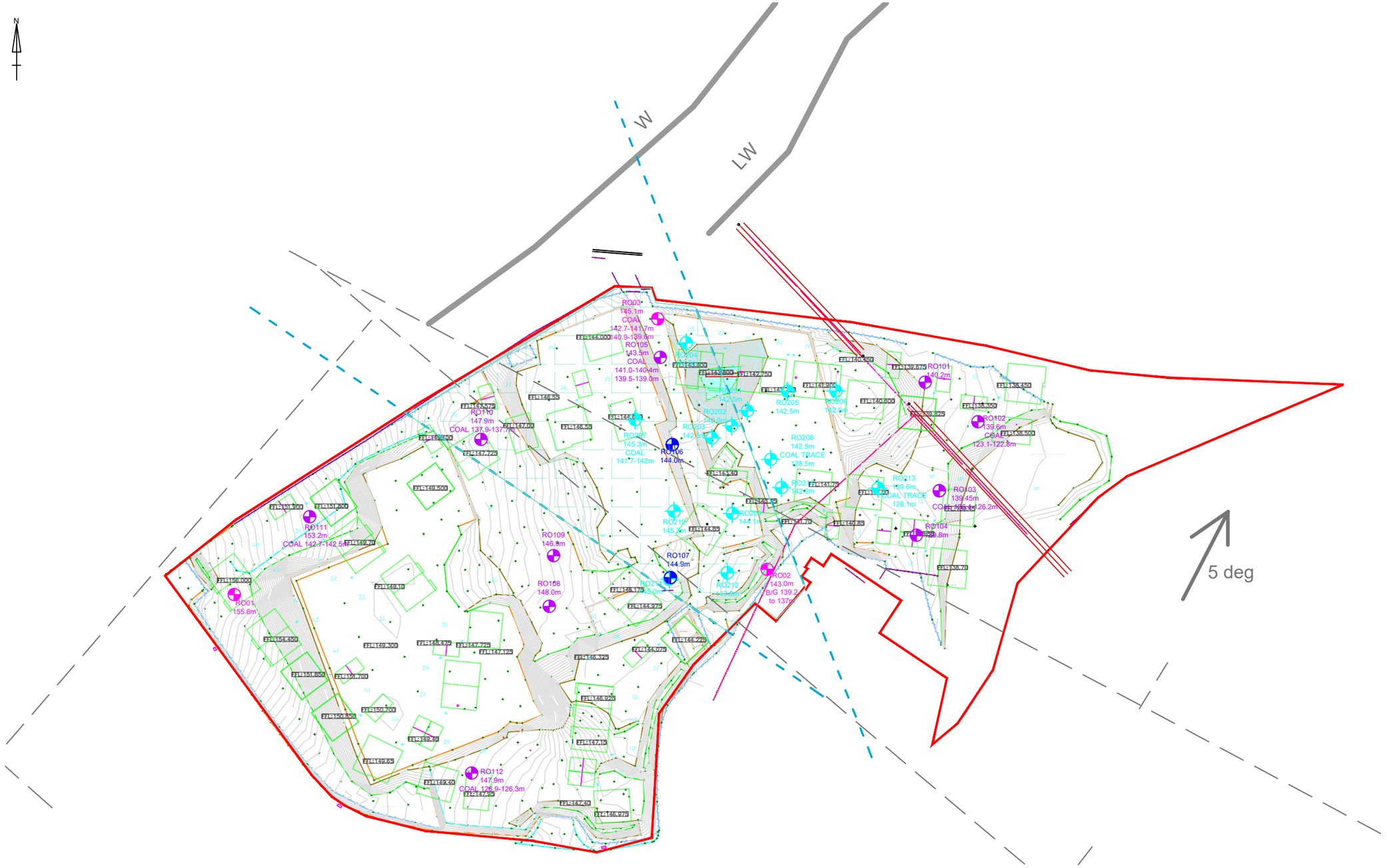
Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Site Features Plan

DRAWING NO.	REVISION NO.
C9297C/DG/02	0
DRAWN BY: MF	APPROVED BY: GH

DATE	SCALE	PAPER SIZE
September 2024	1:1000	A2



NOTES

Site boundary

2023 Site Investigation

Rotary Borehole (RO200 series)

2021 Site Investigation

Rotary Borehole (RO100 series)

2020 Site Investigation

Rotary borehole location (RO01 series)

Inferred fault lines (based on findings of site investigation undertaken to date).

Conjectured fault lines (based on published BGS data

Conjectured coal outcrops (based on published BGS data

Approximate extent of area required for inspection of mine entries.

Existing overhead electricity cables

Topographical survey reproduced from Sirius Remediation Ltd, Post Demolition Survey, ref. SR4358-TS-001, dated October 2023

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. All exploratory hole locations are approximate and based on handheld GPS coordinates unless stated otherwise on the exploratory hole logs.
3. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
4. All marked site features shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

REVISION		BY	DATE
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A	>>	>>	>>
B	>>	>>	>>
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CLIENT

Lovell Partnerships Ltd

SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Indicative Mining Risk Plan

DRAWING NO.	REVISION NO.
C9297/DG/03	0
DRAWN BY	APPROVED BY
MF	GH
DATE	SCALE	PAPER SIZE
November 2023	1:1000	A3

NOTES

Development site boundary

Proposed borehole grid pattern

Proposed plots for drill and subsequent grout stabilisation, where necessary.

Proposed extent of site for stripping for the inspection of unrecorded mine entries (such as bell pits / crop workings etc).

Notes

1. This drawing should not be viewed in isolation from the accompanying report.

2. All marked site features shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

REVISION		BY	DATE
0	For Information	MF	20/11/23
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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CLIENT

Lovell Partnerships Ltd

SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Proposed Shallow Mine Workings Investigation and Treatment Plan

DRAWING NO.	REVISION NO.
C9297/DG/04	0
DRAWN BY	APPROVED BY
MF	GH

DATE	SCALE	PAPER SIZE
November 2023	1:1000	A3

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8.5

Inferred western fault block

POS

Inferred central fault block

NOTES

- Development site boundary
- Drill hole location (no coal enountered)
- Drill hole location (intact coal encountered)
- Conjectured coal seam outcrops(with direction of dip)
- Conjectured fault outcrop

Notes

1. This drawing should not be viewed in isolation from the accompanying report.

2. All marked site features shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

Zoomed Window

REVISION		BY	DATE
0	For Information	MF	16/09/24
A	Updated for reference	GH	28/02/25
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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CLIENT

Lovell Partnerships Ltd

SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Shallow Mine Workings Proof Drilling Location Plan

DRAWING NO.	REVISION NO.
C9297C/DG/03	0
DRAWN BY	APPROVED BY
MF	GH
DATE	SCALE	PAPER SIZE
September 2024	1:500	A3

frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by Groundsure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to Groundsure in full without deduction, counterclaim or set off within 30 days of the date of Groundsure's invoice or such other period as may be agreed in writing between Groundsure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of Groundsure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the Groundsure Materials.

6.2 All Intellectual Property in the Groundsure Materials are and shall remain owned by Groundsure or Groundsure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the Groundsure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to Groundsure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the Groundsure Materials in order to advise the Beneficiary in a professional capacity. However, Groundsure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify Groundsure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of Groundsure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by Groundsure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 Groundsure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the Groundsure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the Groundsure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of Groundsure's internet ordering service.

7.5 Groundsure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 Groundsure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of Groundsure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against Groundsure in relation to the Services or other matters arising pursuant to the Contract.

8 Groundsure's right to suspend or terminate

8.1 If Groundsure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, Groundsure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 Groundsure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to Groundsure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon Groundsure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) Groundsure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in Groundsure's possession or control; and

(ii) the Client shall pay to Groundsure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay Groundsure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of Groundsure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to Groundsure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through Groundsure.

12.3 Groundsure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of Groundsure.

12.4 No failure on the part of Groundsure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 Groundsure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond Groundsure's reasonable control.

In the event that Groundsure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then Groundsure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

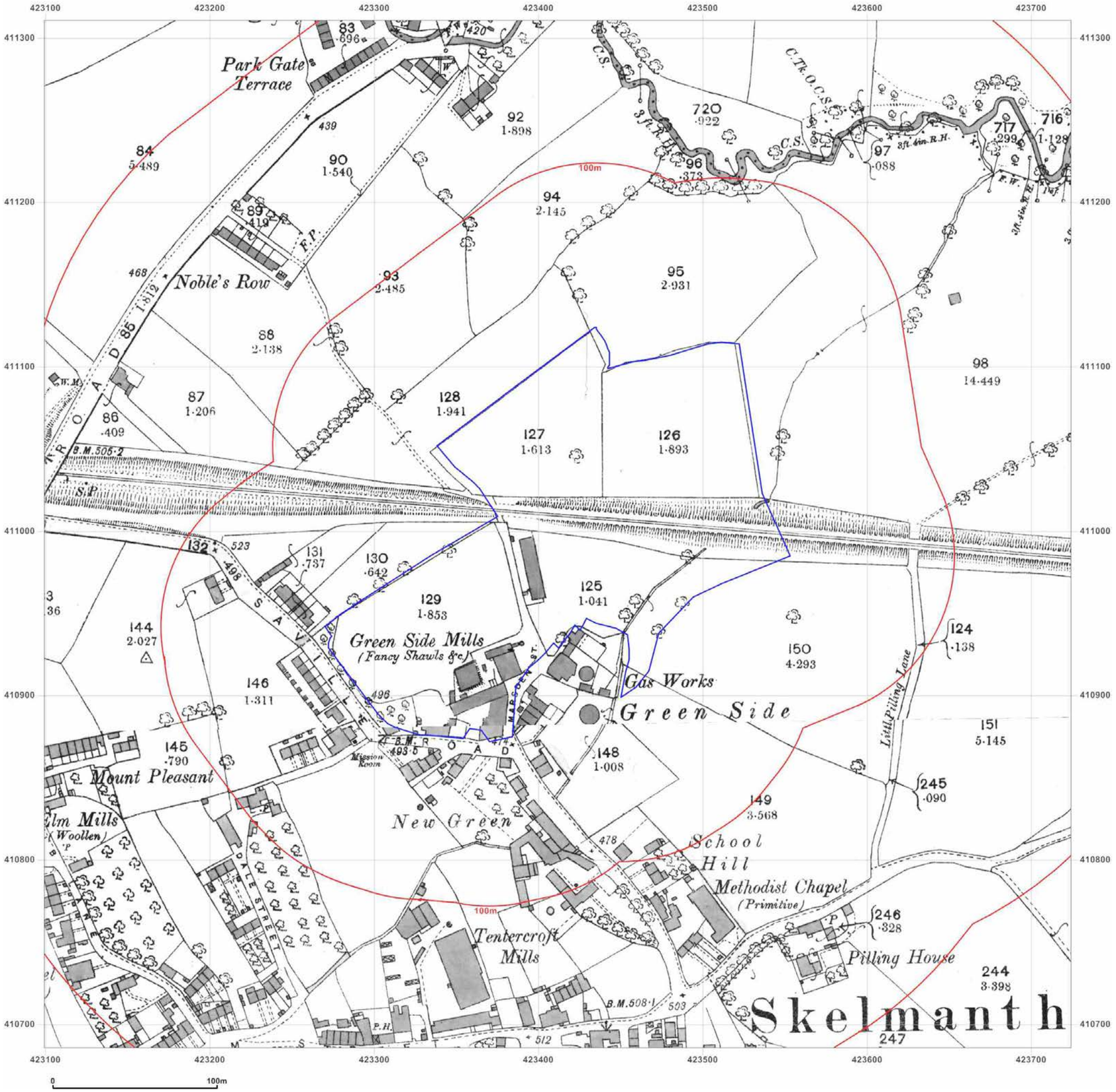
12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 Groundsure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at Groundsure who will respond in a timely manner. In the event you are not satisfied with Groundsure's complaints handling process or you are unable to resolve the complaint, at your discretion you may refer the complaint to The Property Ombudsman Scheme at the following URL/email: website www.tpos.co.uk or email: admin@tpos.co.uk

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law. **© Groundsure Limited June 2013**



Groundsure INSIGHTS

Site Details:

GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Client Ref: 160311_Greenside_Mills
Report Ref: GS-2888917
Grid Ref: 423412, 410998

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

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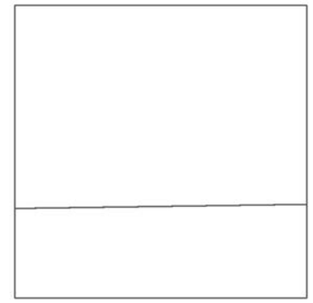
Surveyed 1893
Revised 1893
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1893
Revised 1893
Edition N/A
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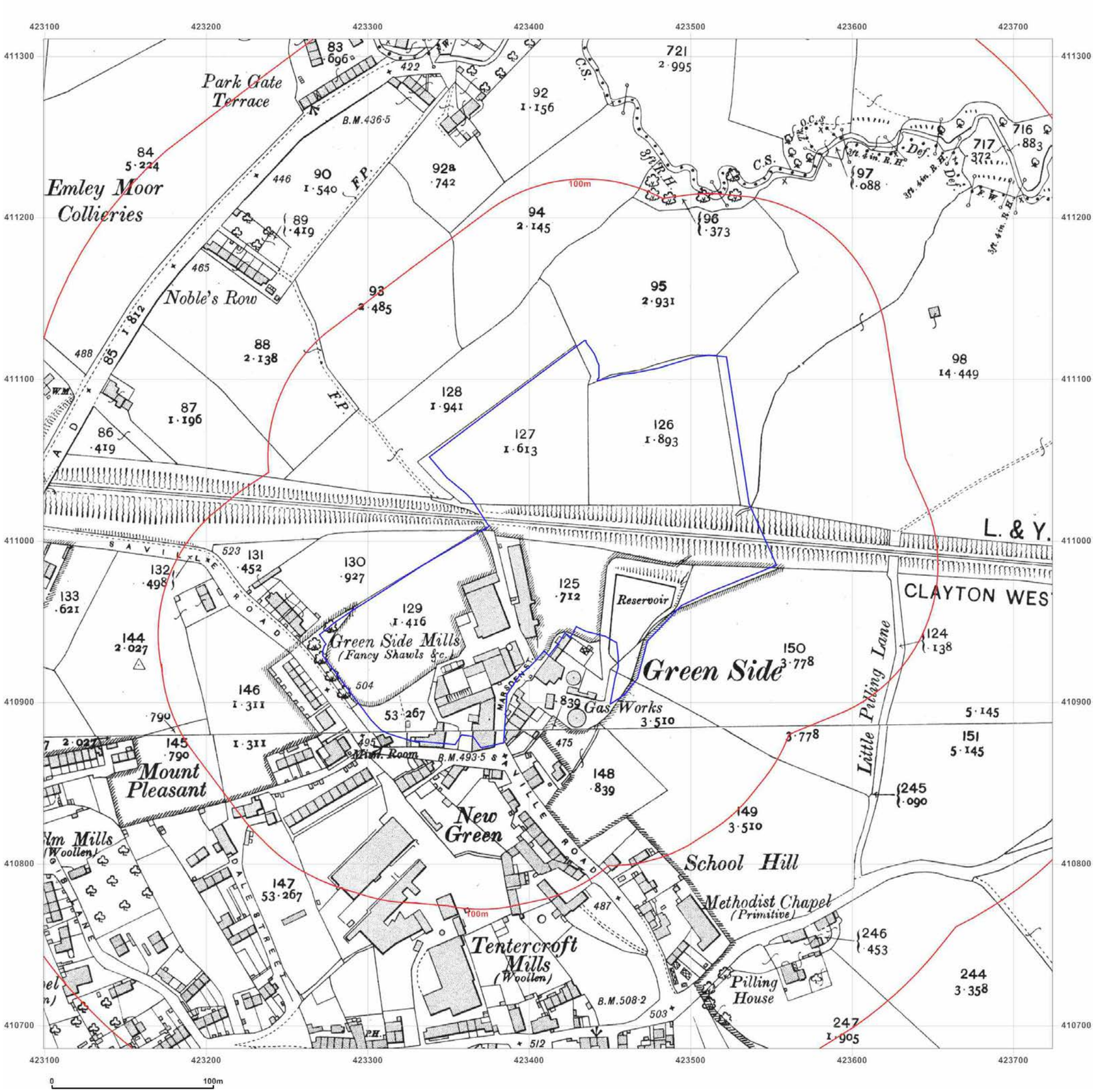
Production date: 08 April 2016

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Client Ref: 160311_Greenside_Mills
Report Ref: GS-2888917
Grid Ref: 423412, 410998

Map Name: County Series
Map date: **1906**
Scale: 1:2,500
Printed at: 1:2,500

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

Surveyed 1906
Revised 1906
Edition N/A
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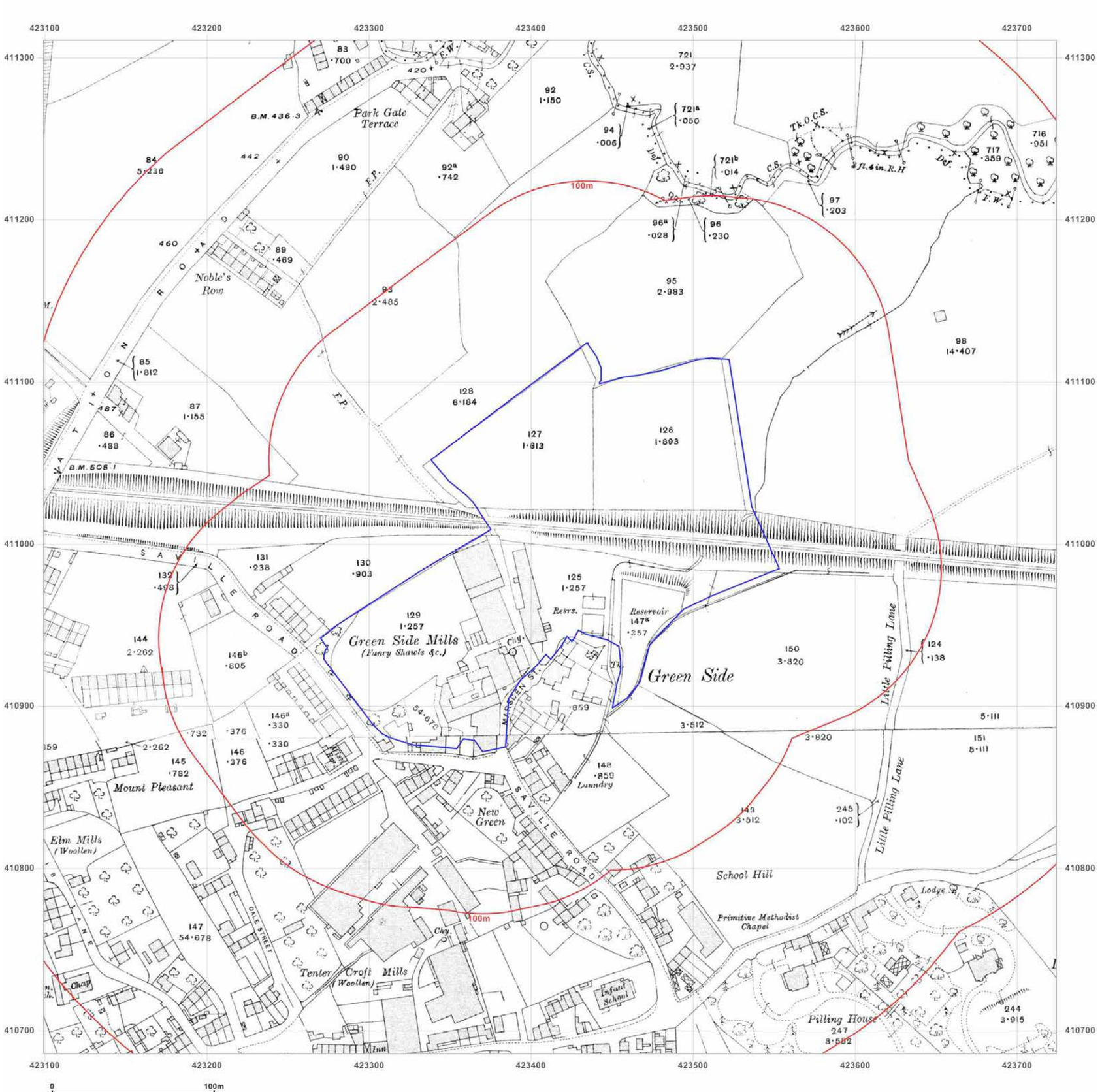

Groundsure INSIGHTS

Site Details:

GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Client Ref: 160311_Greenside_Mills
Report Ref: GS-2888917
Grid Ref: 423412, 410998

Map Name: County Series

Map date: **1913-1916**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed N/A
Revised N/A
Edition 1916
Copyright N/A
Levelled N/A

Surveyed 1913
Revised 1913
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 08 April 2016

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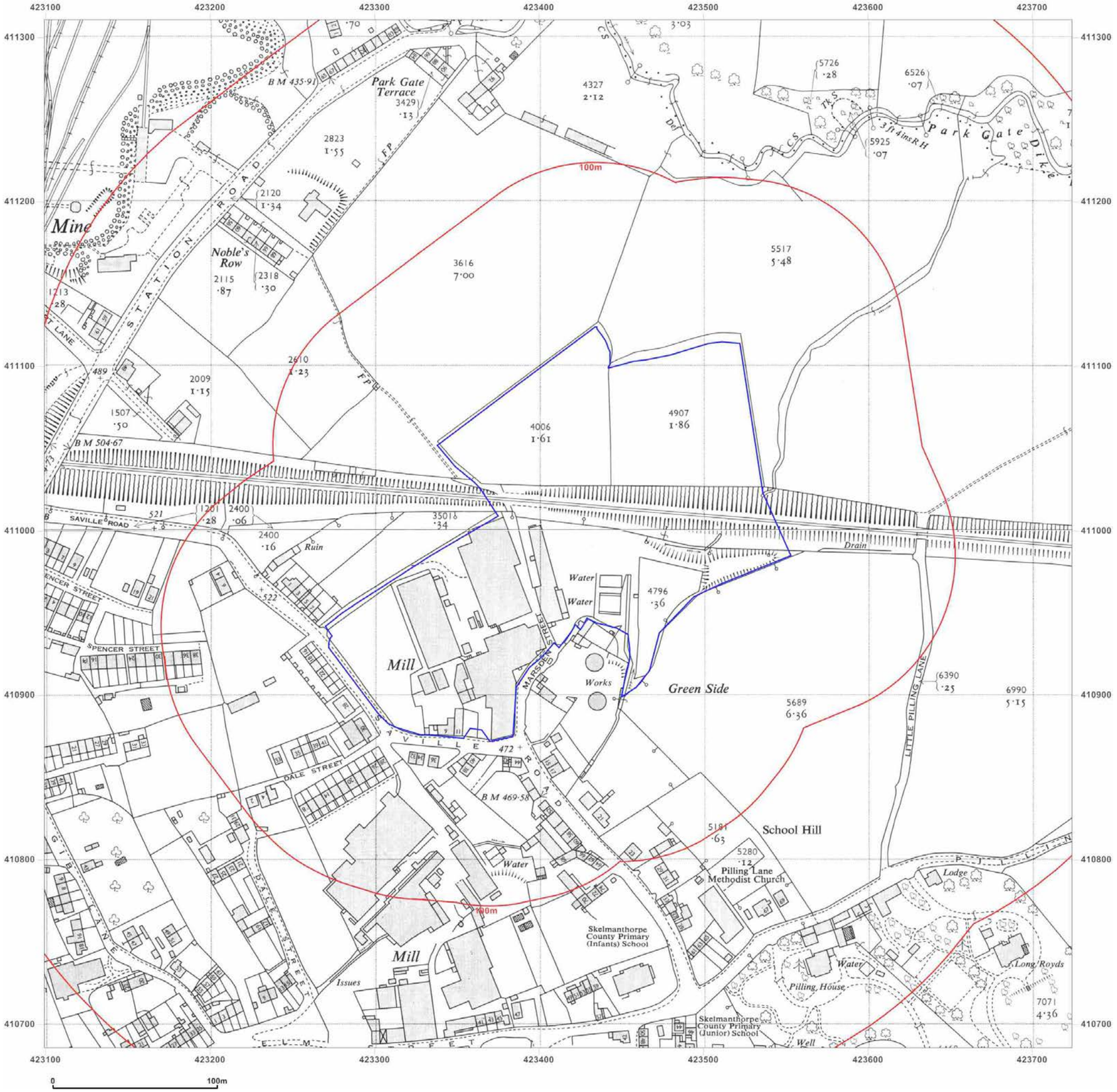

Groundsure INSIGHTS

Site Details:

GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Client Ref: 160311_Greenside_Mills
Report Ref: GS-2888917
Grid Ref: 423412, 410998

Map Name: National Grid

Map date: **1959**

Scale: 1:2,500

Printed at: 1:2,500

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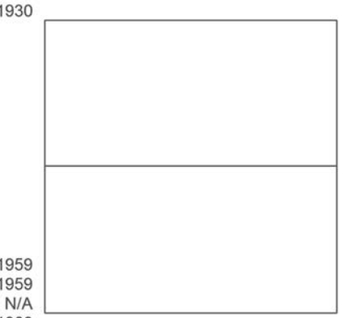
Surveyed 1959
Revised 1959
Edition N/A
Copyright 1960
Levelled 1930



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Revised 1959
Edition N/A
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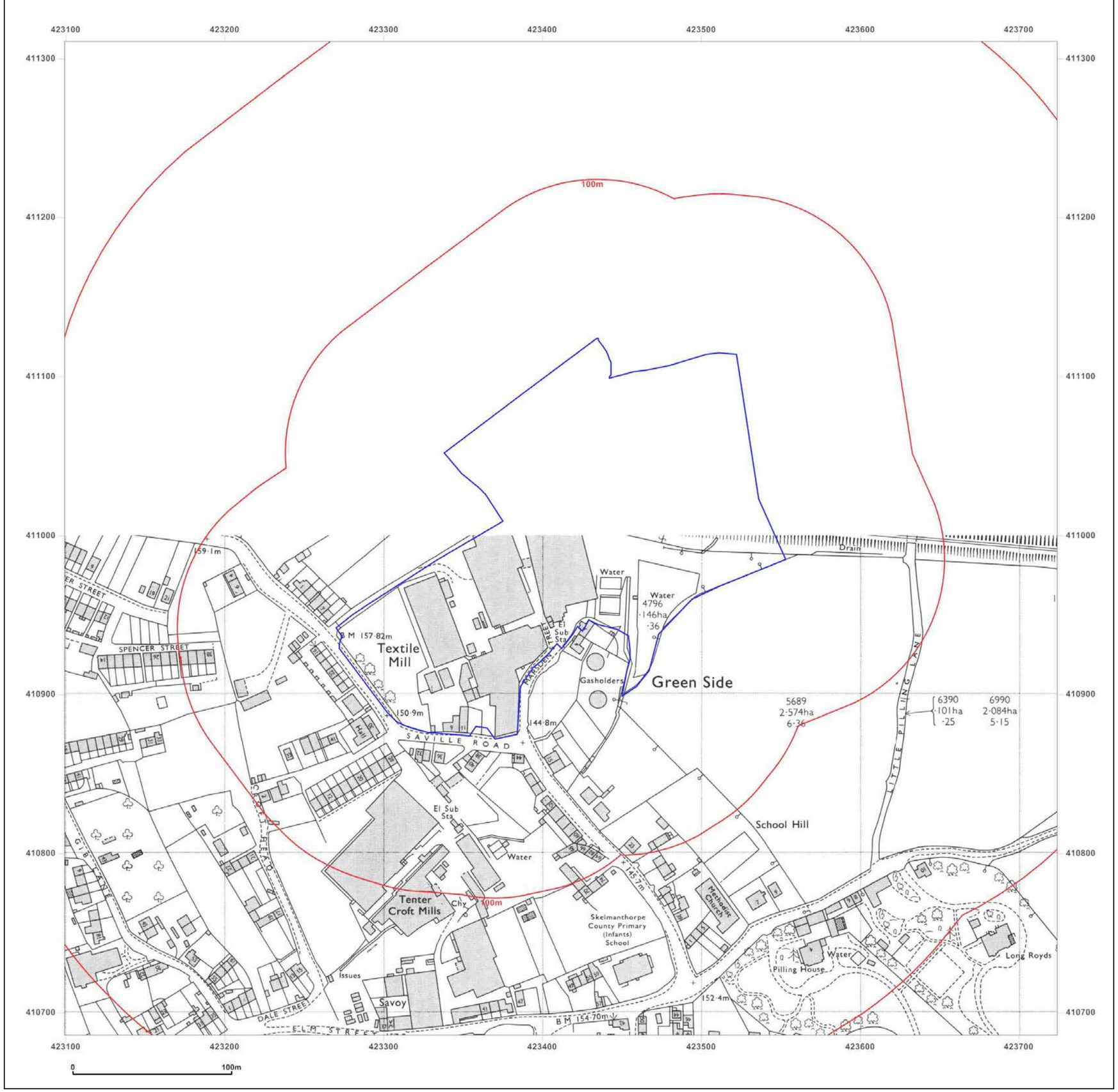
To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Client Ref: 160311_Greenside_Mills
Report Ref: GS-2888917
Grid Ref: 423412, 410998

Map Name: National Grid
Map date: **1969**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1969
Revised 1969
Edition N/A
Copyright 1970
Levelled 1958

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Site Details:

GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Client Ref: 160311_Greenside_Mills
Report Ref: GS-2888917
Grid Ref: 423412, 410998

Map Name: National Grid
Map date: **1974**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed N/A
Revised N/A
Edition N/A
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Groundsure INSIGHTS

Site Details:

GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Client Ref: 160311_Greenside_Mills
Report Ref: GS-2888917
Grid Ref: 423412, 410998

Map Name: National Grid
Map date: **1978**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1978
Levelled N/A

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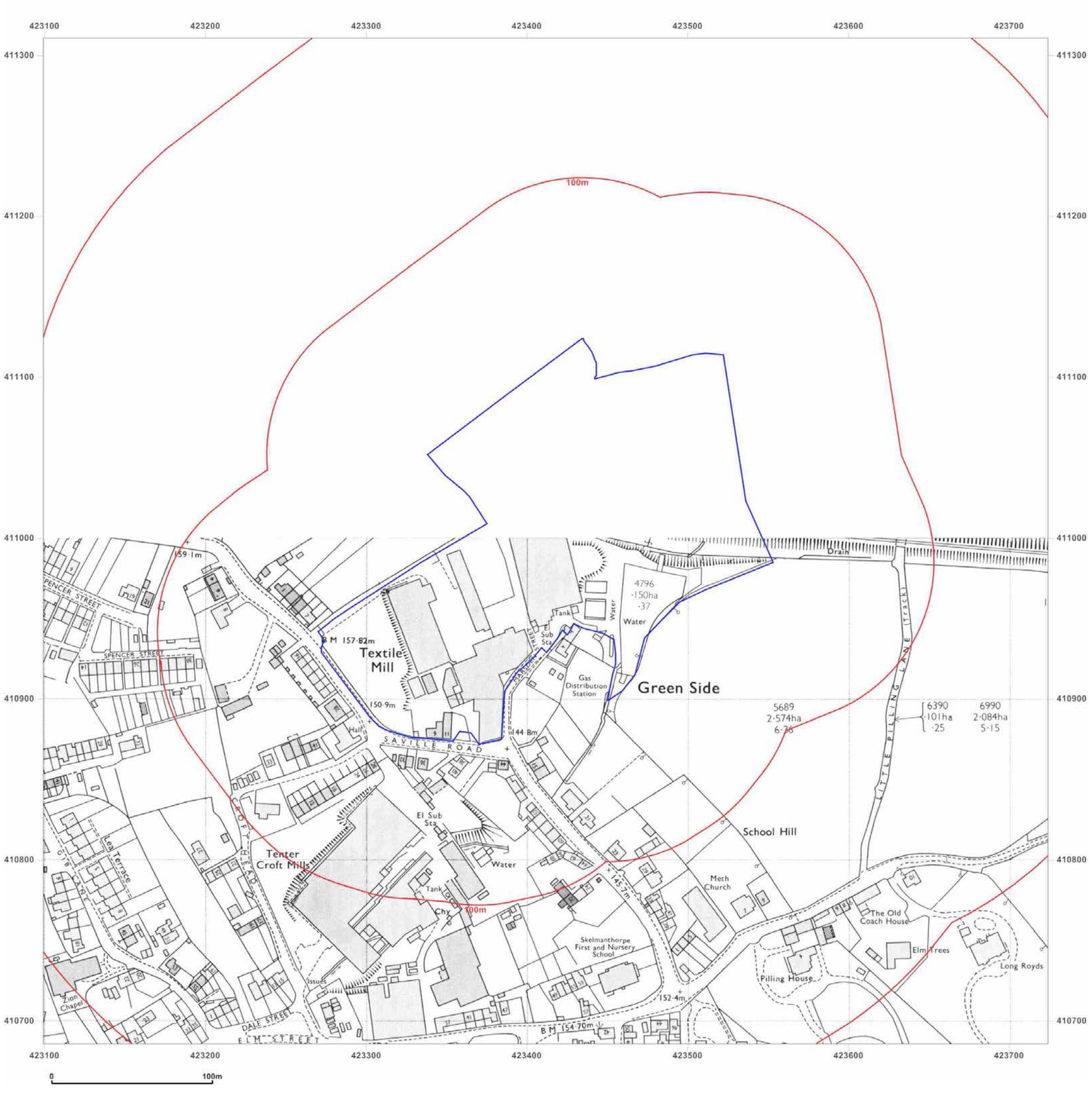

Groundsure INSIGHTS

Site Details:

GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Client Ref: 160311_Greenside_Mills
Report Ref: GS-2888917
Grid Ref: 423412, 410998

Map Name: National Grid
Map date: **1980**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed 1980
Revised 1980
Edition N/A
Copyright 1982
Levelled 1958

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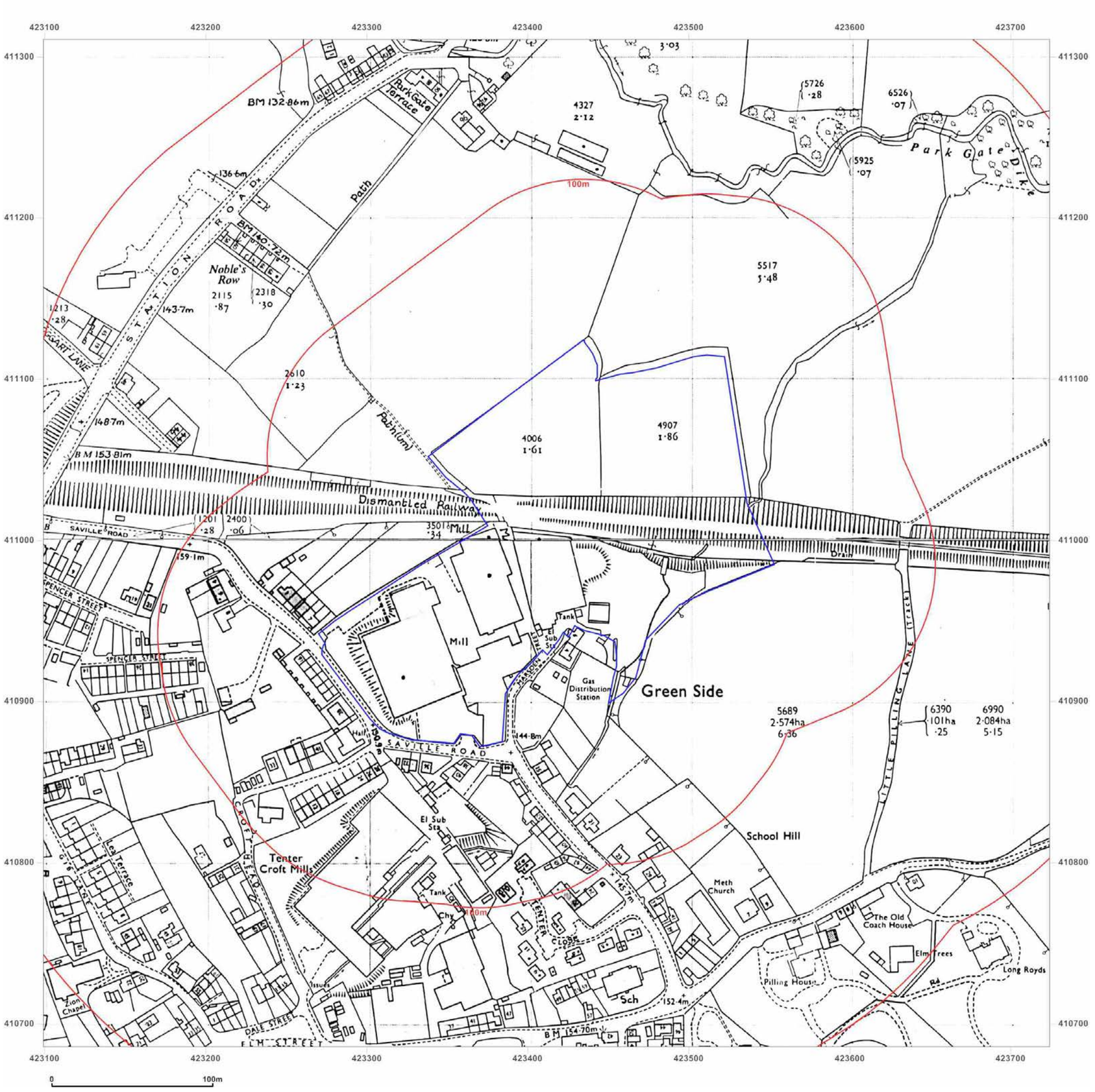

Groundsure INSIGHTS

Site Details:

GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Client Ref: 160311_Greenside_Mills
Report Ref: GS-2888917
Grid Ref: 423412, 410998

Map Name: National Grid

Map date: **1986-1987**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1958
Revised 1987
Edition N/A
Copyright 1987
Levelled 1958

Surveyed 1968
Revised 1986
Edition N/A
Copyright 1986
Levelled 1968

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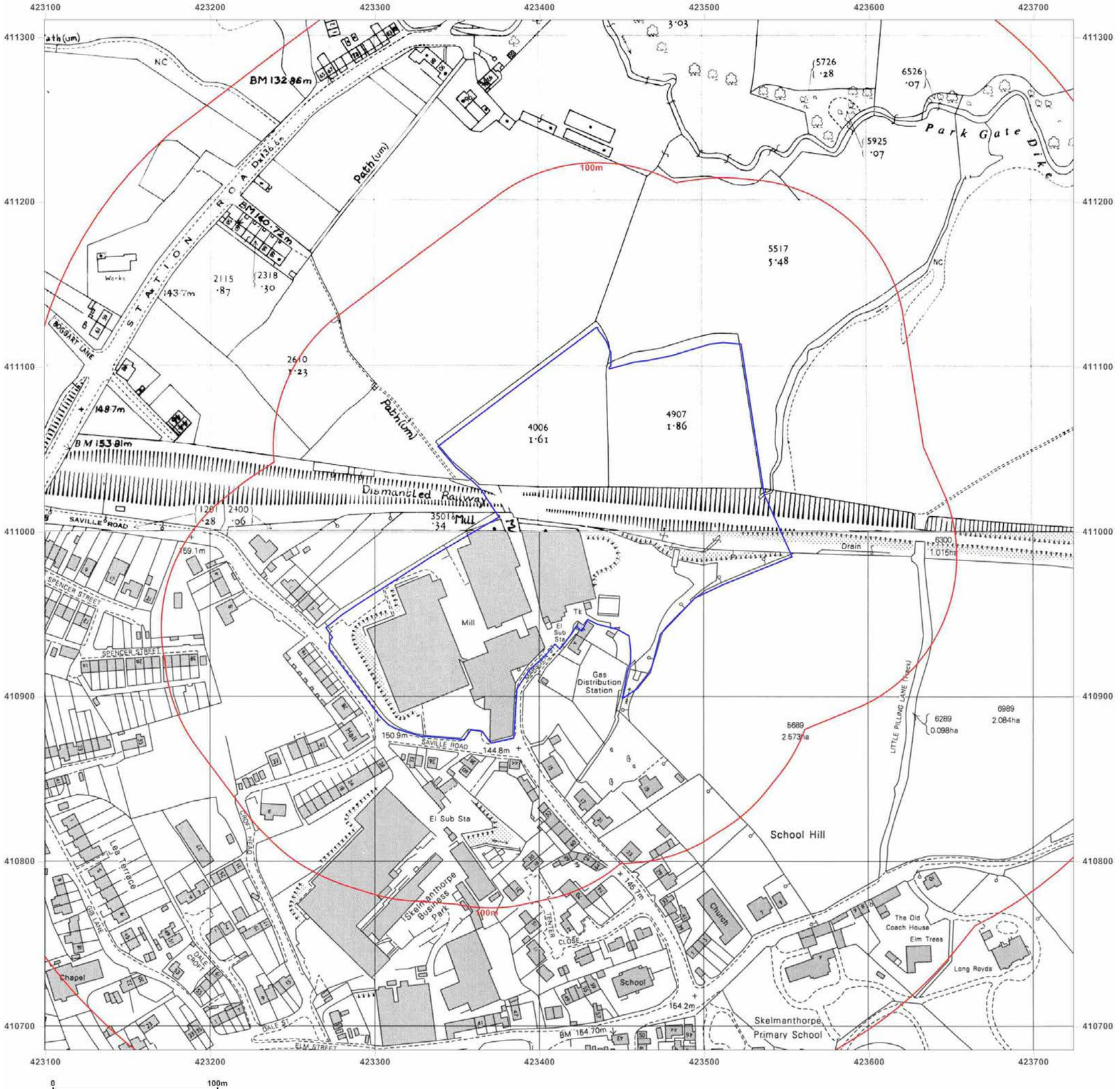

Groundsure INSIGHTS

Site Details:

GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Client Ref: 160311_Greenside_Mills
Report Ref: GS-2888917
Grid Ref: 423412, 410998

Map Name: National Grid

Map date: **1989-1990**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1958
Revised 1990
Edition N/A
Copyright 1990
Levelled 1958

Surveyed N/A
Revised 1989
Edition N/A
Copyright 1991
Levelled N/A

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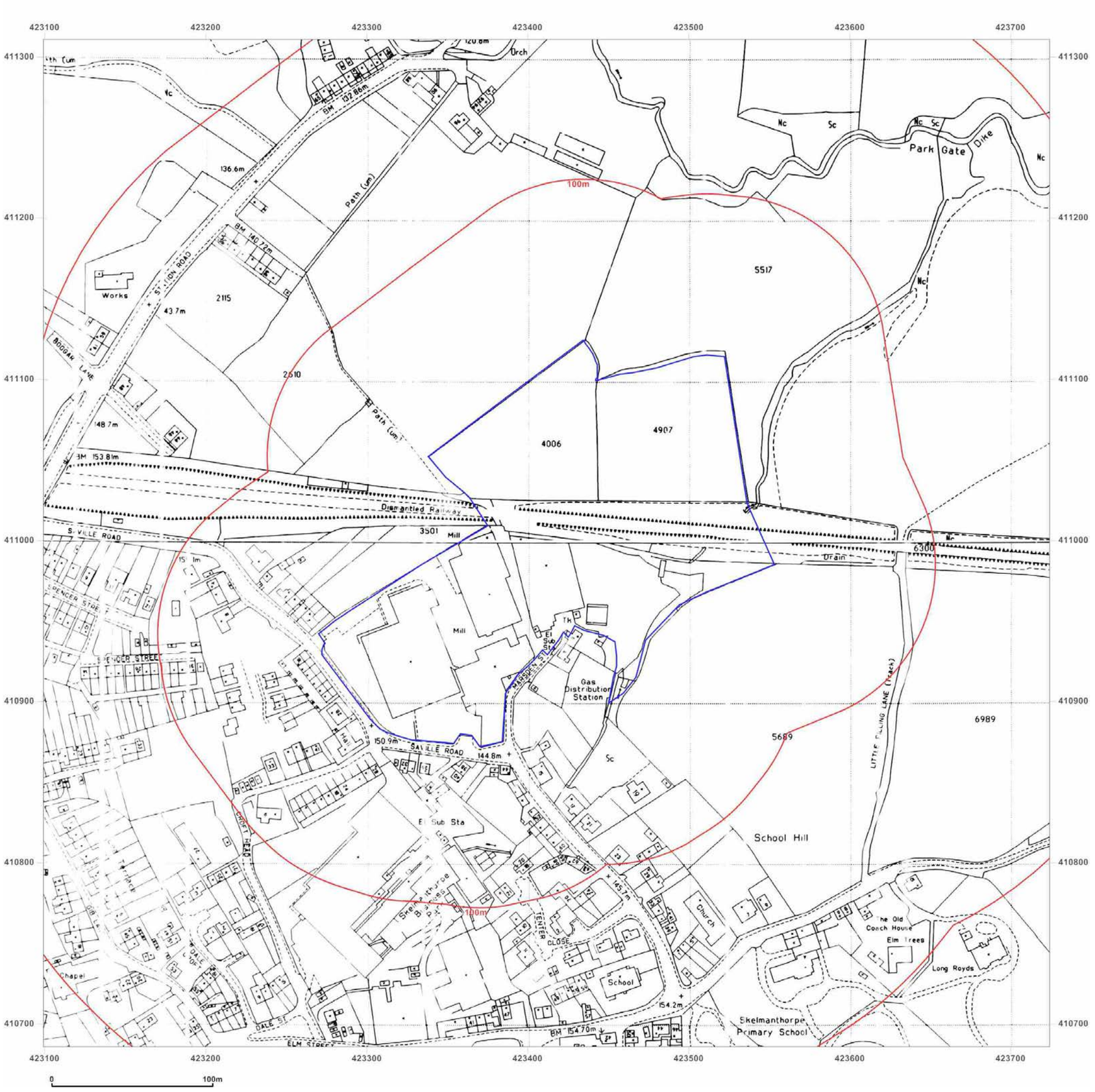

Groundsure INSIGHTS

Site Details:

GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Client Ref: 160311_Greenside_Mills
Report Ref: GS-2888917
Grid Ref: 423412, 410998

Map Name: National Grid

Map date: **1992**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1992
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1992
Levelled N/A

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Groundsure INSIGHTS

Site Details:

GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Client Ref: 160311_Greenside_Mills
Report Ref: GS-2888917
Grid Ref: 423412, 410998

Map Name: National Grid
Map date: **1993**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
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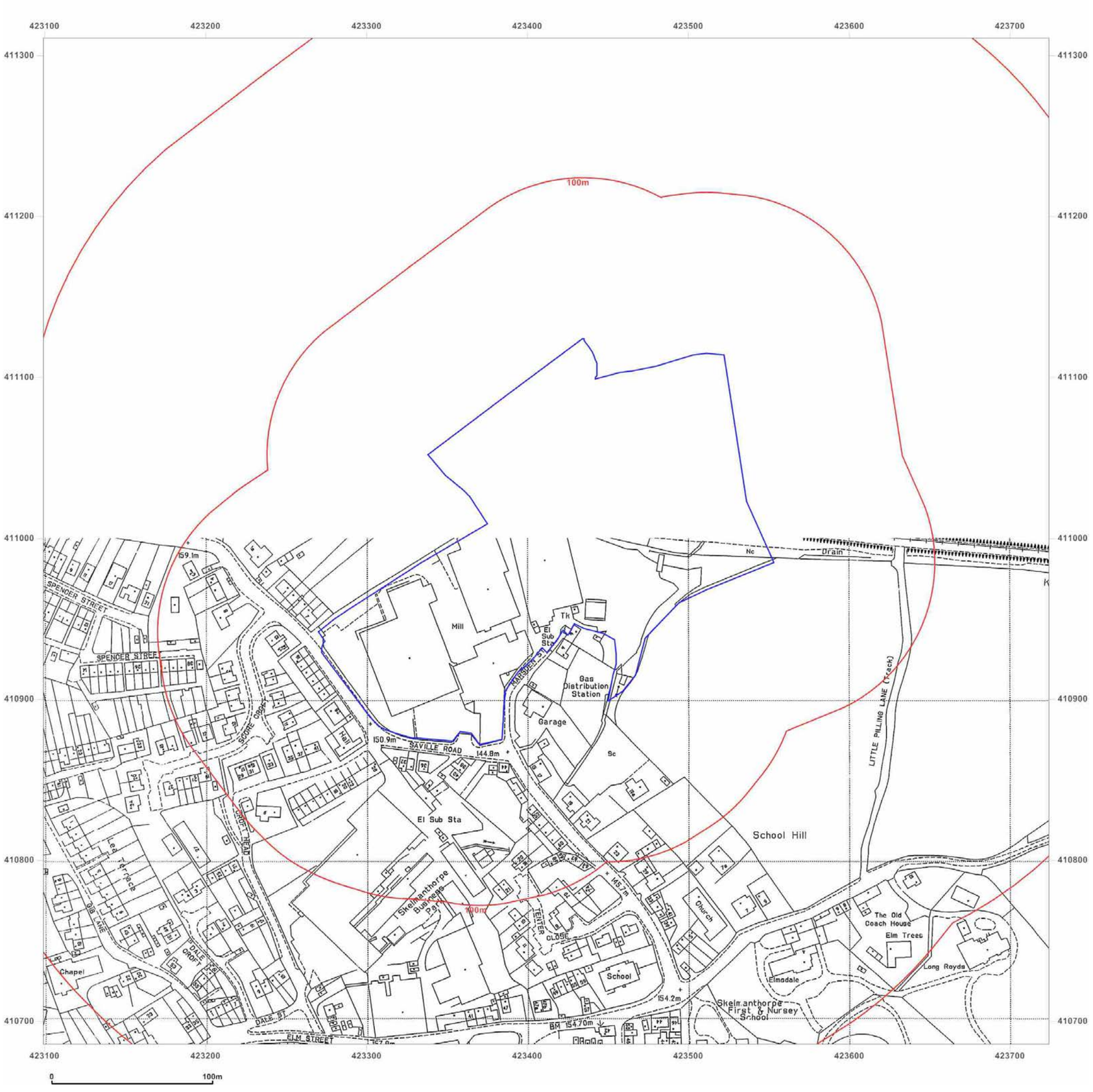

Groundsure INSIGHTS

Site Details:

GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

Client Ref: 160311_Greenside_Mills
Report Ref: GS-2888917
Grid Ref: 423412, 410998

Map Name: National Grid

Map date: **1995**

Scale: 1:2,500

Printed at: 1:2,500

N
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Edition N/A
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Production date: 08 April 2016

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APPENDIX C

COAL AUTHORITY MINING REPORT

The Coal Authority

Issued by:
The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848

CMRA UK LIMITED
5 SANDERS CLOSE
BRISTOL
BS3 2BG

Our reference:	**51001106919001**
Your reference:	**Paramount Retail Group**
Date of your enquiry:	**24 February 2016**
Date we received your enquiry:	**24 February 2016**
Date of issue:	**24 February 2016**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

DAWSON FABRICS LTD, DAWSON FABRICS LTD, GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	See comments below
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

According to the records in our possession, the property is not within the zone of likely physical influence on the surface from past underground workings.
However the property is in an area where the Coal Authority believe there is coal at or close to the surface. This coal may have been worked at some time in the past. The potential presence of coal workings at or close to the surface should be considered prior to any site works or future development activity. Your attention is drawn to the Comments on Coal Authority Information section of the report.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.
The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

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The property is not in an area that is likely to be affected at the surface from any planned future workings.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Records may be incomplete. Consequently, there may exist in the local area mine entries of which the Coal Authority has no knowledge.

Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast coal mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

The property is not in an area for which a notice has been given under section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

The property is not in an area for which a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Comments on Coal Authority information

In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional Remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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Issued by:	The Coal Authority, 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG
Tax Point Date:	24 February 2016
Issued to:	CMRA UK LIMITED 5 SANDERS CLOSE BRISTOL BS3 2BG
Property Search for:	DAWSON FABRICS LTD, DAWSON FABRICS LTD, GREENSIDE MILLS, SAVILLE ROAD, HUDDERSFIELD, HD8 9EE
Reference Number:	51001106919001
Date of Issue:	24 February 2016
Cost:	£59.00
VAT @ 20%:	£11.80
Total Received:	£70.80
VAT Registration	598 5850 68

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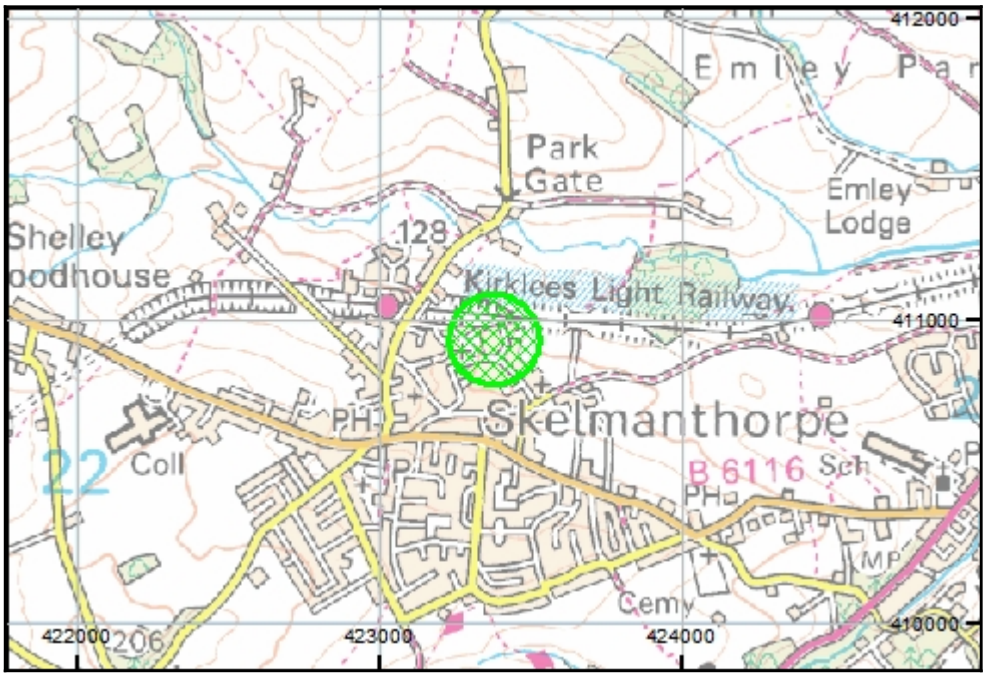
Location map

Approximate position of property



Enquiry boundary

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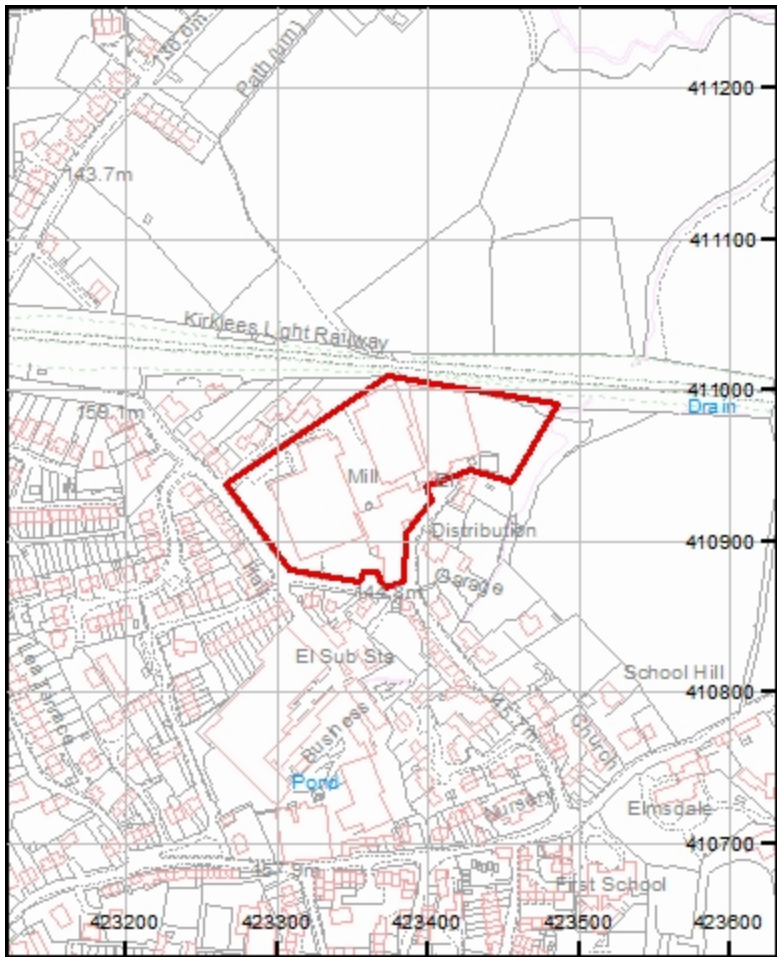


Key

Approximate position of enquiry boundary shown

APPENDIX D

QUALITATIVE RISK ASSESSMENT METHODOLOGY

Qualitative Risk Assessment Methodology

The approach adopted by Sirius for the qualitative assessment of risk is based upon that given in Annex 4 of NHBC-Environment Agency-CIEH "Guidance for the Safe Development of Housing on Land Affected by Contamination" (2008) and is consistent with other current guidance.

The risk posed by viable contaminant linkages is based upon the consideration of both:

a) the magnitude of the potential consequence (i.e. its severity); and,

b) the probability (likelihood) of that consequence being realised.

The classifications used in this report for consequence and probability are given in Tables 1 and 2, respectively. The derived risk classifications are defined in Table 3.

Where there is no viable contaminant linkage there is no potential risk.

Table 1. Classification of Consequence

Classification	Definition
Severe	Contaminant concentrations at the receptor that are likely to result in "significant harm" to human health (as defined in Part 2A of the Environmental Protection Act 1990). Major pollution of controlled waters that could have persistent and/or extensive effects on water quality, for example fish kills, closure of an abstraction, or substantial deterioration in quality of the receiving water body. Major impact on receptor amenity value or major damage to agriculture or commerce. Major damage to an ecosystem that is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Catastrophic damage to crops, buildings or property.
Medium	Elevated concentrations at the receptor that might result in "significant harm" to human health (as defined in Part 2A of the Environmental Protection Act 1990). A pollution incident that has significant effect on water quality or abstraction potential. An incident that has a marked effect on receptor amenity value, agriculture or commerce. Damage to an ecosystem that may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Significant damage to crops, buildings or property.

Classification	Definition
Mild	Potential human health impact at the receptor point but unlikely to be classified as "significant harm" (as defined in Part 2A of the Environmental Protection Act 1990). Pollution of water that will have a small or short-lived effect on water quality and marginal effects on its amenity or resource value or its use in agriculture or commerce. Minor or short-lived damage to ecosystems, which is unlikely to result in a substantial adverse change Minor damage to crops, buildings or property
Minor	No potential measurable detrimental human health impacts at the receptor point. Impact on water that will have no or minimal effect on water quality or use. No or minor and easily repairable effects on buildings, structures and services.

Table 2. Classification of Probability

Classification	Definition
High	An impact is already occurring or is very likely in the short-term and almost inevitable over the long-term.
Medium	It is probable that an event would occur. This is not inevitable but possible in the short-term and likely over the long-term.
Low	Circumstances are possible under which an event could occur. However, it is by no means certain that an event will take place, even over the long-term.
Unlikely	Circumstances are such that it is improbable that an event would occur even over the very long-term.

Table 3. Risk Classification

	Consequence			
Probability	***Severe***	***Medium***	***Mild***	***Minor***
High	Very High	High	Moderate	Low
Medium	High	Moderate	Low to Moderate	Low
Low	Moderate	Low to Moderate	Low	Very Low
Unlikely	Low to Moderate	Low	Very Low	Negligible

Table 4 provides a context for interpretation of the risk classification categories. The definitions provided are based on those given in CIRIA (2001) "Contaminated Land Risk Assessment. A Guide to Good Practice", Report C552.

Table 4. Interpretation of Risk Classification Categories

Risk Classification	Definition
Very High	There is a high probability that severe harm to one or more identified receptors could occur or there is evidence that this is already happening. This risk is likely to result in a substantial liability. Urgent investigation and remediation are likely to be required.
High	Harm is likely to be caused to one or more identified receptors. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short-term and are likely over the longer term.
Moderate	It is possible that harm could be caused to one or more identified receptors. However, it is relatively unlikely that such harm would be severe. Investigation is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low	It is possible that harm could be caused to one or more identified receptors but it is likely that this harm, if realised, would normally be mild. No further investigation is considered necessary to assess risk or environmental liability but investigations could be undertaken if desired to confirm 'baseline' conditions for the purposes of liability management. Remedial works are unlikely to be required.
Very Low	There is a low probability that harm could be caused to one or more identified receptors. In the event of such harm being realised, it is likely to be mild, at worst. No further investigation is considered necessary to assess risk or environmental liability but investigations could be undertaken if desired to confirm 'baseline' conditions for the purposes of liability management. Remedial works are very unlikely to be required.
Negligible	It is unlikely that harm could be caused to one or more identified receptors. In the event of harm being realised, it is likely to be minor. No further investigation is considered necessary to assess risk or environmental liability. Remedial works are not expected.

APPENDIX E

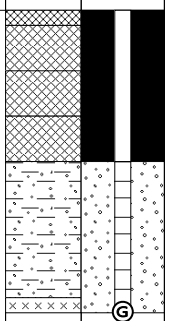
EXPLORATORY HOLE LOGS

WINDOW SAMPLING RECORD

BH No. **WS01**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340
Client: Paramount Retail Group Holdco Ltd
Date: 15/10/2020
Method: Windowless Sampler Rig
Scale: 1:25
Logged By: RC
Checked By: GH
Driller: RP Drilling

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
				MADE GROUND: Black bound macadam.	0.05	153.94		
				MADE GROUND: Dark grey sandy GRAVEL. Gravel is fine to coarse, sub-rounded of sandstone.	0.20	153.79		
ES	0.35 - 0.50			MADE GROUND: Yellowish brown sandy GRAVEL. Gravel is fine to coarse, sub-rounded of sandstone.	0.35	153.64		
D	0.60	74.0		MADE GROUND: Reddish brown GRAVEL. Gravel is fine to coarse, angular and tabular of burnt mudstone / siltstone.	0.50	153.49		
D	0.95 - 1.00	50 (10,13/50 for 275mm)	1	Stiff to very stiff, medium strength, greyish brown slightly gravelly CLAY with rare rootlets. Intermediate plasticity. Gravel is fine to coarse, angular and tabular of relict texture siltstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]	0.95	153.04		
				Extremely weak greyish brown thinly laminated SILSTONE. [DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]	1.00	152.99		
				End of Borehole at 1.00m				



Remarks and Groundwater Observations:

1. Hard standing was cored out to allow drilling. 2. No visual or olfactory evidence of contamination was encountered. 3. No groundwater was encountered. 4. The borehole was installed with a 63mm gas / groundwater monitoring well as detailed above.

GL (m AOD)
153.99m AOD
Easting:
423293.17
Northing:
410952.73

Fig No.
WS01

WINDOW SAMPLING RECORD

BH No. **WS02**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340
Client: Paramount Retail Group Holdco Ltd
Date: 16/10/2020
Method: Windowless Sampler Rig
Scale: 1:25
Logged By: RC
Checked By: GH
Driller: RP Drilling

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
				MADE GROUND: Black bound macadam.	0.06	146.29		
				MADE GROUND: Black bound macadam.	0.15	146.20		
				MADE GROUND: Black bound macadam.	0.27	146.08		
				MADE GROUND: Grey slightly clayey slightly sandy GRAVEL. Gravel is fine to coarse, angular of limestone.				
ES	0.50 - 0.60			MADE GROUND: Black slightly sandy GRAVEL. Gravel is fine to coarse, angular of ash and coal.	0.50	145.85		
					0.52	145.83		
				MADE GROUND: Firm grey mottled orangish brown slightly gravelly CLAY. Friable. Gravel is fine to coarse, sub-angular of mudstone and rare brick. [REWORKED RESIDUAL SOIL]	0.60	145.75		
			1	Very stiff grey mottled light brown and orangish brown gravelly CLAY. Intermediate plasticity. Gravel is fine to coarse, angular and tabular of relict texture mudstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]				
D	1.50 - 1.60							
		50 (4,6/50 for 295mm)	2	End of Borehole at 2.00m	2.00	144.35		
			3					
			4					
			5					

Remarks and Groundwater Observations:

1. Hard standing was cored out to allow drilling. 2. No visual or olfactory evidence of contamination was encountered. 3. No groundwater was encountered. 4. The borehole was backfilled with arisings.

GL (m AOD)
146.35m AOD
Easting:
423367.92
Northing:
410886.99

Fig No.
WS02

WINDOW SAMPLING RECORD

BH No. **WS03** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 16/10/2020

Method: Windowless Sampler Rig

Scale: 1:25

Logged By: RC | Checked By: GH

Driller: RP Drilling

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
				MADE GROUND: Black bound macadam.	0.05	147.70		
				MADE GROUND: Black bound macadam.	0.12	147.63		
				MADE GROUND: Unreinforced concrete.	0.25	147.50		
ES	0.30 - 0.40			MADE GROUND: Grey slightly clayey slightly sandy GRAVEL. Gravel is fine to coarse, angular of limestone.	0.50	147.25		
				MADE GROUND: Stiff, grey mottled orangish brown, slightly gravelly CLAY. Gravel is fine to coarse, sub-angular of mudstone and rare brick.	0.60	147.15		
ES	0.80 - 1.00			MADE GROUND: Pale grey GRAVEL. Gravel is fine to coarse, sub-angular of sandstone and concrete.	0.80	146.95		
			1	MADE GROUND: Dark grey slightly sandy GRAVEL. Gravel is fine to coarse, sub-angular of brick, concrete, mudstone and asphalt.	1.30	146.45		
ES	1.60 - 1.80			MADE GROUND: Soft brown gravelly CLAY. High plasticity (field description). Gravel is fine to coarse, angular of sandstone, brick and rare ash, with fragments of pottery.	1.90	145.85		
			2	MADE GROUND: Yellow slightly sandy GRAVEL. Gravel is fine to coarse, angular of sandstone.	2.30	145.45		
D	2.60 - 2.80	19.0 16.0		MADE GROUND: Soft, very low strength, dark grey slightly gravelly CLAY. High plasticity (field description). Gravel is fine to coarse, gravel is fine to coarse, angular of siltstone and mudstone.				G
				2.70-2.75m bgl. Band of sub-angular siltstone gravel.				
			3	End of Borehole at 3.00m	3.00	144.75		
			4					
			5					

Remarks and Groundwater Observations:

1. Hard standing was cored out to allow drilling. 2. No visual or olfactory evidence of contamination was encountered. 3. No groundwater was encountered. 4. The hole was terminated due to repeated collapse from 2-3m. 5. The borehole was installed with a 63mm gas / groundwater monitoring well as detailed above.

GL (m AOD) 147.75m AOD

Easting: 423351.86

Northing: 410898.44

Fig No. WS03

WINDOW SAMPLING RECORD

BH No. **WS04** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 16/10/2020

Method: Windowless Sampler Rig

Scale: 1:25

Logged By: RC | Checked By: GH

Driller: RP Drilling

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
				MADE GROUND: Concrete with 6mm reinforcement and DPC at base.	0.16			
				MADE GROUND: Grey slightly clayey sandy GRAVEL. Gravel is fine to coarse, angular of limestone.	0.25			
				Extremely weak greyish brown locally mottled orangish brown and dark brown thinly laminated SILTSTONE. [DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]				
		N=50 (5,5/8,10,12,20)		End of Borehole at 1.00m	1.00			

1
2
3
4
5

Remarks and Groundwater Observations:

1. Hard standing was cored out to allow drilling. 2. No visual or olfactory evidence of contamination was encountered. 3. No groundwater was encountered. 4. The borehole was backfilled with arisings.

GL (m AOD)

Easting:

Northing:

Fig No.

WS04

WINDOW SAMPLING RECORD

BH No. **WS05** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe | Contract No: C7340

Client: Paramount Retail Group Holdco Ltd | Date: 15/10/2020

Method: Windowless Sampler Rig | Scale: 1:25

Logged By: RC | Checked By: GH

Driller: RP Drilling

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
				MADE GROUND: Black bound macadam.	0.03	147.29		
ES	0.15 - 0.30			MADE GROUND: Dark grey GRAVEL. Gravel is fine to coarse, angular to sub-angular of sandstone and concrete.	0.15	147.17		
				MADE GROUND: Stiff dark grey, sandy gravelly CLAY. Gravel is fine to medium, sub-angular of brick and siltstone.	0.30	147.02		
				MADE GROUND: Yellowish brown sandy gravelly CLAY. Gravel is fine to coarse, sub-angular of sandstone.	0.60	146.72		
D	0.90 - 1.00	N=18 (2,3/3,4,4,7)	1	Stiff, high strength, grey mottled orangish brown and dark brown slightly gravelly CLAY. High plasticity. Gravel is fine to coarse, sub-angular and tabular of mudstone. [RESIDUAL LOWER PENNINE COAL MEASURES FORMATION]	1.30	146.02		
D	1.90 - 2.00	N=43 (3,5/8,8,12,15)	2	Very stiff, very high strength, grey mottled orangish brown and dark brown gravelly CLAY. Friable. Gravel is fine to coarse, angular and tabular of relict texture mudstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]	2.40	144.92		
D	2.70 - 2.80	50 (6,8/50 for 275mm)	3	Extremely weak greyish brown locally mottled orangish brown and dark brown thinly laminated SILTSTONE. [DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]	3.00	144.32		G
				End of Borehole at 3.00m				
			4					
			5					

Remarks and Groundwater Observations:

1. Hard standing was cored out to allow drilling. 2. No visual or olfactory evidence of contamination was encountered. 3. No groundwater was encountered. 4. The borehole was installed with a 63mm gas / groundwater monitoring well as detailed above.

GL (m AOD) 147.32m AOD

Easting: 423352.34

Northing: 410963.91

Fig No. WS05

WINDOW SAMPLING RECORD

BH No. **WS06** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe | Contract No: C7340

Client: Paramount Retail Group Holdco Ltd | Date: 15/10/2020

Method: Windowless Sampler Rig | Scale: 1:25

Logged By: RC | Checked By: GH

Driller: RP Drilling

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
ES	0.05 - 0.20			MADE GROUND: Black bound macadam.	0.05	147.67		
ES	0.20 - 0.40			MADE GROUND: Black and brown slightly sandy GRAVEL. Gravel is fine to coarse, angular to sub-angular of sandstone and concrete.	0.20	147.52		
D	0.50 - 0.60			MADE GROUND: Firm dark grey slightly gravelly CLAY. High plasticity (field description). Gravel is fine to medium, angular to sub-angular of mudstone, coal and rare concrete. [REWORKED RESIDUAL SOIL]	0.40	147.32		
		56.0		Firm, medium strength, grey mottled orangish brown and dark brown slightly gravelly CLAY. High plasticity. Gravel is fine to coarse, sub-angular and tabular of mudstone and rare coal. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]				
		70.0 N=18 (3,3/3,4,5,6)	1		1.10	146.62		
D	1.50 - 1.60			Very stiff, high strength, grey mottled orangish brown and dark brown gravelly CLAY. High plasticity (laboratory description). Gravel is fine to coarse, angular and tabular of relict texture mudstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]				
		N=27 (3,4/5,5,8,9)	2		2.20	145.52		
				Extremely weak greyish brown locally mottled orangish brown and dark brown thinly laminated SILTSTONE. [DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]				
		N=32 (6,6/6,7,9,10)	3					
		50 (7,9/50 for 260mm)	4	End of Borehole at 4.00m	4.00	143.72		
			5					

Remarks and Groundwater Observations:

1. Hard standing was cored out to allow drilling. 2. No visual or olfactory evidence of contamination was encountered. 3. No groundwater was encountered. 4. The borehole was installed with a 63mm gas / groundwater monitoring well as detailed above.

GL (m AOD) 147.72m AOD

Easting: 423349.15

Northing: 410944.34

Fig No. WS06

WINDOW SAMPLING RECORD

BH No. **WS07** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 15/10/2020

Method: Windowless Sampler Rig

Scale: 1:25

Logged By: RC | Checked By: GH

Driller: RP Drilling

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
				MADE GROUND: Black bound macadam.				
				MADE GROUND: Brown sandy GRAVEL. Gravel is fine to coarse, sub-angular of sandstone.	0.12	148.92		
ES	0.40 - 0.60			MADE GROUND: Firm, dark grey and red gravelly CLAY. Gravel is fine to coarse, angular of brick, mudstone and rare ash.	0.40	148.64		
				MADE GROUND: Pale yellow sandy GRAVEL. Gravel is fine to coarse, sub-angular of sandstone and brick.	0.60	148.44		
ES	0.80 - 0.90			Firm, high strength, grey mottled orangish brown and dark brown slightly gravelly CLAY. High plasticity (field description). Gravel is fine to coarse, sub-angular and tabular of mudstone, sandstone and siltstone.	0.80	148.24		
		N=20 (3,2/5,5,4,6)	1	*0.8-0.9m bgl. Gravel of ash is present in half of the recovered core.*				
ES	1.50 - 1.70							
D	1.90 - 2.00	102.0 N=20 (2,4/4,4,5,7)	2	Stiff, high strength, dark grey gravelly CLAY. Low plasticity (field description). Gravel is fine to coarse, angular and tabular of relict texture mudstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]	1.75	147.29		
				Extremely weak greyish brown locally mottled orangish brown and dark brown thinly laminated SILTSTONE. [DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]	2.40	146.64		
D	2.70 - 2.80							
		50 (25 for 115mm/50 for 255mm)	3	Extremely weak dark grey thinly laminated SILTSTONE. [DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]	2.95	146.09		
				End of Borehole at 3.00m	3.00	146.04		
			4					
			5					

Remarks and Groundwater Observations:

1. Hard standing was cored out to allow drilling. 2. No visual or olfactory evidence of contamination was encountered. 3. No groundwater was encountered. 4. The borehole was installed with a 63mm gas / groundwater monitoring well as detailed above.

GL (m AOD) 149.04m AOD

Easting: 423388.27

Northing: 410940.03

Fig No. WS07

WINDOW SAMPLING RECORD

BH No. **WS08** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 16/10/2020

Method: Windowless Sampler Rig

Scale: 1:25

Logged By: RC | Checked By: GH

Driller: RP Drilling

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
				MADE GROUND: Concrete with 5mm reinforcement and DPC at base.				
				MADE GROUND: Very loose brown clayey sandy GRAVEL. Gravel is fine to coarse, sub-angular of sandstone with rare coal.	0.19			
ES	0.70 - 0.90							
		N=3 (2,1/1,0,1,1)	1					
				MADE GROUND: Soft, very low to low strength, light grey mottled brown and light brown gravelly CLAY. High plasticity (field description). Gravel is fine to coarse, sub-angular of mudstone / siltstone. [REWORKED RESIDUAL SOIL?]	1.40			
		34.0						
D	1.90 - 2.00	25.0						
		N=2 (0,1/0,0,1,1)	2					
		22.0						
				MADE GROUND: Wet, brown slightly clayey slightly sandy GRAVEL. Gravel is fine to coarse, angular to sub-angular of sandstone.	2.70			
D	2.80 - 2.90				2.80			
		50 (4,5/50 for 295mm)	3	Very stiff grey mottled brown gravelly CLAY. Friable. Gravel is fine to coarse, angular and tabular of relict texture mudstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]	3.00			
				End of Borehole at 3.00m				
			4					
			5					

Remarks and Groundwater Observations:

1. Hard standing was cored out to allow drilling. 2. No visual or olfactory evidence of contamination was encountered. 3. Perched water / groundwater encountered at 2.7m bgl. 4. The borehole was backfilled with arisings.

GL (m AOD)

Easting:

Northing:

Fig No. WS08

WINDOW SAMPLING RECORD

BH No. **WS09**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340
Client: Paramount Retail Group Holdco Ltd
Date: 16/10/2020
Method: Windowless Sampler Rig
Scale: 1:25
Logged By: RC
Checked By: GH
Driller: RP Drilling

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
				MADE GROUND: Concrete with 5mm reinforcement and DPC at base.	0.19			
ES	0.40 - 0.50			MADE GROUND: Very stiff yellowish brown slightly sandy gravelly CLAY. Gravel is fine to coarse, sub-angular to angular of micaceous sandstone.	0.60			
ES	0.70 - 0.80			MADE GROUND: Stiff, brown gravelly CLAY. High plasticity (field description). Gravel is fine to coarse, sub-angular of sandstone, siltstone and concrete.	0.90			
ES	1.00 - 1.05			MADE GROUND: Red GRAVEL. Gravel is coarse, angular of brick.	1.00			
				MADE GROUND: Red and black sandy GRAVEL. Gravel is fine to coarse, angular of sandstone, brick and clinker.	1.05			
				End of Borehole at 1.05m				

1
2
3
4
5

Remarks and Groundwater Observations:

1. Hard standing was cored out to allow drilling. 2. No visual or olfactory evidence of contamination was encountered. 3. No groundwater was encountered. 4. The borehole was installed with a 63mm gas / groundwater monitoring well as detailed above.

GL (m AOD)
Easting:
Northing:

Fig No.
WS09

WINDOW SAMPLING RECORD

BH No. **WS10** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 15/10/2020

Method: Windowless Sampler Rig

Scale: 1:25

Logged By: RC | Checked By: GH

Driller: RP Drilling

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
				MADE GROUND: Black bound macadam.	0.05	143.63		
				MADE GROUND: Unreinforced concrete.	0.25	143.43		
		62.0		Firm medium strength dark grey mottled light brown CLAY. High plasticity. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]				
ES	0.70 - 0.90							
D	0.80 - 0.90	67.0						
		60.0						
		N=23 (3,3/5,5,6,7)	1	*1.0m bgl. Becoming high strength.*				
				Stiff, high strength, grey mottled light brown gravelly CLAY. Friable. Gravel is fine to coarse, sub-angular and tabular of mudstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]	1.30	142.38		
D	1.50 - 1.60							
		N=21 (4,3/4,4,6,7)	2					
				Extremely weak greyish brown locally mottled orangish brown and dark brown thinly laminated SILTSTONE. [DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]	2.40	141.28		
		N=23 (3,4/4,4,5,10)	3 ▼					
		50 (25 for 95mm/50 for 235mm)		End of Borehole at 3.60m	3.60	140.08		
			4					
			5					

Remarks and Groundwater Observations:

1. Hard standing was cored out to allow drilling. 2. No visual or olfactory evidence of contamination was encountered. 3. Groundwater encountered at 3m bgl. 4. The borehole was backfilled with arisings.

GL (m AOD) 143.68m AOD

Easting: 423400.96

Northing: 410936.80

Fig No. WS10

WINDOW SAMPLING RECORD

BH No. **WS11** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 16/10/2020

Method: Windowless Sampler Rig

Scale: 1:25

Logged By: RC | Checked By: GH

Driller: RP Drilling

SAMPLE DETAILS				STRATA RECORD			
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend / Well
				MADE GROUND: Concrete with 5mm reinforcing bar and DPC at base.			
				MADE GROUND: Firm, medium strength, grey mottled brown and orangish brown gravelly CLAY. Low plasticity (field description). Gravel is fine to coarse, sub-angular and tabular of mudstone, siltstone, rare coal and brick. [REWORKED RESIDUAL SOIL]	0.20		
ES	0.50 - 0.60	52.0					
		46.0					
		N=16 (2,3/3,4,4,5)	1				
D	1.40 - 1.45			*1.40-1.45m bgl. Firm dark grey-black gravelly CLAY. Gravel is fine, sub-angular of coal.*			
D	1.80 - 1.90	106.0		Very stiff, high strength, grey mottled light brown gravelly CLAY. Intermediate plasticity. Gravel is fine to coarse, sub-angular and tabular of mudstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]	1.70		
		50 (4,6/50 for 235mm)	2	End of Borehole at 2.00m	2.00		
			3				
			4				
			5				

Remarks and Groundwater Observations:

1. Hard standing was cored out to allow drilling. 2. No visual or olfactory evidence of contamination was encountered. 3. No groundwater was encountered. 4. The borehole was backfilled with arisings.

GL (m AOD)

Easting:

Northing:

Fig No. WS11

WINDOW SAMPLING RECORD

BH No. **WS12**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340
Client: Paramount Retail Group Holdco Ltd
Date: 16/10/2020
Method: Windowless Sampler Rig
Scale: 1:25
Logged By: RC
Checked By: GH
Driller: RP Drilling

SAMPLE DETAILS				STRATA RECORD			
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend / Well
				MADE GROUND: Concrete with 5mm reinforcement and DPC at base.			
ES	0.30 - 0.40	105.0		MADE GROUND: Stiff, high strength, grey mottled orangish brown slightly gravelly CLAY. Gravel is fine to coarse, sub-angular of mudstone and rare brick. [REWORKED RESIDUAL SOIL]	0.21		
D	0.70 - 0.80	84.0					
			1	Extremely weak greyish brown locally mottled orangish brown and dark brown thinly laminated SILTSTONE. [DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]	0.90		
				End of Borehole at 1.70m	1.70		
			2				
			3				
			4				
			5				

Remarks and Groundwater Observations:

1. Hard standing was cored out to allow drilling. 2. No visual or olfactory evidence of contamination was encountered. 3. No groundwater was encountered. 4. The borehole was installed with a 63mm gas / groundwater monitoring well as detailed above.

GL (m AOD)
Easting:
Northing:

Fig No.
WS12

WINDOW SAMPLING RECORD

BH No. **WS13** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 15/10/2020

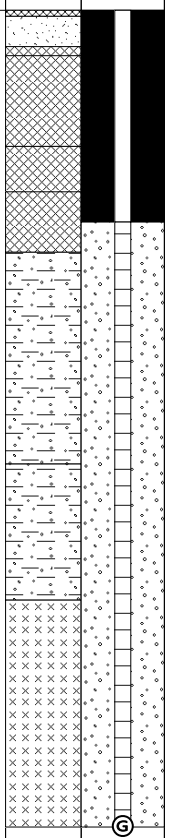
Method: Windowless Sampler Rig

Scale: 1:25

Logged By: RC | Checked By: GH

Driller: RP Drilling

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	SPT (N), {ppm}, Vane Result (kN/m2)	Ground-water	Description	Depth (m)	Level (m AOD)	Legend	Well
				MADE GROUND: Black bound macadam.	0.02	142.48		
				MADE GROUND: Unreinforced concrete.	0.12	142.38		
ES	0.20 - 0.40			MADE GROUND: Grey GRAVEL. Gravel is fine to coarse, angular of sandstone.	0.15	142.35		
				MADE GROUND: Stiff dark grey gravelly CLAY. High plasticity (field description). Gravel is fine to coarse, sub-angular of mudstone, brick and rare coal, with fragments of glass.	0.45	142.05		
ES	0.60 - 0.80			MADE GROUND: Stiff grey mottled brown gravelly CLAY. High plasticity (field description). Gravel is fine to coarse, angular and tabular of mudstone.	0.60	141.90		
D	0.90 - 1.00			MADE GROUND: Stiff dark greyish black gravelly CLAY. Low plasticity (field description). Gravel is fine to medium sub-angular of brick, sandstone, coal and mudstone.	0.80	141.70		
		N=12 (2,2/2,3,3,4)	1	Very stiff, medium strength, grey mottled dark brown gravelly CLAY. Intermediate plasticity. Gravel is fine to coarse, angular and tabular of mudstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]	1.50	141.00		
				Very stiff pale grey mottled light brown gravelly CLAY. Friable. Gravel is fine to coarse, sub-angular and tabular of mudstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]	1.95	140.55		
		N=32 (4,6/9,7,7,9)	2	Extremely weak greyish brown locally mottled orangish brown and dark brown thinly laminated SILTSTONE. [DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]				
D	2.50 - 2.70							
		50 (25,/50 for 255mm)		End of Borehole at 2.70m	2.70	139.80		
			3					
			4					
			5					



Remarks and Groundwater Observations:

1. Hard standing was cored out to allow drilling. 2. No visual or olfactory evidence of contamination was encountered. 3. No groundwater was encountered. 4. The borehole was installed with a 63mm gas / groundwater monitoring well as detailed above.

GL (m AOD) 142.50m AOD

Easting: 423423.02

Northing: 410950.28

Fig No. WS13

TRIAL PIT RECORD

TP No. **TP01** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 04/11/2020

Method: Hidromek 102B with 450mm toothed bucket and breaker

Scale: 1:25

Logged By: RC Checked By: GH

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	0.00 - 0.10			MADE GROUND: Black bound macadam.				
				MADE GROUND: Yellowish brown sandy GRAVEL. Gravel is fine to coarse, sub-angular of sandstone.	0.10	152.78		
				MADE GROUND: Grey sandy GRAVEL. Gravel is fine to coarse, sub-angular of sandstone.	0.40	152.48		
ES	0.60			MADE GROUND: Reddish brown GRAVEL with <5cm layer of firm dark grey gravelly CLAY. Gravel is fine to coarse, angular and tabular of burnt mudstone / siltstone.	0.50	152.38		
B	0.80 - 0.90			Yellow-brown clayey sandy GRAVEL. Gravel is fine to coarse, angular and tabular of relict texture siltstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]	0.70	152.18		
D	1.20		1					
			2	Very weak grey SILTSTONE recovered as slightly clayey GRAVEL. Gravel is fine to coarse, angular and tabular of siltstone. [DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]	2.00	150.88		
				End of trial pit at 2.90m	2.90	149.98		
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Hard standing was broken out using a hydraulic breaker. 2. No visual or olfactory evidence of hydrocarbon contamination was encountered. 3. No groundwater was encountered. 4. The trial pit was backfilled with arisings.

GL (m AOD) 152.88

Easting: 423304.44

Northing: 410955.83

Fig No. TP01

TRIAL PIT RECORD

TP No. **TP02** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 04/11/2020

Method: Hidromek 102B with 450mm toothed bucket and breaker

Scale: 1:25

Logged By: RC Checked By: GH

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	0.00 - 0.10			MADE GROUND: Plants over brown CLAY with common rootlets. [REWORKED TOPSOIL]				
				MADE GROUND: Firm greyish brown gravelly CLAY with rootlets. High plasticity (field description). Gravel is fine to coarse, sub-angular of siltstone.	0.20	149.81		
			1	MADE GROUND: Firm dark brown slightly gravelly CLAY with low cobble content and common rootlets. Gravel is fine to coarse, sub-angular of siltstone. Cobbles are sub-angular of siltstone. [BURIED TOPSOIL]	1.00 1.30	149.01 148.71		
ES	1.50			MADE GROUND: Greyish brown clayey gravelly SAND with moderate cobble and low boulder content, and common rootlets. Gravel is fine to coarse, sub-angular of brick and siltstone. Cobbles and boulders are sub-angular to angular of siltstone.				
			2	Firm, medium strength, orangish brown gravelly CLAY with occasional rootlets. High plasticity (field description). Gravel is fine to coarse, sub-rounded and sub-angular of sandstone and siltstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]	2.00	148.01		
D	2.20	51.0 53.0 59.0						
				End of trial pit at 2.70m	2.70	147.31		
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Hard standing was broken out using a hydraulic breaker. 2. No visual or olfactory evidence of hydrocarbon contamination was encountered. 3. No groundwater was encountered. 4. The trial pit was backfilled with arisings.

GL (m AOD) 150.01

Easting: 423327.88

Northing: 410887.14

Fig No. TP02

TRIAL PIT RECORD

TP No. **TP03** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 04/11/2020

Method: Hidromek 102B with 450mm toothed bucket and breaker

Scale: 1:25

Logged By: RC Checked By: GH

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	0.00 - 0.10			MADE GROUND: Black bound macadam.				
				MADE GROUND: Grey slightly clayey slightly sandy GRAVEL. Gravel is fine to coarse, angular of limestone.	0.25	147.54		
				MADE GROUND: Stiff grey slightly gravelly CLAY. Low plasticity (field description). Gravel is fine to coarse, sub-angular of siltstone and brick, with rare shell fragments.	0.50	147.29		
B	1.00 - 1.20		1	Firm becoming stiff grey mottled dark brown and orangish brown gravelly CLAY. Intermediate plasticity. Gravel is fine to coarse, sub-angular to angular of siltstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]	1.00	146.79		
D	1.20							
			2	Stiff grey mottled brown gravelly CLAY. High plasticity (field description). Gravel is fine to coarse, sub-angular to angular of siltstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]	1.90	145.89		
D	2.30 - 2.40			Weak grey SILTSTONE recovered as clayey GRAVEL. Gravel is fine to coarse, angular and tabular of relict texture siltstone. [DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]	2.30	145.49		
				End of trial pit at 2.40m	2.40	145.39		
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Hard standing was broken out using a hydraulic breaker. 2. No visual or olfactory evidence of hydrocarbon contamination was encountered. 3. No groundwater was encountered. 4. The trial pit was backfilled with arisings.

GL (m AOD) 147.79

Easting: 423344.20

Northing: 410891.10

Fig No. TP03

TRIAL PIT RECORD

TP No. **TP04** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 04/11/2020

Method: Hidromek 102B with 450mm toothed bucket and breaker

Scale: 1:25

Logged By: RC Checked By: GH

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Black bound macadam.	0.11	148.19		
				MADE GROUND: Brown sandy GRAVEL. Gravel is fine to coarse, sub-angular of sandstone.	0.50	147.80		
ES	0.50 - 0.60			MADE GROUND: Grey sandy GRAVEL with moderate cobble and low boulder content. Faint hydrocarbon odour. Gravel is fine to coarse, sub-angular to angular of brick, concrete and sandstone. Cobbles and boulders are sub-angular to angular of siltstone.	0.90	147.40		
			1	Stiff, high strength, grey mottled dark brown and orangish brown gravelly CLAY. High plasticity (field description). Gravel is fine to coarse, sub-angular to angular of siltstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]				
D	1.30 - 1.50	105.0						
ES	1.30 - 1.50	126.0						
		114.0						
			2	Weak grey SILTSTONE recovered as clayey GRAVEL. Gravel is fine to coarse, angular and tabular of relict texture siltstone. [DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]	1.80	146.50		
				End of trial pit at 2.60m	2.60	145.70		
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Hard standing was broken out using a hydraulic breaker. 2. A hydrocarbon odour was noted from 0.5 to 0.9m bgl. 3. No groundwater was encountered. 4. The trial pit was backfilled with arisings.

GL (m AOD) 148.30

Easting: 423339.62

Northing: 410978.95

Fig No. TP04

TRIAL PIT RECORD

TP No. **TP05** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 04/11/2020

Method: Hidromek 102B with 450mm toothed bucket and breaker

Scale: 1:25

Logged By: RC Checked By: GH

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	0.10 - 0.40			MADE GROUND: Black bound macadam.				
				MADE GROUND: Yellowish brown sandy GRAVEL. Gravel is fine to coarse, sub-angular of sandstone.	0.10	146.76		
ES	0.40 - 0.50			MADE GROUND: Stiff dark grey, sandy gravelly CLAY. Gravel is fine to medium, sub-angular of brick and siltstone.	0.40	146.46		
					0.50	146.36		
		76.0		Stiff, high strength, grey mottled dark brown and orangish brown gravelly CLAY. High plasticity. Gravel is fine to coarse, sub-angular to angular of siltstone.				
D	0.80	95.0		[RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]				
		92.0	1					
				Weak grey SILTSTONE recovered as clayey GRAVEL. Gravel is fine to coarse, angular and tabular of relict texture siltstone.	1.90	144.96		
			2	[DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]				
				End of trial pit at 2.20m	2.20	144.66		
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Hard standing was broken out using a hydraulic breaker. 2. No visual or olfactory evidence of hydrocarbon contamination was encountered. 3. No groundwater was encountered. 4. The trial pit was backfilled with arisings.

GL (m AOD) 146.86

Easting: 423358.36

Northing: 410953.70

Fig No. TP05

TRIAL PIT RECORD

TP No. **TP06** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 04/11/2020

Method: Hidromek 102B with 450mm toothed bucket and breaker

Scale: 1:25

Logged By: RC Checked By: GH

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
ES	0.10 - 0.20			MADE GROUND: Black bound macadam.	0.07	147.32		
				MADE GROUND: Grey clayey sandy GRAVEL. Gravel is fine to coarse, sub-rounded to sub-angular of brick, asphalt, concrete, sandstone and rare clinker.	0.30	147.09		
				MADE GROUND: Stiff dark grey, sandy gravelly CLAY. Gravel is fine to medium, sub-angular of brick and siltstone.	0.40	146.99		
B	0.70 - 0.90	58.0		Firm, medium strength, grey mottled dark brown and orangish brown gravelly CLAY. High plasticity (field description). Gravel is fine to coarse, sub-angular to angular of siltstone.				
		56.0		[RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]				
			1	Stiff, high strength, grey mottled brown gravelly CLAY. High plasticity (field description). Gravel is fine to coarse, sub-angular to angular of siltstone.	1.00	146.39		
		147.0		[RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]				
		140.0						
D	1.50							
			2					
				Grey clayey GRAVEL. Gravel is fine to coarse, angular and tabular of relict texture siltstone.	2.30	145.09		
				[DESTRUCTURED PENNINE LOWER COAL MEASURES FORMATION]	2.50	144.89		
				End of trial pit at 2.50m				
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Hard standing was broken out using a hydraulic breaker. 2. No visual or olfactory evidence of hydrocarbon contamination was encountered. 3. No groundwater was encountered. 4. The trial pit was backfilled with arisings.

GL (m AOD) 147.39

Easting: 423353.30

Northing: 410936.03

Fig No. TP06

TRIAL PIT RECORD

TP No. **TP07** Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe

Contract No: C7340

Client: Paramount Retail Group Holdco Ltd

Date: 04/11/2020

Method: Hidromek 102B with 450mm toothed bucket and breaker

Scale: 1:25

Logged By: RC Checked By: GH

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Black bound macadam.	0.06	146.87		
ES	0.30 - 0.50			MADE GROUND: Brown sandy GRAVEL. Gravel is fine to coarse, sub-angular of sandstone. *0.1-0.6m bgl. Boulders of concrete up to 0.8x0.8x0.3m.*	0.30	146.63		
				MADE GROUND: Stiff dark grey, sandy gravelly CLAY. Gravel is fine to medium, sub-angular of brick and siltstone, and fragments of wire.	0.60	146.33		
		41.0 53.0 60.0	1	Firm, medium strength, orangish brown gravelly CLAY with occasional rootlets. High plasticity (field description). Gravel is fine to coarse, sub-rounded and sub-angular of sandstone and siltstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]				
				Stiff grey mottled brown gravelly CLAY. High plasticity (field description). Gravel is fine to coarse, sub-angular to angular of siltstone. [RESIDUAL PENNINE LOWER COAL MEASURES FORMATION]	1.40	145.53		
				End of trial pit at 1.50m	1.50	145.43		
			2					
			3					
			4					
			5					

Remarks and Groundwater Observations

1. Hard standing was broken out using a hydraulic breaker. 2. No visual or olfactory evidence of hydrocarbon contamination was encountered. 3. No groundwater was encountered. 4. The trial pit was backfilled with arisings.

GL (m AOD) 146.93

Easting: 423398.65

Northing: 410944.62

Fig No. TP07

BOREHOLE RECORD

BH No. **RO01**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340

Client: Paramount Retail Group Holdco Ltd
Date(s): 28/10/2020

Method: Rotary Top Hammer Drill Rig
Scale: 1:150

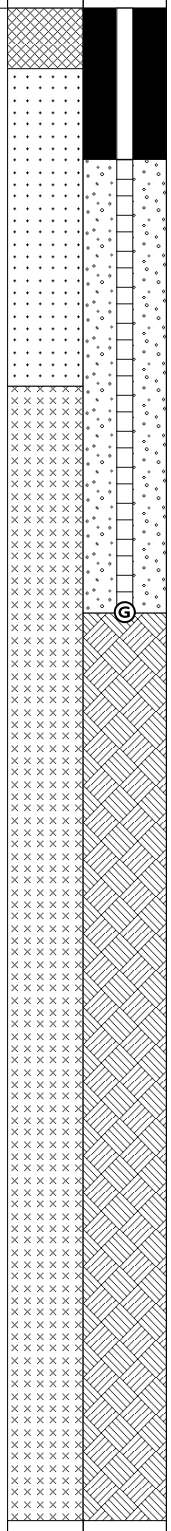
Logged By: SDS
Checked By: GH

Driller: SDS

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)
						MADE GROUND: Brown CLAY.		
						Brown SANDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	1.20	154.40
						Grey SILTSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	7.50	148.10
						End of Borehole at 30.00m	30.00	125.60

Legend | Well



Remarks and Groundwater Observations:

1. The borehole was drilled using water flush. 2. No visual or olfactory evidence of hydrocarbon contamination was encountered. 3. Due to the drilling method, no groundwater strikes were recorded. 4. The hole was installed with 63mm standpipe as detailed above.

GL (m AOD) 155.60
Eastings: 423281.28
Northings: 410941.26

Fig No. RO01

BOREHOLE RECORD

BH No. **RO02**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340
Client: Paramount Retail Group Holdco Ltd
Date(s): 29/10/2020
Method: Rotary Top Hammer Drill Rig
Scale: 1:150
Logged By: SDS
Checked By: GH
Driller: SDS

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						MADE GROUND: Black bound macadam / concrete.	0.20	142.87		
					1	MADE GROUND: Brown CLAY.	1.00	142.07		
					2	Brown MUDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]				
					3					
					4	Broken Ground (worked COAL). [PENNINE LOWER COAL MEASURES FORMATION]	3.80	139.27		
					5					
					6	Brown SANDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	6.00	137.07		
					7					
					8					
					9					
					10					
					11					
					12					
					13					
					14					
					15					
					16					
					17	SILTSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	16.50	126.57		
					18					
					19					
					20					
					21					
					22					
					23					
					24					
					25					
					26					
					27					
					28					
					29					
					30	End of Borehole at 30.00m	30.00	113.07		
	TCR	SCR	RQD	FI						

Remarks and Groundwater Observations:

1. The borehole was drilled using water flush. 2. No visual or olfactory evidence of hydrocarbon contamination was encountered. 3. Due to the drilling method, no groundwater strikes were recorded. 4. The hole was installed with 63mm standpipe as detailed above.

GL (m AOD) 143.07
Eastings: 423411.82
Northings: 410937.02

Fig No. RO02

BOREHOLE RECORD

BH No. **RO03**
Sheet 1 of 1

Site: Greenside Mills, Skelmanthorpe
Contract No: C7340
Client: Paramount Retail Group Holdco Ltd
Date(s): 28/10/2020
Method: Rotary Top Hammer Drill Rig
Scale: 1:150
Logged By: SDS
Checked By: GH
Driller: SDS

SAMPLE DETAILS | STRATA RECORD

Depth From - To(m)	TCR	SCR	RQD	FI	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Well
						MADE GROUND: Black bound macadam.	0.20	144.93		
					1	MADE GROUND: Brown CLAY.	1.20	143.93		
					2	Weathered SANDSTONE / MUDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	2.40	142.73		
					3	COAL (intact). [PENNINE LOWER COAL MEASURES FORMATION]	3.40	141.73		
					4	MUDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	4.20	140.93		
					5	COAL (intact) [PENNINE LOWER COAL MEASURES FORMATION]	5.50	139.63		
					6	SANDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]	6.00	139.13		
					7	SILTSTONE. [PENNINE LOWER COAL MEASURES FORMATION]				
					8					
					9		9.50	135.63		
					10	SANDSTONE. [PENNINE LOWER COAL MEASURES FORMATION]				G
					11					
					12					
					13					
					14					
					15					
					16		16.00	129.13		
					17	CLAY band. [PENNINE LOWER COAL MEASURES FORMATION]	16.30	128.83		
					18	MUDSTONE / SILTSTONE. [PENNINE LOWER COAL MEASURES FORMATION]				
					19					
					20					
					21					
					22					
					23					
					24					
					25					
					26					
					27					
					28					
					29					
					30	End of Borehole at 30.00m	30.00	115.13		
	TCR	SCR	RQD	FI						

Remarks and Groundwater Observations:

1. The borehole was drilled using air mist. 2. No visual or olfactory evidence of hydrocarbon contamination was encountered. 3. Groundwater was encountered at 16m bgl. 4. The hole was installed with 63mm standpipe as detailed above.

GL (m AOD) 145.13
Eastings: 423384.51
Northings: 410999.08

Fig No. RO03

APPENDIX F

LABORATORY TEST RESULTS

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL

Final Report

Report No.:	20-28376-1
Initial Date of Issue:	26-Oct-2020
Client	Sirius Geotechnical Ltd
Client Address:	4245 Park Approach Thorpe Park Leeds West Yorkshire LS15 8GB
Contact(s):	Gemma Halliday Richard Caine
Project	C7340 Greenside Mill, Skelmanthrope

Quotation No.:		**Date Received:**	21-Oct-2020
Order No.:	20515/C7340/RC	**Date Instructed:**	21-Oct-2020
No. of Samples:	10		
Turnaround (Wkdays):	5	**Results Due:**	27-Oct-2020
Date Approved:	26-Oct-2020		

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd					**Chemtest Job No.:**	20-28376	20-28376	20-28376	20-28376	20-28376	20-28376	20-28376	20-28376
Quotation No.:					**Chemtest Sample ID.:**	1083856	1083857	1083858	1083859	1083860	1083861	1083862	1083863	1083864
					Client Sample ID.:	WS13	WS11	WS10	WS09	WS08	WS07	WS03	WS03	WS02
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.2	0.5	0.7	1.0	0.7	0.4	0.3	1.6	0.5
					Bottom Depth (m):	0.4	0.6	0.9	1.05	0.9	0.6	0.4	1.8	0.6
					Date Sampled:	15-Oct-2020	16-Oct-2020	15-Oct-2020	16-Oct-2020	16-Oct-2020	15-Oct-2020	16-Oct-2020	16-Oct-2020	16-Oct-2020
					Asbestos Lab:	COVENTRY	COVENTRY		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
ACM Type	U	2192		N/A		-	-		-	-	-	-	-	-
Asbestos Identification	U	2192		N/A		No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A		-	-		-	-	-	-	-	-
Moisture	N	2030	%	0.020		16	16	19	12	6.2	14	11	17	14
Soil Colour	N	2040		N/A		Brown	Brown	Brown	Brown	Brown	Brown	Beige	Brown	Brown
Other Material	N	2040		N/A		Roots	Stones	None	Stones	Stones	Stones	None	Stones	Stones
Soil Texture	N	2040		N/A		Sand	Clay	Clay	Sand	Sand	Sand	Chalk	Clay	Clay
pH	M	2010		4.0		8.9	7.7	8.0	9.9	8.3	9.0	9.3	8.3	8.6
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010		0.018	0.14	< 0.010	0.22	0.040	< 0.010	< 0.010	0.11	< 0.010
Total Sulphur	M	2175	%	0.010				0.043						
Sulphate (Total)	M	2430	%	0.010		0.081	0.088		0.41	0.012	0.16	0.081	0.19	0.024
Sulphate (Acid Soluble)	M	2430	%	0.010				0.026						
Arsenic	M	2450	mg/kg	1.0		18	18		13	< 1.0	75	17	40	6.3
Cadmium	M	2450	mg/kg	0.10		0.16	0.25		3.2	0.33	0.34	0.12	< 0.10	< 0.10
Chromium	M	2450	mg/kg	1.0		40	23		16	16	92	12	22	14
Copper	M	2450	mg/kg	0.50		55	29		31	6.6	72	13	37	11
Mercury	M	2450	mg/kg	0.10		0.18	0.14		< 0.10	< 0.10	0.31	< 0.10	0.47	< 0.10
Nickel	M	2450	mg/kg	0.50		34	17		22	18	34	9.8	27	10
Lead	M	2450	mg/kg	0.50		190	130		290	11	150	10	110	32
Selenium	M	2450	mg/kg	0.20		0.38	0.40		< 0.20	< 0.20	1.4	< 0.20	0.39	0.38
Zinc	M	2450	mg/kg	0.50		160	94		580	37	110	35	54	47
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Organic Carbon	M	2625	%	0.20		4.2	3.7		4.4	< 0.20	6.3	1.9	7.6	1.2
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0			
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0			
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0		42			12	< 1.0	30			
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0		20			5.8	< 1.0	14			
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0		17			4.2	< 1.0	9.0			
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0		14			2.9	< 1.0	4.9			
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0		78			23	< 1.0	33			
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0		29			2.5	< 1.0	7.1			
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0		200			50	< 5.0	98			
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0			
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0		< 1.0			< 1.0	< 1.0	< 1.0			
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0		170			40	< 1.0	100			
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0		64			14	< 1.0	35			
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0		87			9.9	< 1.0	33			

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd					**Chemtest Job No.:**	20-28376	20-28376	20-28376	20-28376	20-28376	20-28376	20-28376	20-28376
Quotation No.:					**Chemtest Sample ID.:**	1083856	1083857	1083858	1083859	1083860	1083861	1083862	1083863	1083864
					Client Sample ID.:	WS13	WS11	WS10	WS09	WS08	WS07	WS03	WS03	WS02
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.2	0.5	0.7	1.0	0.7	0.4	0.3	1.6	0.5
					Bottom Depth (m):	0.4	0.6	0.9	1.05	0.9	0.6	0.4	1.8	0.6
					Date Sampled:	15-Oct-2020	16-Oct-2020	15-Oct-2020	16-Oct-2020	16-Oct-2020	15-Oct-2020	16-Oct-2020	16-Oct-2020	16-Oct-2020
					Asbestos Lab:	COVENTRY	COVENTRY		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	440			7.8	< 1.0	120			
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	3000			77	< 1.0	410			
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	120			6.7	< 1.0	28			
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	3900			160	< 5.0	730			
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	4100			210	< 10	830			
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.31
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.62
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.15
Phenanthrene	M	2700	mg/kg	0.10	0.84	0.62		< 0.10	< 0.10	5.7	< 0.10	< 0.10	0.86
Anthracene	M	2700	mg/kg	0.10	0.18	0.14		< 0.10	< 0.10	1.0	< 0.10	< 0.10	0.31
Fluoranthene	M	2700	mg/kg	0.10	1.4	1.3		< 0.10	< 0.10	17	1.8	0.99	2.4
Pyrene	M	2700	mg/kg	0.10	1.6	1.3		< 0.10	< 0.10	16	1.7	1.1	2.8
Benzo[a]anthracene	M	2700	mg/kg	0.10	0.78	0.61		< 0.10	< 0.10	9.6	0.80	< 0.10	1.9
Chrysene	M	2700	mg/kg	0.10	0.83	0.64		< 0.10	< 0.10	10	0.69	< 0.10	1.3
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	0.95		< 0.10	< 0.10	14	1.0	< 0.10	1.8
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	0.65		< 0.10	< 0.10	5.5	0.44	< 0.10	0.70
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	0.81		< 0.10	< 0.10	10	0.78	< 0.10	1.7
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	0.36		< 0.10	< 0.10	6.4	0.41	< 0.10	1.0
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	0.35		< 0.10	< 0.10	2.3	0.37	< 0.10	0.79
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	0.66		< 0.10	< 0.10	6.3	0.73	< 0.10	1.0
Total Of 16 PAH's	M	2700	mg/kg	2.0	5.6	8.4		< 2.0	< 2.0	100	8.7	2.1	18
Dichlorodifluoromethane	U	2760	µg/kg	1.0				< 1.0	< 1.0				
Chloromethane	M	2760	µg/kg	1.0				< 1.0	< 1.0				
Vinyl Chloride	M	2760	µg/kg	1.0				< 1.0	< 1.0				
Bromomethane	M	2760	µg/kg	20				< 20	< 20				
Chloroethane	U	2760	µg/kg	2.0				< 2.0	< 2.0				
Trichlorofluoromethane	M	2760	µg/kg	1.0				< 1.0	< 1.0				
1,1-Dichloroethene	M	2760	mg/kg	1.0				< 1.0	< 1.0				
Trans 1,2-Dichloroethene	M	2760	mg/kg	1.0				< 1.0	< 1.0				
1,1-Dichloroethane	M	2760	µg/kg	1.0				< 1.0	< 1.0				
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0				< 1.0	< 1.0				
Bromochloromethane	U	2760	µg/kg	5.0				< 5.0	< 5.0				
Trichloromethane	M	2760	µg/kg	1.0				< 1.0	< 1.0				
1,1,1-Trichloroethane	M	2760	µg/kg	1.0				< 1.0	< 1.0				
Tetrachloromethane	M	2760	µg/kg	1.0				< 1.0	< 1.0				
1,1-Dichloropropene	U	2760	µg/kg	1.0				< 1.0	< 1.0				
Benzene	M	2760	µg/kg	1.0	< 1.0			< 1.0	< 1.0	< 1.0			

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd		Chemtest Job No.:			20-28376	20-28376	20-28376	20-28376	20-28376	20-28376	20-28376	20-28376	20-28376
Quotation No.:		Chemtest Sample ID.:			1083856	1083857	1083858	1083859	1083860	1083861	1083862	1083863	1083864
		Client Sample ID.:			WS13	WS11	WS10	WS09	WS08	WS07	WS03	WS03	WS02
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.2	0.5	0.7	1.0	0.7	0.4	0.3	1.6	0.5
		Bottom Depth (m):			0.4	0.6	0.9	1.05	0.9	0.6	0.4	1.8	0.6
		Date Sampled:			15-Oct-2020	16-Oct-2020	15-Oct-2020	16-Oct-2020	16-Oct-2020	15-Oct-2020	16-Oct-2020	16-Oct-2020	16-Oct-2020
		Asbestos Lab:			COVENTRY	COVENTRY		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
1,2-Dichloroethane	M	2760	µg/kg	2.0				< 2.0	< 2.0				
Trichloroethene	N	2760	µg/kg	1.0				< 1.0	< 1.0				
1,2-Dichloropropane	M	2760	µg/kg	1.0				< 1.0	< 1.0				
Dibromomethane	M	2760	µg/kg	1.0				< 1.0	< 1.0				
Bromodichloromethane	M	2760	µg/kg	5.0				< 5.0	< 5.0				
cis-1,3-Dichloropropene	N	2760	µg/kg	10				< 10	< 10				
Toluene	M	2760	µg/kg	1.0	< 1.0			< 1.0	< 1.0	< 1.0			
Trans-1,3-Dichloropropene	N	2760	µg/kg	10				< 10	< 10				
1,1,2-Trichloroethane	M	2760	µg/kg	10				< 10	< 10				
Tetrachloroethene	M	2760	µg/kg	1.0				< 1.0	< 1.0				
1,3-Dichloropropane	U	2760	µg/kg	2.0				< 2.0	< 2.0				
Dibromochloromethane	U	2760	µg/kg	10				< 10	< 10				
1,2-Dibromoethane	M	2760	µg/kg	5.0				< 5.0	< 5.0				
Chlorobenzene	M	2760	µg/kg	1.0				< 1.0	< 1.0				
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0				< 2.0	< 2.0				
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0			< 1.0	< 1.0	< 1.0			
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0			< 1.0	< 1.0	< 1.0			
o-Xylene	M	2760	µg/kg	1.0	< 1.0			< 1.0	< 1.0	< 1.0			
Styrene	M	2760	µg/kg	1.0				< 1.0	< 1.0				
Tribromomethane	U	2760	µg/kg	1.0				< 1.0	< 1.0				
Isopropylbenzene	M	2760	µg/kg	1.0				< 1.0	< 1.0				
Bromobenzene	M	2760	µg/kg	1.0				< 1.0	< 1.0				
1,2,3-Trichloropropane	N	2760	µg/kg	50				< 50	< 50				
N-Propylbenzene	U	2760	µg/kg	1.0				< 1.0	< 1.0				
2-Chlorotoluene	M	2760	µg/kg	1.0				< 1.0	< 1.0				
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0				< 1.0	< 1.0				
4-Chlorotoluene	U	2760	µg/kg	1.0				< 1.0	< 1.0				
Tert-Butylbenzene	U	2760	µg/kg	1.0				< 1.0	< 1.0				
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0				< 1.0	< 1.0				
Sec-Butylbenzene	U	2760	µg/kg	1.0				< 1.0	< 1.0				
1,3-Dichlorobenzene	M	2760	µg/kg	1.0				< 1.0	< 1.0				
4-Isopropyltoluene	U	2760	µg/kg	1.0				< 1.0	< 1.0				
1,4-Dichlorobenzene	M	2760	µg/kg	1.0				< 1.0	< 1.0				
N-Butylbenzene	U	2760	µg/kg	1.0				< 1.0	< 1.0				
1,2-Dichlorobenzene	M	2760	µg/kg	1.0				< 1.0	< 1.0				
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50				< 50	< 50				
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0				< 1.0	< 1.0				
Hexachlorobutadiene	U	2760	µg/kg	1.0				< 1.0	< 1.0				

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		20-28376	20-28376	20-28376	20-28376	20-28376	20-28376	20-28376	20-28376	20-28376
Quotation No.:			**Chemtest Sample ID.:**		1083856	1083857	1083858	1083859	1083860	1083861	1083862	1083863	1083864
			Client Sample ID.:		WS13	WS11	WS10	WS09	WS08	WS07	WS03	WS03	WS02
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.2	0.5	0.7	1.0	0.7	0.4	0.3	1.6	0.5
			Bottom Depth (m):		0.4	0.6	0.9	1.05	0.9	0.6	0.4	1.8	0.6
			Date Sampled:		15-Oct-2020	16-Oct-2020	15-Oct-2020	16-Oct-2020	16-Oct-2020	15-Oct-2020	16-Oct-2020	16-Oct-2020	16-Oct-2020
			Asbestos Lab:		COVENTRY	COVENTRY		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0				< 2.0	< 2.0				
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0			< 1.0	< 1.0	< 1.0			
PCB 81	N	2815	mg/kg	0.010			< 0.010						
PCB 77	U	2815	mg/kg	0.010			< 0.010						
PCB 105	N	2815	mg/kg	0.010			< 0.010						
PCB 114	N	2815	mg/kg	0.010			< 0.010						
PCB 118	N	2815	mg/kg	0.010			< 0.010						
PCB 123	N	2815	mg/kg	0.010			< 0.010						
PCB 126	N	2815	mg/kg	0.010			< 0.010						
PCB 156	N	2815	mg/kg	0.010			< 0.010						
PCB 157	N	2815	mg/kg	0.010			< 0.010						
PCB 167	N	2815	mg/kg	0.010			< 0.010						
PCB 169	N	2815	mg/kg	0.010			< 0.010						
PCB 189	N	2815	mg/kg	0.010			< 0.010						
Total PCBs (12 Congeners)	N	2815	mg/kg	0.12			< 0.12						
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Cairney Screen	N			N/A									D

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		20-28376
Quotation No.:			**Chemtest Sample ID.:**		1083865
			Client Sample ID.:		WS01
			Sample Type:		SOIL
			Top Depth (m):		0.35
			Bottom Depth (m):		0.5
			Date Sampled:		15-Oct-2020
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-
Moisture	N	2030	%	0.020	15
Soil Colour	N	2040		N/A	Brown
Other Material	N	2040		N/A	Stones
Soil Texture	N	2040		N/A	Sand
pH	M	2010		4.0	10.0
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.44
Total Sulphur	M	2175	%	0.010	
Sulphate (Total)	M	2430	%	0.010	0.25
Sulphate (Acid Soluble)	M	2430	%	0.010	
Arsenic	M	2450	mg/kg	1.0	33
Cadmium	M	2450	mg/kg	0.10	0.14
Chromium	M	2450	mg/kg	1.0	16
Copper	M	2450	mg/kg	0.50	54
Mercury	M	2450	mg/kg	0.10	< 0.10
Nickel	M	2450	mg/kg	0.50	26
Lead	M	2450	mg/kg	0.50	14
Selenium	M	2450	mg/kg	0.20	< 0.20
Zinc	M	2450	mg/kg	0.50	21
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Total Organic Carbon	M	2625	%	0.20	1.1
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		20-28376
Quotation No.:			**Chemtest Sample ID.:**		1083865
			Client Sample ID.:		WS01
			Sample Type:		SOIL
			Top Depth (m):		0.35
			Bottom Depth (m):		0.5
			Date Sampled:		15-Oct-2020
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	
Naphthalene	M	2700	mg/kg	0.10	0.25
Acenaphthylene	M	2700	mg/kg	0.10	0.31
Acenaphthene	M	2700	mg/kg	0.10	0.12
Fluorene	M	2700	mg/kg	0.10	0.74
Phenanthrene	M	2700	mg/kg	0.10	6.3
Anthracene	M	2700	mg/kg	0.10	2.2
Fluoranthene	M	2700	mg/kg	0.10	12
Pyrene	M	2700	mg/kg	0.10	12
Benzo[a]anthracene	M	2700	mg/kg	0.10	5.2
Chrysene	M	2700	mg/kg	0.10	4.2
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	5.9
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	2.5
Benzo[a]pyrene	M	2700	mg/kg	0.10	4.9
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	2.7
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	1.4
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	3.0
Total Of 16 PAH's	M	2700	mg/kg	2.0	64
Dichlorodifluoromethane	U	2760	µg/kg	1.0	
Chloromethane	M	2760	µg/kg	1.0	
Vinyl Chloride	M	2760	µg/kg	1.0	
Bromomethane	M	2760	µg/kg	20	
Chloroethane	U	2760	µg/kg	2.0	
Trichlorofluoromethane	M	2760	µg/kg	1.0	
1,1-Dichloroethene	M	2760	mg/kg	1.0	
Trans 1,2-Dichloroethene	M	2760	mg/kg	1.0	
1,1-Dichloroethane	M	2760	µg/kg	1.0	
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0	
Bromochloromethane	U	2760	µg/kg	5.0	
Trichloromethane	M	2760	µg/kg	1.0	
1,1,1-Trichloroethane	M	2760	µg/kg	1.0	
Tetrachloromethane	M	2760	µg/kg	1.0	
1,1-Dichloropropene	U	2760	µg/kg	1.0	
Benzene	M	2760	µg/kg	1.0	

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		20-28376
Quotation No.:			**Chemtest Sample ID.:**		1083865
			Client Sample ID.:		WS01
			Sample Type:		SOIL
			Top Depth (m):		0.35
			Bottom Depth (m):		0.5
			Date Sampled:		15-Oct-2020
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
1,2-Dichloroethane	M	2760	µg/kg	2.0	
Trichloroethene	N	2760	µg/kg	1.0	
1,2-Dichloropropane	M	2760	µg/kg	1.0	
Dibromomethane	M	2760	µg/kg	1.0	
Bromodichloromethane	M	2760	µg/kg	5.0	
cis-1,3-Dichloropropene	N	2760	µg/kg	10	
Toluene	M	2760	µg/kg	1.0	
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	
1,1,2-Trichloroethane	M	2760	µg/kg	10	
Tetrachloroethene	M	2760	µg/kg	1.0	
1,3-Dichloropropane	U	2760	µg/kg	2.0	
Dibromochloromethane	U	2760	µg/kg	10	
1,2-Dibromoethane	M	2760	µg/kg	5.0	
Chlorobenzene	M	2760	µg/kg	1.0	
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0	
Ethylbenzene	M	2760	µg/kg	1.0	
m & p-Xylene	M	2760	µg/kg	1.0	
o-Xylene	M	2760	µg/kg	1.0	
Styrene	M	2760	µg/kg	1.0	
Tribromomethane	U	2760	µg/kg	1.0	
Isopropylbenzene	M	2760	µg/kg	1.0	
Bromobenzene	M	2760	µg/kg	1.0	
1,2,3-Trichloropropane	N	2760	µg/kg	50	
N-Propylbenzene	U	2760	µg/kg	1.0	
2-Chlorotoluene	M	2760	µg/kg	1.0	
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0	
4-Chlorotoluene	U	2760	µg/kg	1.0	
Tert-Butylbenzene	U	2760	µg/kg	1.0	
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0	
Sec-Butylbenzene	U	2760	µg/kg	1.0	
1,3-Dichlorobenzene	M	2760	µg/kg	1.0	
4-Isopropyltoluene	U	2760	µg/kg	1.0	
1,4-Dichlorobenzene	M	2760	µg/kg	1.0	
N-Butylbenzene	U	2760	µg/kg	1.0	
1,2-Dichlorobenzene	M	2760	µg/kg	1.0	
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0	
Hexachlorobutadiene	U	2760	µg/kg	1.0	

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		20-28376
Quotation No.:			**Chemtest Sample ID.:**		1083865
			Client Sample ID.:		WS01
			Sample Type:		SOIL
			Top Depth (m):		0.35
			Bottom Depth (m):		0.5
			Date Sampled:		15-Oct-2020
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0	
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	
PCB 81	N	2815	mg/kg	0.010	
PCB 77	U	2815	mg/kg	0.010	
PCB 105	N	2815	mg/kg	0.010	
PCB 114	N	2815	mg/kg	0.010	
PCB 118	N	2815	mg/kg	0.010	
PCB 123	N	2815	mg/kg	0.010	
PCB 126	N	2815	mg/kg	0.010	
PCB 156	N	2815	mg/kg	0.010	
PCB 157	N	2815	mg/kg	0.010	
PCB 167	N	2815	mg/kg	0.010	
PCB 169	N	2815	mg/kg	0.010	
PCB 189	N	2815	mg/kg	0.010	
Total PCBs (12 Congeners)	N	2815	mg/kg	0.12	
Total Phenols	M	2920	mg/kg	0.30	< 0.30
Cairney Screen	N			N/A	

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2810	Polychlorinated Biphenyls (PCB) as Aroclors in Soils by GC-ECD	Polychlorinated Biphenyls expressed as an Aroclor (normally reported as *Aroclor 1242)	Extraction of a soil sample, as received, into hexane/acetone (50:50) followed by gas chromatography (GC) using mass spectrometric (MS) detection for identification of polychlorinated biphenyls and electron capture detection (ECD) for quanitation if present.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	20-30547-1
Initial Date of Issue:	17-Nov-2020
Client	Sirius Geotechnical Ltd
Client Address:	4245 Park Approach Thorpe Park Leeds West Yorkshire LS15 8GB
Contact(s):	Gemma Halliday Richard Caine
Project	C7340 Greenside Mill, Skelmanthrope

Quotation No.:		**Date Received:**	11-Nov-2020
Order No.:	20757/C7340/RC	**Date Instructed:**	11-Nov-2020
No. of Samples:	9		
Turnaround (Wkdays):	5	**Results Due:**	17-Nov-2020
Date Approved:	17-Nov-2020		
Approved By:			

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd		**Chemtest Job No.:**			20-30547	20-30547	20-30547	20-30547	20-30547	20-30547	20-30547	20-30547
Quotation No.:		**Chemtest Sample ID.:**			1094730	1094731	1094732	1094733	1094734	1094735	1094736	1094737
		Client Sample ID.:			TP01	TP03	TP01	TP02	TP02	TP04	TP04	TP06
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.00	0.00	0.60	0.00	1.50	0.50	1.30	0.10
		Bottom Depth (m):			0.10	0.10		0.10		0.60	1.50	0.20
		Date Sampled:			04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020
		Asbestos Lab:					DURHAM	DURHAM	DURHAM	DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type	U	2192		N/A			-	-	-	-		Fibres/Clumps
Asbestos Identification	U	2192		N/A			No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		Chrysotile
ACM Detection Stage	U	2192		N/A			-	-	-	-		Stereo Microscopy
Moisture	N	2030	%	0.020	< 0.020	< 0.020	16	17	15	16	15	13
Soil Colour	N	2040		N/A	Black	Black	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	None	None	Stones	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Tarmac	Tarmac	Sand	Sand	Sand	Sand	Clay	Sand
Chromatogram (TPH)	N			N/A	See Attached	See Attached						
pH	M	2010		4.0			8.6	7.1	7.3	8.2	7.9	8.3
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010			0.058	< 0.010	< 0.010	0.12	0.080	0.027
Sulphate (Total)	M	2430	%	0.010			0.65	0.10	0.16	0.45	0.030	0.12
Arsenic	M	2450	mg/kg	1.0			74	27	93	21	5.8	19
Cadmium	M	2450	mg/kg	0.10			0.20	0.48	0.27	1.7	< 0.10	0.40
Chromium	M	2450	mg/kg	1.0			23	26	26	19	24	17
Copper	M	2450	mg/kg	0.50			48	37	110	50	24	66
Mercury	M	2450	mg/kg	0.10			0.12	0.17	0.31	< 0.10	< 0.10	< 0.10
Nickel	M	2450	mg/kg	0.50			28	27	49	39	27	36
Lead	M	2450	mg/kg	0.50			51	87	270	71	20	38
Selenium	M	2450	mg/kg	0.20			0.95	0.61	1.2	< 0.20	0.21	0.45
Zinc	M	2450	mg/kg	0.50			55	170	210	290	59	92
Chromium (Hexavalent)	N	2490	mg/kg	0.50			< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Organic Carbon	M	2625	%	0.20			1.6	2.6	12	9.4	0.35	5.1
Diesel Present	N	2670		N/A	False	False						
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0				< 1.0	< 1.0	49	< 1.0	2.9
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0				< 1.0	< 1.0	11	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0				< 1.0	< 1.0	74	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0				< 1.0	3.3	170	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0				< 1.0	48	230	< 1.0	5.3
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0				< 1.0	< 1.0	65	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0				< 5.0	51	590	< 5.0	12
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0				< 1.0	< 1.0	14	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0				< 1.0	< 1.0	37	< 1.0	< 1.0

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd		**Chemtest Job No.:**			20-30547	20-30547	20-30547	20-30547	20-30547	20-30547	20-30547	20-30547
Quotation No.:		**Chemtest Sample ID.:**			1094730	1094731	1094732	1094733	1094734	1094735	1094736	1094737
		Client Sample ID.:			TP01	TP03	TP01	TP02	TP02	TP04	TP04	TP06
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.00	0.00	0.60	0.00	1.50	0.50	1.30	0.10
		Bottom Depth (m):			0.10	0.10		0.10		0.60	1.50	0.20
		Date Sampled:			04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020
		Asbestos Lab:					DURHAM	DURHAM	DURHAM	DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0				< 1.0	< 1.0	220	< 1.0	2.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0				< 1.0	2.4	710	< 1.0	6.8
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0				< 1.0	120	2800	< 1.0	35
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0				< 1.0	< 1.0	310	< 1.0	2.1
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0				< 5.0	120	4100	< 5.0	48
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0				< 10	170	4700	< 10	60
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.4	7.4	1.3	2.1
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.17	2.5	0.14	0.80
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.25	22	0.20	1.0
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.30	17	0.27	1.3
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.5	86	0.76	4.6
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.27	20	0.12	1.7
Fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.0	1.7	89	0.54	18
Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.0	1.8	86	0.56	14
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.79	43	0.32	6.1
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.4	44	0.46	6.1
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	70	< 0.10	7.4
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	28	< 0.10	3.2
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	56	< 0.10	5.4
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	39	< 0.10	3.3
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	10	< 0.10	1.5
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	32	< 0.10	3.6
Coronene	N	2700	mg/kg	0.10	< 0.10	< 0.10						
Total Of 16 PAH's	M	2700	mg/kg	2.0			< 2.0	2.0	9.6	650	4.7	80
Total Of 17 PAH's	N	2700	mg/kg	2.0	< 2.0	< 2.0						
Dichlorodifluoromethane	U	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
Chloromethane	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
Vinyl Chloride	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
Bromomethane	M	2760	µg/kg	20					< 20	< 20	< 20	
Chloroethane	U	2760	µg/kg	2.0					< 2.0	< 2.0	< 2.0	
Trichlorofluoromethane	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
1,1-Dichloroethene	M	2760	mg/kg	1.0					< 1.0	< 1.0	< 1.0	
Trans 1,2-Dichloroethene	M	2760	mg/kg	1.0					< 1.0	< 1.0	< 1.0	
1,1-Dichloroethane	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
Bromochloromethane	U	2760	µg/kg	5.0					< 5.0	< 5.0	< 5.0	
Trichloromethane	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
1,1,1-Trichloroethane	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd		**Chemtest Job No.:**			20-30547	20-30547	20-30547	20-30547	20-30547	20-30547	20-30547	20-30547
Quotation No.:		**Chemtest Sample ID.:**			1094730	1094731	1094732	1094733	1094734	1094735	1094736	1094737
		Client Sample ID.:			TP01	TP03	TP01	TP02	TP02	TP04	TP04	TP06
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.00	0.00	0.60	0.00	1.50	0.50	1.30	0.10
		Bottom Depth (m):			0.10	0.10		0.10		0.60	1.50	0.20
		Date Sampled:			04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020
		Asbestos Lab:					DURHAM	DURHAM	DURHAM	DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Tetrachloromethane	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
1,1-Dichloropropene	U	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
Benzene	M	2760	µg/kg	1.0				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	M	2760	µg/kg	2.0					< 2.0	< 2.0	< 2.0	
Trichloroethene	N	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
1,2-Dichloropropane	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
Dibromomethane	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
Bromodichloromethane	M	2760	µg/kg	5.0					< 5.0	< 5.0	< 5.0	
cis-1,3-Dichloropropene	N	2760	µg/kg	10					< 10	< 10	< 10	
Toluene	M	2760	µg/kg	1.0				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10					< 10	< 10	< 10	
1,1,2-Trichloroethane	M	2760	µg/kg	10					< 10	< 10	< 10	
Tetrachloroethene	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
1,3-Dichloropropane	U	2760	µg/kg	2.0					< 2.0	< 2.0	< 2.0	
Dibromochloromethane	U	2760	µg/kg	10					< 10	< 10	< 10	
1,2-Dibromoethane	M	2760	µg/kg	5.0					< 5.0	< 5.0	< 5.0	
Chlorobenzene	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0					< 2.0	< 2.0	< 2.0	
Ethylbenzene	M	2760	µg/kg	1.0				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0				< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
Tribromomethane	U	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
Isopropylbenzene	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
Bromobenzene	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
1,2,3-Trichloropropane	N	2760	µg/kg	50					< 50	< 50	< 50	
N-Propylbenzene	U	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
2-Chlorotoluene	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
4-Chlorotoluene	U	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
Tert-Butylbenzene	U	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
Sec-Butylbenzene	U	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
1,3-Dichlorobenzene	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
4-Isopropyltoluene	U	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
1,4-Dichlorobenzene	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
N-Butylbenzene	U	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	
1,2-Dichlorobenzene	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd					**Chemtest Job No.:**	20-30547	20-30547	20-30547	20-30547	20-30547	20-30547	20-30547	20-30547
Quotation No.:					**Chemtest Sample ID.:**	1094730	1094731	1094732	1094733	1094734	1094735	1094736	1094737
					Client Sample ID.:	TP01	TP03	TP01	TP02	TP02	TP04	TP04	TP06
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.00	0.00	0.60	0.00	1.50	0.50	1.30	0.10
					Bottom Depth (m):	0.10	0.10		0.10		0.60	1.50	0.20
					Date Sampled:	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020
					Asbestos Lab:			DURHAM	DURHAM	DURHAM	DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50						< 50	< 50	< 50	
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0						< 1.0	< 1.0	< 1.0	
Hexachlorobutadiene	U	2760	µg/kg	1.0						< 1.0	< 1.0	< 1.0	
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0						< 2.0	< 2.0	< 2.0	
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodimethylamine	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
Phenol	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
2-Chlorophenol	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
Bis-(2-Chloroethyl)Ether	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
1,3-Dichlorobenzene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
1,4-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
1,2-Dichlorobenzene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
2-Methylphenol	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
Bis(2-Chloroisopropyl)Ether	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
Hexachloroethane	N	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
N-Nitrosodi-n-propylamine	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
4-Methylphenol	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
Nitrobenzene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
Isophorone	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
2-Nitrophenol	N	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
2,4-Dimethylphenol	N	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
Bis(2-Chloroethoxy)Methane	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
2,4-Dichlorophenol	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
1,2,4-Trichlorobenzene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
Naphthalene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
4-Chloroaniline	N	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
Hexachlorobutadiene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
4-Chloro-3-Methylphenol	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
2-Methylnaphthalene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
4-Nitrophenol	N	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
2,4,6-Trichlorophenol	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
2,4,5-Trichlorophenol	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
2-Chloronaphthalene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
2-Nitroaniline	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
Acenaphthylene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
Dimethylphthalate	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							
2,6-Dinitrotoluene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50							

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd		**Chemtest Job No.:**			20-30547	20-30547	20-30547	20-30547	20-30547	20-30547	20-30547	20-30547
Quotation No.:		**Chemtest Sample ID.:**			1094730	1094731	1094732	1094733	1094734	1094735	1094736	1094737
		Client Sample ID.:			TP01	TP03	TP01	TP02	TP02	TP04	TP04	TP06
		Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):			0.00	0.00	0.60	0.00	1.50	0.50	1.30	0.10
		Bottom Depth (m):			0.10	0.10		0.10		0.60	1.50	0.20
		Date Sampled:			04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020
		Asbestos Lab:					DURHAM	DURHAM	DURHAM	DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Acenaphthene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
3-Nitroaniline	N	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Dibenzofuran	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
4-Chlorophenylphenylether	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
2,4-Dinitrotoluene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Fluorene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Diethyl Phthalate	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
4-Nitroaniline	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Azobenzene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
4-Bromophenylphenyl Ether	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Hexachlorobenzene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Pentachlorophenol	N	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Phenanthrene	M	2790	mg/kg	0.50	0.63	[C] < 0.50						
Anthracene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Carbazole	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Di-N-Butyl Phthalate	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Fluoranthene	M	2790	mg/kg	0.50	1.1	[C] < 0.50						
Pyrene	M	2790	mg/kg	0.50	0.91	[C] < 0.50						
Butylbenzyl Phthalate	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Benzo[a]anthracene	M	2790	mg/kg	0.50	0.56	[C] < 0.50						
Chrysene	M	2790	mg/kg	0.50	0.60	[C] < 0.50						
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Di-N-Octyl Phthalate	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Benzo[b]fluoranthene	M	2790	mg/kg	0.50	0.61	[C] < 0.50						
Benzo[k]fluoranthene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Benzo[a]pyrene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Indeno(1,2,3-c,d)Pyrene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Dibenz(a,h)Anthracene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
Benzo[g,h,i]perylene	M	2790	mg/kg	0.50	< 0.50	[C] < 0.50						
PCB 81	N	2815	mg/kg	0.010								
PCB 77	U	2815	mg/kg	0.010								
PCB 105	N	2815	mg/kg	0.010								
PCB 114	N	2815	mg/kg	0.010								
PCB 118	N	2815	mg/kg	0.010								
PCB 123	N	2815	mg/kg	0.010								
PCB 126	N	2815	mg/kg	0.010								
PCB 156	N	2815	mg/kg	0.010								

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		20-30547	20-30547	20-30547	20-30547	20-30547	20-30547	20-30547	20-30547
Quotation No.:			**Chemtest Sample ID.:**		1094730	1094731	1094732	1094733	1094734	1094735	1094736	1094737
			Client Sample ID.:		TP01	TP03	TP01	TP02	TP02	TP04	TP04	TP06
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.00	0.00	0.60	0.00	1.50	0.50	1.30	0.10
			Bottom Depth (m):		0.10	0.10		0.10		0.60	1.50	0.20
			Date Sampled:		04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020
			Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
PCB 157	N	2815	mg/kg	0.010								
PCB 167	N	2815	mg/kg	0.010								
PCB 169	N	2815	mg/kg	0.010								
PCB 189	N	2815	mg/kg	0.010								
Total PCBs (12 Congeners)	N	2815	mg/kg	0.12								
Total Phenols	M	2920	mg/kg	0.30			< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Interpretive Report	N			N/A	See Below	See Below						
SVOC TIC	N	2790	mg/kg	N/A	None Detected	None Detected						

Sample 1094730 does not contain coal tar contamination. Dibenzothiophene, a biomarker present in coal tar, has not been detected by SVOC analysis. This, in conjuction with the low PAH contamination detected, confirms the absence of coal tar in this sample

Sample 1094731 does not contain coal tar contamination. Dibenzothiophene, a biomarker present in coal tar, has not been detected by SVOC analysis. This, in conjuction with the low PAH contamination detected, confirms the absence of coal tar in this sample

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		20-30547
Quotation No.:			**Chemtest Sample ID.:**		1094738
			Client Sample ID.:		TP07
			Sample Type:		SOIL
			Top Depth (m):		0.30
			Bottom Depth (m):		0.50
			Date Sampled:		04-Nov-2020
			Asbestos Lab:		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-
Moisture	N	2030	%	0.020	12
Soil Colour	N	2040		N/A	Brown
Other Material	N	2040		N/A	Stones
Soil Texture	N	2040		N/A	Sand
Chromatogram (TPH)	N			N/A	
pH	M	2010		4.0	9.0
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.054
Sulphate (Total)	M	2430	%	0.010	0.29
Arsenic	M	2450	mg/kg	1.0	26
Cadmium	M	2450	mg/kg	0.10	1.1
Chromium	M	2450	mg/kg	1.0	37
Copper	M	2450	mg/kg	0.50	51
Mercury	M	2450	mg/kg	0.10	0.13
Nickel	M	2450	mg/kg	0.50	29
Lead	M	2450	mg/kg	0.50	110
Selenium	M	2450	mg/kg	0.20	< 0.20
Zinc	M	2450	mg/kg	0.50	130
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Total Organic Carbon	M	2625	%	0.20	4.1
Diesel Present	N	2670		N/A	
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		20-30547
Quotation No.:			**Chemtest Sample ID.:**		1094738
			Client Sample ID.:		TP07
			Sample Type:		SOIL
			Top Depth (m):		0.30
			Bottom Depth (m):		0.50
			Date Sampled:		04-Nov-2020
			Asbestos Lab:		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	
Naphthalene	M	2700	mg/kg	0.10	0.97
Acenaphthylene	M	2700	mg/kg	0.10	1.1
Acenaphthene	M	2700	mg/kg	0.10	4.2
Fluorene	M	2700	mg/kg	0.10	3.7
Phenanthrene	M	2700	mg/kg	0.10	23
Anthracene	M	2700	mg/kg	0.10	11
Fluoranthene	M	2700	mg/kg	0.10	60
Pyrene	M	2700	mg/kg	0.10	57
Benzo[a]anthracene	M	2700	mg/kg	0.10	27
Chrysene	M	2700	mg/kg	0.10	24
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	31
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	13
Benzo[a]pyrene	M	2700	mg/kg	0.10	25
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	16
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	4.5
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	13
Coronene	N	2700	mg/kg	0.10	
Total Of 16 PAH's	M	2700	mg/kg	2.0	310
Total Of 17 PAH's	N	2700	mg/kg	2.0	
Dichlorodifluoromethane	U	2760	µg/kg	1.0	
Chloromethane	M	2760	µg/kg	1.0	
Vinyl Chloride	M	2760	µg/kg	1.0	
Bromomethane	M	2760	µg/kg	20	
Chloroethane	U	2760	µg/kg	2.0	
Trichlorofluoromethane	M	2760	µg/kg	1.0	
1,1-Dichloroethene	M	2760	mg/kg	1.0	
Trans 1,2-Dichloroethene	M	2760	mg/kg	1.0	
1,1-Dichloroethane	M	2760	µg/kg	1.0	
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0	
Bromochloromethane	U	2760	µg/kg	5.0	
Trichloromethane	M	2760	µg/kg	1.0	
1,1,1-Trichloroethane	M	2760	µg/kg	1.0	

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		20-30547
Quotation No.:			**Chemtest Sample ID.:**		1094738
			Client Sample ID.:		TP07
			Sample Type:		SOIL
			Top Depth (m):		0.30
			Bottom Depth (m):		0.50
			Date Sampled:		04-Nov-2020
			Asbestos Lab:		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Tetrachloromethane	M	2760	µg/kg	1.0	
1,1-Dichloropropene	U	2760	µg/kg	1.0	
Benzene	M	2760	µg/kg	1.0	
1,2-Dichloroethane	M	2760	µg/kg	2.0	
Trichloroethene	N	2760	µg/kg	1.0	
1,2-Dichloropropane	M	2760	µg/kg	1.0	
Dibromomethane	M	2760	µg/kg	1.0	
Bromodichloromethane	M	2760	µg/kg	5.0	
cis-1,3-Dichloropropene	N	2760	µg/kg	10	
Toluene	M	2760	µg/kg	1.0	
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	
1,1,2-Trichloroethane	M	2760	µg/kg	10	
Tetrachloroethene	M	2760	µg/kg	1.0	
1,3-Dichloropropane	U	2760	µg/kg	2.0	
Dibromochloromethane	U	2760	µg/kg	10	
1,2-Dibromoethane	M	2760	µg/kg	5.0	
Chlorobenzene	M	2760	µg/kg	1.0	
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0	
Ethylbenzene	M	2760	µg/kg	1.0	
m & p-Xylene	M	2760	µg/kg	1.0	
o-Xylene	M	2760	µg/kg	1.0	
Styrene	M	2760	µg/kg	1.0	
Tribromomethane	U	2760	µg/kg	1.0	
Isopropylbenzene	M	2760	µg/kg	1.0	
Bromobenzene	M	2760	µg/kg	1.0	
1,2,3-Trichloropropane	N	2760	µg/kg	50	
N-Propylbenzene	U	2760	µg/kg	1.0	
2-Chlorotoluene	M	2760	µg/kg	1.0	
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0	
4-Chlorotoluene	U	2760	µg/kg	1.0	
Tert-Butylbenzene	U	2760	µg/kg	1.0	
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0	
Sec-Butylbenzene	U	2760	µg/kg	1.0	
1,3-Dichlorobenzene	M	2760	µg/kg	1.0	
4-Isopropyltoluene	U	2760	µg/kg	1.0	
1,4-Dichlorobenzene	M	2760	µg/kg	1.0	
N-Butylbenzene	U	2760	µg/kg	1.0	
1,2-Dichlorobenzene	M	2760	µg/kg	1.0	

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		20-30547
Quotation No.:			**Chemtest Sample ID.:**		1094738
			Client Sample ID.:		TP07
			Sample Type:		SOIL
			Top Depth (m):		0.30
			Bottom Depth (m):		0.50
			Date Sampled:		04-Nov-2020
			Asbestos Lab:		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0	
Hexachlorobutadiene	U	2760	µg/kg	1.0	
1,2,3-Trichlorobenzene	U	2760	µg/kg	2.0	
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	
N-Nitrosodimethylamine	M	2790	mg/kg	0.50	
Phenol	M	2790	mg/kg	0.50	
2-Chlorophenol	M	2790	mg/kg	0.50	
Bis-(2-Chloroethyl)Ether	M	2790	mg/kg	0.50	
1,3-Dichlorobenzene	M	2790	mg/kg	0.50	
1,4-Dichlorobenzene	N	2790	mg/kg	0.50	
1,2-Dichlorobenzene	M	2790	mg/kg	0.50	
2-Methylphenol	M	2790	mg/kg	0.50	
Bis(2-Chloroisopropyl)Ether	M	2790	mg/kg	0.50	
Hexachloroethane	N	2790	mg/kg	0.50	
N-Nitrosodi-n-propylamine	M	2790	mg/kg	0.50	
4-Methylphenol	M	2790	mg/kg	0.50	
Nitrobenzene	M	2790	mg/kg	0.50	
Isophorone	M	2790	mg/kg	0.50	
2-Nitrophenol	N	2790	mg/kg	0.50	
2,4-Dimethylphenol	N	2790	mg/kg	0.50	
Bis(2-Chloroethoxy)Methane	M	2790	mg/kg	0.50	
2,4-Dichlorophenol	M	2790	mg/kg	0.50	
1,2,4-Trichlorobenzene	M	2790	mg/kg	0.50	
Naphthalene	M	2790	mg/kg	0.50	
4-Chloroaniline	N	2790	mg/kg	0.50	
Hexachlorobutadiene	M	2790	mg/kg	0.50	
4-Chloro-3-Methylphenol	M	2790	mg/kg	0.50	
2-Methylnaphthalene	M	2790	mg/kg	0.50	
4-Nitrophenol	N	2790	mg/kg	0.50	
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50	
2,4,6-Trichlorophenol	M	2790	mg/kg	0.50	
2,4,5-Trichlorophenol	M	2790	mg/kg	0.50	
2-Chloronaphthalene	M	2790	mg/kg	0.50	
2-Nitroaniline	M	2790	mg/kg	0.50	
Acenaphthylene	M	2790	mg/kg	0.50	
Dimethylphthalate	M	2790	mg/kg	0.50	
2,6-Dinitrotoluene	M	2790	mg/kg	0.50	

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		20-30547
Quotation No.:			**Chemtest Sample ID.:**		1094738
			Client Sample ID.:		TP07
			Sample Type:		SOIL
			Top Depth (m):		0.30
			Bottom Depth (m):		0.50
			Date Sampled:		04-Nov-2020
			Asbestos Lab:		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Acenaphthene	M	2790	mg/kg	0.50	
3-Nitroaniline	N	2790	mg/kg	0.50	
Dibenzofuran	M	2790	mg/kg	0.50	
4-Chlorophenylphenylether	M	2790	mg/kg	0.50	
2,4-Dinitrotoluene	M	2790	mg/kg	0.50	
Fluorene	M	2790	mg/kg	0.50	
Diethyl Phthalate	M	2790	mg/kg	0.50	
4-Nitroaniline	M	2790	mg/kg	0.50	
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50	
Azobenzene	M	2790	mg/kg	0.50	
4-Bromophenylphenyl Ether	M	2790	mg/kg	0.50	
Hexachlorobenzene	M	2790	mg/kg	0.50	
Pentachlorophenol	N	2790	mg/kg	0.50	
Phenanthrene	M	2790	mg/kg	0.50	
Anthracene	M	2790	mg/kg	0.50	
Carbazole	M	2790	mg/kg	0.50	
Di-N-Butyl Phthalate	M	2790	mg/kg	0.50	
Fluoranthene	M	2790	mg/kg	0.50	
Pyrene	M	2790	mg/kg	0.50	
Butylbenzyl Phthalate	M	2790	mg/kg	0.50	
Benzo[a]anthracene	M	2790	mg/kg	0.50	
Chrysene	M	2790	mg/kg	0.50	
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50	
Di-N-Octyl Phthalate	M	2790	mg/kg	0.50	
Benzo[b]fluoranthene	M	2790	mg/kg	0.50	
Benzo[k]fluoranthene	M	2790	mg/kg	0.50	
Benzo[a]pyrene	M	2790	mg/kg	0.50	
Indeno(1,2,3-c,d)Pyrene	M	2790	mg/kg	0.50	
Dibenz(a,h)Anthracene	M	2790	mg/kg	0.50	
Benzo[g,h,i]perylene	M	2790	mg/kg	0.50	
PCB 81	N	2815	mg/kg	0.010	< 0.010
PCB 77	U	2815	mg/kg	0.010	< 0.010
PCB 105	N	2815	mg/kg	0.010	< 0.010
PCB 114	N	2815	mg/kg	0.010	< 0.010
PCB 118	N	2815	mg/kg	0.010	< 0.010
PCB 123	N	2815	mg/kg	0.010	< 0.010
PCB 126	N	2815	mg/kg	0.010	< 0.010
PCB 156	N	2815	mg/kg	0.010	< 0.010

Results - Soil

Project: C7340 Greenside Mill, Skelmanthrope

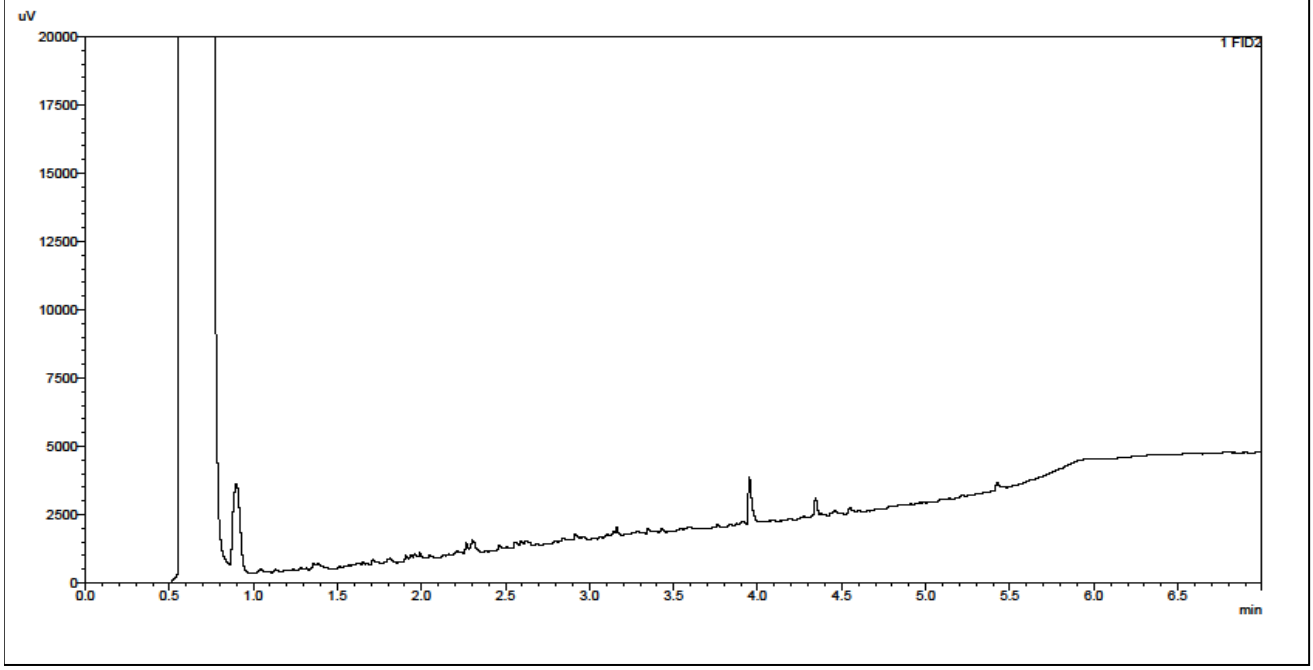
Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		20-30547
Quotation No.:			**Chemtest Sample ID.:**		1094738
			Client Sample ID.:		TP07
			Sample Type:		SOIL
			Top Depth (m):		0.30
			Bottom Depth (m):		0.50
			Date Sampled:		04-Nov-2020
			Asbestos Lab:		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
PCB 157	N	2815	mg/kg	0.010	< 0.010
PCB 167	N	2815	mg/kg	0.010	< 0.010
PCB 169	N	2815	mg/kg	0.010	< 0.010
PCB 189	N	2815	mg/kg	0.010	< 0.010
Total PCBs (12 Congeners)	N	2815	mg/kg	0.12	< 0.12
Total Phenols	M	2920	mg/kg	0.30	< 0.30
Interpretive Report	N			N/A	
SVOC TIC	N	2790	mg/kg	N/A	

TPH Chromatogram on Soil Sample: 1094730

<Sample Information>

Sample Name : 1094730 20-30547
Data Filename : 11 November 2020_11112020_1094730 20-30547_112.gcd
Method Filename : TPH 12m Fast OSv2.gcm
Sample # : 131
Date Acquired : 12/11/2020 03:10:38
Date Processed : 12/11/2020

<Chromatogram>

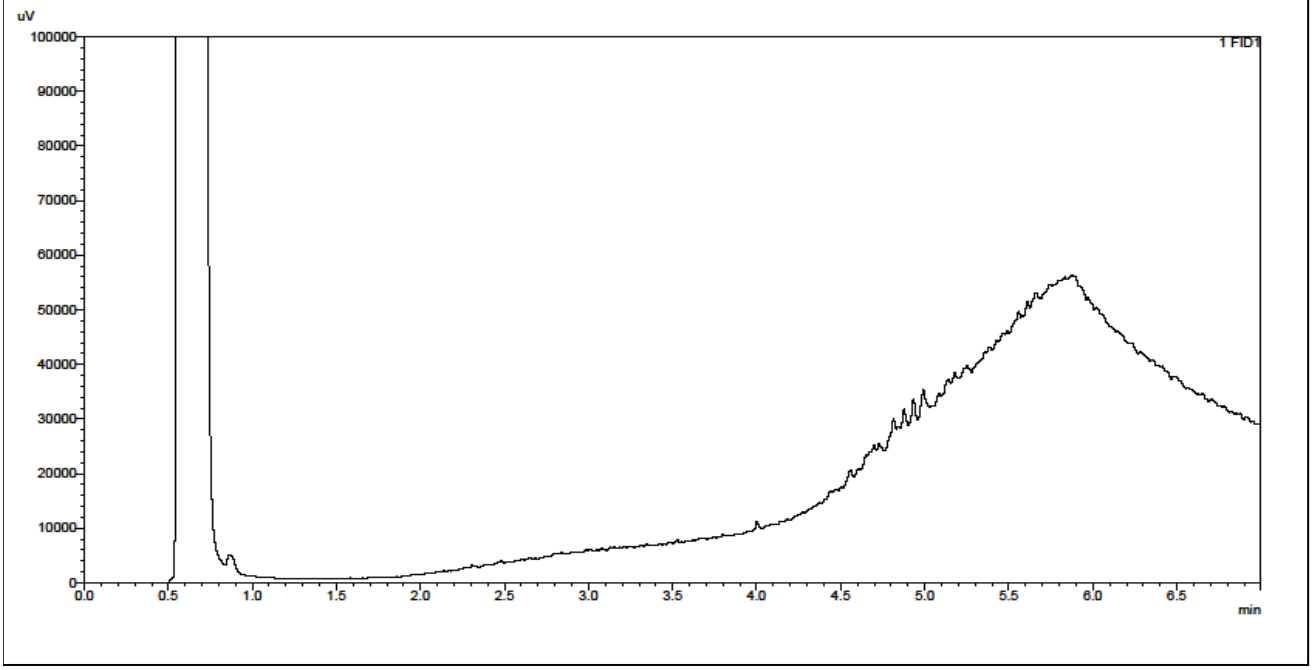


TPH Chromatogram on Soil Sample: 1094731

<Sample Information>

Sample Name : 1094731 20-30547
Data Filename : 11 November 2020_11112020_1094731 20-30547_029.gcd
Method Filename : TPH 12m Fast OSv2.gcm
Sample # : 29
Date Acquired : 11/11/2020 22:28:31
Date Processed : 16/11/2020

<Chromatogram>



TPH Interpretation

Job	Sample	Matrix	Location	Sample Ref	Sample ID	Sample Depth (m)	Gasoline / Diesel Present	TPH Interpretation
20-30547	1094730	S			TP01	0.00	No	PAH
20-30547	1094731	S			TP03	0.00	No	Heavy Oil

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1094731		TP03		04-Nov-2020	C	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS
2810	Polychlorinated Biphenyls (PCB) as Aroclors in Soils by GC-ECD	Polychlorinated Biphenyls expressed as an Aroclor (normally reported as *Aroclor 1242)	Extraction of a soil sample, as received, into hexane/acetone (50:50) followed by gas chromatography (GC) using mass spectrometric (MS) detection for identification of polychlorinated biphenyls and electron capture detection (ECD) for quanitation if present.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

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SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL

Final Report

Report No.:	20-30645-1
Initial Date of Issue:	18-Nov-2020
Client	Sirius Geotechnical Ltd
Client Address:	4245 Park Approach Thorpe Park Leeds West Yorkshire LS15 8GB
Contact(s):	Gemma Halliday Richard Caine
Project	C7430 Greenside Mill, Skelmanthrope

Quotation No.:		**Date Received:**	12-Nov-2020
Order No.:	20757/C7340/RC	**Date Instructed:**	12-Nov-2020
No. of Samples:	5		
Turnaround (Wkdays):	5	**Results Due:**	18-Nov-2020
Date Approved:	18-Nov-2020		
Approved By:			

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: C7430 Greenside Mill, Skelmanthrope

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		20-30645	20-30645	20-30645	20-30645	20-30645
Quotation No.:			**Chemtest Sample ID.:**		1095275	1095276	1095277	1095278	1095279
			Client Sample ID.:		TP01	TP02	TP03	TP04	TP06
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.20	2.20	2.30	1.30	1.50
			Bottom Depth (m):				2.40	1.50	
			Date Sampled:		04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020	04-Nov-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Moisture	N	2030	%	0.020	9.9	21	10	17	24
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Grey	Grey
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Clay	Clay
pH	M	2010		4.0	7.9	6.8	7.7	8.2	6.6
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.33	0.12	< 0.010	0.063	0.052
Total Sulphur	M	2175	%	0.010	0.048	0.030	0.012	0.023	0.016
Sulphate (Acid Soluble)	M	2430	%	0.010	0.13	0.062	< 0.010	0.035	0.024
Cairney Screen	N			N/A	E	E	F	F	F

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.

Report Information

Key

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U/S	Unsuitable Sample
N/E	not evaluated
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Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

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E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
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Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL

Final Report

Report No.:	20-30342-1
Initial Date of Issue:	13-Nov-2020
Client	Sirius Geotechnical Ltd
Client Address:	4245 Park Approach Thorpe Park Leeds West Yorkshire LS15 8GB
Contact(s):	Gemma Halliday
Project	C7340 Skelmanthorpe

Quotation No.:		**Date Received:**	09-Nov-2020
Order No.:	20582/C7340/JGM	**Date Instructed:**	09-Nov-2020
No. of Samples:	5		
Turnaround (Wkdays):	5	**Results Due:**	13-Nov-2020
Date Approved:	13-Nov-2020		
Approved By:			

Details: Glynn Harvey, Technical Manager

Results - Water

Project: C7340 Skelmanthorpe

Client: Sirius Geotechnical Ltd		**Chemtest Job No.:**			20-30342	20-30342	20-30342	20-30342	20-30342
Quotation No.:		**Chemtest Sample ID.:**			1093730	1093731	1093732	1093733	1093734
			Client Sample ID.:		R1	R2	R3	WS06	WS13
			Sample Type:		WATER	WATER	WATER	WATER	WATER
			Date Sampled:		06-Nov-2020	06-Nov-2020	06-Nov-2020	06-Nov-2020	06-Nov-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
pH	U	1010		N/A	7.5	8.2	6.8	7.7	8.2
Electrical Conductivity	U	1020	µS/cm	1.0	590	800	360	740	1100
Ammoniacal Nitrogen	U	1220	mg/l	0.050	5.7	0.68	0.30	< 0.050	0.093
Sulphate	U	1220	mg/l	1.0	100	97	98	190	120
Arsenic (Dissolved)	U	1450	µg/l	1.0	< 1.0	1.2	1.7	< 1.0	1.7
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080	< 0.080	0.30	0.094	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	2.0	9.5	1.2	6.1	9.8
Copper (Dissolved)	U	1450	µg/l	1.0	< 1.0	1.6	2.0	< 1.0	2.0
Mercury (Dissolved)	U	1450	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Nickel (Dissolved)	U	1450	µg/l	1.0	3.5	1.7	18	6.6	3.2
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	2.1	< 1.0	< 1.0	< 1.0	1.7
Zinc (Dissolved)	U	1450	µg/l	1.0	19	23	54	13	7.5
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	[C] < 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	[C] < 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10	< 10	[C] < 10
Naphthalene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Acenaphthylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10

Results - Water

Project: C7340 Skelmanthorpe

Client: Sirius Geotechnical Ltd		**Chemtest Job No.:**			20-30342	20-30342	20-30342	20-30342	20-30342
Quotation No.:		**Chemtest Sample ID.:**			1093730	1093731	1093732	1093733	1093734
		Client Sample ID.:			R1	R2	R3	WS06	WS13
		Sample Type:			WATER	WATER	WATER	WATER	WATER
		Date Sampled:			06-Nov-2020	06-Nov-2020	06-Nov-2020	06-Nov-2020	06-Nov-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Chrysene	N	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	[C] < 2.0
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030	< 0.030	[C] < 0.030

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1093734		WS13		06-Nov-2020	C	EPA Vial 40ml
1093734		WS13		06-Nov-2020	C	Plastic Bottle 1000ml

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

LABORATORY REPORT

4043

Contract Number: PSL20/5822

Report Date: 06 November 2020

Client's Reference: C7340

Client Name: Sirius Leeds
4245 Park Approach
Century Way
Thorpe Park
Leeds
LS15 8GB

For the attention of: Richard Caine/Gemma Halliday

Contract Title: Greenside Mills, Skelmanthorpe

Date Received: 26/10/2020
Date Commenced: 26/10/2020
Date Completed: 6/11/2020

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)	A Watkins (Director)	R Berriman (Quality Manager)
L Knight (Senior Technician)	S Eyre (Senior Technician)	S Royle (Laboratory Manager)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS01		D	0.60		Brown slightly gravelly sandy silty CLAY.
WS02		D	1.50	1.60	Brown mottled grey slightly gravelly sandy silty CLAY.
WS05		D	0.90	1.00	Brown mottled grey slightly gravelly sandy silty CLAY.
WS06		D	1.50	1.60	Brown mottled grey sandy silty CLAY.
WS10		D	0.80	0.90	Brown mottled grey slightly gravelly slightly sandy silty CLAY.
WS11		D	1.80	1.90	Brown sandy silty CLAY.
WS13		D	0.90	1.00	Brown slightly gravelly sandy silty CLAY.

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
WS01		D	0.60		24			41	25	16	94	Intermediate plasticity CI.
WS02		D	1.50	1.60	15			43	23	20	98	Intermediate plasticity CI.
WS05		D	0.90	1.00	25			51	25	26	95	High plasticity CH.
WS06		D	1.50	1.60	19			54	26	28	100	High plasticity CH.
WS10		D	0.80	0.90	38			65	29	36	96	High plasticity CH.
WS11		D	1.80	1.90	17			43	22	21	100	Intermediate plasticity CI.
WS13		D	0.90	1.00	23			47	25	22	93	Intermediate plasticity CI.

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

PSL Professional Soils Laboratory

Greenside Mills, Skelmanthorpe

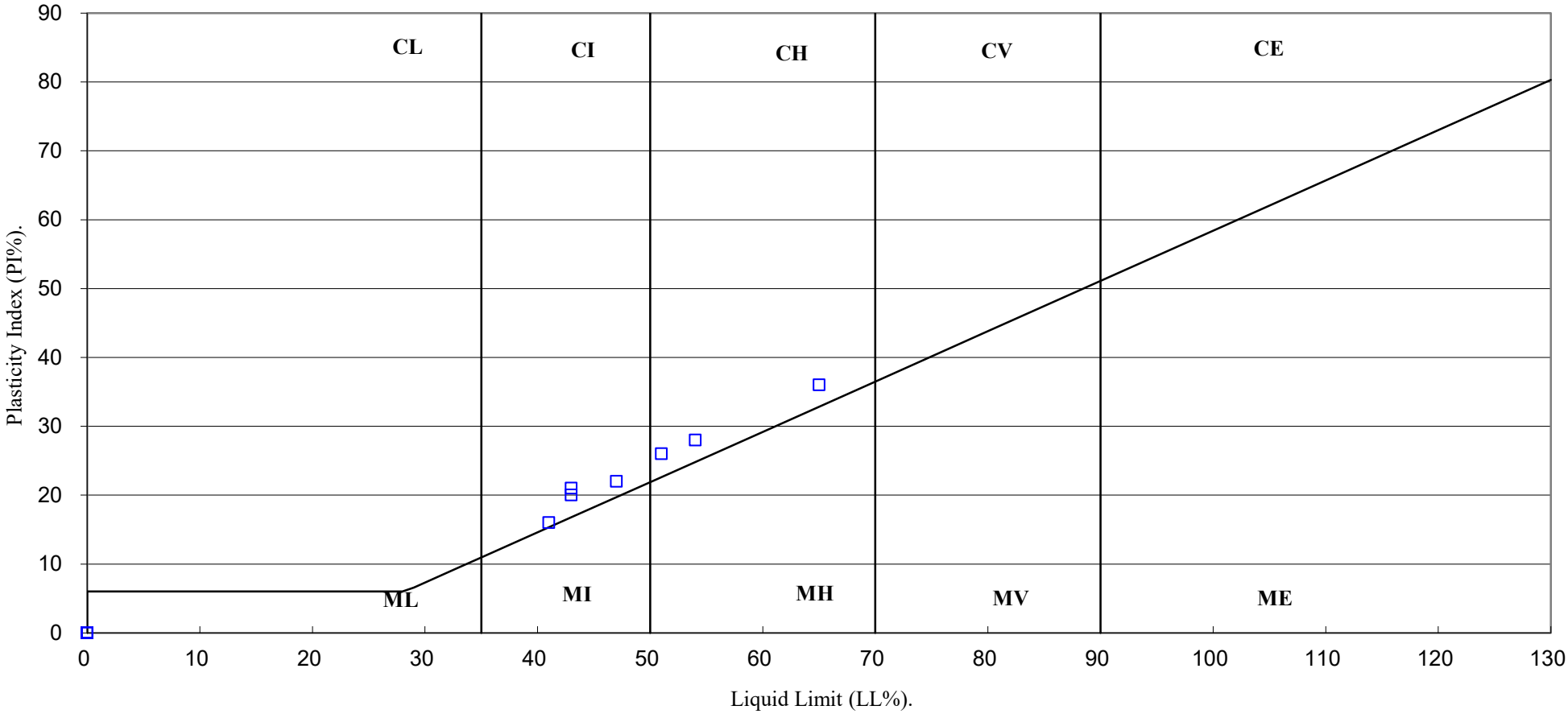
Contract No:

PSL20/5822

Client Ref:

C7340

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	Greenside Mills, Skelmanthorpe	Contract No: PSL20/5822
			Client Ref: C7340

LABORATORY REPORT

4043

Contract Number: PSL20/6346

Report Date: 09 December 2020

Client's Reference: C7340

Client Name: Sirius Leeds
4245 Park Approach
Century Way
Thorpe Park
Leeds
LS15 8GB

For the attention of: Richard Caine/Gemma Halliday

Contract Title: Greenside Mills, Skelmanthorpe

Date Received: 11/11/2020
Date Commenced: 11/11/2020
Date Completed: 9/12/2020

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)	A Watkins (Director)	R Berriman (Quality Manager)
L Knight (Senior Technician)	S Eyre (Senior Technician)	S Royle (Laboratory Manager)

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Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP01		B	0.80	0.90	Brown sandy very clayey GRAVEL.
TP03		B	1.00	1.20	Brown mottled grey very gravelly sandy CLAY.
TP06		B	0.70	0.90	Brown mottled grey gravelly very sandy CLAY.
TP03		D	1.20		Brown mottled grey gravelly sandy CLAY.

UKAS TESTING
4043

PSL
Professional Soils Laboratory

Greenside Mills, Skelmanthorpe

Contract No:
PSL20/6346
Client Ref:
C7340

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP03		D	1.20		23			39	20	19	82	Intermediate Plasticity CI

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

PSL Professional Soils Laboratory

Greenside Mills, Skelmanthorpe

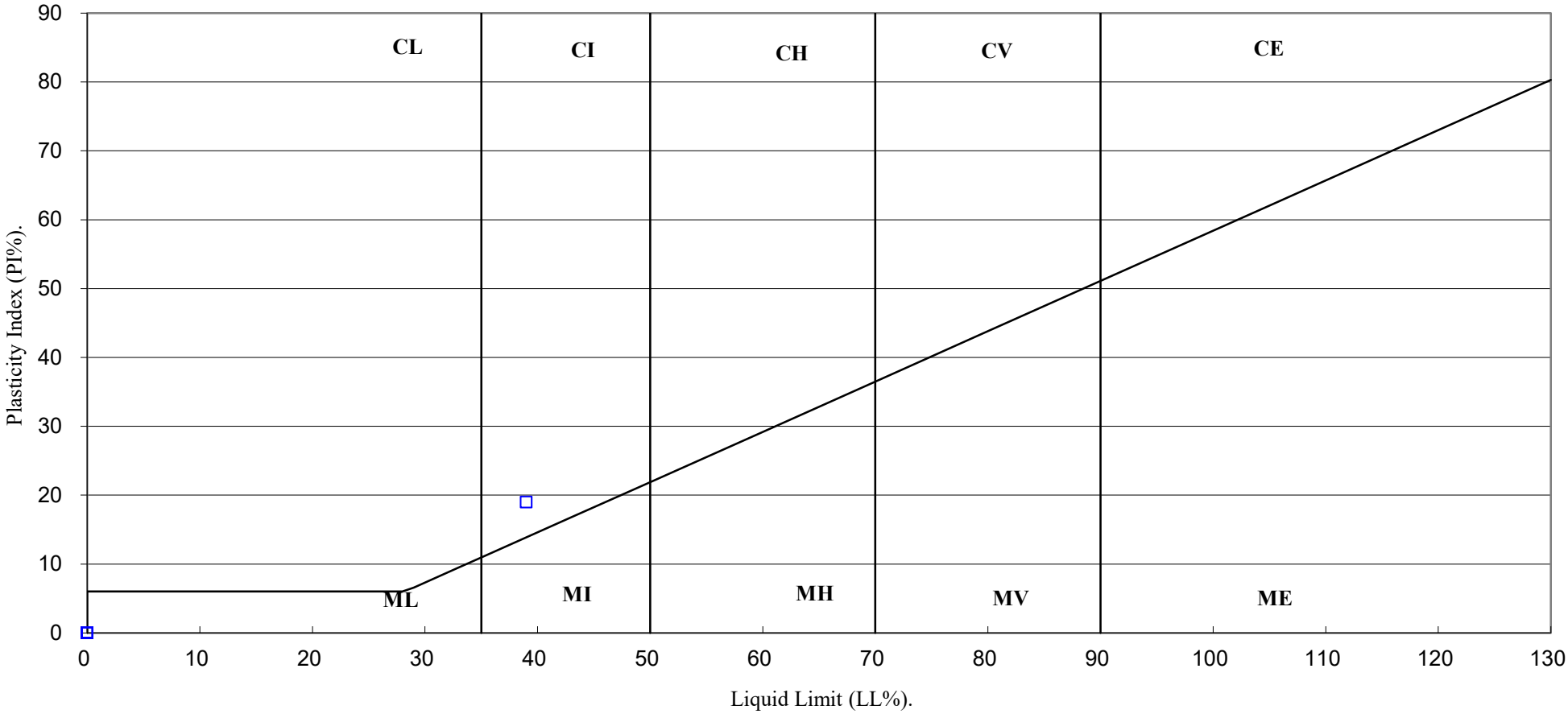
Contract No:

PSL20/6346

Client Ref:

C7340

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



UKAS TESTING 4043	PSL Professional Soils Laboratory	Greenside Mills, Skelmanthorpe	Contract No: PSL20/6346
			Client Ref: C7340

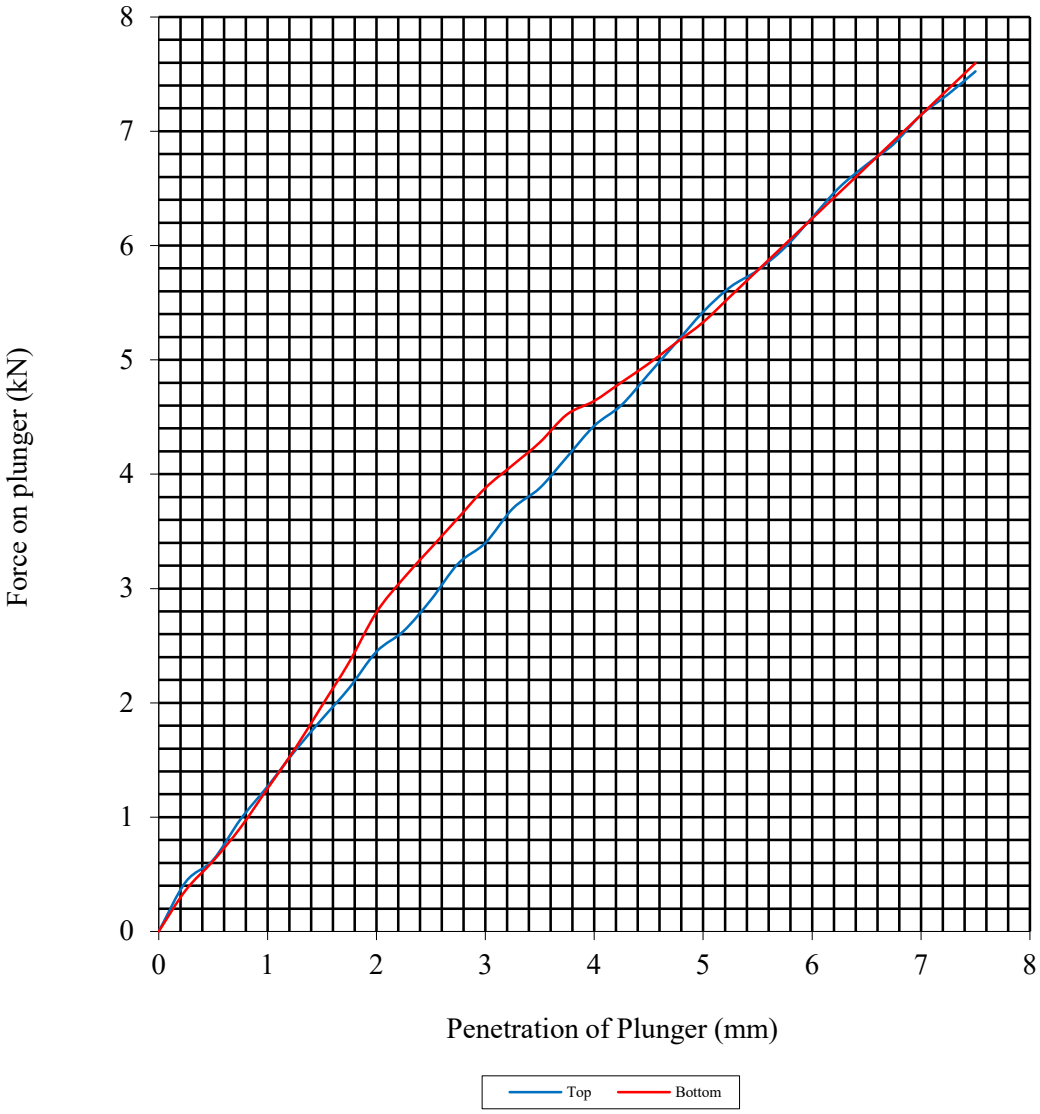
CALIFORNIA BEARING RATIO TEST

Non compliance with BS 1377 : Part 4 : 1990

Hole Number: TP01 **Top Depth (m):** 0.80

Sample Number: **Base Depth (m):** 0.90

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	11	Surcharge Kg:	4.20	Sample Top	11	Sample Top	27.1
Bulk Density Mg/m3:	2.15	Soaking Time hrs	0	Sample Bottom	11	Sample Bottom	26.6
Dry Density Mg/m3:	1.93	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			31				
Compaction Conditions		2.5kg					

UKAS TESTING 4043

PSL Professional Soils Laboratory

Greenside Mills, Skelmanthorpe

Contract No: PSL20/6346

Client Ref: C7340

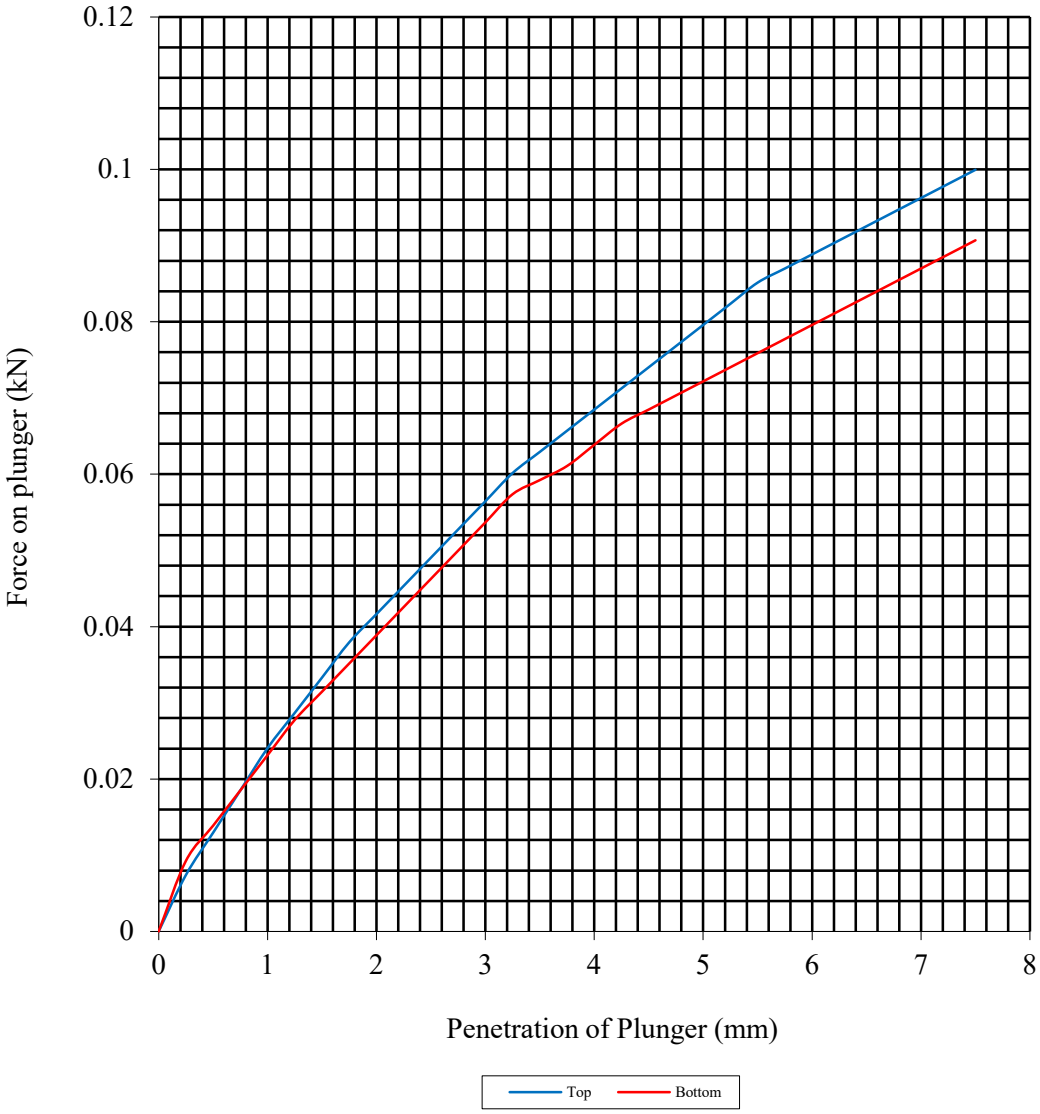
CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

Hole Number: TP03 **Top Depth (m):** 1.00

Sample Number: **Base Depth (m):** 1.20

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	25	Surcharge Kg:	4.20	Sample Top	25	Sample Top	0.4
Bulk Density Mg/m3:	1.97	Soaking Time hrs	0	Sample Bottom	25	Sample Bottom	0.4
Dry Density Mg/m3:	1.57	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			24				
Compaction Conditions		2.5kg					

UKAS TESTING 4043

PSL Professional Soils Laboratory

Greenside Mills, Skelmanthorpe

Contract No: PSL20/6346

Client Ref: C7340

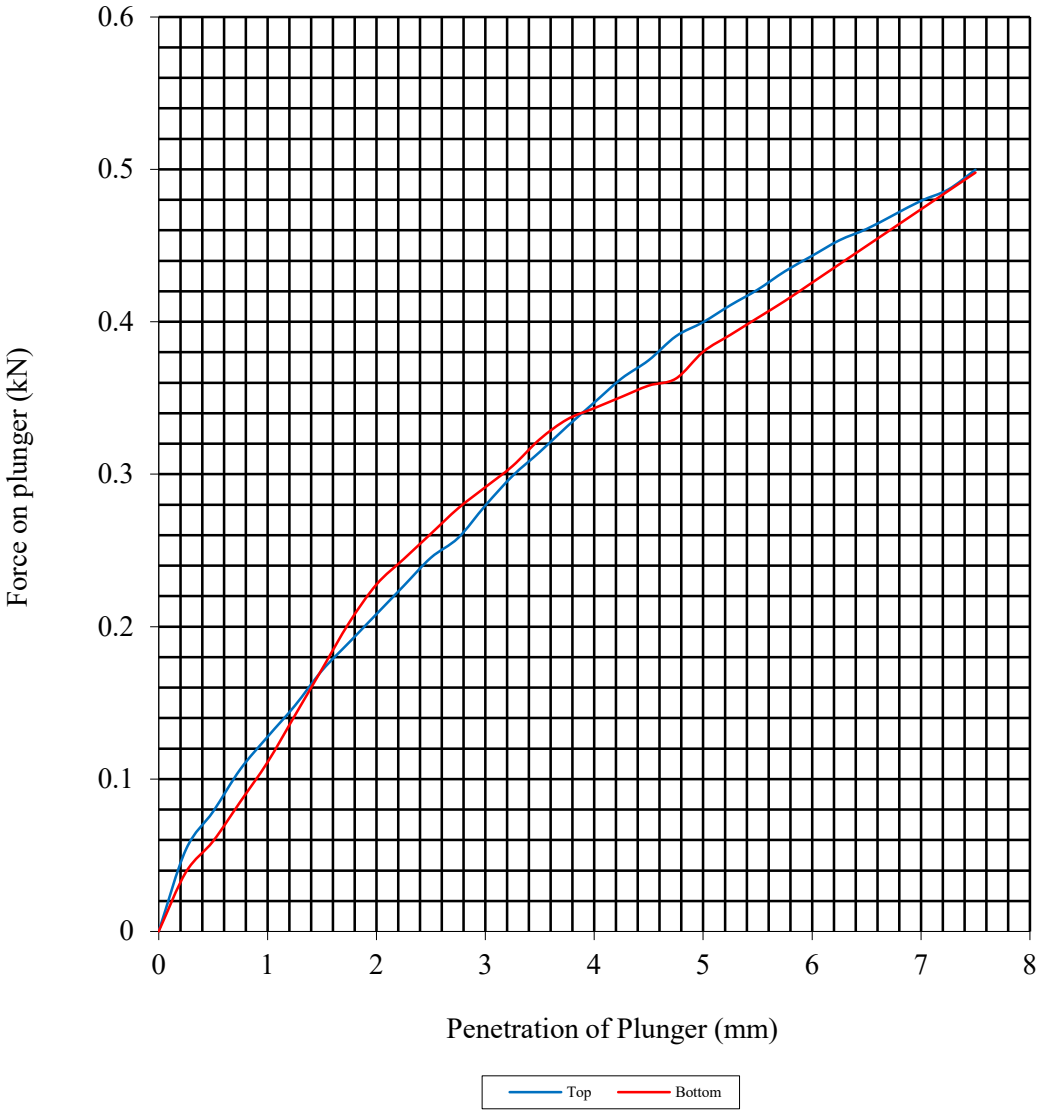
CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

Hole Number: TP06 **Top Depth (m):** 0.70

Sample Number: **Base Depth (m):** 0.90

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	12	Surcharge Kg:	4.20	Sample Top	12	Sample Top	2.0
Bulk Density Mg/m3:	1.91	Soaking Time hrs	0	Sample Bottom	12	Sample Bottom	2.0
Dry Density Mg/m3:	1.71	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions		2.5kg					

UKAS TESTING 4043

PSL Professional Soils Laboratory

Greenside Mills, Skelmanthorpe

Contract No: PSL20/6346

Client Ref: C7340

APPENDIX G

INTERIM GROUND GAS AND GROUNDWATER MONITORING RESULTS

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Paramount Retail Group Holdco Limited **Job No:** C7340
Site: Greenside Mills, Skelmanthorpe **Visit No:** 1 **of** 6
Date: 29/10/2020 **Operator:** JGM **Project Manager:** RC/GH

Monitoring Point	GAS CONCENTRATIONS: Methane (%v/v) Peak	Methane (%v/v) Steady	%LEL Peak	%LEL Steady	Carbon dioxide (%v/v) Peak	Carbon dioxide (%v/v) Steady	Carbon monoxide (ppmv) Peak	Carbon monoxide (ppmv) Steady	Hydrogen sulphide (ppmv) Peak	Hydrogen sulphide (ppmv) Steady	Oxygen (%v/v) Min.	Oxygen (%v/v) Steady	VOLATILES: PID Peak (ppm)	Product thickness (mm)	FLOW DATA: Flow rate (l/hr) Peak	Flow rate (l/hr) Steady	Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Qhg per borehole: Methane (l/hr)	CO2 (l/hr)	WELL AND WATER DATA: Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	Comments
WS01	**ND**	ND	ND	ND	1.2	**1.2**	ND	ND	ND	ND	17.6	17.6	ND	ND	ND	ND	ND	ND	0.0001	0.0012	DRY	1.06	153.99	DRY	0.5-1	
WS03	**ND**	ND	ND	ND	0.2	**0.2**	ND	ND	ND	ND	20.0	20.0	ND	ND	ND	ND	ND	ND	0.0001	0.0002	2.15	2.52	147.75	145.60	0.5-2.5	
WS05	**ND**	ND	ND	ND	0.2	**0.2**	ND	ND	ND	ND	19.6	19.6	ND	ND	ND	ND	ND	ND	0.0001	0.0002	1.23	3.05	147.32	146.09	1-3	
WS06	**ND**	ND	ND	ND	2.4	**1.1**	ND	ND	ND	ND	17.4	19.6	ND	ND	-2.0	ND	-28.0	2	0.0020	0.0011	1.47	4.05	147.72	146.25	1-4	
WS07	**ND**	ND	ND	ND	0.3	**0.3**	ND	ND	ND	ND	19.7	19.7	ND	ND	ND	ND	ND	ND	0.0001	0.0003	2.47	3.03	149.04	146.57	1-3	
WS09	**ND**	ND	ND	ND	1.6	**1.6**	ND	ND	ND	ND	15.9	16.4	ND	ND	ND	ND	ND	ND	0.0001	0.0016	DRY	1.12			0.5-1	
WS12	**ND**	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	18.5	18.6	0	ND	ND	ND	ND	ND	0.0001	0.0001	1.44	1.69			0.7-1.7	
WS13	**ND**	ND	ND	ND	0.6	**0.6**	ND	ND	ND	ND	17.7	17.7	ND	ND	ND	ND	ND	ND	0.0001	0.0006	1.78	2.64	142.50	140.72	0.7-2.7	
RO01	**NR**	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	6.40	11.22	155.60	149.20	3-12	Borehole being drilled/installed
RO02	**NR**	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	4.21	5.55	143.07	138.86	3-6	Borehole being drilled/installed
RO03	**NR**	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	2.83	10.33	145.13	142.30	1-10	Borehole being drilled/installed
Max	**ND**	**ND**	**ND**	**ND**	**2.4**	**1.6**	**ND**	**ND**	**ND**	**ND**	**20.0**	**20.0**	**0.07**	**ND**	**-2.0**	**ND**	**-28.0**	**2**	**0.0020**	**0.0016**	**6.40**			**149.20**		
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**15.9**	**16.4**	**ND**	**ND**	**-2.0**	**ND**	**ND**	**ND**	**0.0001**	**0.0001**	**DRY**			**DRY**		

ND - Not detected

NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equiment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry		Moist	x	Wet		Snow		Frozen
Wind:		Calm	x	Light		Moderate		Strong	
Cloud cover:		None		Slight		Cloudy	x	Overcast	
Precipitation:		None		Slight	x	Moderate		Heavy	
Time monitoring performed:			10:00	Start			14:00	End	
Barometric pressure (mbar):			1006	Start			1003	End	
Pressure trend (Daily):			x	Falling		Steady		Rising	
Source:	https://www.timeanddate.com/weather/@2637753/historic								
Air Temperature (Deg. C):			8	Before			12	After	

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GMF430 (BM36)
Gas Range: **CH_4** 0 - 100% **CO_2** 0 - 100% **O_2** 0 - 25%
Gas Flow range: +100/-50 l/hour
Differential Pressure: (+/-) 1000 Pa
Date of last external calibration: 22/04/2020 **Date of last in-house calibration:** 21/08/2020
Date of next external calibration: 22/04/2021

Ambient air check: **CH_4** ND **CO_2** ND **O_2** 20.3

PID:
Calibrated range: 5
Calibration gas: Benzene C6H6
Response time: 2 seconds
Accuracy: (+/-) 3% displayed reading
Date of last external calibration: 26/11/2019 **Date of last in-house calibration:** 21/08/2020
Date of next external calibration: 26/11/2020

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Paramount Retail Group Holdco Limited **Job No:** C7340
Site: Greenside Mills, Skelmanthorpe **Visit No:** 2 **of** 6
Date: 13/11/2020 **Operator:** RC **Project Manager:** RC/GH

Monitoring Point	GAS CONCENTRATIONS: Methane (%v/v) Peak	Methane (%v/v) Steady	%LEL Peak	%LEL Steady	Carbon dioxide (%v/v) Peak	Carbon dioxide (%v/v) Steady	Carbon monoxide (ppmv) Peak	Carbon monoxide (ppmv) Steady	Hydrogen sulphide (ppmv) Peak	Hydrogen sulphide (ppmv) Steady	Oxygen (%v/v) Min.	Oxygen (%v/v) Steady	VOLATILES: PID Peak (ppm)	Product thickness (mm)	FLOW DATA: Flow rate (l/hr) Peak	Flow rate (l/hr) Steady	Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Qhg per borehole: Methane (l/hr)	CO2 (l/hr)	WELL AND WATER DATA: Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	Comments
WS01	**ND**	ND	ND	ND	1.7	**1.7**	ND	ND	ND	ND	18.0	18.0	NR	NR	ND	ND	ND	ND	0.0001	0.0017	Dry	1.06	153.99	DRY	0.5-1	
WS03	**ND**	ND	ND	ND	0.4	**0.4**	ND	ND	ND	ND	20.1	20.1	NR	NR	ND	ND	ND	ND	0.0001	0.0004	2.14	2.52	147.75	145.61	0.5-2.5	
WS05	**ND**	ND	ND	ND	4.2	**4.1**	ND	ND	ND	ND	15.1	15.1	NR	NR	5.5	0.0	35.0	70	0.0055	0.0000	1.50	3.05	147.32	145.82	1-3	
WS06	**ND**	ND	ND	ND	4.6	**2.1**	ND	ND	ND	ND	16.0	18.5	NR	NR	6.0	0.0	38.0	60	0.0060	0.0000	1.43	4.05	147.72	146.29	1-4	
WS07	**ND**	ND	ND	ND	0.5	**0.4**	ND	ND	ND	ND	19.9	20.0	NR	NR	ND	ND	ND	ND	0.0001	0.0004	2.49	3.03	149.04	146.55	1-3	
WS09	**ND**	ND	ND	ND	1.6	**1.6**	ND	ND	ND	ND	16.5	16.5	NR	NR	0.5	0.0	0.0	1	0.0005	0.0000	Dry	1.12			0.5-1	
WS12	**ND**	ND	ND	ND	0.1	**ND**	ND	ND	ND	ND	18.6	18.6	NR	NR	1.5	0.0	4.0	10	0.0015	0.0000	1.59	1.69			0.7-1.7	
WS13	**ND**	ND	ND	ND	1.6	**1.6**	ND	ND	ND	ND	17.4	17.4	NR	NR	ND	ND	ND	ND	0.0001	0.0016	1.67	2.64	142.50	140.83	0.7-2.7	
RO01	**ND**	ND	ND	ND	5.6	**5.5**	ND	ND	ND	ND	6.8	6.9	NR	NR	ND	ND	ND	ND	0.0001	0.0055	8.92	11.22	155.60	146.68	3-12	
RO02	**ND**	ND	ND	ND	1.4	**1.4**	ND	ND	ND	ND	9.8	9.8	NR	NR	ND	ND	ND	ND	0.0001	0.0014	4.19	5.55	143.07	138.88	3-6	
RO03	**ND**	ND	ND	ND	7.5	**7.5**	ND	ND	ND	ND	8.0	8.0	NR	NR	4.0	0.0	22.0	225	0.0040	0.0000	5.51	10.33	145.13	139.62	1-10	
Max	**ND**	**ND**	**ND**	**ND**	**7.5**	**7.5**	**ND**	**ND**	**ND**	**ND**	**20.1**	**20.1**	**NR**	**NR**	**6.0**	**0.0**	**38.0**	**225**	**0.0060**	**0.0055**	**8.92**			**146.68**		
Min	**ND**	**ND**	**ND**	**ND**	**0.1**	**ND**	**ND**	**ND**	**ND**	**ND**	**6.8**	**6.9**	**NR**	**NR**	**0.5**	**0.0**	**ND**	**ND**	**0.0001**	**0.0000**	**DRY**			**DRY**		

ND - Not detected

NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equiment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry	X	Moist		Wet		Snow		Frozen
Wind:		Calm	X	Light		Moderate		Strong		
Cloud cover:		None	X	Slight		Cloudy		Overcast		
Precipitation:	X	None		Slight		Moderate		Heavy		
Time monitoring performed:			1005	Start			1147	End		
Barometric pressure (mbar):			985	Start			986	End		
Pressure trend (Daily):				Falling		Steady	X	Rising		
Source:	https://www.timeanddate.com/weather/@2637753/historic									
Air Temperature (Deg. C):			10	Before			11	After		

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GFM430 (BM51)
Gas Range: **CH_4** 0 - 100% **CO_2** 0 - 100% **O_2** 0 - 25%
Gas Flow range: +100/-50 l/hour
Differential Pressure: (+/-) 1000 Pa
Date of last external calibration: 14/10/2020 **Date of last in-house calibration:** 21/08/2020
Date of next external calibration 14/10/2021

Ambient air check: **CH_4** 0 **CO_2** 0 **O_2** 20.5

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Paramount Retail Group Holdco Limited **Job No:** C7340
Site: Greenside Mills, Skelmanthorpe **Visit No:** 3 **of** 6
Date: 24/11/2020 **Operator:** RC **Project Manager:** RC/GH

Monitoring Point	GAS CONCENTRATIONS												VOLATILES		FLOW DATA				Qhg per borehole		WELL AND WATER DATA					Comments
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	**Steady**	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady										
WS01	**ND**	ND	ND	ND	1.8	**1.8**	ND	ND	ND	ND	17.8	17.8	NR	NR	ND	ND	ND	ND	0.0001	0.0018	DRY	1.06	153.99	DRY	0.5-1	
WS03	**ND**	ND	ND	ND	0.2	**0.2**	ND	ND	ND	ND	20.3	20.3	NR	NR	ND	ND	ND	ND	0.0001	0.0002	2.19	2.52	147.75	145.56	0.5-2.5	
WS05	**ND**	ND	ND	ND	3.4	**3.4**	ND	ND	ND	ND	13.0	13.0	NR	NR	ND	ND	ND	ND	0.0001	0.0034	1.73	3.05	147.32	145.59	1-3	
WS06	**ND**	ND	ND	ND	5.6	**5.6**	ND	ND	ND	ND	13.4	13.4	NR	NR	-6.0	0.0	-38.0	161	0.0060	0.0000	1.37	4.05	147.72	146.35	1-4	
WS07	**ND**	ND	ND	ND	0.4	**0.4**	ND	ND	ND	ND	19.8	19.8	NR	NR	ND	ND	ND	ND	0.0001	0.0004	2.55	3.03	149.04	146.49	1-3	
WS09	**ND**	ND	ND	ND	1.7	**1.7**	ND	ND	ND	ND	17.1	17.1	NR	NR	1.0	0.0	0.0	1	0.0010	0.0000	1.08	1.12			0.5-1	
WS12	**ND**	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	18.1	18.1	NR	NR	ND	ND	ND	ND	0.0001	0.0001	1.44	1.69			0.7-1.7	
WS13	**ND**	ND	ND	ND	2.2	**2.2**	ND	ND	ND	ND	16.2	16.2	NR	NR	ND	ND	ND	ND	0.0001	0.0022	1.24	2.64	142.50	141.26	0.7-2.7	
RO01	**ND**	ND	ND	ND	7.3	**7.2**	ND	ND	ND	ND	2.3	2.4	NR	NR	ND	ND	ND	ND	0.0001	0.0072	8.87	11.22	155.60	146.73	3-12	
RO02	**ND**	ND	ND	ND	3.1	**2.0**	ND	ND	ND	ND	5.0	5.0	NR	NR	ND	ND	ND	ND	0.0001	0.0020	4.27	5.55	143.07	138.80	3-6	
RO03	**ND**	ND	ND	ND	10.2	**10.2**	ND	ND	ND	ND	1.5	1.5	NR	NR	19.0	0.0	144.0	455	0.0190	0.0000	3.14	10.33	145.13	141.99	1-10	
Max	**ND**	**ND**	**ND**	**ND**	**10.2**	**10.2**	**ND**	**ND**	**ND**	**ND**	**20.3**	**20.3**	**NR**	**NR**	**19.0**	**0.0**	**144.0**	**455**	**0.0190**	**0.0072**	**8.87**			**146.73**		
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**1.5**	**1.5**	**NR**	**NR**	**-6.0**	**0.0**	**ND**	**ND**	**0.0001**	**0.0000**	**DRY**			**DRY**		

ND - Not detected

NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equiment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry	X	Moist		Wet		Snow		Frozen
Wind:		Calm	X	Light		Moderate		Strong		
Cloud cover:		None		Slight	X	Cloudy		Overcast		
Precipitation:	X	None		Slight		Moderate		Heavy		
Time monitoring performed:			907	Start			1138	End		
Barometric pressure (mbar):			994	Start			991	End		
Pressure trend (Daily):			X	Falling		Steady		Rising		
Source:	https://www.timeanddate.com/weather/@2637753/historic									
Air Temperature (Deg. C):			11	Before			12	After		

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GFM430 (BM51)
Gas Range: **CH_4** 0 - 100% **CO_2** 0 - 100% **O_2** 0 - 25%
Gas Flow range: +100/-50 l/hour
Differential Pressure: (+/-) 1000 Pa
Date of last external calibration: 14/10/2020 **Date of last in-house calibration:** 21/08/2020
Date of next external calibration 14/10/2021

Ambient air check: **CH_4** 20.5 **CO_2** 0 **O_2** 0

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Paramount Retail Group Holdco Limited **Job No:** C7340
Site: Greenside Mills, Skelmanthorpe **Visit No:** 4 **of** 6
Date: 08/12/2020 **Operator:** JGM **Project Manager:** RC/GH

Monitoring Point	GAS CONCENTRATIONS: Methane (%v/v) Peak	Methane (%v/v) Steady	%LEL Peak	%LEL Steady	Carbon dioxide (%v/v) Peak	Carbon dioxide (%v/v) Steady	Carbon monoxide (ppmv) Peak	Carbon monoxide (ppmv) Steady	Hydrogen sulphide (ppmv) Peak	Hydrogen sulphide (ppmv) Steady	Oxygen (%v/v) Min.	Oxygen (%v/v) Steady	VOLATILES: PID Peak (ppm)	Product thickness (mm)	FLOW DATA: Flow rate (l/hr) Peak	Flow rate (l/hr) Steady	Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Qhg per borehole: Methane (l/hr)	CO2 (l/hr)	WELL AND WATER DATA: Water level (mbgl)	Depth of well (m)	Top of BH (mAOD)	Water level (mAOD)	Response Zone	Comments
WS01	**ND**	ND	ND	ND	0.8	**0.7**	1	1	1	1	17.5	17.5	ND	ND	ND	ND	ND	ND	0.0001	0.0007	DRY	1.01	153.99	DRY	0.5-1	
WS03	**ND**	ND	ND	ND	ND	ND	3	3	1	1	20.1	20.1	ND	ND	ND	ND	ND	ND	0.0001	0.0001	2.15	2.49	147.75	145.60	0.5-2.5	
WS05	**ND**	ND	ND	ND	0.9	**0.9**	1	1	2	2	8.1	8.1	ND	ND	100.1	ND	>>>	150	0.1001	0.0009	1.52	3.00	147.32	145.80	1-3	
WS06	**ND**	ND	ND	ND	4.7	**4.7**	5	5	1	1	11.2	11.2	ND	ND	23.0	0.7	195.0	60	0.0230	0.0329	1.29	4.00	147.72	146.43	1-4	
WS07	**ND**	ND	ND	ND	ND	ND	1	1	1	1	19.7	19.7	ND	ND	ND	ND	ND	ND	0.0001	0.0001	2.24	2.99	149.04	146.80	1-3	
WS09	**ND**	ND	ND	ND	ND	ND	1	1	1	1	20.6	20.6	ND	ND	ND	ND	ND	ND	0.0001	0.0001	DRY	1.07			0.5-1	
WS12	**ND**	ND	ND	ND	ND	ND	1	1	3	3	17.2	17.2	ND	ND	178.0	ND	12.0	1	0.1780	0.0001	1.25	1.64			0.7-1.7	Cover flooded, so bung removed and water drained. Monitored c. 1.5 hours later
WS13	**ND**	ND	ND	ND	2.0	**2.0**	1	1	ND	ND	16.0	16.0	ND	ND	ND	ND	ND	ND	0.0001	0.0020	1.72	2.60	142.50	140.78	0.7-2.7	
RO01	**ND**	ND	ND	ND	2.7	**2.7**	1	1	2	2	12.7	12.7	ND	ND	ND	ND	ND	ND	0.0001	0.0027	8.32	11.05	155.60	147.28	3-12	
RO02	**ND**	ND	ND	ND	1.1	**1.1**	5	5	1	1	4.1	4.1	ND	ND	ND	ND	ND	ND	0.0001	0.0011	4.19	5.43	143.07	138.88	3-6	
RO03	**ND**	ND	ND	ND	ND	ND	1	1	2	2	20.1	20.1	ND	ND	103.0	2.8	>>>	180	0.1030	0.0028	5.32	10.03	145.13	139.81	1-10	
Max	**ND**	**ND**	**ND**	**ND**	**4.7**	**4.7**	**5**	**5**	**3**	**3**	**20.6**	**20.6**	**ND**	**ND**	**178.0**	**2.8**	**195.0**	**180**	**0.1780**	**0.0329**	**8.32**			**147.28**		
Min	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**1**	**1**	**ND**	**ND**	**4.1**	**4.1**	**ND**	**ND**	**23.0**	**0.7**	**ND**	**ND**	**0.0001**	**0.0001**	**DRY**			**DRY**		

ND - Not detected

NR - Not recorded

NB: Where no flow (ND) recorded, Qhg values are calculated using equiment limit of detection (0.1l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

METEOROLOGICAL AND SITE INFORMATION: (Select correct box with X or enter data, as applicable)

State of ground:		Dry		Moist	x	Wet		Snow		Frozen
Wind:	x	Calm		Light		Moderate		Strong		
Cloud cover:		None		Slight	x	Cloudy		Overcast		
Precipitation:	x	None		Slight		Moderate		Heavy		
Time monitoring performed:			10:00	Start			11:50	End		
Barometric pressure (mbar):			998	Start			998	End		
Pressure trend (Daily):				Falling	x	Steady		Rising		
Source:	https://www.timeanddate.com/weather/@2637753/historic									
Air Temperature (Deg. C):			4	Before			4	After		

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter: GFM430 (BM51)
Gas Range: **CH_4** 0 - 100% **CO_2** 0 - 100% **O_2** 0 - 25%
Gas Flow range: +100/-50 l/hour
Differential Pressure: (+/-) 1000 Pa
Date of last external calibration: 14/10/2020 **Date of last in-house calibration:** 21/08/2020
Date of next external calibration 14/10/2021

Ambient air check: **CH_4** 20.2 **CO_2** 0 **O_2** 0

PID: LE76
Calibrated range: 5
Calibration gas: Benzene C6H6
Response time: 2 seconds
Accuracy: (+/-) 3% displayed reading
Date of last external calibration: 26/11/2020 **Date of last in-house calibration:** 21/08/2020
Date of next external calibration 26/11/2021

Ground Gas and Groundwater Monitoring Record Sheet

Summary of all gas monitoring events

JOB DETAILS:

Client: Paramount Retail Group Holdco Limited **Job No:** C7340
Site: Greenside Mills, Skelmanthorpe
Start Date: 29/10/2020
End Date: 08/12/2020 **No. events:** 4

	GAS CONCENTRATIONS												PID	FLOW DATA						Max. Qhg Recorded		Worst-credible Qhg		Comments
Monitoring Point	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppmv)		Hydrogen sulphide (ppmv)		Oxygen (%v/v)		Peak (ppm)	Peak flow rate (l/hr)		Steady flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Methane (l/hr)	CO2 (l/hr)	
	Peak	Steady	Peak	Steady	Peak	**Steady**	Peak	Steady	Peak	Steady	Min.	Steady		Max.	Min.	Max.	Min.						
WS01	**ND**	ND	ND	ND	1.8	**1.8**	1	1	1	1	17.5	17.5	ND	ND	ND	ND	ND	ND	ND	0.0001	0.0018	0.0001	0.0018	
WS03	**ND**	ND	ND	ND	0.4	**0.4**	3	3	1	1	20.0	20.0	ND	ND	ND	ND	ND	ND	ND	0.0001	0.0004	0.0001	0.0004	
WS05	**ND**	ND	ND	ND	4.2	**4.1**	1	1	2	2	8.1	8.1	ND	100.1	ND	ND	ND	35.0	150	0.1001	0.0034	0.1001	0.0041	
WS06	**ND**	ND	ND	ND	5.6	**5.6**	5	5	1	1	11.2	11.2	ND	23.0	-6.0	0.7	ND	195.0	161	0.0230	0.0329	0.0230	0.0392	
WS07	**ND**	ND	ND	ND	0.5	**0.4**	1	1	1	1	19.7	19.7	ND	ND	ND	ND	ND	ND	ND	0.0001	0.0004	0.0001	0.0004	
WS09	**ND**	ND	ND	ND	1.7	**1.7**	1	1	1	1	15.9	16.4	ND	1.0	ND	ND	ND	ND	1	0.0010	0.0016	0.0010	0.0017	
WS12	**ND**	ND	ND	ND	0.1	**ND**	1	1	3	3	17.2	17.2	0.1	178.0	ND	ND	ND	12.0	10	0.1780	0.0001	0.1780	0.0001	
WS13	**ND**	ND	ND	ND	2.2	**2.2**	1	1	ND	ND	16.0	16.0	ND	ND	ND	ND	ND	ND	ND	0.0001	0.0022	0.0001	0.0022	
RO01	**ND**	ND	ND	ND	7.3	**7.2**	1	1	2	2	2.3	2.4	ND	ND	ND	ND	ND	ND	ND	0.0001	0.0072	0.0001	0.0072	
RO02	**ND**	ND	ND	ND	3.1	**2.0**	5	5	1	1	4.1	4.1	ND	ND	ND	ND	ND	ND	ND	0.0001	0.0020	0.0001	0.0020	
RO03	**ND**	ND	ND	ND	10.2	**10.2**	1	1	2	2	1.5	1.5	ND	103.0	ND	2.8	ND	144.0	455	0.1030	0.0028	0.1030	0.2856	
Max	**ND**	**ND**	**ND**	**ND**	**10.2**	**10.2**	**5**	**5**	**3**	**3**	**20.0**	**20.0**	**0.1**	**178.0**	**-6.0**	**2.8**	**ND**	**195.0**	**455**	**0.1780**	**0.0329**	**0.1780**	**0.2856**	
Min	**ND**	**ND**	**ND**	**ND**	**0.1**	**ND**	**1**	**1**	**ND**	**ND**	**1.5**	**1.5**	**ND**	**ND**	**-6.0**	**ND**	**ND**	**ND**	**ND**	**0.0001**	**0.0001**	**0.0001**	**0.0001**	

ND - Not detected
NR - Not recorded

Worst-possible Qhg

0.1780	**0.2856**

Qhg calculated for methane on the basis of peak flow and concentration (short-term explosive risk).
Qhg calculated for carbon dioxide on the basis of steady flow and concentration (risk of long-term accumulation of suffocating mixture).
For calculation purposes, it is assumed that negative flows could be realised as positive flows.
Max. Qhg recorded is the highest Qhg determined in any individual monitoring event.
Worst-credible Qhg is the value calculated from the highest concentration and flow recorded in any monitoring event for an individual borehole.
Worst-possible Qhg is the value calculated from the highest concentration and flow recorded in any monitoring event for any borehole.

Ground Gas and Groundwater Monitoring Record Sheet

Summary of Groundwater Data

JOB DETAILS:

Client: Paramount Retail Group Holdco Limited **Job No:** C7340
Site: Greenside Mills, Skelmanthorpe
Start Date: 29/10/2020
End Date: 08/12/2020 **No. events:** 4

Monitoring Point	Product thickness (mm)	Water level (mbgl)		Water level (mAOD)		Water level range (m)	Response zone
	Max.	Max.	Min.	Max.	Min.		
WS01	ND	DRY or NR	DRY or NR	153.99	DRY or NR	Can't calc.	0.5-1
WS03	ND	2.19	2.14	147.75	145.56	0.05	0.5-2.5
WS05	ND	1.73	1.23	147.32	145.59	0.50	1-3
WS06	ND	1.47	1.29	147.72	146.25	0.18	1-4
WS07	ND	2.55	2.24	149.04	146.49	0.31	1-3
WS09	ND	1.08	DRY or NR	DRY or NR	DRY or NR	Can't Calc.	0.5-1
WS12	ND	1.59	1.25	DRY or NR	DRY or NR	0.34	0.7-1.7
WS13	ND	1.78	1.24	142.50	140.72	0.54	0.7-2.7
RO01	ND	8.92	6.40	155.60	146.68	2.52	3-12
RO02	ND	4.27	4.19	143.07	138.80	0.08	3-6
RO03	ND	5.51	2.83	145.13	139.62	2.68	1-10
Max.	**ND**	**8.92**	**6.40**	**155.60**	**146.68**	**2.68**	
Min.	**NR**	**NR**	**DRY or NR**	**DRY or NR**	**DRY or NR**	**0.05**	

APPENDIX H

SIRIUS GENERIC ASSESSMENT CRITERIA

SIRIUS GENERIC ASSESSMENT CRITERIA

Context

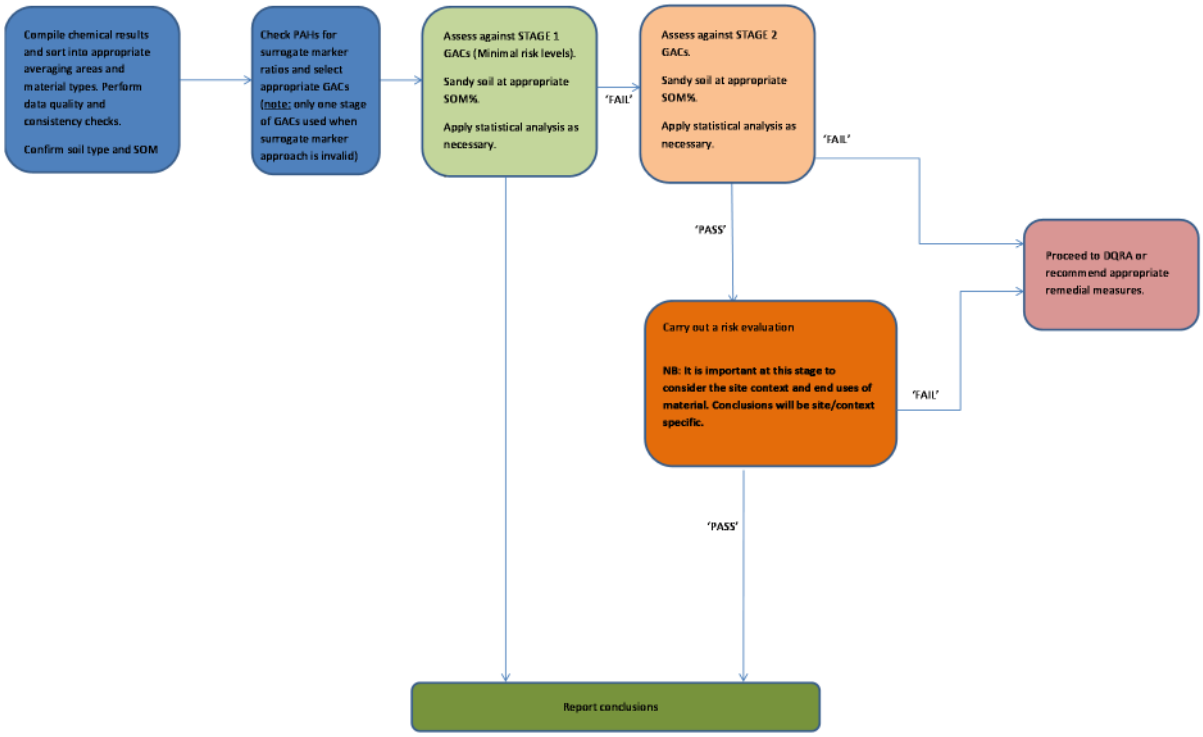
The framework for conducting site investigations, risk assessments and undertaking any necessary remedial works in the UK is provided by Environment Agency report CLR11 "Model Procedures for the Management of Contaminated Land". This presents a phased approach to risk assessment, involving: identification and qualitative assessment of potential pollutant linkages (source-pathway-receptor relationships) by means of a Conceptual Site Model; Generic Quantitative Risk Assessment (GQRA) of potentially significant pollutant links by comparing contaminant concentrations with appropriate Generic Assessment Criteria (GAC) values; and, if required, a Detailed Quantitative Risk Assessment (DQRA) based on site-specific conditions.

Assessment of Risk to Human Health

Introduction

A staged approach to GQRA has been adopted by Sirius for the evaluation of soil concentration data, as shown schematically in Figure 1.

Figure 1. GQRA Process.



The first stage of GQRA comprises assessment of the data against GAC values derived using toxicological parameter values based on "minimum risk". Any contaminants exceeding their GACs at this stage are further assessed against Stage 2 GACs, which have been derived using Low Level of Toxicological Concern (LLTC) criteria, where these are available.

With appropriate justification, a contaminant concentration that does not exceed the relevant Stage 2 GAC value may be considered to indicate that the land is "suitable for use". The appropriate use of LLTC-based criteria within the planning regime is considered reasonable by government agencies, as most recently highlighted in the letter (dated 3rd September 2014) to all local authorities from Lord de Mauley, Parliamentary Under Secretary at DEFRA.

A narrative "risk evaluation" must therefore accompany any Stage 2 assessment to justify the conclusions drawn. Where appropriate, this may provide a basis for eliminating from further consideration those contaminants whose concentrations do not exceed the applicable Stage 2 GAC value.

For the specific case of lead, the Category 4 Screening Level criteria given in CL:AIRE (2014)[1] have been adopted directly as GACs, as these are considered to be based on expert interpretation of current toxicological evidence.

In some areas, background concentrations of lead, other metals and metalloids, and/or individual PAHs may exceed their respective GACs and it may be appropriate to consider relative site and background concentration data as part of a more detailed assessment of the data.

Derivation of GACs

Except where otherwise stated, GACs have been derived by Sirius using CLEA version 1.071.

The GAC values have been derived for a sandy soil type, which will be conservative for the majority of soils (including made ground) encountered on historically contaminated sites. For organic contaminants of concern, criteria have been derived for a number of Soil Organic Matter (SOM) contents.

Genotoxic PAHs are assessed by the "Surrogate Method" using benzo(a)pyrene. Further information on this approach is given below.

Unless specifically stated, chemical properties and Health Criteria Values (HCVs) were obtained from:

- Environment Agency Science Report SC050021 series;
- Nathanail *et al*. (2009) "The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment", 2nd edition, Land Quality Press, Nottingham;
- CL:AIRE - AGS - EIC (2010) "Soil Generic Assessment Criteria for Human Health Risk Assessment". CL:AIRE, London.

GACs for arsenic, benzene, benzo(a)pyrene, cadmium and chromium (VI) have been derived using the

[1] CL:AIRE (2014) "Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination", Report SP1010, rev. 2.

Low Level of Toxicological Concern (LLTC) criteria given in CL:AIRE (2013). These criteria are considered a reasonable basis for assessment as they are still highly precautionary and definitely do not approach an intake level that could be defined as approaching Significant Possibility of Significant Harm to human health in the context of Part 2A of the Environmental Protection Act 1990. It must be further understood that the GACs derived will still incorporate a residual level of conservatism resulting from the exposure parameters used and the assumptions inherent in the model algorithms.

GACs for Genotoxic PAHs

Our approach to the assessment of genotoxic PAHs retains the use of benzo(a)pyrene as a surrogate marker. This approach for genotoxic PAHs is recommended by the HPA (2010)[2], which we consider to be the authoritative current guidance produced by a UK expert body and note that it was retained in the DEFRA Category 4 Screening Levels project (CL:AIRE, 2014).

The surrogate marker approach allows the assessment of the combined carcinogenic risk associated with all genotoxic PAHs[3] present as a mixture within soil, even though detailed toxicological information for many of the individual compounds may be lacking. The approach is based on determining the risk posed by the genotoxic PAH mixture using the concentration of benzo(a)pyrene present as an indicator.

To use the GAC for benzo(a)pyrene as a surrogate marker, a number of requirements must be met (HPA, 2010):

- Benzo(a)pyrene must be present in all soil samples containing genotoxic PAHs for which this method of assessment is being used;
- A similar profile of the genotoxic PAHs relative to benzo(a)pyrene should be present in all of the samples being assessed;
- The PAH profile of PAHs in the soil samples should be similar to that present in the pivotal toxicity study on which toxicological criterion for benzo(a)pyrene was based (Culp et al., 1998[4]). Table 1 provides the basis for defining the acceptable range.

Data indicate that contaminated soils in the UK generally meet these criteria[5] but the assessor must review their dataset before adopting this approach. If the above criteria are not met, then the surrogate marker approach must not be adopted and individual GAC or SSAC values are to be applied.

[2] HPA (2010) "Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)", version 5.

[3] The genotoxic PAHs included in the USEPA PAH 16 analysis reported by analytical labs are: benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, benzo(a)pyrene, chrysene, dibenz[a,h]anthracene and indeno[1,2,3-c,d]pyrene.

[4] Culp, S. *et al*. (1998) Carcinogenesis, 19, 117-124.

[5] Bull, S. & Collins, C. (2013) Environ. Geochem. Health, 31, 101-109.

Table 1. Profile of Genotoxic PAHs Relative to Benzo(a)pyrene that are Considered Acceptable for Application of Benzo(a)pyrene as a Surrogate Marker.

PAH	Acceptable Ratio of PAH Concentration to Benzo(a)pyrene for Application of Surrogate Marker Assessment	
	Lower Limit	Upper Limit
Benz[a]anthracene	0.12	12.43
Benzo[b]fluoranthene	0.11	10.85
Benzo[k]fluoranthene	0.04	3.72
Benzo[g,h,i]perylene	0.08	8.22
Chrysene	0.12	11.61
Dibenz[a,h]anthracene	0.01	1.38
Indeno[1,2,3-c,d]pyrene	0.07	7.27

For further information see: HPA (2010).

Soil Criteria Set for Purposes Other Than Human Health Protection

The Sirius GACs for sulphate, total organic carbon (TOC) and calorific value are set on basis of risks other than human health and their exceedance does not indicate a potential risk to future site users:

- The GAC for sulphate content is based on potential detrimental effects on buried concrete[6] and must be assessed with reference to the soil pH;
- The GAC for TOC content is provided for indicative assessment of disposal options if off-site landfill of soil were to be considered. This GAC is set at the 'Inert' waste threshold and should be considered as being applied for information purposes only;
- The GAC for calorific value is set to assist in an initial assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

Assessment criteria more stringent than those for human health may be set for specific purposes, for example, elimination of nuisance odours or ensuring that potentially mobile free-phase organic products are not present.

Controlled Waters

The Environment Agency's "Remedial Targets Methodology" (2006) provides a framework for assessing the potential for pollution of controlled waters and for deriving remedial target concentrations in soil and groundwater.

There are no generic groundwater or surface water quality standards that are applicable to all sites. Drinking Water Standards and Environmental Quality Standards (EQS) are used by Sirius as assessment criteria where they are appropriate to the contaminant linkages under consideration. Given that these standards apply at the receptor point, this is a conservative approach for samples collected at a source or along a transport pathway.

[6] BRE (2005) "Concrete in Aggressive Ground", Special Digest No. 1; 3rd Edition.

Soil Leachability

Sirius specifies that the analytical laboratory undertakes leachate preparation by BS EN 12475-2:2002. Where specific circumstances require a different method to be used, then this will be explained and justified within the report body text.

The results of leachate analysis are compared to the relevant GAC values for controlled waters.

The Sirius Group
Stage 1 Generic Assessment Criteria for Soils

Revision: 24 January 2020

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
Metals/Metalloids										
Arsenic (inorganic)	37			40			630			[1]
Cadmium	11			85			190			[2]
Chromium (III)	910			4000			8600			
Chromium (VI)	6.0			6.1			33			[3]
Copper	200			7100			68000			[4]
Lead	200			310			2300			[5]
Mercury (inorganic)	40			56			1100			[6]
Nickel	130			180			980			[7]
Selenium	250			430			12000			
Vanadium	410			1200			9000			
Zinc	450			40000			750000			[4]
Other Inorganics										
pH	<5 or >9			<5 or >9			<5 or >9			
Total Sulphate	2400			2400			2400			[8]
Water-Soluble Sulphate	0.5 g/l			0.5 g/l			0.5 g/l			[8]
Free Cyanide	34			34			1400			[9]
Organics										
PAHs										
Acenaphthene	200	490	920	2000	3600	4900	75000	92000	100000	
Acenaphthylene	170	400	760	2000	3600	4900	76000	93000	100000	
Anthracene	2300	5300	9400	30000	34000	36000	520000	540000	540000	[10]
Benzo(a)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(a)pyrene	2.1	2.1	2.2	2.3	2.3	2.3	27	27	27	[11]
Benzo(b)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(k)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(g,h,i)perylene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Chrysene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Dibenzo(a,h)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Fluoranthene	280	560	820	1500	1600	1600	23000	23000	23000	
Fluorene	170	390	730	2200	3400	4000	60000	67000	70000	
Indeno(1,2,3-c,d)pyrene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Naphthalene	1.0	2.3	4.6	1.0	2.4	4.7	110	260	510	
Phenanthrene	95	220	380	1300	1400	1500	22000	22000	23000	
Pyrene	620	1200	1900	3700	3800	3800	54000	54000	54000	
BTEX and related										
Benzene	0.063	0.13	0.24	0.16	0.30	0.38	15	28	49	
Toluene	100	240	460	370	830	1100	33000	68000	110000	
Ethylbenzene	26	62	120	34	81	110	3200	7400	14000	
Xylenes (total)	28	67	130	33	78	110	3200	7700	15000	[12]
1,2,4-trimethylbenzene	0.22	0.53	1.1	0.24	0.58	1.2	39	93	170	
Iso-propylbenzene	6.6	16	32	6.8	17	33	1300	3100	6100	
Propylbenzene	21	51	100	23	57	110	3800	9100	17000	
Styrene	6.9	16	32	21	49	93	3100	6100	9500	
TPH										
Aliphatic EC 5-6	24	41	68	24	41	68	2400	4100	6900	
Aliphatic EC >6-8	53	110	210	53	110	210	5300	11000	21000	
Aliphatic EC >8-10	13	31	61	13	31	61	1300	3100	6000	
Aliphatic EC >10-12	62	150	300	62	150	300	6100	15000	28000	
Aliphatic EC >12-16	510	1200	2300	510	1200	2300	43000	72000	85000	
Aliphatic EC >16-35	41000	70000	90000	42000	70000	90000	>1E6	>1E6	>1E6	[13]
Aromatic EC >5-7	53	110	200	150	300	538	15000	28000	48000	
Aromatic EC >7-8	100	240	460	370	820	1500	33000	68000	110000	
Aromatic EC >8-10	20	48	94	22	54	100	2200	5200	9800	
Aromatic EC >10-12	63	150	290	120	290	560	11000	22000	30000	
Aromatic EC >12-16	140	320	570	1100	1900	2200	35000	37000	37000	
Aromatic EC >16-21	260	540	840	1800	1900	1900	28000	28000	28000	
Aromatic EC >21-35	1100	1500	1700	1900	1900	1900	28000	28000	28000	
Chlorinated Organics										
Chlorobenzene	0.19	0.44	0.86	0.19	0.45	0.87	31	71	140	
Dichloromethane (DCM)	0.47	0.78	1.2	1.2	1.7	2.4	250	340	470	
1,1-dichloroethane (DCA)	1.4	2.4	4.0	1.4	2.4	4.1	260	420	690	
1,2-dichloroethane (DCA)	0.0031	0.0048	0.0076	0.0035	0.0053	0.0084	0.34	0.51	0.81	
1,1-dichloroethene (DCE)	0.15	0.26	0.45	0.15	0.26	0.46	24	43	74	
cis -1,2-dichloroethene (DCE)	0.066	0.12	0.20	0.069	0.12	0.21	14	23	38	
trans -1,2-dichloroethene (DCE)	0.11	0.21	0.38	0.12	0.22	0.39	21	37	65	
Pentachlorophenol	0.21	0.52	1.0	27	30	31	400	400	400	
1,1,1,2-tetrachloroethane	0.56	1.3	2.6	0.63	1.5	2.9	59	140	270	

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
1,1,2,2-tetrachloroethane	0.98	2.1	4.0	1.6	3.4	6.3	150	310	570	
Tetrachloroethene (PCE)	0.074	0.17	0.32	0.07	0.17	0.33	10	23	45	
Tetrachloromethane (CT)	0.011	0.024	0.046	0.011	0.024	0.046	1.6	3.6	6.9	
1,1,1-trichloroethane (TCA)	3.7	7.8	15	3.8	7.9	15	370	770	1400	
1,1,2-trichloroethane (TCA)	0.39	0.85	1.6	0.51	1.1	2.0	89	180	320	
Trichloroethene (TCE)	0.0070	0.015	0.028	0.0071	0.015	0.028	1.5	2.8	44	
Trichloromethane (CF)	0.43	0.80	1.4	0.48	0.89	53	98	170	300	
Vinyl Chloride	0.00034	0.00045	0.00062	0.00037	0.00048	0.00066	0.038	0.049	0.068	
Miscellaneous Organics										
Carbon disulphide	0.066	0.13	0.25	0.066	0.13	0.25	6.7	14	25	
Di-(2-ethylhexyl)-phthalate	290	660	1100	3900	4000	4100	85000	85000	8600	
MTBE	31	55	94	39	68	120	7400	12000	19000	
Phenol	110	190	330	420	440	440	440			[14]
Methylphenols (cresols), total	78	170	330	5600	8200	9900	160000	170000	18000	[15]
2,4-dimethylphenol (m-xylenol)	18	43	82	200	430	720	15000	23000	28000	
Other Parameters										
TOC	3% w/w			3% w/w			3% w/w			[16]
Calorific Value	2 MJ/kg			2 MJ/kg			2 MJ/kg			[17]
Asbestos	Fibres present			Fibres present			Fibres present			

All concentration-based criteria are rounded to 2 significant figures.

The criteria assume a sandy soil type, which will be conservative for the great majority of soils (including made ground) encountered on historically contaminated sites.

Except where otherwise stated, criteria have been derived by Sirius using CLEA version 1.06. Parameters for the land use cases are consistent with those given in Environment Agency (2009) "Updated Technical Background to the CLEA Model", report SC050021/SR3 but updated (where relevant) for respiration rate, exposure frequency for dermal contact outdoors, soil adherence factors for children, and plant uptake concentration factors given in CL:AIRE (2014) and Nathanail et al., (2015). No correction has been made for the "Top Two" crop types in the Residential with Homegrown Produce land use and the criteria will therefore be conservative in this regard.

Health Criteria Values (HCVs) and (except where specifically noted) chemical property data were obtained from:
• Environment Agency Science Report SC050021 Series;
• Nathanail et al. (2015);
• CL:AIRE-AGS-EIC (2010).

Footnotes

[1] Based on oral GAC as this is the lower GAC and reflects a cancer risk many orders of magnitude greater than for inhalation.

[2] Determined for lifetime exposure. Plant uptake concentration factors applied were as given in CL:AIRE (2014). The GAC values are based on data for soils having a pH value in the range 6-8; caution should be applied in applying them at pH values outside this range, especially at pH values <5.

[3] Both oral and inhalation HCVs are based on local toxicological effects and therefore the lowest (oral) GAC value is adopted.

[4] For the Residential with Homegrown Produce land use, the GAC values for Cu and Zn are based on potential phytotoxic effects and have been set at the maximum allowable concentrations for sewage sludge-amended soils presented in the "Sludge (Use in Agriculture) Regulations" (SI 1263/1989); these criteria may also be applied in any land use where plants are to be grown. The equivalent GAC values for human health protection in the Residential with Homegrown Produce land use are around an order of magnitude greater.

[5] The Category 4 Screening Levels for lead defined in CL:AIRE (2013) have been adopted directly to provide an acceptable basis for initial assessment of data. Where background concentrations of lead exceed the GAC value, then site-specific evaluation will be required.

[6] The SGV for mercury is based on inorganic mercury which represents the most common form encountered within the environment. This is considered appropriate for most sites as: "…the SGV for inorganic mercury can normally be compared with chemical analysis for total mercury content because the equilibrium concentrations of elemental and methylmercury compounds are likely to be very low" (Environment Agency report SC050021/Mercury SGV). Analysis and specific assessment for elemental or methylated forms of mercury will need to be considered if historical land use or site-specific factors indicate that these forms of mercury are likely to be present.

[7] Toxicological effects by inhalation are localised, therefore the lower of the GAC values for oral and inhalation HCVs have been adopted.

[8] BRE (2005). Sulphate is not considered to pose a potential risk to human health under normal circumstances – this GAC applies to construction cases only and is set at the upper limit for DS-1 Design Sulphate Class concrete.

[9] GAC calculated for acute risk. Further information can be provided upon request.

[10] The genotoxic PAHs (benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene) are routinely assessed using benzo(a)pyrene as a surrogate (HPA (2010) "Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)", version 5). Separate information on this approach is provided.

[11] Calculated using a 'minimum risk' oral index dose derived from the application of a 10,000x safety factor to the BMD10 presented in CL:AIRE (2014) for benzo(a)pyrene as a surrogate marker and the inhalation index dose specified in CL:ARE (2014) and Nathanail *et al*. (2015). As a conservative measure, the GAC is based on combined exposure pathways to account for systemic carcinogenic effects. Further information on the derivation can be provided upon request.

[12] For screening purposes, a single GAC has been set for total xylene. This is the lowest of the values calculated for the three individual xylene isomers.

[13] "No GAC" indicates that no value has been specified for this land use as the TDSI cannot be exceeded at achievable soil concentrations.

[14] 440mg/kg is the minimum concentration that is protective for direct skin contact with phenol (See Environment Agency SR050021/Phenol SGV) and is adopted where GACs for chronic exposure are higher.

[15] For screening purposes, a single GAC has been set for total methylphenol. This is the lowest of the values calculated for the three individual methylphenol isomers.

[16] The Hazardous Waste (England and Wales) Regulations 2005. TOC content in itself does not represent a potential risk to human health. This GAC is provided for indicative assessment of disposal options, in the case that off-site landfill of soil is undertaken. This GAC is specified at the 'Inert' waste threshold and should be considered as for information purposes only.

[17] ICRCL (1986) Guidance Note 61/84, 2nd Edition, Notes on the Fire Hazards of Contaminated Land. Calorific value is not an indication of direct human health risk but may be useful in assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

The Sirius Group
Stage 2 Generic Assessment Criteria for Soils

Revision: 24th January 2020

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
Metals/Metalloids										
Arsenic (inorganic)	37			40			630			[1]
Cadmium	18			150			410			[2]
Chromium (III)	910			4000			8600			
Chromium (VI)	21			21			49			[3]
Copper	200			7100			68000			[4]
Lead	200			310			2300			[5]
Mercury (inorganic)	40			56			1100			[6]
Nickel	130			180			980			[7]
Selenium	250			430			12000			
Vanadium	410			1200			9000			
Zinc	450			40000			750000			[4]
Other Inorganics										
pH	<5 or >9			<5 or >9			<5 or >9			
Total Sulphate	2400			2400			2400			[8]
Water-Soluble Sulphate	0.5 g/l			0.5 g/l			0.5 g/l			[8]
Free Cyanide	34			34			1400			[9]
Organics										
PAHs										
Acenaphthene	200	490	920	2000	3600	4900	75000	92000	100000	
Acenaphthylene	170	400	760	2000	3600	4900	76000	93000	100000	
Anthracene	2300	5300	9400	30000	34000	36000	520000	540000	540000	[10]
Benzo(a)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(a)pyrene	4.9	4.9	4.9	5.3	5.3	5.3	76	76	76	[11]
Benzo(b)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(k)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(g,h,i)perylene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Chrysene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Dibenzo(a,h)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Fluoranthene	280	560	820	1500	1600	1600	23000	23000	23000	
Fluorene	170	390	730	2200	3400	4000	60000	67000	70000	
Indeno(1,2,3-c,d)pyrene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Naphthalene	1.0	2.3	4.6	1.0	2.4	4.7	110	260	510	
Phenanthrene	95	220	380	1300	1400	1500	22000	22000	23000	
Pyrene	620	1200	1900	3700	3800	3800	54000	54000	54000	
BTEX and related										
Benzene	0.13	0.27	0.50	0.37	0.71	1.30	15	29	51	[12]
Toluene	100	240	460	370	830	1100	33000	68000	110000	
Ethylbenzene	26	62	120	34	81	110	3200	7400	14000	
Xylenes (total)	28	67	130	33	78	110	3200	7700	15000	[13]
1,2,4-trimethylbenzene	0.22	0.53	1.1	0.24	0.58	1.2	39	93	170	
Iso-propylbenzene	6.6	16	32	6.8	17	33	1300	3100	6100	
Propylbenzene	21	51	100	23	57	110	3800	9100	17000	
Styrene	6.9	16	32	21	49	93	3100	6100	9500	
TPH										
Aliphatic EC 5-6	24	41	68	24	41	68	2400	4100	6900	
Aliphatic EC >6-8	53	110	210	53	110	210	5300	11000	21000	
Aliphatic EC >8-10	13	31	61	13	31	61	1300	3100	6000	
Aliphatic EC >10-12	62	150	300	62	150	300	6100	15000	28000	
Aliphatic EC >12-16	510	1200	2300	510	1200	2300	43000	72000	85000	
Aliphatic EC >16-35	41000	70000	90000	42000	70000	90000	>1E6	>1E6	>1E6	[14]
Aromatic EC >5-7	53	110	200	150	300	530	15000	28000	48000	
Aromatic EC >7-8	100	240	460	370	820	1500	33000	68000	110000	
Aromatic EC >8-10	20	48	94	22	54	100	2200	5200	9800	
Aromatic EC >10-12	63	150	290	120	290	560	11000	22000	30000	
Aromatic EC >12-16	140	320	570	1100	1900	2200	35000	37000	37000	
Aromatic EC >16-21	260	540	840	1800	1900	1900	28000	28000	28000	
Aromatic EC >21-35	1100	1500	1700	1900	1900	1900	28000	28000	28000	
Chlorinated Organics										
Chlorobenzene	0.19	0.44	0.86	0.19	0.45	0.87	31	71	140	
Dichloromethane (DCM)	0.47	0.78	1.2	1.2	1.7	2.4	250	340	470	
1,1-dichloroethane (DCA)	1.4	2.4	4.0	1.4	2.4	4.1	260	420	690	
1,2-dichloroethane (DCA)	0.0031	0.0048	0.0076	0.0035	0.0053	0.0084	0.34	0.51	0.81	
1,1-dichloroethene (DCE)	0.15	0.26	0.45	0.15	0.26	0.46	24	43	74	
cis -1,2-dichloroethene (DCE)	0.066	0.12	0.20	0.069	0.12	0.21	14	23	38	
trans -1,2-dichloroethene (DCE)	0.11	0.21	0.38	0.12	0.22	0.39	21	37	65	
Pentachlorophenol	0.21	0.52	1.0	27	30	31	400	400	400	
1,1,1,2-tetrachloroethane	0.56	1.3	2.6	0.63	1.5	2.9	59	140	270	

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
1,1,2,2-tetrachloroethane	1.0	2.1	4.0	1.6	3.4	6.3	150	310	570	
Tetrachloroethene (PCE)	0.074	0.17	0.32	0.074	0.17	0.33	10	23	45	
Tetrachloromethane (CT)	0.011	0.024	0.046	0.011	0.024	0.046	1.6	3.6	7	
1,1,1-trichloroethane (TCA)	3.7	7.8	15	3.8	7.9	15	370	770	1400	
1,1,2-trichloroethane (TCA)	0.39	0.85	1.6	0.51	1.1	2.0	89	180	320	
Trichloroethene (TCE)	0.0070	0.015	0.028	0.0071	0.015	0.028	1.5	2.8	44	
Trichloromethane (CF)	0.43	0.80	1.4	0.48	0.89	53	98	170	300	
Vinyl Chloride	0.00034	0.00045	0.00062	0.00037	0.00048	0.00066	0.038	0.049	0.07	
Miscellaneous Organics										
Carbon disulphide	0.066	0.13	0.25	0.066	0.13	0.25	6.7	14	25	
Di-(2-ethylhexyl)-phthalate	290	660	1100	3900	4000	4100	85000	85000	8600	
MTBE	31	55	94	39	68	120	7400	12000	19000	
Phenol	110	190	330	420	440	440	440			[15]
Methylphenols (cresols), total	78	170	330	5600	8200	9900	160000	170000	18000	[16]
2,4-dimethylphenol (m-xylenol)	18	43	82	200	430	720	15000	23000	28000	
Other Parameters										
TOC	3% w/w			3% w/w			3% w/w			[17]
Calorific Value	2 MJ/kg			2 MJ/kg			2 MJ/kg			[18]
Asbestos	Fibres present			Fibres present			Fibres present			

All concentration-based criteria are rounded to 2 significant figures.

The criteria assume a sandy soil type, which will be conservative for the great majority of soils (including made ground) encountered on historically contaminated sites.

Except where otherwise stated, criteria have been derived by Sirius using CLEA version 1.06. Parameters for the land use cases are consistent with those given in Environment Agency (2009) “Updated Technical Background to the CLEA Model”, report SC050021/SR3 but updated (where relevant) for respiration rate, exposure frequency for dermal contact outdoors, soil adherence factors for children, and plant uptake concentration factors given in CL:AIRE (2014) and Nathanail et al. (2015). No correction has been made for the “Top Two” crop types in the Residential with Homegrown Produce land use and the criteria will therefore be conservative in this regard.

Health Criteria Values (HCVs) and (except where specifically noted) chemical property data were obtained from:
- Environment Agency Science Report SC050021 Series;
- CL:AIRE (2014)
- Nathanail et al. (2015);
- CL:AIRE-AGS-EIC (2010).

Footnotes

[1] Determined using LLTC value and plant uptake concentration factors given in CL:AIRE (2014). The oral GAC is adopted as this is the lower value and reflects a cancer risk many orders of magnitude greater than for inhalation.

[2] Determined for lifetime exposure using the LLTC value and plant uptake concentration factors given in CL:AIRE (2014). The GAC values are based on data for soils having a pH value in the range 6-8; caution should be applied in applying them at pH values outside this range, especially at pH values <5.

[3] Determined using LLTC value and plant uptake concentration factors given in CL:AIRE (2014). Both oral and inhalation LLTCs are based on local toxicological effects and therefore the lowest (oral) GAC value is adopted.

[4] For the Residential with Homegrown Produce land use, the GAC values for Cu and Zn are based on potential phytotoxic effects and have been set at the maximum allowable concentrations for sewage sludge-amended soils presented in the "Sludge (Use in Agriculture) Regulations" (SI 1263/1989); these criteria may also be applied in any land use where plants are to be grown. The equivalent GAC values for human health protection in the Residential with Homegrown Produce land use are around an order of magnitude greater.

[5] The Category 4 Screening Levels for lead defined in CL:AIRE (2013) have been adopted directly to provide an acceptable basis for initial assessment of data. Where background concentrations of lead exceed the GAC value, then site-specific evaluation will be required.

[6] The SGV for mercury is based on inorganic mercury which represents the most common form encountered within the environment. This is considered appropriate for most sites as: “…the SGV for inorganic mercury can normally be compared with chemical analysis for total mercury content because the equilibrium concentrations of elemental and methylmercury compounds are likely to be very low” (SC050021/Mercury SGV). Analysis and specific assessment for elemental or methylated forms of mercury will need to be considered if historical land use or site-specific factors indicate that these forms of mercury are likely to be present.

[7] Toxicological effects by inhalation are localised, therefore the lower of the GAC values for oral and inhalation HCVs have been adopted.

[8] BRE (2005). Sulphate is not considered to pose a potential risk to human health under normal circumstances – this GAC applies to construction cases only and is set at the upper limit for DS-1 Design Sulphate Class concrete.

[9] GAC calculated for acute risk. Further information can be provided upon request.

[10] The genotoxic PAHs (benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene) are routinely assessed using benzo(a)pyrene as a surrogate (HPA (2010) “Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)”, version 5). Separate information on this approach is provided.

[11] Determined using oral LLTC value (CL:AIRE, 2014) for assessment of all pathways to determine systemic carcinogenic effect; inhalation HCV and LLTC values are based on local pulmonary effects only and result in a less conservative GAC.

[12] Calculated using LLTC value (CL:AIRE, 2014).

[13] For screening purposes, a single GAC has been set for total xylene. This is the lowest of the values calculated for the three individual xylene isomers.

[14] “No GAC” indicates that no value has been specified for this land use as the TDSI cannot be exceeded at achievable soil concentrations.

[15] 440mg/kg is the minimum concentration that is protective for direct skin contact with phenol (See Environment Agency SR050021/Phenol SGV) and is adopted where GACs for chronic exposure are higher.

[16] For screening purposes, a single GAC has been set for total methylphenol. This is the lowest of the values calculated for the three individual methylphenol isomers.

[17] The Hazardous Waste (England and Wales) Regulations 2005. TOC content in itself does not represent a potential risk to human health. This GAC is provided for indicative assessment of disposal options, in the case that off-site landfill of soil is undertaken. This GAC is specified at the ‘Inert’ waste threshold and should be considered as for information purposes only.

[18] ICRCL (1986) Guidance Note 61/84, 2nd Edition, Notes on the Fire Hazards of Contaminated Land. Calorific value is not an indication of direct human health risk but may be useful in assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

GAC VALUES FOR CONTROLLED WATERS IN ENGLAND AND WALES

Parameter	GAC (µg/l, unless stated)			Notes
	Inland waters		Coastal and transition waters	
	EQS	DWS	EQS	
Metals and metalloids (dissolved)				
Arsenic	50	10	25	1
Cadmium	See separate table	5	0.2	1, 2
Chromium (total)	4.7	50	N.A.	1, 3
Copper	1.0 (bioavailable)	2000	3.76	1, 4
Lead	1.2 (bioavailable)	10	1.3	1, 4
Mercury	0.07	1.0	0.07	1, 4, 5
Nickel	4.0 (bioavailable)	20	8.6	1, 4
Zinc	10.9 (bioavailable) + background	5000	6.8 + background	1, 4, 6
Misc. inorganics				
Ammonia (total, as N)	See separate table	N.A.	N.A.	7
Ammonia (total, as $NH4^+$)	N.A.	500	N.A.	
Ammonia (un-ionised (NH3), as N)	N.A.	N.A.	21	7
Cyanide (free)	10	50	10	
Sulphate	N.A.	250 mg/l	N.A.	8
Petroleum hydrocarbons and related				
TPH (speciated analysis) *per fraction*	10	10	10	9, 10
Benzene	10	1.0	8	
Toluene	74	700	74	11
Xylenes (sum)	N.A.	500	N.A.	11
MTBE	2600	200	2600	12, 13
PAHs				
Anthracene	0.1	N.A.	0.1	
Benzo(b)fluoranthene + Benzo(k)fluoranthene (sum)	N.A.	Sum of 4 = 0.1	N.A.	
Benzo(g,h,i)perylene + indeno(1,2,3-c,d)pyrene (sum)	N.A.		N.A.	
Benzo(a)pyrene	1.7E-04	0.01	1.7E-04	
Fluoranthene	0.0063	N.A.	0.0063	
Naphthalene	2.0	N.A.	2.0	
Phenol				
Phenol	7.7	N.A.	7.7	
Chlorinated organics				
Dichloromethane	20	N.A.	20	
Trichloromethane (chloroform)	2.5	100	2.5	14
Tetrachloromethane (carbon tetrachloride)	12	3.0	12	
1,2-dichloroethane (1,2-DCA)	10	3.0	10	

Cadmium - inland waters EQS	
Hardness (as mg/l CaCO3)	EQS (µg/l)
<40	0.08
40-50	0.08
50-100	0.09
100-200	0.15
>=200	0.25

Ammonia - inland waters EQS		
Alkalinity (as mg/l CaCO3)	Altitude	EQS (µg/l)
<10	Any	300
10-50	Any	300
50-100	<80m	600
50-100	>80m	300
100-200	<80m	600
100-200	>80m	300
>200	Any	600

Parameter	GAC (µg/l, unless stated)			Notes
	Inland waters		Coastal and transition waters	
	EQS	DWS	EQS	
1,1,1-trichloroethane (1,1,1-TCA)	100	N.A.	100	
1,1,2-trichloroethane (1,1,2-TCA)	400	N.A.	300	
Trichloroethene (TCE)	10	Sum of 2 = 10	10	
Tetrachloroethene (PCE)	10		10	
Vinyl chloride	N.A.	0.5	N.A.	

Notes referenced in table:

1. Metals and metalloid EQS relate to dissolved contamination only (i.e. analysis of filtered samples).
2. Inland waters EQS for cadmium is dependent upon hardness or alkalinity of the receiving surface water. See separate table.
3. Separate EQS standards exist for Cr III and CrVI in fresh water. The fresh water Cr III has been value adopted as the screening value for total Cr analysis as it is normally the predominant form in solution. Specific EQS for Cr VI (3.4µg/l in freshwater; 0.6µg/l in transition and coastal waters) must be applied where relevant.
4. The bioavailable concentration of copper, nickel and zinc in fresh water is dependent upon the pH, DOC and calcium data for the receiving surface water. These data should be collected whenever possible to calculate an equivalent GAC for total metal concentration using the UKTAG m-BAT spreadsheet model. Although the standard indicates that lead should be assessed on a bioavilable basis, no tool is currently avaiable and this criterion should be applied as-is for screening purposes.
5. The value for mercury is the Maximum Acceptable Concentration (MAC) as no annual average EQS is specified in the legislation.
6. The EQS for zinc may be adjusted for the ambient uncontaminated background concentration in the receiving surface water where data are available.
7. EQS for ammonia in inland waters depends on the hardness and altitude of the receiving water body - see separate table. The criteria given here are based on the attainment of "good" chemical quality in the water body.
8. No EQS for sulphate appears in the referenced legislation.
9. No concentration-based EQS values currently exist for TPH. In the absence of specific criteria, our recent discussions with the Environment Agency have led us to adopt 10µg/l *for each individual fraction* determined by speciated TPH (TPHCWG) analysis.
10. No concentration-based DWS exists for TPH. A sum TPH concentration of 200µg/l defines the DW2 Class threshold limit in the Surface Water (Abstraction for Drinking Water) (Classification) Regulations 1996; DW2 waters are generally suitable for abstraction as drinking water supplies, subject to standard filtration and chemical treatment. We therefore consider that the 10µg/l criterion *for each fraction* provides a reasonable and proportionate basis for the initial assessment of risk posed to off-site groundwater and/or surface water potable abstractions that may be impacted at a downgradient abstraction point by TPH contamination originating from the site.
11. The drinking water-based criteria are from World Health Organisation (WHO) Guidelines for Drinking Water Quality, 2008. Taint may result at lower concentrations.
12. The "EQS" given here for MTBE is the PNEC value for fresh and sea water life given in: EU Risk Assessment Report (2002) MTBE, 3rd Priority List, volume 19.
13. DWS for MTBE is a 5-fold dilution of the USEPA (1997) Drinking Water Advisory value for taint, EPA-822-F-97-009. Toxicological thresholds are significantly higher.
14. Sum trihalomethanes limit for drinking water is 100µg/l but chloroform is only compound of this class normally encountered at contaminated sites.

Sources and general comments

Unless otherwise stated, EQS-based GACs are annual average surface water quality criteria given in Table 1 within Part 3 (Priority Substances) or long-term average criteria given in Table 1 within Part 2 (Specific Pollutants) of The Water Framework Directive (Standards and Classification) Directions (England and Wales), 2015.

Unless otherwise stated, drinking water standard-based GACs are taken from the Water Supply (Water Quality) Regulations 2016, and relate to concentration at the supply point and/or consumers' taps.

This list presents recommended GAC values for commonly monitored analytes but is not exhaustive. See the above-referenced legislation for the full lists of criteria.

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APPENDIX 2

Strategy for Remedial and Preparatory Works - Sirius

Geotechnical

STRATEGY FOR REMEDIAL AND PREPARATORY WORKS

Former Greenside Mills, Skelmanthorpe

For Lovell Partnerships Ltd

Date: **November 2023**

Report reference: C9297

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Drawing No.	Title	Scale
C9297/RS/01	Site Location Plan	1:25,000
C9297/RS/02	Site Features Plan	1:1,000
C9297/RS/03	Exploratory Hole Location Plan	1:1,000
C9297/RS/04	Proposed Remediation Plan	1:1,000
2156.01	Planning Layout (Revision N), STEN Architecture Ltd	1:500
21374 155 P10	External Levels Plan, Dudleys Structural and Civil Consultants	1:250

1. Introduction

Sirius Geotechnical Ltd was commissioned by Lovell Partnerships Ltd to produce a Remediation Strategy required to facilitate development of land at the Former Greenside Mills, Skelmanthorpe (the "site").

It is understood that Lovell are proposing the development of the site for 46 no. low rise (2-3 storey) residential properties with private gardens and associated infrastructure, including areas of hardstanding, access roads and public open space (POS). A proposed development layout has been provided to Sirius (STEN Architecture drawing ref. 2156.01 Rev N, last dated June 2023), a copy of which is included in Appendix A.

Review of the proposed development levels (as shown on Dudleys Structural and Civil Consultants, External Levels Plan, drawing ref. 21374 155 P10, last dated January 2023, a copy of which is included within Appendix A) indicates that proposed finished floor levels will range between 138.225m and 155.750m Above Ordnance Datum (AOD). This will necessitate localised cut and fill earthworks, with a maximum cut of c.1.5m and a maximum uplift of c.2.5m, in conjunction with the construction of a number of retaining walls up to 2.95m in height.

It is understood that the foundation solutions for the proposed development are likely to comprise traditional shallow foundations (strip and trench fill) and piled foundations, subject to the depth of made ground and softened natural soils present.

The site has been subject to the previous reports, as reported in the following documents:

- Geo-environmental Phase 1 Desk Study report dated May 2016 by Adeptus Consulting (report ref. 163-11).
- Preliminary Remediation Strategy, Land at Greenside Mill, Skelmanthorpe (Ref. 4319/1), dated February 2022 by Lithos Consulting Limited.

The following ground investigation reports have also been previously compiled for the site by Sirius Geotechnical Ltd:

- Geo-environmental Appraisal of Land at Greenside Mills, Skelmanthorpe (Ref. C7340) dated December 2020.
- Gas Risk Assessment Letter Report (Ref. C7340/GH/9548) dated April 2021.
- Supplementary Site Investigation Letter Report (Ref. C7340/RC/9607) dated June 2021.
- Supplementary Contamination Appraisal Letter Report (Ref. C9297/AEC/10326) dated November 2023.

The above documents are the principal source of information used in the preparation of this Remediation Strategy and should be read in conjunction with this report.

The main aims of this Remediation Strategy are summarised as follows:

- To discharge the relevant planning conditions pertaining to discovery of contamination when carrying out the development works;
- To minimise the impact to the environment and human health whilst undertaking the works;
- To satisfy the Local Planning Authority (LPA) environmental health department, Environment Agency (EA) and building warranty provider, that the remedial works provide a site suitable for the proposed development; and,

- In the interests of sustainability, to reduce requirements for excavation, off-site disposal and promote the use of existing site-won materials providing they are suitable for the proposed end use.

A Method Statement should be prepared, in order to detail how the objectives will be achieved. The Method Statement should be accompanied by a Designer's Risk Assessment in accordance with the current CDM Regulations. The Method Statement and Risk Assessment should be submitted to, and approved by, a suitably qualified geoenvironmental consultant.

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2. Site Details and Description

2.1 Site Overview

For a detailed description of the site's historical development, published geology, hydrogeological and environmental setting, proven ground conditions and soil, groundwater and ground gas contaminant concentrations etc., refer to the above-referenced Geoenvironmental Appraisal report. A brief overview is given in Table 2.1.

Table 2.1 - Site Overview

National Grid Reference	423390, 410930
Site Description	The overall site comprises an irregularly shaped parcel of land covering an area of approximately 2 hectares, located to the north of Saville Road and west of Marsden Street in the village of Skelmanthorpe. In general, the site slopes downward from northwest to southeast / east, with levels of approximately 156.5m AOD adjacent to the northwestern site boundary, and 138m AOD to the eastern site boundary, and is formed by approximately four development plateaus. A site location and site features plan are included as Drawing No's. C9297/RS/01 and /02, respectively, within Appendix A. The western and central site areas formerly comprised a number of mill buildings and associated structures, with areas of asphalt hardstanding and roughly overgrown areas of landscaping. The site has recently undergone demolition and clearance leaving concrete slabs and crushed demolition hardsurfaced ground / remnant asphalt hardstand elsewhere. Steep vegetated slopes are present along the western site boundary retaining the off site adjacent highway (Saville Road), with level changes of c. 6m within the northwest and c.2m within the southwest, sloping down towards the east / southeast. An approximately 3m high concrete retaining wall is located to the north of the slope, orientated approximately east-west. Land along the northern perimeter of the site slopes down to an overgrown ditch c. 1.0 to 3.0m below site levels, with wire mesh and concrete post fencing currently seperating it from the main site area. The eastern area of the site comprises a former mill pond (which has recently undergone infilling with crushed demolition materials) and an unlined reservoir / pond feature to the east with water levels at 137.5m AOD. The reservoir / pond feature is largely filled with sediment and vegetation, with an unnamed stream recorded to run from south to north, within the locality of the pond. An overgrown stockpile of soil arisings (c. 1m to 2m high and covering an area of c. 0.06 hectares) is present within the northwest of the eastern site area. Overhead cables run northwest-southeast across the site area, with associated wooden pylons located within the stockpile. Newly constructed overhead electricity cables and an associated temporary wooden pole is located within the southeast of the site, orientated approximately southwest-northeast. A former above ground storage tank (AST) was present in the southeast of the site. An open surface water culvert is located within the southeast, fed by on and off site surface water drains.
Site History	The site has been known as "Green Side Mills" since the late 1800s and appears to have remained in use as a cloth / textile mill throughout its history with associated mill ponds. Demolition of the site has recently been undertaken (2023), with all above ground structures demolished and cleared.

Ground Conditions	Reinforced concrete hardstand is located across the former building footprints to depths of up to 0.30m bgl. Black bound asphalt was also encountered at ground surface in the external investigation locations during the pre-demolition site investigations. Made ground was generally encountered to maximum depths of c. 1.0m to 1.5m bgl across the western and central site areas (locally deeper to c.2 - 3m bgl), typically including yellow-red-brown slightly clayey sandy gravels of sandstone, limestone and brick with occasional concrete obstructions. In the eastern area, made ground was encountered to proven depths of up to 2.6m bgl comprising grey-brown-black-yelllow clayey gravel / gravelly clays, with low to moderate cobble and boulder content, and fragments of ash, glass, plastic, brick, concrete, sandstone, rebar, timbers and clothing / carpet fibres. In the reservoir/pond area, saturated very soft black silts with gravels and cobbles of brick, sandstone with fabrics, wood fragments and decomposing plant and leaf waste was recorded, the base of which was not proven. Made ground within both the stockpile and the pond sediments are entrained with anthropogenic materials including potentially degradable woollen fabrics, brick, glass, plastic and ash, and may be considered as geotechnically unsuitable for re-use within the site in their current condition. Softened natural clays comprising low strength grey-brown slightly sandy slightly gravelly silty (on occasion organic-rich) clays were locally encountered in the eastern site area between approximately 2.6m to 3.5m bgl. Residual/destructured bedrock, comprising firm to stiff, medium to high strength slightly sandy slightly gravelly silty clay to sandy gravel was encountered from depths of between 0.2m and 3.5m bgl. Lower Coal Measures (LCM) Formation bedrock, generally comprising very weak sandstone and mudstone with localised coal bands was encountered from depths of between 0.45m and 3.90m bgl. The site comprises three conjectured fault blocks, with evidence of shallow coal and associated mine workings within the central fault block. The possibility of encountering unrecorded mine entries within the site (including bell pits and crop workings), cannot be discounted. An exploratory hole location plan is included as Drawing No. C9298/RS/03, within Appendix A.
Sub Surface Obstructions	A number of exploratory hole locations identified subsurface concrete and brick obstructions at depths of between 0.7m and 2.0-3.0m bgl. There is the potential for other unrecorded obstructions across the site associated with relict foundations and other substructures.
Groundwater	Perched water ingress was noted within made ground soils within a number of exploratory hole locations, at depths of between 0.2m and 2.0m bgl, with deeper groundwater recorded at depths of between 11m and 18m within LCM bedrock. Moderate to rapid groundwater ingress was noted within the eastern site area at an approximate depth of 2m bgl, at a similar level to the adjacent pond.
Ground Gas	In accordance with the ground gas risk assessment, the site is considered to fall within CS2 conditions, as defined in BS8485. Gas protection measures are therefore required for new buildings. No radon protective measures are required for the site.
Identified Contamination	Heavy metals and PAHs have been identified within made ground soils across the site. Localised asbestos fibres have also been identified within made ground soils in TP06, and within the stockpile and pond sediments in the east of the site. Hydrocarbon odours and staining has been identified locally in the former AST and mill pond areas in TP218 and TP223, and within the locality of TP04 / TP226. Any potential hydrocarbon sources were recommended to be identified, with appropriate remedial measures undertaken.

	A significantly elevated concentration of naphthalene was recorded within a sample of pond sediment (obtained from the eastern most pond). It was recommended that additional testing of the pond sediment be undertaken as part of enabling works to confirm the characteristic naphthalene concentration of the soils. Subject to further assessment, consideration of the excavation and off-site removal of all impacted materials, or alternative remedial options to treat the impacted soils, such as biological or chemical remedial techniques, should be considered. It was noted that the pond contains a substantial quantity of sediments which have been demonstrated to include elevated concentrations of heavy metals and PAHs. It has been strongly recommended that a suitable strategy for management of surface waters is developed for this area of the site to prevent harmful mobilisation and release of sediments into adjacent watercourses. Whilst no evidence of hydrocarbon contamination has been noted within the surface water culvert sample, the presence of the black oily substance should be further assessed, with appropriate remedial measures taken to avoid mobilisation to the adjacent surface water feature.
Utilities	A temporary overhead electricity cable and underground linking cable are located in the southeast of the site, linked to on and off site overhead cables. Statutory service plans show BT cables and water extending into the site from the southern boundary. It is understood that gas disconnection works have taken place since service plans were originally procured.

3. Remediation Strategy and Objectives

The primary objective of the remediation works is to discharge relevant planning conditions whilst mitigating the transient and long-term risks to human health receptors from potential contaminants within made ground and reworked topsoil across the site, as well as identified hydrocarbon hotspots, mill pond sediments and made ground forming a stockpile, which have recorded elevated concentrations of contamination.

In brief, the risks to human health from exposure to contaminated soils will be mitigated by remedial earthworks, in addition to excavation and on-site treatment / removal off site of hydrocarbon and naphthalene impacted soils, and provision of a clean cover system as described herein.

It should be noted that this strategy assumes that any previously unidentified asbestos containing materials will be addressed by an appropriately qualified contractor in accordance with an agreed method statement.

Where the works involve re-use of site-won material and / or importation of clean naturally derived soils from another development site, it is recommended that this be undertaken under a Materials Management Plan (MMP) produced in accordance with the CL:AIRE Development Industry Code of Practice[1] (DoWCoP). Any MMP will need to be reviewed and declared to CL:AIRE by a Qualified Person prior to commencement of remedial and preparatory works.

The main requirements of the remediation works are given below in the approximate sequence of works. Pertinent elements of the works are discussed in greater detail in subsequent sections of this document and the proposed remediation measures are summarised on Drawing No. C9297/RS/04 in Appendix A.

It is anticipated that the remediation works would include the following:

Consolidation of Shallow Mine Workings/ Earthworks to Create Development Platforms

- Service location, disconnection and / or protection.
- Erection of temporary tree protection measures for retained trees within the site, or adjacent to the site boundary (if applicable).
- The presence or absence of invasive plant species should be confirmed by a qualified consultant and their advice taken on appropriate treatment if necessary.
- Removal of remaining existing vegetation (trees, hedges, etc.) from the proposed development area necessary to facilitate the works.
- Breaking out areas of hardstanding and intact substructures. Excavations resulting from removal of underground structures should be prepared to be backfilled with selected fill materials in accordance with a suitable Earthworks Specification. The extent of the earthworks should also be suitable to facilitate the chosen foundation solution(s) where practicable.
- On-site crushing, screening and classification of all suitable construction materials won from the above works, to provide a secondary aggregate for re-use.
- Undertake a cut / fill earthworks operation across the development area to create required levels, with excavation and re-engineering of the full depth of made ground (where practicable and feasible). Excavated materials will be processed and screened (as required) to produce suitable engineering fill and placed in accordance with an appropriate earthwork specification. Prior to filling, the base of the

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

excavation shall be proof-rolled, and any soft / hard spots encountered investigated, removed as necessary and replaced with suitable fill materials.

- Stripping, stockpiling, sampling and analysis of shallow natural subsoils for potential re-use within proposed soft landscaped areas.
- Treatment of shallow mine workings by drill and grout methods, in accordance with a specification agreed with the Coal Authority.

Identified Contamination Remediation

- Asbestos impacted soils identified locally within made ground in TP06 (<0.001%), the on-site stockpile (HDTP101 (<0.001%) and TP217 (0.015%)) and pond sediment (Sediment 1 (<0.001%)) should be excavated and either (subject to geotechnical suitability), be re-used on site (below hardstand where they will not be later disturbed), below a suitable capping layer, or be removed, for off-site disposal at a suitable licensed landfill facility.
- If the excavated material does not contain visible ACMs, and the asbestos concentration is <0.1%, as currently recorded within each positive sample, the material could potentially be retained on site, placed beneath bulk fill material ((≥1m bgl), or beneath hardstanding (but not beneath highways, or where underground services are to be installed). The potentially degradable nature of the stockpile and pond sediment materials should be taken into consideration.
- Should the excavated material contain visible ACMs and / or asbestos in concentrations >0.1%, the material should be removed from site as hazardous waste.
- Excavation and on-site treatment / off-site disposal of hydrocarbon sources / impacted soils and perched waters identified in the vicinity of TP04 / TP206 and in the vicinity of the former tank/ mill pond area (TP218 / TP223).
- Additional assessment of naphthalene within pond sediments, to assess the characteristic concentrations of the material, with subsequent excavation and on-site treatment / off-site disposal, as necessary.
- The black oily substance identified within the surface water culvert within the southeast of the site should be recovered, treated (if applicable) and removed from site to an appropriate disposal facility.
- The re-use of site-won soils, and / or importation of soils from another development site for use on the site, should be undertaken in accordance with a Materials Management Plan (MMP).

Technical Support by a Suitably Qualified Geoenvironmental Engineer (GE)

- Carry out a watching brief during all of the above, to identify previously unidentified sources of contamination and unrecorded mining features (such as bell pits or crop workings).
- Supervision of earthworks to address geotechnical constraints, including directing the earthworks contractor to ensure that the earthworks facilitate the chosen foundation solution(s) where practicable.
- Arrange and interpret laboratory analysis as required throughout the earthworks.
- Prepare a verification report following completion of the works. This initial report will provide a record of the remediation works the results of testing to demonstrate the integrity of the work and confirm the work has been carried out in accordance with the relevant legislation, planning conditions and this Remediation Strategy. Production of a suitable verification report is a strict requirement for works undertaken under the CL:AIRE DoWCoP.

Post-remediation Works

- Detailed foundation design, based on the as-built earthworks.
- Importation of suitable clean topsoil, and if necessary, subsoil for use in 'clean' cover layers (chemical analysis should be undertaken prior to importation to confirm suitability).
- Placement of a clean cover layer within all areas underlain by existing made ground and not otherwise covered by buildings or hardstanding. The thickness of the capping layer should be 600mm in residential gardens and a minimum of 450mm in soft landscaped areas and comprise at least 150mm of suitable clean topsoil underlain by suitable clean subsoil.
- If asbestos is found to be present where a risk of exposure to asbestos soil contamination exists following development, the clean cover layer outlined above should be upgraded to include either a geotextile separator or 150mm dense granular 'hard dig' layer at the base.
- Where the site is underlain directly by natural ground a nominal 100mm depth of clean suitable topsoil should be provided in gardens or soft landscaped areas to provide a suitable medium for plant growth.
- Construction of clean cover soil capping to be validated by a suitably qualified GE. The thickness of the capping layer should be verified physically on site, and a programme of laboratory testing should be implemented to confirm chemical suitability. Clean cover verification reports should be produced by a suitably qualified GE as gardens/ landscaped areas are completed/ verified.
- Design and installation of appropriate gas protection measures in accordance with the requirements of BS8485:2015+A1:2019. Installation of appropriate gas protection measures to be suitably validated on completion, in accordance with an agreed gas verification plan.
- Provision of suitably protected water supply pipes.
- Specification for suitable protection measures for buried concrete.

The scope of works above may have to be amended to suit final design levels, adoptable highway and foundation design/ construction.

4. Geoenvironmental Engineer

A suitably experienced and qualified GE should be appointed for the works, to supervise and advise on relevant matters.

The GE shall attend site as required to ensure that the requirements of this Remediation Strategy are complied with. The responsibilities of the GE shall include, but not be limited to, the following:

- Liaison with the client and statutory bodies in relation to the remedial works.
- Supervision and quality control of the remedial works.
- Advising on the correct handling of materials and conditions encountered.
- Supervision of soil sampling and analysis, as required under the Remediation Strategy.
- Implementation of contingency measures if unexpected/ previously unidentified contamination, buried substructures, unrecorded mine entries, etc., are found during the works.
- Inspection of excavations for any disturbed ground associated with possible historic bell pits/shallow crop workings of the shallow coal within central site areas.
- Review of site records and test results as they become available and making comment and acting upon those results accordingly.
- Production of a verification report, covering the general remedial earthworks, as required by this Remediation Strategy and any subsequent MMP.
- Validation of clean cover placement within garden/ landscaped areas.
- Validation of gas protection measures installed in properties.
- On completion of the shallow coal mineworkings drill and grout programme, a drill and grout validation report will be produced.

5. Site Clearance / Preparation

5.1 Services

Prior to site works commencing, the position and depth of all services shall be determined and clearly identified on site by the contractor. The locations should be confirmed on site by appropriate investigation and observations. The following should be undertaken:

- Service providers shall be contacted by the contractor to determine any precautions, safe working distances etc., relating to services, both underground and overhead.
- Copies of a consolidated services location drawing should be retained and displayed in the contractor's office.
- Cable avoidance tool (CAT) scanning of areas where works are to be carried out.
- Hand-dug trial holes to expose service locations shall be undertaken where possible.
- Physical marking out on the site of service routes on the ground and appropriate lay-offs / easements using paint, pegging, bunting etc.
- Where services are being re-routed during the works, both the drawings and site markings must be kept up to date.
- When works commence on a new area of the site, the site manager or relevant foreman must brief all operatives on the location of services in this area.
- Method statements / risk assessments must be read by all relevant personnel and their understanding of them confirmed in writing.
- If coloured sands, service ductwork or services are exposed during operations then work must cease until the site manager has confirmed it is safe to continue.
- All manholes and inspection chambers to remain should be located and clearly identified on site to prevent damage. The location, overall depth and diameter of each manhole, and the size and depth of all connections, shall be recorded.

5.2 Tree Protection

Any trees to be retained should be identified and protected in accordance with an approved arboricultural method statement, if required.

5.3 Invasive Plants Removal

Where any invasive plants are identified by a suitably qualified ecologist, these should be removed / treated in accordance with their recommendations.

5.4 Site Clearance

Following removal / treatment of any invasive plants and the construction of any required tree protection measures, all remaining vegetation shall be stripped / cleared and stockpiled on site for re-use (where applicable) or removal from site.

Any general debris shall be cleared and placed in skips or wagons for off-site disposal.

5.5 Existing Stockpiles

Existing stockpiles are located across the site, associated with recent demolition of the former development.

A visual / olfactory inspection should be undertaken during earthworks to ensure that stockpiled materials are free from obvious contamination i.e., staining/free product, free of odours, and do not comprise any evidence of asbestos containing materials (ACMs) and potentially degradable materials. The stockpiles should also be subject to geotechnical testing to assess their suitability for re-use on site. The testing requirements should be in accordance with an agreed earthworks specification.

The GE shall carefully inspect stockpiled materials during their re-use and advise the contractor of any testing requirements to adequately classify the materials for potential re-use or removal from site.

During the above works all of the soils should be kept sufficiently damp to avoid any possible dust release.

6. Treatment of Shallow Mine Workings

6.1 Treatment of Shallow Mine Workings

Treatment of shallow mine workings in those areas of the site at risk from surface instability should be undertaken using drill and grout methods in accordance with an appropriate specification, to be agreed in advance with the Coal Authority.

6.2 Unrecorded Mining Features

As the central area of the site is underlain by shallow coal seams and associated mine workings, it is considered possible that there are unrecorded mine entries at the site. It is therefore recommended that the central area of the site be stripped down to natural subsoil, plus 0.3m, under the supervision of a suitably experienced consultant, to observe for evidence of crown holes, mine entries and bell pits.

All other excavations into natural ground made during enabling and earthworks should be inspected for evidence of crown holes, mine entries and bell pits etc. If evidence of mining features is suspected, advice regarding treatment/ foundation precautions should be sought from a suitably qualified engineer.

7. Earthworks

7.1 Earthworks Specification

Earthworks undertaken at the site shall be undertaken in accordance with the requirements of an appropriate Earthworks Specification. The Earthworks Specification is to be produced by the appointed specialist contractor and agreed with the Developer / Developer's Engineer, as well as the local highway's authority, building warranty provider and any other involved parties as necessary.

7.2 Soil Re-Use and Disposal

The re-use of site-won soils, and / or importation of soils from another development site for use on the site, should be undertaken in accordance with a Materials Management Plan (MMP). Soils proposed for re-use on site as capping within soft landscaped areas should be tested in accordance with Section 8.1 of this report.

Soil materials for off-site disposal shall be sampled and analysed by the contractor at a frequency sufficient to allow the material to be adequately categorised.

Removal of any materials from the site should be undertaken in accordance with current Duty of Care requirements and the latest version of EA Technical Guidance Document WM3, *Guidance on the Classification and Assessment of Waste*. The waste may also be subject to Waste Acceptance Criteria (WAC) testing. It is recommended that discussion with landfill operators takes place at an early stage if off-site disposal is to be considered. Waste transfer notes / hazardous waste consignment notes shall be completed, signed and retained by all parties involved and retained by the contractor for a period of at least two years. The transfer note shall state the volume of waste, the nature of the material and statement of its chemical composition.

7.3 Grubbing up of Slabs, Hardstands and Foundations

Any remnant hardstanding, foundations, sub-structures, drainage and other relic structures associated with the former uses of the site should be broken out / removed to the full depth of the made ground where feasible. Selected materials suitable for re-use or recycling shall be retained on site for potential reuse within the works.

Excavations made to remove existing intact substructures may need to be extended to facilitate the chosen foundation solution(s), where practicable.

All unsuitable materials, including, but not limited to, asbestos, metal, steel reinforcement, rags, plastic, timber or degradable material shall be removed.

All hard arisings / materials, where appropriate, shall be stockpiled, crushed and processed in agreed locations. The crushed product shall be inspected by the GE to confirm deleterious materials have been removed as far as practicable.

The crushed product should also be tested for the suite of determinands as detailed within Table 8.2. If asbestos presence / absence testing returns positive results, then quantitative testing of the affected samples should be undertaken.

7.4 Excavation of Subsurface Structures

Previously identified substructures, as well as any other buried structures encountered during the earthworks (with possible exceptions, as described below), shall be broken out and removed, where present within the footprint of proposed buildings, roads, paved areas, sewers and surface water drainage infrastructure, etc., to their full depth.

Possible exceptions to the above include any previously unidentified piled foundations. Any piled foundations that the contractor intends to leave in situ during enabling works shall be inspected by the GE, made safe, accurately surveyed and marked on a plan to determine their location in relation to the proposed development layout. Any such features that may require additional breaking out or other remedial works due to structural / build implications (e.g., may hinder foundation construction) shall be discussed with the client.

It should be noted that, whilst breaking out of intact substructures to their full depth within proposed areas of public open space may not be strictly necessary to facilitate the proposed development, it could generate re-usable fill materials that are required to achieve the remediation objectives.

All hard arisings, where appropriate, shall be stockpiled, crushed and processed to create a suitable granular fill material.

7.5 General Excavations / Turnover

A turnover of made ground shall be undertaken, in order to identify previously unidentified intact subsurface features and areas of gross soil contamination. Any intact subsurface features identified by the turnover should be removed to a depth suitable to facilitate proposed development works (e.g., foundation construction, drainage installation, etc.).

Previous investigation works have revealed made ground soils that are chemically and texturally unsuitable for use in soft-surfaced garden and landscaped areas across the site. These soils should be placed below suitable hardstanding, buildings, or appropriate clean cover system within gardens / areas of soft landscaping. Final remediation formation levels should allow for the placement of a clean cover layer, with minimum depth of 600mm in gardens / 450mm in soft landscaped areas, where potentially contaminated made ground is present. An additional 150mm reduction from finished ground level may be required in garden / soft landscaped areas where asbestos is present within made ground, should a coarse granular 'hard dig' layer option be used at the base of the clean cover layer.

During excavation works, the materials excavated should be inspected to ensure there are no areas of previously undetected contamination. Any soils exhibiting visual and / or olfactory evidence of gross contamination shall be placed in temporary stockpiles on hardstanding or heavy-duty Visqueen sheeting, suitably covered and bunded with appropriate signage and identification. The GE shall advise the contractor of any testing requirements to adequately classify the materials for potential re-use (with or without treatment works), or removal from site.

Any materials excavated not immediately placed in the deposition area shall be stored in clearly identified stockpiles. Surveys of any stockpiles shall be undertaken at regular intervals through the remediation works and provided to the GE, together with a description of their intended use.

Any stockpile of made ground soils shall be assumed to contain elevated concentrations of contaminants until proven otherwise through laboratory analysis. It shall be ensured that such materials are not allowed to cross-contaminate any clean areas of the site, nor are they allowed to contaminate any off-site areas or controlled waters.

The possibility of encountering unrecorded mine entries/bell pits on site cannot be discounted. Excavations should be inspected for any disturbed ground, associated with possible historic bell pits/mine entries/ crop workings of the shallow coal. It is recommended that areas beneath proposed buildings within the central site area have overlying made ground removed in order to expose the natural ground.

If any evidence of unrecorded mining features are encountered, appropriate stabilisation by drill and grout treatment shall be carried out in accordance with a mineworkings drill and grout specification. Treatment of identified mine-workings shall meet the requirements of relevant regulators, namely the Coal Authority and the

local authority. If such mine-workings are identified, then works shall cease immediately in those areas and the advice sought from the GE.

7.6 Excavations within Hydrocarbon-Impacted Soils

Hydrocarbon impacted soils / perched waters have been identified by visual and olfactory means in localised areas around investigation locations TP04 / TP206, and TP218 / TP223, as shown on Drawing No. C9297/RS/04, included within Appendix A of this report. These should be further investigated for evidence of any associated hydrocarbon sources, with any grossly impacted soils excavated and subjected either to on-site treatment or be removed for off-site treatment or disposal at a suitably licensed landfill facility.

It is recommended that an experienced geoenvironmental engineer be in attendance during excavation and removal of contaminated soils. Following removal of any hydrocarbon-impacted soils encountered, and prior to any infilling works, validation samples for chemical analysis shall be taken by the GE from the exposed surfaces (i.e. base and sidewalls) on a nominal 5m grid (with at least one sample per side wall / base) to confirm that all potentially hazardous hydrocarbon contamination has been removed. Samples shall be tested for speciated TPH and BTEX / MTBE at a UKAS and MCERTS accredited laboratory, and the results compared to the appropriate GACs listed in the tables in Appendix D of this Strategy. Analysis for other determinands may be appropriate and should be undertaken as necessary.

If the referenced GACs (or relevant site specific assessment criteria (SSAC's) derived as part of previous reports) are exceeded, then additional soils should be removed, and further validation samples recovered. This shall be an iterative process until validation test results fall below the GACs across the entire face and base of the excavation.

With regard to the stockpiled soils following validation, these should be treated, as required, in order to achieve the assessment criteria as detailed in Appendix D allowing re-use, or, alternatively removed and disposed off site, if considered appropriate.

Any incidental groundwater encountered whilst removing hydrocarbon hotspots in soils that exhibits significantly elevated concentrations of TPH and/or free product, shall also be removed/treated as part of the excavation works.

7.7 Excavations within Asbestos-Impacted Soils

Where necessary, excavation, movement, stockpiling and placement of asbestos-contaminated soils/ aggregates should be undertaken in accordance with a site-specific method statement and the Control of Asbestos Regulations 2012.

The following should be undertaken if ACMs are visible, and/ or in areas or materials where laboratory analysis has identified asbestos contamination of surface soils, including made ground in the vicinity of TP06, and the stockpile made ground soils (HDTP101 and TP217). Consideration should be given the practicalities of excavating the saturated pond sediments in their current condition.

An exclusion zone should be set out at the location of the impacted soils to be excavated, with access restricted for all site personnel except those specifically undertaking the works.

Where any visible fragments of ACM are identified, a hand-picking exercise should be undertaken during earthworks, where practicable, using Category B non-licensed asbestos work qualified personnel. All identified visible ACMs should be carefully picked, double bagged and placed into a lockable skip for subsequent off-site disposal.

Following the above picking, any remaining soils containing residual asbestos (i.e., no visible ACMs and asbestos soil matrix concentration of <0.1%) may be carefully excavated and placed outside the footprint of proposed

roads and drainage infrastructure at an appropriate depth to allow for the placement of hard surfacing or clean cover soils as necessary. These works should be supervised by Category B trained personnel, with the location and depths of placed impacted soils being accurately surveyed / recorded and marked on a constraints plan.

Any excavated soils containing visible ACMs, and / or asbestos fibres in concentrations >0.1% that are excavated must be removed from site as hazardous waste.

During all operations, the risk of dust release should be continuously assessed, and appropriate mitigation measures put in place. This is typically a bowser with hose attachment to wet down working areas and suppress dust, although other alternative techniques will be considered as necessary. Potential dust emissions from stockpiled soils should be mitigated by the application of water or stabilising agents and / or by covering with tarpaulin sheeting or other appropriate cover material.

Excavated 'residual' soils should be carefully placed within the deposition area and carefully compacted to minimise the risk of dust emission.

All site personnel undertaking the remedial works should be suitably trained for the task being undertaken and should wear the appropriate personal protective equipment / respiratory protective equipment (PPE / RPE), taking into account the weather conditions at the time of the works. Advice should be sought from a qualified and experienced asbestos surveyor / analyst if necessary. PPE / RPE may include:

- Cat 3 Type 5 coveralls.
- RPE (typically Sundstrom ½ mask fitted with P3 filter or equivalent).
- Boots that are easily cleanable.
- Disposable gloves.

Personal decontamination should be carried out in accordance with, and as applicable to, the HSE's Asbestos Essentials EM8 document. All disposable PPE / RPE should be treated as contaminated waste and disposed of appropriately.

The excavation and handling of asbestos-contaminated soils on the site may comprise notifiable non-licenced work. If this applies, the Health and Safety Executive (HSE) should be notified. Reference should be made to the CL:AIRE CAR-SOIL guidance[2] to determine whether the work is notifiable.

7.7.1 Verification Sampling

Following removal of visually asbestos-impacted soils, the resultant excavation side walls and base will require sampling and verification by a suitably qualified GE (trained to a minimum standard of Category A 'Asbestos Awareness').

Samples shall be taken on a nominal 5m grid by the GE, to verify that the area of asbestos impact has been substantially removed from within the identified impacted area, with the recovered samples being sent to an UKAS accredited laboratory for asbestos identification. If asbestos is positively identified by the analysis, additional quantitative asbestos analysis should be undertaken.

Where the results of laboratory testing indicate an asbestos concentration of >0.001% is present within the footprint of landscaped areas, additional soil shall be excavated from the sidewalls or base of the excavation, following which, further verification samples shall be recovered and tested in accordance with the method

[2] CL:AIRE, 2016. *Control of Asbestos Regulations 2012 - Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials: Industry guidance*. CL:AIRE, London.

described above. This shall be an iterative process until verification test results confirm asbestos is not present at concentrations >0.001%.

Subsequent to removal of asbestos impacted soils from soft landscaped areas, a suitable clean cover should be provided, as described within Section 8.

The base of all excavations and location of all verification samples should be surveyed prior to deposition of replacement fill material / growth medium.

7.8 Previously Unidentified Contamination

There is the possibility that as yet undiscovered sources of contamination may be present which will require remediation. It is therefore considered that the following actions should be undertaken during site reclamation and preparatory works.

A watching brief should be carried out during the enabling works, with particular attention to;

- Evidence of asbestos containing materials.
- Visual or olfactory evidence of hydrocarbons.
- Made ground differing significantly in nature from that previously identified during the site investigation works.

If previously unidentified contamination is encountered during any of the proposed works by any site personnel, the GE shall be notified immediately and works in the vicinity of the suspected contamination should be temporarily suspended. Additional laboratory analysis of previously unidentified contamination sources will be required in order to determine the requirements for remediation, assessed against appropriate assessment criteria.

If deemed appropriate the GE shall request additional and/or supplementary chemical testing, dependant on the nature of any materials encountered on site during the course of the remediation works. The analytical testing will be undertaken on a five-day turnaround and shall be forwarded to the GE as they become available. The results shall be compared with the threshold guideline values given in Appendix B of this Strategy. Should any analyte exceed the concentrations shown, then the GE will advise upon further works required.

7.9 Re-profiling/ In-filling

Earthworks are required to achieve proposed final development levels. The volume of soil to be imported to site is to be determined following completion of cut and fill calculations.

Any areas requiring infilling shall be made level, by terracing if necessary, with a nominal fall of 1 in 50. The base of all excavations shall be surveyed prior to the placement of engineered fill.

The base of any excavation or surface prepared by the contractor to accept fill material shall be proof-rolled using a vibratory roller and any soft spots encountered investigated, removed as necessary and replaced with suitable fill materials.

Once a clean working surface has been exposed / created and approved by the GE, suitable fill materials shall be laid and compacted in accordance with an appropriate Earthworks Specification.

Areas of fill shall be benched into adjacent areas in accordance with BS6031:2009, 'Code of Practice for Earthworks'.

Any fill placed within excavations within the footprint of proposed buildings or structures should be compatible with the proposed founding solution.

Any materials excavated and not immediately placed in the deposition area shall be stored in clearly identified stockpiles. Surveys of any stockpiles shall be undertaken at regular intervals through the remediation works and provided to the GE, together with a description of their intended use.

Any stockpile of soils shall be assumed to contain elevated concentrations of contaminants until proven otherwise via laboratory analysis. It shall be ensured that such materials are not allowed to cross-contaminate any clean areas of the site, nor are they allowed to contaminate any off-site areas or controlled waters.

7.10 Control Testing

The contractor shall undertake appropriate earthworks control testing. All control testing shall be carried out in accordance with the relevant British Standard or other relevant guidance, except where the specification adopts alternative methodologies.

If the results of control / validation tests indicate that the fill is being placed and compacted in such a way that the desired level of compaction is not being achieved, the contractor shall further compact or if necessary, shall excavate the affected work and replace with new fill, compacted to meet the specification requirements.

7.11 Control of Waters

The contractor shall ensure that potentially contaminated waters and leachate from excavations or stockpiling areas do not reach watercourses, surface water drains, etc. The contractor shall ensure contaminated waters or leachate do not discharge onto ground outside of the site, or enter surface water courses or drains.

All such waters will be treated on site as necessary for subsequent disposal to the foul sewer or alternatively removed from site by tanker to a suitable disposal facility.

The contractor will be responsible for obtaining all necessary permits, licenses and consents for disposal to foul sewers.

Contaminated waters pumped from excavations should be stored appropriately and subject to appropriate chemical analysis prior to disposal. Any discharges to foul sewer should be recorded in relation to date, time, quantity and quality. All records should be maintained at all times and be made available for inspection upon request.

In addition, measures should be in place to prevent the run-off of site water containing dust or silt, or mobilisation of existing pond sediments into the surface water feature.

The presence of the black oily substance identified within the southeastern site surface water culvert should be recovered, treated (if applicable) and removed from site to an appropriate disposal facility.

The appointed earthworks contractor should produce detailed Method Statements describing how these objectives will be achieved.

7.12 Adoptable Highways

Where applicable, the details of remedial works undertaken within the footprint of adoptable highways should be agreed in advance with the adopting Local Authority.

8. Clean Cover Soils

8.1 Clean Cover System Thickness

Previous investigation works have identified chemically and texturally unsuitable made ground across the site. Made ground should be overlain by a suitable clean cover system in private gardens / areas of soft landscaping.

The makeup of the required clean cover system (capping layer) shall be as shown in Table 8.1.

Table 8.1 - Required Clean Cover Layer Makeup

	Minimum Thickness (mm)			
	Subsoil	**Topsoil**	**Soil Cover Thickness**	**Additional 150mm Granular Hard Dig Layer or Geotextile Separator Required at Base?**
Private Gardens (front and rear)	450	150	600	Only where asbestos impacted made ground is present at depths of <1m below finished ground levels.
Soft landscaped / POS areas	300	150	450	

8.2 Topsoil and Subsoil

Topsoil and subsoil shall be placed by the contractor responsible for the construction phase of the works. It shall be ensured that topsoil / subsoil material is of an appropriate quality and that concentrations of contaminants do not exceed the maximum concentrations stipulated in tables provided within Appendix B for gardens and soft landscaped/ POS areas.

Any material used within the growth medium shall be inspected to ensure that they are suitable. It shall be clean and free of foreign debris, building waste materials, timber and other deleterious matter.

Site-won subsoil proposed for re-use shall be placed in stockpiles for future placement by the contractor responsible for the development works. It is assumed that all topsoil will be imported.

Any materials used within the clean cover layer shall be tested in accordance with the guidance given in the YALPAG document *Verification Requirements for Cover Systems,* Version 4.1, dated June 2021, included in Appendix C, and as summarised in Table 8.2, below to ensure that contaminant concentrations do not exceed those stipulated in Appendix B for residential end-use.

Table 8.2 - Sampling and Testing for Clean Cover Materials

Type	Number of Samples (Per Material Type and Source)	Testing Schedule	Assessment Criteria
Virgin Quarried Material	1 or 2 depending on the type of stone used	Standard metals/metalloids (As, Cd, Cr, Cr(VI), Cu, Hg, Ni, Pb, Se, Zn)	As per Appendix B
Crushed Hardcore, Stone, Brick (excluding asphalt)	Minimum 1 per 500m³	Standard metals/metalloids (As above) PAH (16 USEPA speciation) Asbestos Total TPH	
Greenfield / Manufactured Soils	Minimum of 3 Dependent on source, between 1 per 50 m³ and 1 per 250m³	Standard metals / metalloids (As above) PAH (16 USEPA speciation) Asbestos pH and soil organic matter	
Brownfield / Screened Soils	Minimum of 6 Dependent on source, between 1 per 50 m³ and 1 per 100m³	Standard metals / metalloids (As above) PAH (16 USEPA speciation) TPH (CWG banded) Asbestos pH and soil organic matter Any additional analysis dependant on the history of the donor site.	

The analysis should be undertaken at a UKAS accredited laboratory, with MCERTS accredited analysis used where available.

In general, the soils would be considered suitable for use within the clean cover when all recorded contaminant concentrations are less than the concentrations stated in Appendix B. Where a minority of samples tested contain contaminant concentrations greater than the relevant threshold values stated in Appendix B, consideration can be given to undertaking statistical analysis to determine the suitability of the material as a whole, in accordance with current CL:AIRE guidance[3].

Existing reworked topsoil within the site are chemically unsuitable for use within the soil cover layer. Site-won clean natural subsoils from excavation for foundations, drainage etc. may be suitable for use, subject to careful segregation from contaminated soils, visual inspection and chemical analysis.

For imported soils, the test results shall be made available to the GE, and their acceptance given in writing, prior to any material being delivered to site.

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

8.3 Placement

The surface of any existing made ground should be levelled and compacted to reduce the risk of intermixing with the clean cover soil materials.

The clean cover subsoil and topsoil materials shall be lightly compacted following placement to limit future settlements.

It is envisaged that the clean cover shall be placed towards the end of the development programme. This will act to minimise the potential for disturbance of the growth medium and physical destruction of topsoil structure e.g., via plant trafficking following placement.

8.4 Verification

Verification of the depth of topsoil and subsoil (and the presence of hard-dig layer / geotextile separator, where required), shall be carried out by a suitably qualified GE by excavation of trial pits following placement.

Verification trial pits shall be excavated at a rate of 1 per 3 plots for private rear and front garden areas or spaced on a minimum of a 25m grid for landscaped / POS areas (minimum 3 per landscaped area).

Evidence for verifying placement of the clean cover, shall accord with the YALPAG document, *Verification Requirements for Cover Systems*, Version 4.1, included in Appendix C.

Turf, fencing, planting, etc., should not be placed until the GE has given confirmation that the soils meet the requirements of this Remediation Strategy.

Should any excavation of foundations, drainage or services, etc., extend below any placed 'clean' capping layer, and therefore encounter underlying made ground materials, then there is a potential for cross-contamination. This should be avoided where possible. Detailed Risk Assessments and Method Statements outlining the soil management for the site shall be provided for this work by the developer and their specialist sub-contractors.

9. Gas Protection Measures

Characteristic Situation 2 (CS2) gas conditions should be adopted within new houses and garages on site.

Table 4 of BS8485 states that CS2 conditions require a minimum gas protection score of 3.5 points for a low-rise residential end-use (Type A buildings).

The required gas protection score could be achieved by utilising a suitable combination of gas-resistant membrane and sub-floor ventilation measures, installed and verified in accordance with CIRIA Report C735[4].

This may include:

- A beam and block floor, which achieves 0 points.
- A minimum 150mm ventilated sub-floor void, which achieves at least 'good performance' and 1.5 points.
- A ground gas protection membrane (meeting the requirements of BS8485 Table 7), installed above the ventilated void with beam and block floor system in accordance with the recommendations provided within Table 7 of BS8485. Subject to the satisfactory installation of the membrane, plus independent verification of selected plots, this would achieve a protection score of 2 points.

Hydrocarbon and naphthalene impacted soils, including those identified in pond sediments and TP4 / TP206 and TP218 / TP223, should not be placed beneath proposed buildings.

Prior to undertaking any construction works on the site, the proposed design of gas protection measures, and strategy for verification should be confirmed in the form of a Gas Protection Verification Plan. This should be agreed with the Local Authority and if applicable the NHBC or relevant warranty provider.

The site is recorded to be located within a lower probability radon area (where <1% of homes are estimated to be at or above the action level). Therefore, no radon protection measures are required for the proposed development.

[4] CIRIA. 2014. Good Practice on the Testing and Verification of Protection Systems for Buildings against Hazardous Ground Gases.

10. General Site Requirements

10.1 Introduction

The contractor shall comply at all times with this Strategy, the Conditions of Contract and all relevant health and safety requirements. Site works will be supervised by a GE appointed by the client.

The contractor shall prepare and submit a programme for the works to the client prior to the commencement on site.

10.2 Health and Safety

The remediation and earthworks shall be undertaken in accordance with all relevant legislation including, but not limited to:

- The Health and Safety at Work etc. Act, 1974;
- Construction (Design and Management) Regulations (CDM Regulations), 2015;
- The Control of Substances Hazardous to Health (COSHH) Regulations, 2002; and
- The Control of Asbestos at Work Regulations, 2012 and the associated HSE's *Approved Code of Practice and Guidance*.

Contaminated soils are present on the site. During the remediation and construction, it will be necessary to protect the health and safety of site personnel. General guidance on these matters is given in the Health and Safety Executive (HSE) document '*Protection of Workers and the General Public during the Redevelopment of Contaminated Land* (HS(G)66)'.

In summary, the following measures are suggested to provide a minimum level of protection.

- All ground workers should be issued with high visibility clothing, hard hats, safety glasses, protective footwear and impermeable heavy-duty gloves. Personnel should be instructed in their correct use;
- Hand washing and boot cleaning facilities shall be provided;
- No smoking on site other than in designated areas, if any are present on site; and,
- Good practices relating to personal hygiene shall be adopted.

Before site operations are commenced, the necessary COSHH Assessment, Method Statements and Construction Phase Plan should be completed and issued by the contractor in accordance with The CDM Regulations.

All site personnel shall undergo a site-specific health and safety induction prior to starting work on site.

If an excavation meets the definition of a 'confined space' within the Confined Space Regulations 1997, entry must be undertaken in accordance with a safe system of work meeting the requirements of the HSE's *Safe Work in Confined Spaces - Confined Spaces Regulations 1997: Approved Code of Practice and Guidance* (Third Edition, 2014).

10.3 Fuel

Fuelling of any plant shall be undertaken in a designated area and all above ground fuel storage tanks shall comply with The Control of Pollution (Oil Storage) (England) Regulations 2001, (The Oil Storage Regulations).

Specifically, any fuel storage tanks should:

- Be situated within an oil-tight secondary containment system such as an impermeable bund;
- The secondary containment must provide storage of at least 110% of the tank's maximum capacity;
- Be located within a secured area; and
- All taps and valves should be fitted with a lock and be adequately secured when not in use.

Contractors shall provide a fuel spill kit, to be kept on site in an accessible place near to the designated refuelling area.

Waste oil, hydraulic fluid etc., should not be tipped directly or otherwise discharged onto site. Such materials shall be stored separately in a secure bunded area for off-site disposal. Waste oil is a Hazardous Waste, and disposal shall be undertaken by a registered carrier in accordance with the Waste (England and Wales) Regulations (2011).

10.4 Asbestos

Construction workers involved in the groundworks and construction during the site redevelopment and during future works (e.g., maintenance or replacement of underground services) should be vigilant and adopt a safe system of work, including use of appropriate personal protection equipment (PPE), hygiene precautions and good working practices (e.g., wetting of soils etc).

The contractor must ensure that all relevant personnel working on site are aware of the possible risk associated with the potential presence of asbestos within soils at the site and be vigilant during works. If visual evidence of additional ACMs is encountered during the works, advice should be sought from an appropriately qualified asbestos specialist and an appropriate strategy developed for the safe remediation of the material.

All groundworks contractors who could potentially come into contact with such materials shall be required to submit appropriate method statements and risk assessments clearly stating how any such risks will be managed.

During earthworks (i.e., excavation, sorting and placement of potentially asbestos-impacted made ground), made ground soils should be assumed to be potentially impacted by asbestos and therefore all reasonable measures should be put in place in order to minimise, as far as practicable, dust generation and therefore the potential release of asbestos fibres (if present). Appropriate management of all excavation arisings and other works shall be considered to ensure asbestos within excavated materials does not present a risk to site workers, or result in cross contamination of other areas of the site, or clean imported / site-won soils.

10.5 Dust Control and Monitoring

Appropriate measures shall be implemented at all times during the remediation works, to minimise any dust / asbestos fibre emissions.

Any haul roads shall, where practical to do so, be constructed of crushed hardcore products. These haul roads shall be maintained for the duration of their use to minimise any build-up of mud, loose spoil, etc. Mobile water bowsers and sprayers shall be made available to dampen unpaved haul roads and working areas. An adequate accessible supply of clean water shall be maintained at all times to allow dust suppression to be carried out at short notice.

Traffic both entering and working on the site shall obey an appropriate maximum speed limit to minimise dust generation.

Regular inspections of the public highway adjacent to the site entrance shall be carried out by the contractor. If deemed necessary, the highway shall be swept regularly to remove any mud, slurry or dust deposited by vehicles

entering or departing the site, and a wheel wash provided for exiting vehicles, if required. If the contractor considers that significant amounts of any detritus have been deposited on the public highway, then operations shall be temporarily suspended until appropriate cleaning operations have been undertaken.

Any wagons that are to be used for the haulage of potentially contaminated material from the site shall be sheeted to prevent the release of fugitive dust.

When works involving potential disturbance of asbestos are undertaken, dust control mitigation (and where deemed necessary, monitoring) should be undertaken, in accordance with the Control of Asbestos Regulations 2012.

10.6 Noise

The requirements of BS 5228-1:2009 *'Code of Practice for Noise and Vibration Control on Construction and Open Sites. Noise'* shall be adhered to at all times.

All machinery shall be fitted with effective silencers and shall be serviced at regular intervals. No items of plant shall be operated with engine covers raised.

The location of any crushing plant shall take into consideration the location of neighbouring properties and other noise sensitive receptors and shall be located away from these areas and located adjacent to proposed stockpile locations, where possible and practicable.

10.7 Fires

No fires shall be permitted on site, unless previously agreed with the Local Authority.

11. Validation and Reporting

The GE shall ensure that the requirements of this strategy are complied with. On satisfactory completion of all remediation works, the GE will provide a validation report, comprising relevant site records and act as certification that the remedial and ground preparation works have been carried out in accordance with this Strategy.

The verification report shall include the following:

- A description of the works undertaken;
- Records of the works;
- Progress photographs;
- Waste transfer notes / hazardous waste consignment notes;
- Laboratory test results;
- As built surveys, including base of excavation and final level survey, base and top of made ground;
- A statement that the works have been undertaken in accordance with the agreed specification.

A Validation Report is a strict requirement for works undertaken under the CL:AIRE DoWCoP.

A separate validation report specific to the treatment of shallow coal mine workings would be required for submission to the Coal Authority (this can form an appendix to the main remediation Validation Report if preferred).

Following the main phase of remediation earthworks, further validation reporting would be required, including the following:

- Validation of placement of clean cover layers, in accordance with Section 8, Appendix B and Appendix C of this Strategy.
- Validation of correct installation of ground gas protection measures.

12. Regulatory Approval

A copy of this specification should be forwarded by the client or their appointed planning agent to the Local Planning Authority and other parties as appropriate (e.g., the building warranty provider) for their approval prior to the works.

Detailed method statements from the Earthworks Contractor and any nominated sub-contractors may also be required to be submitted and approved in writing by the LPA prior to commencement of these works. Sufficient time should be allowed for regulatory approval to be obtained during the redevelopment programme.

APPENDICES

APPENDIX A
Drawings

Photo 1 - photo of natural strata within northwestern corner of inspection area.

Photo 2 Photo of intact remnant structures in northern area of strip. Evidence of coal outcrop to the south of the concrete structure.

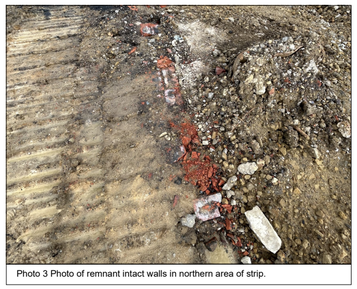

Photo 3 Photo of remnant intact walls in northern area of strip.

Photo 4 Photo of remnant gas pipework and fencing along northern site boundary.

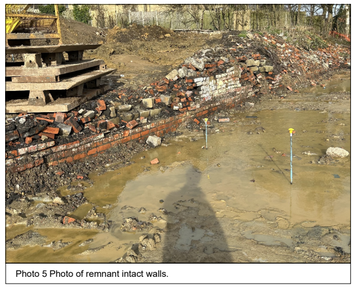

Photo 5 Photo of remnant intact walls.

Photo 6 Evidence of intact remnant concrete walls and made ground.

Photo 7 Evidence of intact structures, looking south.

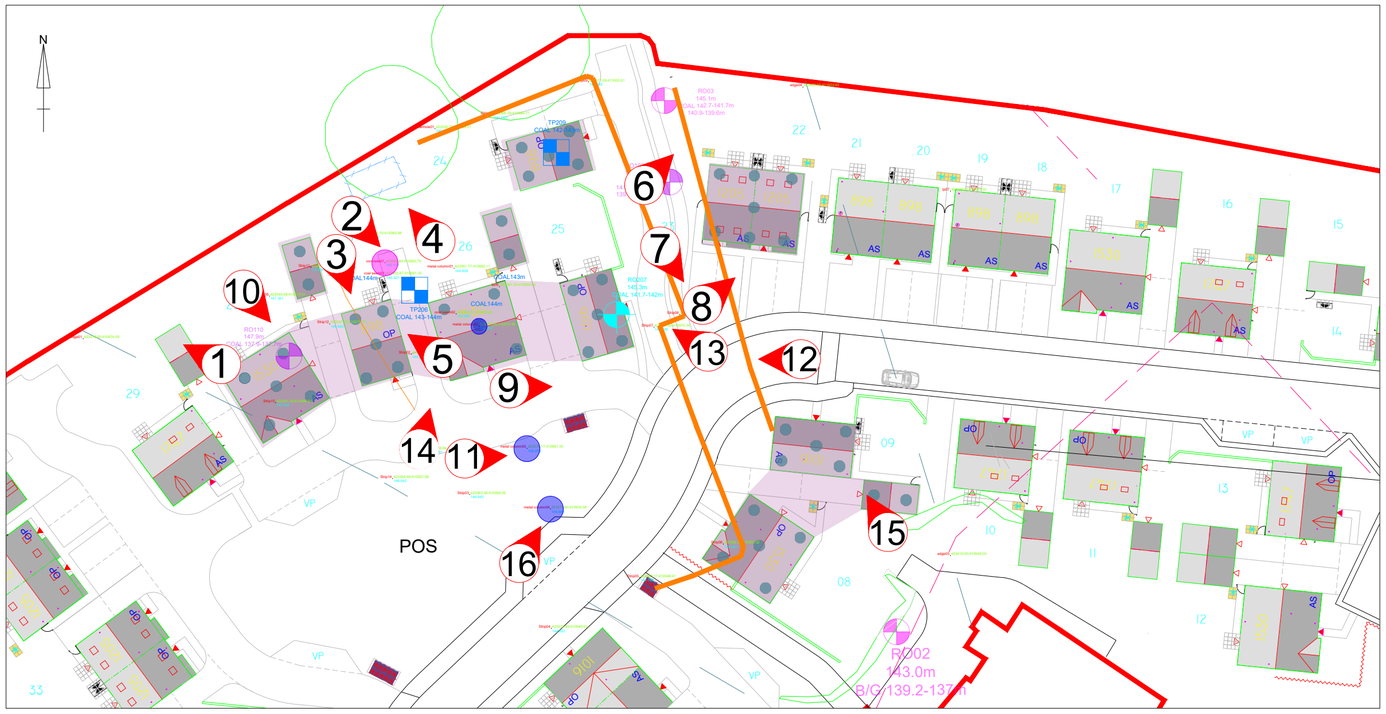

Photo 9 Photo of formation level looking east across inspection area.

Photo 8 Evidence of natural strata in northeast of inspection area.

Photo 10 Photo of natural strata in western site area, looking south.

Photo 11 Photo looking west at formation level with intact remnant structures evident.

Photo 12 Photos of intact walls looking east within inspection area.

Photo 13 Photo of intact concrete walls looking northwest.

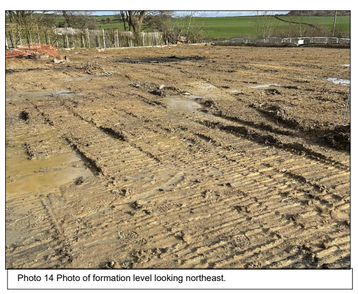

Photo 14 Photo of formation level looking northeast.

Photo 15 Evidence of natural strata within eastern inspection area.

Photo 16 Evidence of intact remnant metal columns.

NOTES

- Development site boundary
- Proposed borehole grid pattern
- Proposed plots for drill and subsequent grout stabilisation, where necessary.
- Proposed extent of site for stripping for the inspection of unrecorded mine entries (such as bell pits / crop workings etc).
- Intact Walls
- Metal column
- Concete column
- 1 Photo Location and Direction Photos taken between February and March 2024

Notes

1. This drawing should not be viewed in isolation from the accompanying report.

2. All marked site features shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

Zoomed Window

REVISION		BY	DATE
0	For Information	MF	21/03/24
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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CLIENT

Lovell Partnerships Ltd

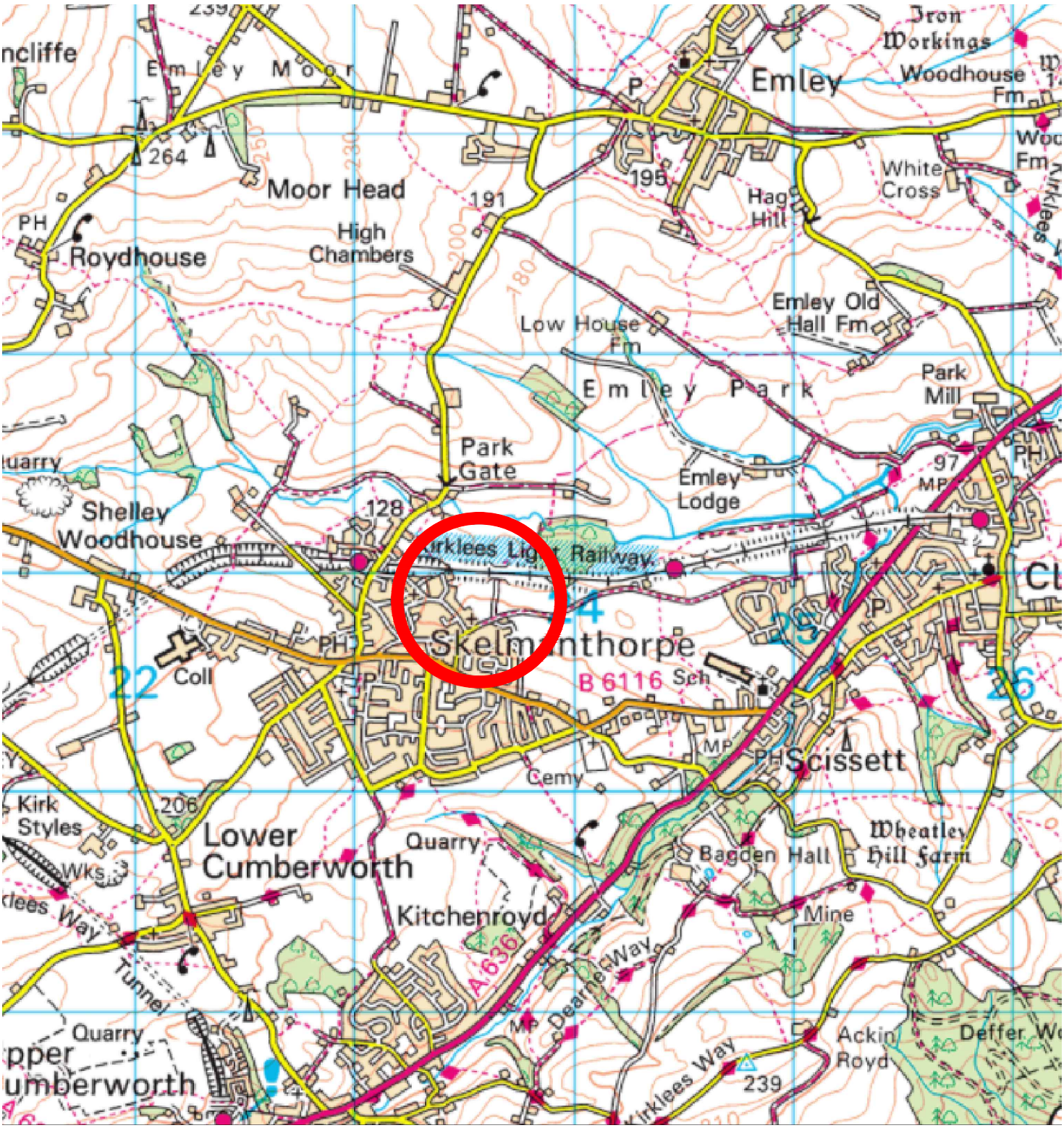
SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Site Strip Inspection Plan, 2024 Visits

DRAWING NO.	REVISION NO.
C9297B/DG/01	0
DRAWN BY	**APPROVED BY**
MF	GH
DATE	**SCALE**	**PAPER SIZE**
March 2024	1:500	A2



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NOTES

Site Location

REVISION	
0	For Information
A	>>
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D	>>

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CLIENT: Lovell Partnerships Ltd	DRAWING NO.: C9297/RS/01	REVISION NO.: 0	
SITE: Former Greenside Mills, Skelmanthorpe	DRAWN BY: MF	APPROVED BY: GH	
DRAWING TITLE: Site Location Plan	DATE: November 2023	SCALE: 1:25,000	A4

1. Photo of pond within east of the site, looking southeast.

2. Photo of pond and surface water feature looking south.

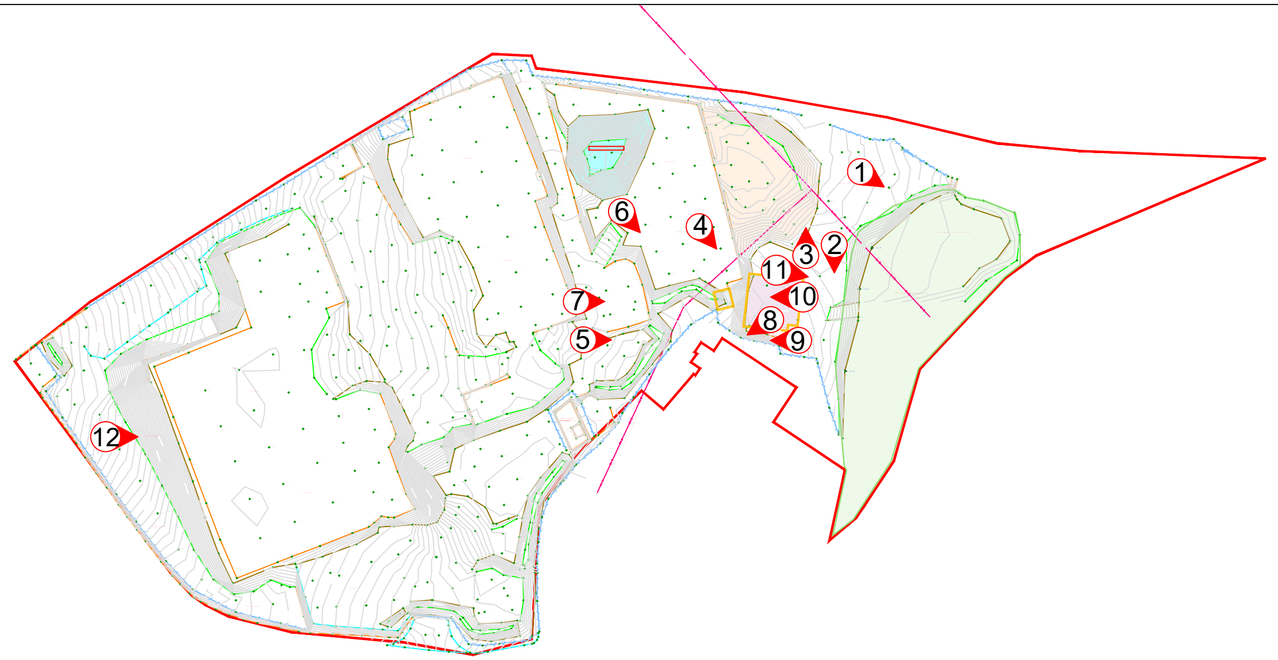
3. Photo of stockpile within east of site, including wooden pole, with area of former infilling and pad beyond to the east.

4. Evidence of former brick lined mill pond and adjacent structures prior to backfilling / clearance.

5. Newly constructed overhead cables and wooden pole, located in close proximity to former AST and sub-station.

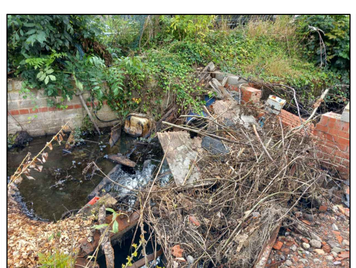
6. View of former AST, prior to demolition and clearance.

N



7. View of former sub-station prior to demolition and clearance.

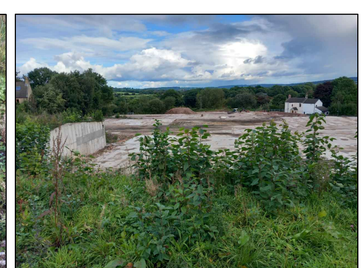
8. Surface water culvert located in southeast, with black oily substance noted.



9. View of surface water culvert with discarded containers.

10. Evidence of hydrocarbon staining within backfilled mill pond (trial pit TP218).

11. View of black saturated pond sediments during trial pitting.



12. View of varying topography of the site, looking east.

NOTES

Site boundary

Photo Location and Direction

Existing pond and surface water feature

Former brick lined mill pond

Existing stockpile

Former above ground storage tank

Topographical survey reproduced from Sirius Remediation Ltd, Post Demolition Survey, ref. SR4358-TS-001, dated October 2023

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
3. All marked site features (including historical features, potential contaminant constraints, and any other potential constraint or feature of note) shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

REVISION		BY	DATE
0	For Information	MF	08/11/23
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
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CLIENT

Lovell Partnerships Ltd

SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Site Features Plan

DRAWING NO.	REVISION NO.
C9297/RS/02	0
DRAWN BY: MF	APPROVED BY: GH

DATE	SCALE	PAPER SIZE
November 2023	1:1000	A2

NOTES

Site boundary

2023 Site Investigation

- Trial Pits (TP200 series)
- Hotspot Delineation Trial Pits
- Rotary Borehole (RO200 series)
- Cable Percussive Boreholes
- Pond Sediment Samples (2023)
- SW — Surface Water Samples (2023)

2021 Site Investigation

- Trial Pits (TP100 series)
- Rotary Borehole (RO100 series)
- Surface Water Samples

Pond 1

2020 Site Investigation

- Rotary borehole location (RO01 series)
- Window sample borehole location (WS01 series)
- Trial pit location (TP01 series)
- Rotary Borehole (RO01 series)
- Proposed Development Outline with Proposed FFLs
- Former building outlines (now demolished to slab level)
- Former AST
- Former backfilled mill pond

Topographical survey reproduced from Stamford Geomatics Ltd survey ref. 2456 / 001 RevA, dated March 2021

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. All exploratory hole locations are approximate and based on handheld GPS coordinates unless stated otherwise on the exploratory hole logs.
3. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
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REVISION		BY	DATE
0	For Information	MF	21/09/23
A	Combined Site Investigation	MF	16/10/23
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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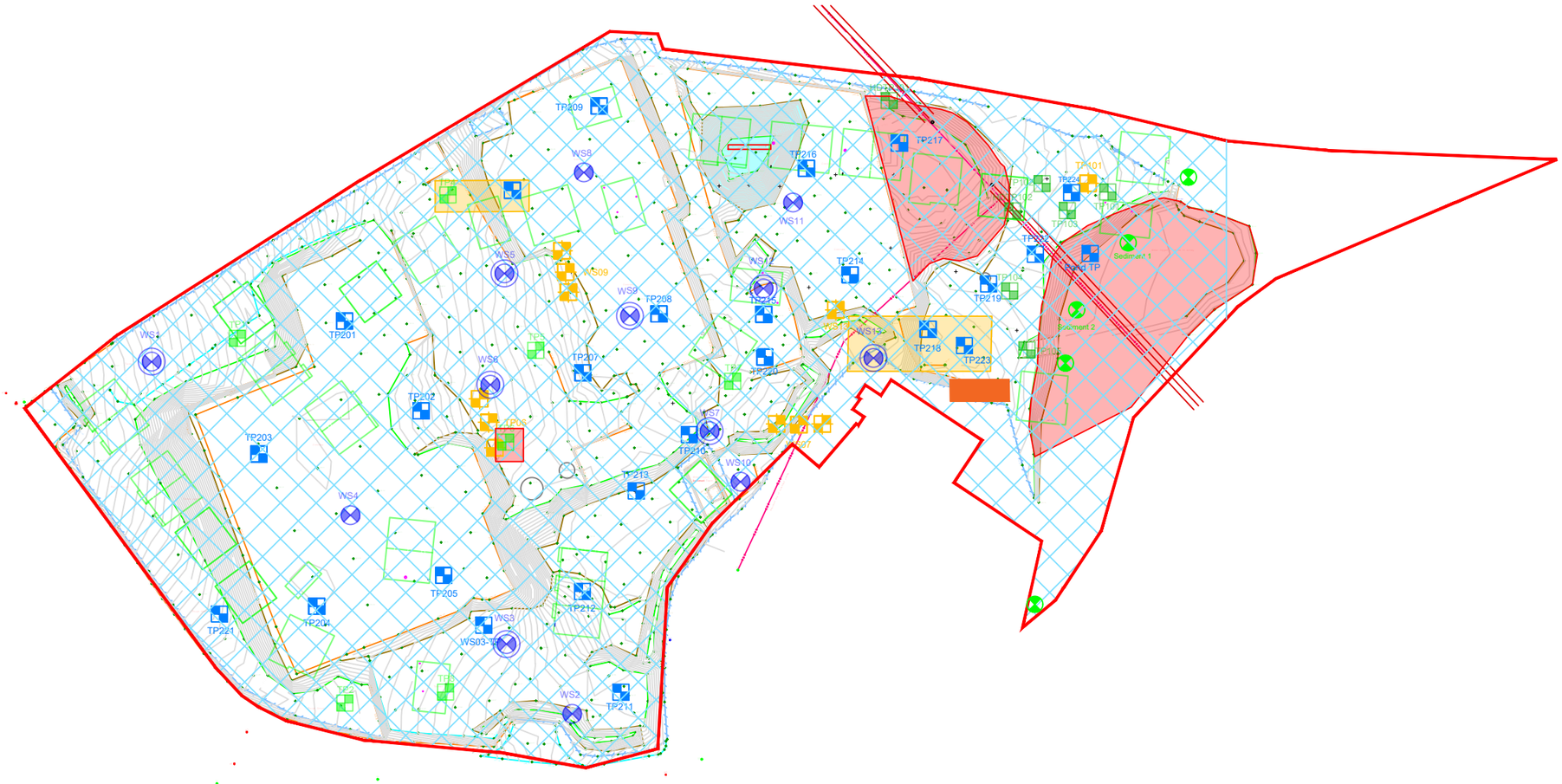
Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Exploratory Hole Location Plan

DRAWING NO.	REVISION NO.
C9297/RS/03	A
DRAWN BY	APPROVED BY
MF	GH
DATE	SCALE	PAPER SIZE
November 2023	1:1000	A3



NOTES

Site boundary

2023 Site Investigation

- Trial Pits (TP200 series)
- Hotspot Delineation Trial Pits
- Pond Sediment Samples (2023)
- SW — Surface Water Samples (2023)

2021 Site Investigation

- Trial Pits (TP100 series)

2020 Site Investigation

- Window sample borehole location (WS01 series)
- Trial pit location (TP01 series)
- Proposed Development Outline with Proposed FFLs
- Former building outlines (now demolished to slab level)

Topographical survey reproduced from Stamford Geomatics Ltd survey ref. 2456 / 001 RevA, dated March 2021

- Asbestos impacted soils - to be placed below proposed hardstand where it won't later be disturbed, or below a clean cover. Geotechnical properties of the stockpile and pond sediment soils to be considered for their suitability for re-use.
- Hydrocarbon impacted soils - further investigation in areas of visual / olfactory evidence of hydrocarbons, with grossly impacted soils / perched waters to be treated for re-use and / or disposal off site. Further assessment and consideration of concentrations of naphthalene within pond sediments to be undertaken.
- Site wide made ground - to be placed below areas of proposed hardstand or clean cover.
- Surface water culvert - to be further assessed as part of enabling works

Gas Protection - Gas Protection measures with a minimum score of 3.5 points to be installed in all new builds and validated in accordance with BS8485:2019 to suit CS2 conditions

Topographical survey reproduced from Sirius Remediation Ltd, Post Demolition Survey, ref. SR4358-TS-001, dated October 2023

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
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3. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
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REVISION		BY	DATE
0	For Information	MF	27/10/23
A	>>	>>	>>
B	>>	>>	>>
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CLIENT

Lovell Partnerships Ltd

SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Proposed Remediation Plan

DRAWING NO.	REVISION NO.
C9297/RS/04	0
DRAWN BY: MF	APPROVED BY: GH
DATE: November 2023	SCALE: 1:1000
PAPER SIZE: A3	

Notes:

This drawing, design and concept are copyright of STEN Architecture.

All Dimensions are to be verified on site before any work commences. If any discrepancies, errors or emissions are noted, these are to be reported to STEN Architecture immediately.

If any other drawings are referenced within this layout, please refer to the specific detailed drawing for design, materials and specific working practices.

PLANNING LAYOUT KEY:

Boundary treatments (see separate drawing for details)

- Bin collection point (bin collection day only)
- Secure 6ft (length) x 2ft (width) x 4ft (height) timber cycle store on 8no. 450sq.flags (900mm x 1800mm). Dwellings with garages to have bicycle hook within for storage.
- Bin storage area on 6no. 450sq.flags (900mm x 1350mm)
- Wall mounted - Mode 3, Type 2, 7kW Electric Vehicle Charging Point
- Post mounted - Mode 3, Type 2, 7kW Electric Vehicle Charging Point

REV:	DESCRIPTION:	BY:	DATE:
N	plot 09 moved east by 0.5m	BMS	21.06.23
M	'Puttenham' house type renamed as 'Newbury'	BMS	23.03.23
L	EV charging point locations added	BMS	15.03.23
K	Tweaks to bin and cycle store positions as per client mark up	BMS	10.01.23
J	Cycle stores, bin store areas and patios added. Central path added between parking spaces.	BMS	06.01.23
H	'AS' and 'OP' notes added to blocks, 1747 type handing corrected and side door added. Plot 1 amended to client's comments.	DS	08.11.22
G	Bin collection point serving plots 30-34 relocated closer to adoptable highway as per clients comments.	LS	20.07.22
F	Turning head serving plots 12-15 amended., positions of plots 12 and 14 amended to suit. Knee railing introduced to edge of turning head. All as per clients comments.	LS	01.07.22
E	Garage for plot 1 moved away from Saville Road. Plots 35-37 re-orientated to enable adjacent road to be reduced to private drive. Plots 33-34 moved forward to reduce height of retaining walls at rear. Other minor updates to Planning Officer comments.	BMS	17.06.22
D	Green walls moved back from footpath	BMS	31.03.22
C	Semi detached plots handed so entrance doors are on the high side	BMS	24.03.22
B	Plots to Saville Road amended to provide more rontage and opportunities for landscaping. Detached Osbourne removed. Additional footpaths and visitor parking added	BMS	18.03.22
A	Parking arrangement amended for plot 45	BMS	25.11.21

LOVELL

Client	LOVELL
Project	Skelmanthorpe
Job Number	CAD

STEN ARCHITECTURE

Type	Floor Area Sq Ft	Bed	Total Units	Total	% Used
OPEN MARKET					
3 BEDS					
Lansdown	898	3	7	6286	15.2
Lansdown detached	898	3	2	1796	4.3
Newbury semi	1016	3	1	1016	2.2
Newbury detached	1016	3	4	4064	8.7
Osbourne	1205	3	13	15665	28.3
					58.7
4 BEDS					
Tattenham	1530	4	7	10710	15.2
Grassington	1747	4	12	20964	26.1
					41.3
Total			**46**	**60501**	

	ACRES	Hectares
Approx gross area	4.6	1.86
Approx nett area	3.78	1.53
Coverage per Acre	**16006**	**30**

STEN ARCHITECTURE
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Facebook: stenarchitectureltd
Linkedin: Sten Architecture

CLIENT: LOVELL PARTNERSHIPS

SITE: Greenside Mills
Skelmanthorpe

TITLE: Planning Layout

SCALE AT A1:	DATE:	DRAWN:	CHECKED:
1:500	29.09.21	BMS	--

PROJECT NO:	DRAWING NO:	REVISION:
2156	2156.01	N

N

Scaled @ 1:500

0 10m 20m 50m

NORTH

KIRKLEES LIGHT RAILWAY

LAUREL BANK

PD PLOTS 25-29

PD PLOT 24

POS

PD PLOTS 30-35

ROAD 1 TH

MARSDEN ST

ROAD 1

SAVILLE ROAD

150.9m

144.8m

Hall

Garage

FFL: 151.625
FFL: 151.775
FFL: 150.25
FFL: 149.50
FFL: 148.90
FFL: 148.45
FFL: 147.10
FFL: 146.95
FFL: 147.55
FFL: 147.85
FFL: 155.750
FFL: 155.300
FFL: 154.450
FFL: 154.000
FFL: 151.60
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FFL: 146.925
FFL: 145.625
FFL: 145.475
FFL: 144.40
FFL: 144.60
FFL: 146.175
FFL: 144.45
FFL: 144.85
FFL: 143.475
FFL: 143.025
FFL: 143.025
FFL: 142.575
FFL: 142.10
FFL: 141.65
FFL: 140.800
FFL: 140.575
FFL: 139.80
FFL: 140.025
FFL: 138.225
FFL: 138.75
FFL: 142.150
FFL: 141.00
FFL: 143.875
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FFL: 144.30
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FFL: 146.85
FFL: 147.15
FFL: 147.15
FFL: 147.15
FFL: 146.850
FFL: 146.850
FFL: 138.375

REFER TO NOTE 2 REQUIREMENTS FOR METER BOXES IN THE VICINITY OF

REFER TO NOTE 2 REQUIREMENTS FOR METER BOXES IN THE VICINITY OF

REFER TO NOTE 2 REQUIREMENTS FOR METER BOXES IN THE VICINITY OF

FOR MORE DETAIL ON THE WATERCOURSE DIVERSION PLEASE SEE DRAWING 180

12 STEPS
11 STEPS
12 STEPS

DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS DRAWING HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

1. THIS DRAWING IS BASED FROM:
   1.1. TOPO SURVEY – 2456/001 (MAR 21)
   1.2. ARCHITECT LAYOUT – 2156.01 K (12/01/23)
2. DO NOT SCALE FROM THIS DRAWING AS IT MAY NOT BE REPRODUCED TO SCALE.
3. THIS DRAWING IS TO BE REPRODUCED IN COLOUR.
4. PLEASE REPORT ANY DISCREPA DUDLEY'S CONSULTING ENGINEE CONSTRUCTION.

KEY

+31.940 PROPOSED LEVELS
38.909 EXISTING TOPO SURVEY LEVELS
FFL: 30.000 FINISHED FLOOR LEVEL
1:4 EMBANKMENT SLOPE
RW 0.75m TRADITIONAL BRICK RETAINING WALL (WITH WEEPHOLES)
OB 0.15m OVERBUILD RETAINING WALL DETAIL
RW 0.15m INDICATES THAT EXTERNAL GL IS THE SAME AS THE FFL – DETAIL TO BE CONFIRMED BY ARCHITECT
WATERCOURSE DIVERSION
(ROOT LOCK – GEOGROW) OR (FLEX M RETENTION TBC.
RW 0.15m TANKING (DETAIL TBC)

Date	Revision	By	Chkd	Ref
27.01.23	TANKING ADDED TO GARAGES	MDJ	PD	P10
12.01.23	PLOT 1 UPDATED TO SUIT NEW LAYOUT	MDJ	PD	P9
09.01.23	REVIEWED AT DETAILED DESIGN	MDJ	PD	P8
29.11.22	UPDATED TO SUIT COMMENTS	MDJ	PD	P7
28.06.22	UPDATED TO SUIT NEW LAYOUT	MDJ	PD	P6
08.04.22	UPDATED TO SUIT NEW LAYOUT	MDJ	PD	P5
25.11.21	UPDATED TO SUIT NEW LAYOUT	MDJ	PD	P4
24.11.21	UPDATED TO SUIT CLIENT COMMENTS	MDJ	PD	P3
08.11.21	REVIEWED INTERNALLY	MDJ	PD	P2
05.11.21	INITIAL ISSUE	SR	PD	P1

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EXTERNAL LEVELS PLAN

Scale	Paper	Drawn	Check
1:250	A0	SDR	PD
Date	Status		
NOV. 21	PRELIMINARY		
Job No.	Drg. No.	Rev.	
21374	155	P10	

APPENDIX B
Clean Cover Guidance Values for Topsoil / /Subsoils for Use in Areas of Gardens and Soft Landscaping

The Sirius Group
Stage 1 Threshold Concentrations for Clean Cover Material for Use in Gardens of Private Residential Properties

Parameter	Threshold Concentration (mg/kg, unless otherwise stated)			Comment
	1% SOM*	2.5% SOM	5% SOM	
Metals/Metalloids				
Arsenic (inorganic)	37			
Cadmium	11			Soil pH 6-9
Chromium (III)	910			
Copper	200			Based on phytotoxic effect
Lead	200			
Mercury (inorganic)	40			
Nickel	130			
Selenium	250			
Zinc	450			Based on phytotoxic effect
Other Inorganics				
pH	<5 or >9			Must be in range 5-9
Water-Soluble Sulphate	0.5 g/l			
Organics				
PAHs**				
Total 16 PAHs	***100***	***100***	***100***	Professional judgement
Benzo(a)pyrene	2.1	2.1	2.2	Genotoxic surrogate
Naphthalene	1.0	2.3	4.6	
TPH†				
Sum of TPH fractions EC5-35	***500***	***500***	***500***	Professional judgement
Aliphatic EC 5-6	24	41	68	
Aliphatic EC >6-8	53	110	210	
Aliphatic EC >8-10	13	31	61	
Aliphatic EC >10-12	62	150	300	
Aliphatic EC >12-16	510	1200	2300	
Aliphatic EC >16-35	41000	70000	90000	
Aromatic EC >5-7	53	110	200	
Aromatic EC >7-8	100	240	460	
Aromatic EC >8-10	20	48	94	
Aromatic EC >10-12	63	150	290	
Aromatic EC >12-16	140	320	570	
Aromatic EC >16-21	260	540	840	
Aromatic EC >21-35	1100	1500	1700	
TPH Hazard Index (no units)	<1	<1	<1	
BTEX‡				
Benzene	0.063	0.13	0.24	
Miscellaneous Organics				
Phenol	110	190	330	
Other Parameters				
Asbestos	Unsuitable if any fibres present			

Based on sandy soil at a range of soil organic matter contents and assuming a standard residential with gardens land use. Alternative criteria may be specified for other soil types and SOM contents, for soils placed at depth, or for other land uses.

Notes:

* Soil organic matter; %SOM = 1.724 * %TOC.

** Soils must meet the specified criteria for each component AND the sum of 16 PAHs. The total is specified to prevent unsuitable materials being placed as cover. Where an individual PAH is not shown, then its criterion is greater than that for the sum or it is a genotoxic PAH assessed by using benzo(a)pyrene as a surrogate marker.

† Soils must meet the specified criteria for each component and the Hazard Index for TPH must be <1.0. The sum of TPH fractions must also be met to prevent unsuitable materials being placed as cover. Where an individual TPH fraction has a criterion greater than that for the sum of TPH fractions, the value is solely provided for the calculation of the Hazard Index.

‡ Components other than benzene are not genotoxic carcinogens and therefore assessed as part of the TPH mixture.

Soils must have no visual or olfactory evidence of contamination.

Version date: 20 August 2015

The Sirius Group
Stage 1 Threshold Concentrations for Clean Cover Soils for Use in Areas of Soft Landscaping

Parameter	Threshold Concentration (mg/kg, unless otherwise stated)			Comment
	1% SOM*	2.5% SOM	5% SOM	
Metals/Metalloids				
Arsenic (inorganic)	79			
Cadmium	120			Soil pH 6-9
Chromium (III)	1500			
Copper	200			Based on phytotoxic effect
Lead	630			
Mercury (inorganic)	120			
Nickel	230			
Selenium	1100			
Zinc	450			Based on phytotoxic effect
Other Inorganics				
pH	<5 or >9			pH to be in range 5-9
Water-Soluble Sulphate	0.5 g/l			
Organics				
PAHs**				
Total 16 PAHs	***100***	***100***	***100***	Professional judgement
Benzo(a)pyrene	4.2	4.2	4.2	Genotoxic surrogate
TPH†				
Sum of TPH fractions EC5-35	***500***	***500***	***500***	Professional judgement
Aliphatic EC 5-6	520000	550000	570000	
Aliphatic EC >6-8	560000	580000	600000	
Aliphatic EC >8-10	12000	12000	12000	
Aliphatic EC >10-12	13000	13000	13000	
Aliphatic EC >12-16	13000	13000	13000	
Aliphatic EC >16-35	250000	250000	250000	
Aromatic EC >5-7	55000	55000	55000	
Aromatic EC >7-8	55000	55000	55000	
Aromatic EC >8-10	5000	5000	5000	
Aromatic EC >10-12	5000	5000	5000	
Aromatic EC >12-16	5000	5000	5000	
Aromatic EC >16-21	3800	3800	3800	
Aromatic EC >21-35	3800	3800	3800	
TPH Hazard Index (no units)	<1	<1	<1	
BTEX‡				
Benzene	71	72	72	
Miscellaneous Organics				
Phenol	440	440	440	440mg/kg is the skin irritation threshold
Other Parameters				
Asbestos	Fibres present			

Based on sandy soil at a range of soil organic matter contents for areas of vegetated landscaping in residential or commercial land uses. Alternative criteria may be specified for other soil types and SOM contents, for soils placed at depth, or for other land uses.

Notes:

* Soil organic matter; %SOM = 1.724 * %TOC.

** Soils must meet the specified criteria for each component AND the sum of 16 PAHs. The total is specified to prevent unsuitable materials being placed as cover. Where an individual PAH is not shown, then its criterion is greater than that for the sum or it is a genotoxic PAH assessed by using benzo(a) pyrene as a surrogate marker.

† Soils must meet the specified criteria for each component and the Hazard Index for TPH must be <1.0. The sum of TPH fractions must also be met to prevent unsuitable materials being placed as cover. Where an individual TPH fraction has a criterion greater than that for the sum of TPH fractions, the value is solely provided for the calculation of the Hazard Index.

‡ Components other than benzene are not genotoxic carcinogens and therefore assessed as part of the TPH mixture.

Soils must have no visual or olfactory evidence of contamination.

Version date: 20 August 2015

APPENDIX C
YALPAG Guidance

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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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.

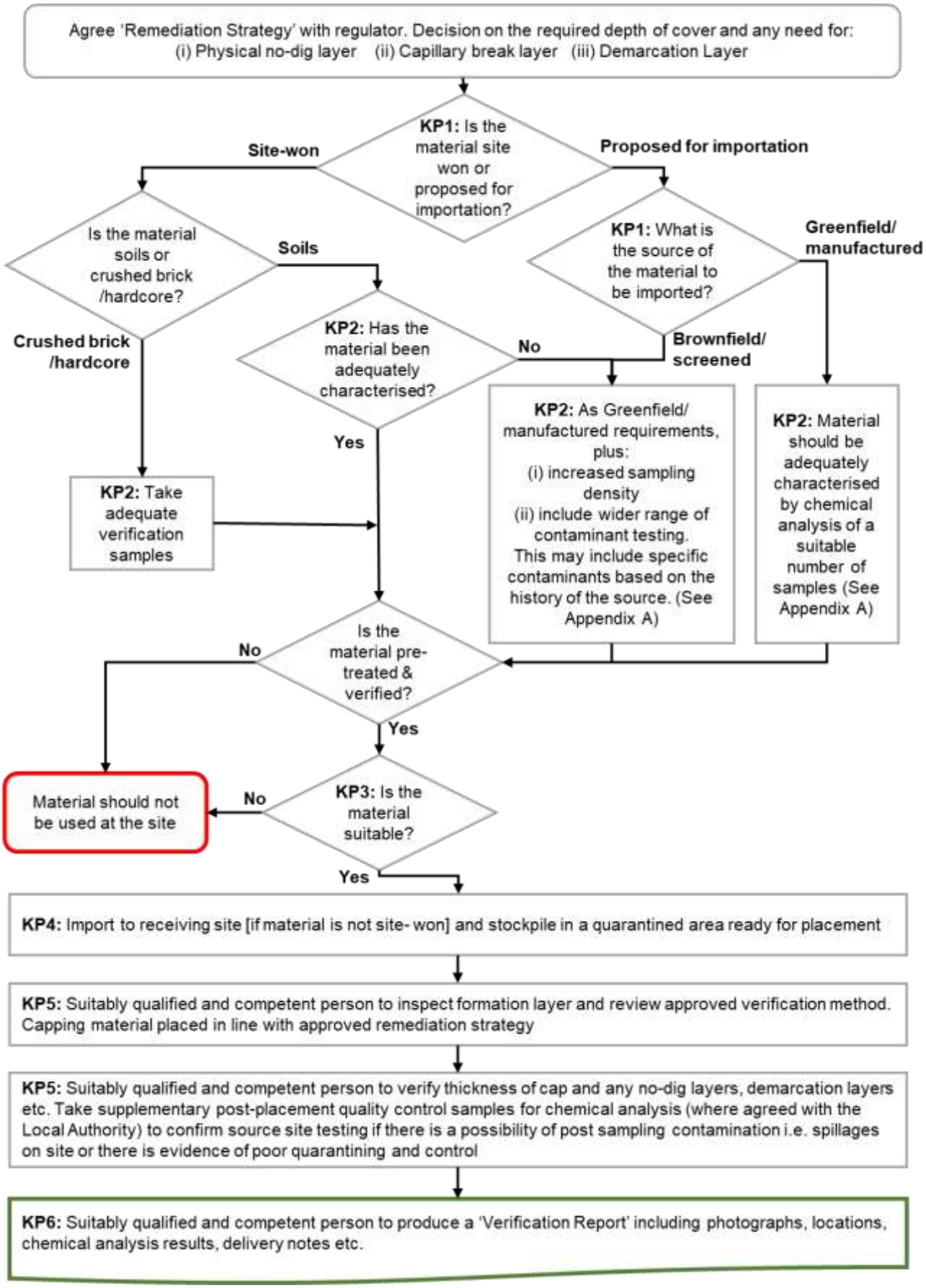
For cover and containment systems, verification will normally depend upon the provision of defensible measurements, observations and records. Critical factors to be considered are:

- 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

© Coopers Consulting Engineers

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.

© Coopers Consulting Engineers

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

© Coopers Consulting Engineers

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

© Coopers Consulting Engineers

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

© Coopers Consulting Engineers

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

© Coopers Consulting Engineers

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

© Coopers Consulting Engineers

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.

© Coopers Consulting Engineers

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

© Coopers Consulting Engineers

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).

© Coopers Consulting Engineers

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.

APPENDIX D
Sirius Generic Assessment Criteria for Retained Soils

SIRIUS GENERIC ASSESSMENT CRITERIA

Context

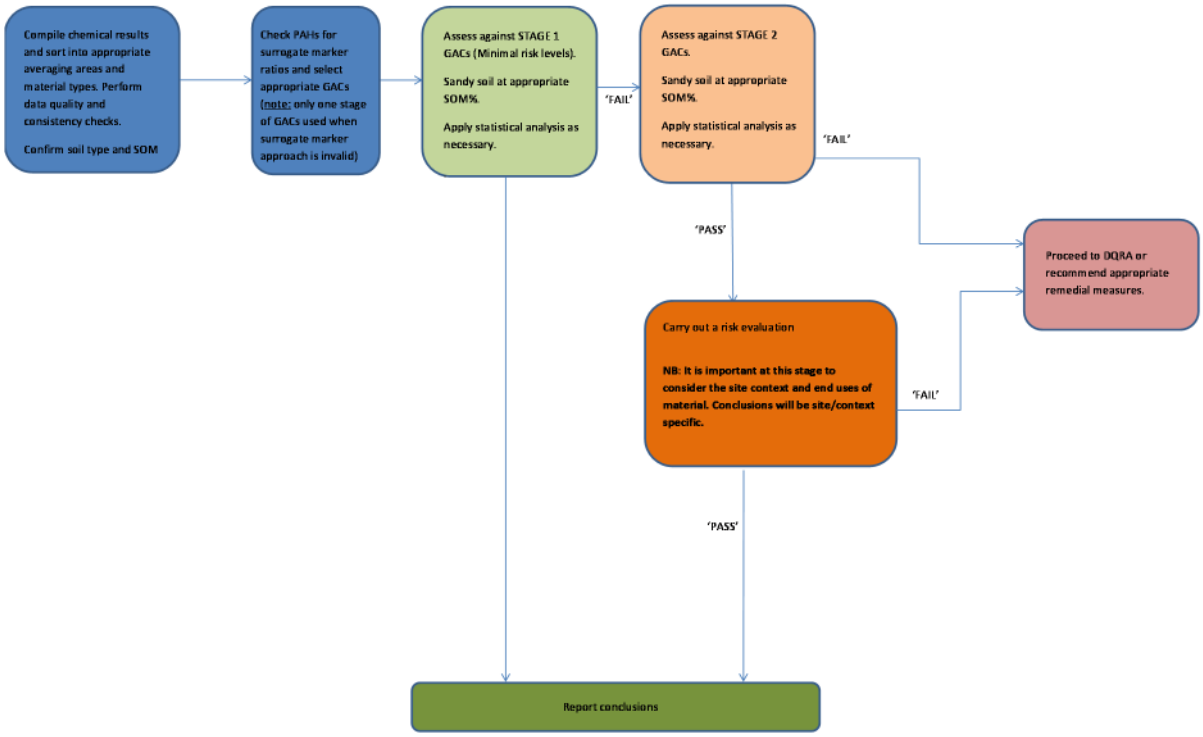
The framework for conducting site investigations, risk assessments and undertaking any necessary remedial works in the UK is provided by Environment Agency report CLR11 "Model Procedures for the Management of Contaminated Land". This presents a phased approach to risk assessment, involving: identification and qualitative assessment of potential pollutant linkages (source-pathway-receptor relationships) by means of a Conceptual Site Model; Generic Quantitative Risk Assessment (GQRA) of potentially significant pollutant links by comparing contaminant concentrations with appropriate Generic Assessment Criteria (GAC) values; and, if required, a Detailed Quantitative Risk Assessment (DQRA) based on site-specific conditions.

Assessment of Risk to Human Health

Introduction

A staged approach to GQRA has been adopted by Sirius for the evaluation of soil concentration data, as shown schematically in Figure 1.

Figure 1. GQRA Process.



The first stage of GQRA comprises assessment of the data against GAC values derived using toxicological parameter values based on "minimum risk". Any contaminants exceeding their GACs at this stage are further assessed against Stage 2 GACs, which have been derived using Low Level of Toxicological Concern (LLTC) criteria, where these are available.

With appropriate justification, a contaminant concentration that does not exceed the relevant Stage 2 GAC value may be considered to indicate that the land is "suitable for use". The appropriate use of LLTC-based criteria within the planning regime is considered reasonable by government agencies, as most recently highlighted in the letter (dated 3rd September 2014) to all local authorities from Lord de Mauley, Parliamentary Under Secretary at DEFRA.

A narrative "risk evaluation" must therefore accompany any Stage 2 assessment to justify the conclusions drawn. Where appropriate, this may provide a basis for eliminating from further consideration those contaminants whose concentrations do not exceed the applicable Stage 2 GAC value.

For the specific case of lead, the Category 4 Screening Level criteria given in CL:AIRE (2014)[1] have been adopted directly as GACs, as these are considered to be based on expert interpretation of current toxicological evidence.

In some areas, background concentrations of lead, other metals and metalloids, and/or individual PAHs may exceed their respective GACs and it may be appropriate to consider relative site and background concentration data as part of a more detailed assessment of the data.

Derivation of GACs

Except where otherwise stated, GACs have been derived by Sirius using CLEA version 1.071.

The GAC values have been derived for a sandy soil type, which will be conservative for the majority of soils (including made ground) encountered on historically contaminated sites. For organic contaminants of concern, criteria have been derived for a number of Soil Organic Matter (SOM) contents.

Genotoxic PAHs are assessed by the "Surrogate Method" using benzo(a)pyrene. Further information on this approach is given below.

Unless specifically stated, chemical properties and Health Criteria Values (HCVs) were obtained from:

- Environment Agency Science Report SC050021 series;
- Nathanail *et al*. (2009) "The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment", 2nd edition, Land Quality Press, Nottingham;
- CL:AIRE - AGS - EIC (2010) "Soil Generic Assessment Criteria for Human Health Risk Assessment". CL:AIRE, London.

GACs for arsenic, benzene, benzo(a)pyrene, cadmium and chromium (VI) have been derived using the

[1] CL:AIRE (2014) "Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination", Report SP1010, rev. 2.

Low Level of Toxicological Concern (LLTC) criteria given in CL:AIRE (2013). These criteria are considered a reasonable basis for assessment as they are still highly precautionary and definitely do not approach an intake level that could be defined as approaching Significant Possibility of Significant Harm to human health in the context of Part 2A of the Environmental Protection Act 1990. It must be further understood that the GACs derived will still incorporate a residual level of conservatism resulting from the exposure parameters used and the assumptions inherent in the model algorithms.

GACs for Genotoxic PAHs

Our approach to the assessment of genotoxic PAHs retains the use of benzo(a)pyrene as a surrogate marker. This approach for genotoxic PAHs is recommended by the HPA (2010)[2], which we consider to be the authoritative current guidance produced by a UK expert body and note that it was retained in the DEFRA Category 4 Screening Levels project (CL:AIRE, 2014).

The surrogate marker approach allows the assessment of the combined carcinogenic risk associated with all genotoxic PAHs[3] present as a mixture within soil, even though detailed toxicological information for many of the individual compounds may be lacking. The approach is based on determining the risk posed by the genotoxic PAH mixture using the concentration of benzo(a)pyrene present as an indicator.

To use the GAC for benzo(a)pyrene as a surrogate marker, a number of requirements must be met (HPA, 2010):

- Benzo(a)pyrene must be present in all soil samples containing genotoxic PAHs for which this method of assessment is being used;
- A similar profile of the genotoxic PAHs relative to benzo(a)pyrene should be present in all of the samples being assessed;
- The PAH profile of PAHs in the soil samples should be similar to that present in the pivotal toxicity study on which toxicological criterion for benzo(a)pyrene was based (Culp et al., 1998[4]). Table 1 provides the basis for defining the acceptable range.

Data indicate that contaminated soils in the UK generally meet these criteria[5] but the assessor must review their dataset before adopting this approach. If the above criteria are not met, then the surrogate marker approach must not be adopted and individual GAC or SSAC values are to be applied.

[2] HPA (2010) "Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)", version 5.

[3] The genotoxic PAHs included in the USEPA PAH 16 analysis reported by analytical labs are: benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, benzo(a)pyrene, chrysene, dibenz[a,h]anthracene and indeno[1,2,3-c,d]pyrene.

[4] Culp, S. *et al*. (1998) Carcinogenesis, 19, 117-124.

[5] Bull, S. & Collins, C. (2013) Environ. Geochem. Health, 31, 101-109.

Table 1. Profile of Genotoxic PAHs Relative to Benzo(a)pyrene that are Considered Acceptable for Application of Benzo(a)pyrene as a Surrogate Marker.

PAH	Acceptable Ratio of PAH Concentration to Benzo(a)pyrene for Application of Surrogate Marker Assessment	
	Lower Limit	Upper Limit
Benz[a]anthracene	0.12	12.43
Benzo[b]fluoranthene	0.11	10.85
Benzo[k]fluoranthene	0.04	3.72
Benzo[g,h,i]perylene	0.08	8.22
Chrysene	0.12	11.61
Dibenz[a,h]anthracene	0.01	1.38
Indeno[1,2,3-c,d]pyrene	0.07	7.27

For further information see: HPA (2010).

Soil Criteria Set for Purposes Other Than Human Health Protection

The Sirius GACs for sulphate, total organic carbon (TOC) and calorific value are set on basis of risks other than human health and their exceedance does not indicate a potential risk to future site users:

- The GAC for sulphate content is based on potential detrimental effects on buried concrete[6] and must be assessed with reference to the soil pH;
- The GAC for TOC content is provided for indicative assessment of disposal options if off-site landfill of soil were to be considered. This GAC is set at the 'Inert' waste threshold and should be considered as being applied for information purposes only;
- The GAC for calorific value is set to assist in an initial assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

Assessment criteria more stringent than those for human health may be set for specific purposes, for example, elimination of nuisance odours or ensuring that potentially mobile free-phase organic products are not present.

Controlled Waters

The Environment Agency's "Remedial Targets Methodology" (2006) provides a framework for assessing the potential for pollution of controlled waters and for deriving remedial target concentrations in soil and groundwater.

There are no generic groundwater or surface water quality standards that are applicable to all sites. Drinking Water Standards and Environmental Quality Standards (EQS) are used by Sirius as assessment criteria where they are appropriate to the contaminant linkages under consideration. Given that these standards apply at the receptor point, this is a conservative approach for samples collected at a source or along a transport pathway.

[6] BRE (2005) "Concrete in Aggressive Ground", Special Digest No. 1; 3rd Edition.

Soil Leachability

Sirius specifies that the analytical laboratory undertakes leachate preparation by BS EN 12475-2:2002. Where specific circumstances require a different method to be used, then this will be explained and justified within the report body text.

The results of leachate analysis are compared to the relevant GAC values for controlled waters.

GAC VALUES FOR CONTROLLED WATERS IN ENGLAND AND WALES

Parameter	GAC (µg/l, unless stated)			Notes
	Inland waters		Coastal and transition waters	
	EQS	DWS	EQS	
Metals and metalloids (dissolved)				
Arsenic	50	10	25	1
Cadmium	See separate table	5	0.2	1, 2
Chromium (total)	4.7	50	N.A.	1, 3
Copper	1.0 (bioavailable)	2000	3.76	1, 4
Lead	1.2 (bioavailable)	10	1.3	1, 4
Mercury	0.07	1.0	0.07	1, 4, 5
Nickel	4.0 (bioavailable)	20	8.6	1, 4
Zinc	10.9 (bioavailable) + background	5000	6.8 + background	1, 4, 6
Misc. inorganics				
Ammonia (total, as N)	See separate table	N.A.	N.A.	7
Ammonia (total, as $NH4^+$)	N.A.	500	N.A.	
Ammonia (un-ionised (NH3), as N)	N.A.	N.A.	21	7
Cyanide (free)	10	50	10	
Sulphate	N.A.	250 mg/l	N.A.	8
Petroleum hydrocarbons and related				
TPH (speciated analysis) *per fraction*	10	10	10	9, 10
Benzene	10	1.0	8	
Toluene	74	700	74	11
Xylenes (sum)	N.A.	500	N.A.	11
MTBE	2600	200	2600	12, 13
PAHs				
Anthracene	0.1	N.A.	0.1	
Benzo(b)fluoranthene + Benzo(k)fluoranthene (sum)	N.A.	Sum of 4 = 0.1	N.A.	
Benzo(g,h,i)perylene + indeno(1,2,3-c,d)pyrene (sum)	N.A.		N.A.	
Benzo(a)pyrene	1.7E-04	0.01	1.7E-04	
Fluoranthene	0.0063	N.A.	0.0063	
Naphthalene	2.0	N.A.	2.0	
Phenol				
Phenol	7.7	N.A.	7.7	
Chlorinated organics				
Dichloromethane	20	N.A.	20	
Trichloromethane (chloroform)	2.5	100	2.5	14
Tetrachloromethane (carbon tetrachloride)	12	3.0	12	
1,2-dichloroethane (1,2-DCA)	10	3.0	10	

Cadmium - inland waters EQS	
Hardness (as mg/l CaCO3)	EQS (µg/l)
<40	0.08
40-50	0.08
50-100	0.09
100-200	0.15
>=200	0.25

Ammonia - inland waters EQS		
Alkalinity (as mg/l CaCO3)	Altitude	EQS (µg/l)
<10	Any	300
10-50	Any	300
50-100	<80m	600
50-100	>80m	300
100-200	<80m	600
100-200	>80m	300
>200	Any	600

Parameter	GAC (µg/l, unless stated)			Notes
	Inland waters		Coastal and transition waters	
	EQS	DWS	EQS	
1,1,1-trichloroethane (1,1,1-TCA)	100	N.A.	100	
1,1,2-trichloroethane (1,1,2-TCA)	400	N.A.	300	
Trichloroethene (TCE)	10	Sum of 2 = 10	10	
Tetrachloroethene (PCE)	10		10	
Vinyl chloride	N.A.	0.5	N.A.	

Notes referenced in table:

1. Metals and metalloid EQS relate to dissolved contamination only (i.e. analysis of filtered samples).
2. Inland waters EQS for cadmium is dependent upon hardness or alkalinity of the receiving surface water. See separate table.
3. Separate EQS standards exist for Cr III and CrVI in fresh water. The fresh water Cr III has been value adopted as the screening value for total Cr analysis as it is normally the predominant form in solution. Specific EQS for Cr VI (3.4µg/l in freshwater; 0.6µg/l in transition and coastal waters) must be applied where relevant.
4. The bioavailable concentration of copper, nickel and zinc in fresh water is dependent upon the pH, DOC and calcium data for the receiving surface water. These data should be collected whenever possible to calculate an equivalent GAC for total metal concentration using the UKTAG m-BAT spreadsheet model. Although the standard indicates that lead should be assessed on a bioavilable basis, no tool is currently avaiable and this criterion should be applied as-is for screening purposes.
5. The value for mercury is the Maximum Acceptable Concentration (MAC) as no annual average EQS is specified in the legislation.
6. The EQS for zinc may be adjusted for the ambient uncontaminated background concentration in the receiving surface water where data are available.
7. EQS for ammonia in inland waters depends on the hardness and altitude of the receiving water body - see separate table. The criteria given here are based on the attainment of "good" chemical quality in the water body.
8. No EQS for sulphate appears in the referenced legislation.
9. No concentration-based EQS values currently exist for TPH. In the absence of specific criteria, our recent discussions with the Environment Agency have led us to adopt 10µg/l *for each individual fraction* determined by speciated TPH (TPHCWG) analysis.
10. No concentration-based DWS exists for TPH. A sum TPH concentration of 200µg/l defines the DW2 Class threshold limit in the Surface Water (Abstraction for Drinking Water) (Classification) Regulations 1996; DW2 waters are generally suitable for abstraction as drinking water supplies, subject to standard filtration and chemical treatment. We therefore consider that the 10µg/l criterion *for each fraction* provides a reasonable and proportionate basis for the initial assessment of risk posed to off-site groundwater and/or surface water potable abstractions that may be impacted at a downgradient abstraction point by TPH contamination originating from the site.
11. The drinking water-based criteria are from World Health Organisation (WHO) Guidelines for Drinking Water Quality, 2008. Taint may result at lower concentrations.
12. The "EQS" given here for MTBE is the PNEC value for fresh and sea water life given in: EU Risk Assessment Report (2002) MTBE, 3rd Priority List, volume 19.
13. DWS for MTBE is a 5-fold dilution of the USEPA (1997) Drinking Water Advisory value for taint, EPA-822-F-97-009. Toxicological thresholds are significantly higher.
14. Sum trihalomethanes limit for drinking water is 100µg/l but chloroform is only compound of this class normally encountered at contaminated sites.

Sources and general comments

Unless otherwise stated, EQS-based GACs are annual average surface water quality criteria given in Table 1 within Part 3 (Priority Substances) or long-term average criteria given in Table 1 within Part 2 (Specific Pollutants) of The Water Framework Directive (Standards and Classification) Directions (England and Wales), 2015.
Unless otherwise stated, drinking water standard-based GACs are taken from the Water Supply (Water Quality) Regulations 2016, and relate to concentration at the supply point and/or consumers' taps.

This list presents recommended GAC values for commonly monitored analytes but is not exhaustive. See the above-referenced legislation for the full lists of criteria.

The Sirius Group
Stage 1 Generic Assessment Criteria for Soils

Revision: 24 January 2020

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
Metals/Metalloids										
Arsenic (inorganic)	37			40			630			[1]
Cadmium	11			85			190			[2]
Chromium (III)	910			4000			8600			
Chromium (VI)	6.0			6.1			33			[3]
Copper	200			7100			68000			[4]
Lead	200			310			2300			[5]
Mercury (inorganic)	40			56			1100			[6]
Nickel	130			180			980			[7]
Selenium	250			430			12000			
Vanadium	410			1200			9000			
Zinc	450			40000			750000			[4]
Other Inorganics										
pH	<5 or >9			<5 or >9			<5 or >9			
Total Sulphate	2400			2400			2400			[8]
Water-Soluble Sulphate	0.5 g/l			0.5 g/l			0.5 g/l			[8]
Free Cyanide	34			34			1400			[9]
Organics										
PAHs										
Acenaphthene	200	490	920	2000	3600	4900	75000	92000	100000	
Acenaphthylene	170	400	760	2000	3600	4900	76000	93000	100000	
Anthracene	2300	5300	9400	30000	34000	36000	520000	540000	540000	[10]
Benzo(a)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(a)pyrene	2.1	2.1	2.2	2.3	2.3	2.3	27	27	27	[11]
Benzo(b)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(k)fluoranthene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Benzo(g,h,i)perylene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Chrysene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Dibenzo(a,h)anthracene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Fluoranthene	280	560	820	1500	1600	1600	23000	23000	23000	
Fluorene	170	390	730	2200	3400	4000	60000	67000	70000	
Indeno(1,2,3-c,d)pyrene	Assessed using benzo(a)pyrene as a surrogate marker									[10]
Naphthalene	1.0	2.3	4.6	1.0	2.4	4.7	110	260	510	
Phenanthrene	95	220	380	1300	1400	1500	22000	22000	23000	
Pyrene	620	1200	1900	3700	3800	3800	54000	54000	54000	
BTEX and related										
Benzene	0.063	0.13	0.24	0.16	0.30	0.38	15	28	49	
Toluene	100	240	460	370	830	1100	33000	68000	110000	
Ethylbenzene	26	62	120	34	81	110	3200	7400	14000	
Xylenes (total)	28	67	130	33	78	110	3200	7700	15000	[12]
1,2,4-trimethylbenzene	0.22	0.53	1.1	0.24	0.58	1.2	39	93	170	
Iso-propylbenzene	6.6	16	32	6.8	17	33	1300	3100	6100	
Propylbenzene	21	51	100	23	57	110	3800	9100	17000	
Styrene	6.9	16	32	21	49	93	3100	6100	9500	
TPH										
Aliphatic EC 5-6	24	41	68	24	41	68	2400	4100	6900	
Aliphatic EC >6-8	53	110	210	53	110	210	5300	11000	21000	
Aliphatic EC >8-10	13	31	61	13	31	61	1300	3100	6000	
Aliphatic EC >10-12	62	150	300	62	150	300	6100	15000	28000	
Aliphatic EC >12-16	510	1200	2300	510	1200	2300	43000	72000	85000	
Aliphatic EC >16-35	41000	70000	90000	42000	70000	90000	>1E6	>1E6	>1E6	[13]
Aromatic EC >5-7	53	110	200	150	300	538	15000	28000	48000	
Aromatic EC >7-8	100	240	460	370	820	1500	33000	68000	110000	
Aromatic EC >8-10	20	48	94	22	54	100	2200	5200	9800	
Aromatic EC >10-12	63	150	290	120	290	560	11000	22000	30000	
Aromatic EC >12-16	140	320	570	1100	1900	2200	35000	37000	37000	
Aromatic EC >16-21	260	540	840	1800	1900	1900	28000	28000	28000	
Aromatic EC >21-35	1100	1500	1700	1900	1900	1900	28000	28000	28000	
Chlorinated Organics										
Chlorobenzene	0.19	0.44	0.86	0.19	0.45	0.87	31	71	140	
Dichloromethane (DCM)	0.47	0.78	1.2	1.2	1.7	2.4	250	340	470	
1,1-dichloroethane (DCA)	1.4	2.4	4.0	1.4	2.4	4.1	260	420	690	
1,2-dichloroethane (DCA)	0.0031	0.0048	0.0076	0.0035	0.0053	0.0084	0.34	0.51	0.81	
1,1-dichloroethene (DCE)	0.15	0.26	0.45	0.15	0.26	0.46	24	43	74	
cis-1,2-dichloroethene (DCE)	0.066	0.12	0.20	0.069	0.12	0.21	14	23	38	
trans-1,2-dichloroethene (DCE)	0.11	0.21	0.38	0.12	0.22	0.39	21	37	65	
Pentachlorophenol	0.21	0.52	1.0	27	30	31	400	400	400	
1,1,1,2-tetrachloroethane	0.56	1.3	2.6	0.63	1.5	2.9	59	140	270	

Parameter	Residential (mg/kg, unless otherwise stated)						Commercial / Industrial (mg/kg, unless otherwise stated)			Note
	With Homegrown Produce			Without Homegrown Produce						
	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	1% SOM	2.5% SOM	5% SOM	
1,1,2,2-tetrachloroethane	0.98	2.1	4.0	1.6	3.4	6.3	150	310	570	
Tetrachloroethene (PCE)	0.074	0.17	0.32	0.07	0.17	0.33	10	23	45	
Tetrachloromethane (CT)	0.011	0.024	0.046	0.011	0.024	0.046	1.6	3.6	6.9	
1,1,1-trichloroethane (TCA)	3.7	7.8	15	3.8	7.9	15	370	770	1400	
1,1,2-trichloroethane (TCA)	0.39	0.85	1.6	0.51	1.1	2.0	89	180	320	
Trichloroethene (TCE)	0.0070	0.015	0.028	0.0071	0.015	0.028	1.5	2.8	44	
Trichloromethane (CF)	0.43	0.80	1.4	0.48	0.89	53	98	170	300	
Vinyl Chloride	0.00034	0.00045	0.00062	0.00037	0.00048	0.00066	0.038	0.049	0.068	
Miscellaneous Organics										
Carbon disulphide	0.066	0.13	0.25	0.066	0.13	0.25	6.7	14	25	
Di-(2-ethylhexyl)-phthalate	290	660	1100	3900	4000	4100	85000	85000	8600	
MTBE	31	55	94	39	68	120	7400	12000	19000	
Phenol	110	190	330	420	440	440	440			[14]
Methylphenols (cresols), total	78	170	330	5600	8200	9900	160000	170000	18000	[15]
2,4-dimethylphenol (m-xylenol)	18	43	82	200	430	720	15000	23000	28000	
Other Parameters										
TOC	3% w/w			3% w/w			3% w/w			[16]
Calorific Value	2 MJ/kg			2 MJ/kg			2 MJ/kg			[17]
Asbestos	Fibres present			Fibres present			Fibres present			

All concentration-based criteria are rounded to 2 significant figures.

The criteria assume a sandy soil type, which will be conservative for the great majority of soils (including made ground) encountered on historically contaminated sites.

Except where otherwise stated, criteria have been derived by Sirius using CLEA version 1.06. Parameters for the land use cases are consistent with those given in Environment Agency (2009) "Updated Technical Background to the CLEA Model", report SC050021/SR3 but updated (where relevant) for respiration rate, exposure frequency for dermal contact outdoors, soil adherence factors for children, and plant uptake concentration factors given in CL:AIRE (2014) and Nathanail et al., (2015). No correction has been made for the "Top Two" crop types in the Residential with Homegrown Produce land use and the criteria will therefore be conservative in this regard.

Health Criteria Values (HCVs) and (except where specifically noted) chemical property data were obtained from:
• Environment Agency Science Report SC050021 Series;
• Nathanail et al. (2015);
• CL:AIRE-AGS-EIC (2010).

Footnotes

[1] Based on oral GAC as this is the lower GAC and reflects a cancer risk many orders of magnitude greater than for inhalation.

[2] Determined for lifetime exposure. Plant uptake concentration factors applied were as given in CL:AIRE (2014). The GAC values are based on data for soils having a pH value in the range 6-8; caution should be applied in applying them at pH values outside this range, especially at pH values <5.

[3] Both oral and inhalation HCVs are based on local toxicological effects and therefore the lowest (oral) GAC value is adopted.

[4] For the Residential with Homegrown Produce land use, the GAC values for Cu and Zn are based on potential phytotoxic effects and have been set at the maximum allowable concentrations for sewage sludge-amended soils presented in the "Sludge (Use in Agriculture) Regulations" (SI 1263/1989); these criteria may also be applied in any land use where plants are to be grown. The equivalent GAC values for human health protection in the Residential with Homegrown Produce land use are around an order of magnitude greater.

[5] The Category 4 Screening Levels for lead defined in CL:AIRE (2013) have been adopted directly to provide an acceptable basis for initial assessment of data. Where background concentrations of lead exceed the GAC value, then site-specific evaluation will be required.

[6] The SGV for mercury is based on inorganic mercury which represents the most common form encountered within the environment. This is considered appropriate for most sites as: "…the SGV for inorganic mercury can normally be compared with chemical analysis for total mercury content because the equilibrium concentrations of elemental and methylmercury compounds are likely to be very low" (Environment Agency report SC050021/Mercury SGV). Analysis and specific assessment for elemental or methylated forms of mercury will need to be considered if historical land use or site-specific factors indicate that these forms of mercury are likely to be present.

[7] Toxicological effects by inhalation are localised, therefore the lower of the GAC values for oral and inhalation HCVs have been adopted.

[8] BRE (2005). Sulphate is not considered to pose a potential risk to human health under normal circumstances – this GAC applies to construction cases only and is set at the upper limit for DS-1 Design Sulphate Class concrete.

[9] GAC calculated for acute risk. Further information can be provided upon request.

[10] The genotoxic PAHs (benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene) are routinely assessed using benzo(a)pyrene as a surrogate (HPA (2010) "Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs)", version 5). Separate information on this approach is provided.

[11] Calculated using a 'minimum risk' oral index dose derived from the application of a 10,000x safety factor to the BMD10 presented in CL:AIRE (2014) for benzo(a)pyrene as a surrogate marker and the inhalation index dose specified in CL:ARE (2014) and Nathanail *et al*. (2015). As a conservative measure, the GAC is based on combined exposure pathways to account for systemic carcinogenic effects. Further information on the derivation can be provided upon request.

[12] For screening purposes, a single GAC has been set for total xylene. This is the lowest of the values calculated for the three individual xylene isomers.

[13] "No GAC" indicates that no value has been specified for this land use as the TDSI cannot be exceeded at achievable soil concentrations.

[14] 440mg/kg is the minimum concentration that is protective for direct skin contact with phenol (See Environment Agency SR050021/Phenol SGV) and is adopted where GACs for chronic exposure are higher.

[15] For screening purposes, a single GAC has been set for total methylphenol. This is the lowest of the values calculated for the three individual methylphenol isomers.

[16] The Hazardous Waste (England and Wales) Regulations 2005. TOC content in itself does not represent a potential risk to human health. This GAC is provided for indicative assessment of disposal options, in the case that off-site landfill of soil is undertaken. This GAC is specified at the 'Inert' waste threshold and should be considered as for information purposes only.

[17] ICRCL (1986) Guidance Note 61/84, 2nd Edition, Notes on the Fire Hazards of Contaminated Land. Calorific value is not an indication of direct human health risk but may be useful in assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.

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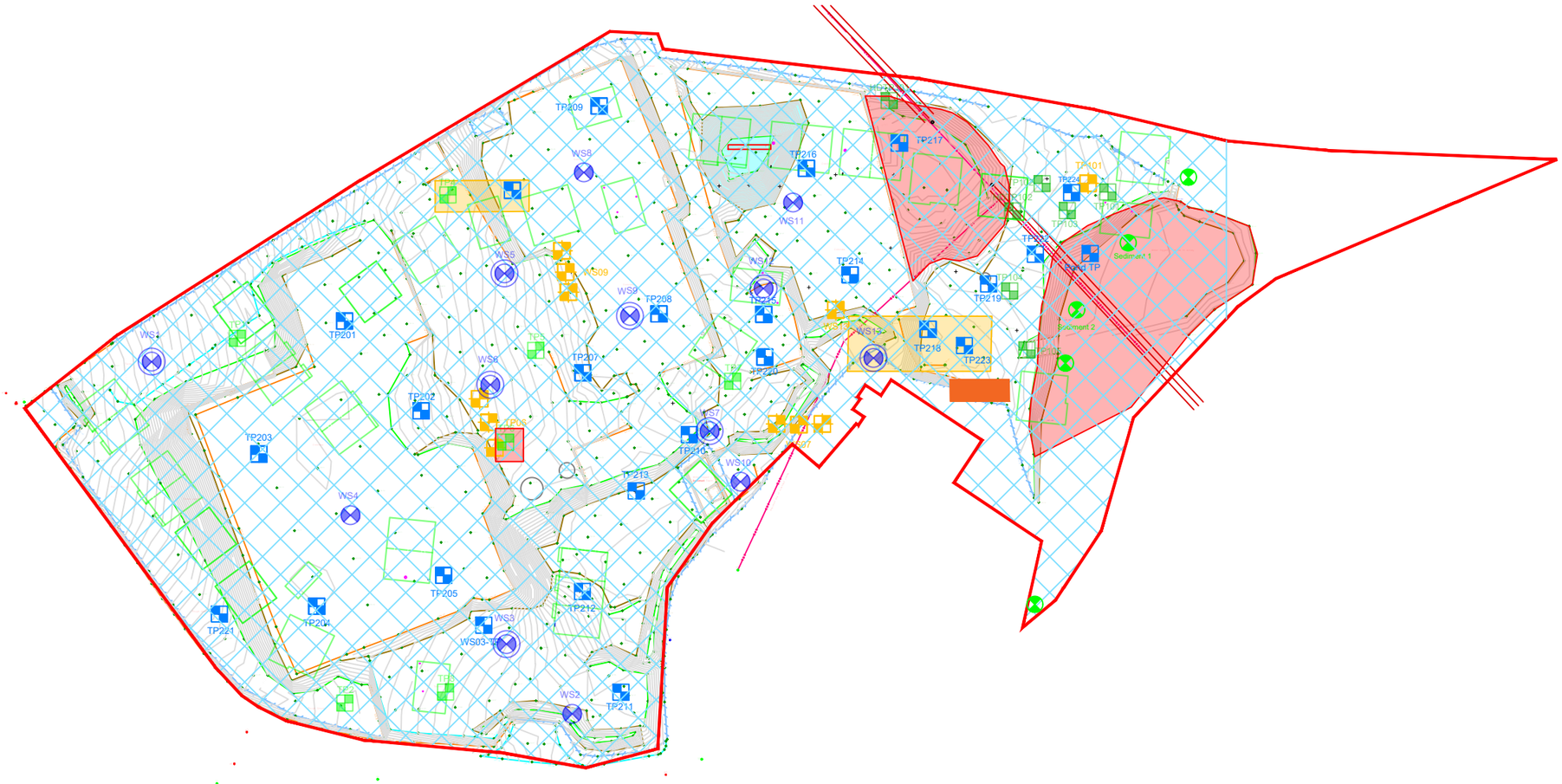

NOTES

Site boundary

2023 Site Investigation

- Trial Pits (TP200 series)
- Hotspot Delineation Trial Pits
- Pond Sediment Samples (2023)
- SW — Surface Water Samples (2023)

2021 Site Investigation

- Trial Pits (TP100 series)

2020 Site Investigation

- Window sample borehole location (WS01 series)
- Trial pit location (TP01 series)
- Proposed Development Outline with Proposed FFLs
- Former building outlines (now demolished to slab level)

Topographical survey reproduced from Stamford Geomatics Ltd survey ref. 2456 / 001 RevA, dated March 2021

- Asbestos impacted soils - to be placed below proposed hardstand where it won't later be disturbed, or below a clean cover. Geotechnical properties of the stockpile and pond sediment soils to be considered for their suitability for re-use.
- Hydrocarbon impacted soils - further investigation in areas of visual / olfactory evidence of hydrocarbons, with grossly impacted soils / perched waters to be treated for re-use and / or disposal off site. Further assessment and consideration of concentrations of naphthalene within pond sediments to be undertaken.
- Site wide made ground - to be placed below areas of proposed hardstand or clean cover.
- Surface water culvert - to be further assessed as part of enabling works

Gas Protection - Gas Protection measures with a minimum score of 3.5 points to be installed in all new builds and validated in accordance with BS8485:2019 to suit CS2 conditions

Topographical survey reproduced from Sirius Remediation Ltd, Post Demolition Survey, ref. SR4358-TS-001, dated October 2023

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. All exploratory hole locations are approximate and based on handheld GPS coordinates unless stated otherwise on the exploratory hole logs.
3. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
4. All marked site features shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

REVISION		BY	DATE
0	For Information	MF	27/10/23
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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CLIENT

Lovell Partnerships Ltd

SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Proposed Remediation Plan

DRAWING NO.	REVISION NO.
C9297/RS/04	0
DRAWN BY: MF	APPROVED BY: GH
DATE: November 2023	SCALE: 1:1000
PAPER SIZE: A3	

APPENDIX 3

Completion Reports for Proof Drilling of Potential Shallow Mineworkings and Site Strip - Sirius

Geotechnical

COMPLETION REPORT FOR THE PROOF DRILLING OF POTENTIAL SHALLOW MINE WORKINGS

Former Greenside Mills, Skelmanthorpe

for Lovell Partnerships Ltd

Date: **September 2024**

Report reference: C9297C/D&G

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QUALITY ASSURANCE

Issue / Revision	First Issue	Second Issue	Third Issue
Report Status	FINAL		
Prepared For	Lovell Partnerships Ltd		
Prepared By	Gemma Halliday Principal Engineer		
Signature			
Checked By	J Cheesman		
Signature			
Report Reference	C9297C/D&G		
Report Revision	0		

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APPENDIX A FIGURES AND DRAWINGS

Drawing No.	Title	Scale
C9297C/DG/01	Site Location Plan	1:25,000
C9297C/DG/02	Site Features Plan	1:1,000
C9297C/DG/03	Shallow Mine Workings Proof Drilling Location Plan	1:500
2156.01 RevN	STEN Architecture Planning Layout, last dated June 2023	1:500
21374 155 P10	Dudleys Structural and Civil Consultants, External Levels Plan, last dated January 2023	1:250

1. Introduction

1.1 Background

It is understood that Lovell Partnerships Limited (Lovell) are proposing re-development of land at the former Greenside Mills, off Saville Road, Skelmanthorpe (the "site"). The re-development will comprise 46 no. low rise (2-3 storey) residential properties with private gardens and associated infrastructure, including areas of hardstanding, access roads and public open space (POS). A proposed development layout has been provided to Sirius (STEN Architecture drawing ref. 2156.01 Rev N, last dated June 2023), a copy of which is included in Appendix A of this report.

Previous site investigations identified a potential risk to surface stability from localised possible shallow mine workings underlying the central area of the site. This potential risk indicated that a programme of proof drilling of boreholes, followed by stabilisation where / if necessary was required. A Specification for the Investigation and Treatment of Shallow Mine Workings (hereafter, 'the Specification') was prepared by SGL, which included a Proposed Shallow Mine Workings Investigation and Treatment Plan (Drawing No. C9297/DG/04). The Specification is provided in Appendix D.

Boreholes were to be drilled to sufficient depth to encounter the Whinmoor (Top and / or Low Whinmoor) coal seams unless otherwise instructed by the supervising engineer, or where sufficient thickness of intact rock is proven in individual boreholes. Where the seam(s) were encountered, boreholes were to be extended through the seam and at least 0.5m into the underlying strata.

1.2 Appointment

Lovell Partnerships Ltd (Lovell) appointed Sirius Drilling Limited (SDL) as a specialist contractor to investigate and stabilise possible shallow mine workings across central areas of the proposed development. SGL acted as Supervising Engineer for the works.

On behalf of Lovell, a permit to undertake the investigation and grouting of the shallow mine workings within the treatment area was obtained by SGL from the Coal Authority (CA) prior to commencement of works. A copy of this permit is included within Appendix B.

1.3 Sources of Information

The site has been subject to previous site investigation by SGL, with relevant reports detailed below:

- Geo-environmental Appraisal of Land at Greenside Mills, Skelmanthorpe (Ref. C7340, dated December 2020).
- Supplementary Site Investigation Letter Report for land at the former Greenside Mills, Skelmanthorpe (Ref. C7340/RC/9607, dated June 2021).
- Geotechnical Assessment Letter Report for land at the former Greenside Mills, Skelmanthorpe (Ref. C9297/10330/AEC) dated December 2023).

This document should be read in conjunction with the previous reports for the site, which present in detail the site setting and the findings of the previous phases of intrusive investigation. Relevant findings are summarised in Section 2.4 of this document.

1.4 Reporting

This Completion Report includes the following information:

- A summary of the works undertaken and presentation of the findings of further investigations;
- A drawing showing the location of boreholes and ground conditions encountered (Appendix A - Drawing No. C9297C/DG/03); and,
- Confirmation that the works have been undertaken in accordance with the Specification.

This Completion Report is written for the sole use of Lovell Partnerships Limited. No other third party may rely on or reproduce the contents of this report without the prior written approval of SGL. If any unauthorised third party comes into possession of this report, they rely on it at their own risk and the authors do not owe them a Duty of Care or Skill.

1.5 Relevant Parties

The principal parties to the contract are:

- Lovell Partnerships Ltd: Client and Landowner
- Sirius Drilling Ltd: Contractor for the drilling and grouting works
- Sirius Geotechnical Ltd: Supervising Engineer

2. Site Details and Description

2.1 Site Details

A summary of the pertinent site details are summarised Table 2.1, below.

Table 2.1 - Current Site Overview

Location	The overall site comprises an irregularly shaped parcel of land covering an area of approximately 2 hectares, located to the north of Saville Road and west of Marsden Street in the village of Skelmanthorpe. The location of the site is shown on Drawing No. C9297C/DG/01, presented in Appendix A.
National Grid Ref.	423390mE, 410930mN
Topography and Features	In general, the site slopes downward from northwest to southeast / east, with levels of approximately 156.5m AOD adjacent to the northwestern site boundary, and 138m AOD to the eastern site boundary, and is formed by approximately four development plateaus. The site is currently undergoing earthworks (by third party contractors), to enable residential development by Lovell. The perimeter of the site is secured by bunding formed by crushed demolition materials and herras fencing, with several stockpiles of crushed demolition materials present across the site. Overhead cables run northwest-southeast across the eastern site area. Newly constructed overhead electricity cables and an associated temporary wooden pole is located within the southeast of the site, orientated approximately southwest-northeast. The key, post-demolition, site features are summarised on Drawing C9297C/DG/02, in Appendix A. The site is bound to the north by Kirklees Light Railway and residential properties, with open fields beyond. The site is bound to the east by Marsden Street and residential properties, a car garage, and open fields beyond. The site is bound to the south and west by Saville Road, with residential properties beyond. Laurel Bank is located to the northwest, with residential properties beyond.

2.2 Geological Setting

A summary of available published geological information is provided in Table 2.2 below.

Table 2.2 - Published Geological Summary

Sources of Information	BGS 1:10,000 scale geological map (Sheet name, SE21SW). BGS 1:50,000 scale geological map (Glossop, Sheet 86). The Geology of the Country around Holmfirth and Glossop, Memoirs of the Geological Survey, Explanation of Sheet 86, dated 1933. Geology of the Glossop District, a brief explanation of the geological map Sheet 86 Glossop, dated 2012. BGS Geology of Britain Viewer (on-line service).

	BGS Lexicon of Named Rock Units (on-line service). BGS borehole records (on-line service). Coal Authority (CA) Interactive Map Viewer (on-line service). Non-Residential Coal Authority Mining Report (ref. 51001106919001), dated 24th February 2016.
Published Geology	No made ground or superficial deposits are recorded to underlie the site. The site is shown to be underlain by Carboniferous Pennine Lower Coal Measures (LCM) strata, comprising undifferentiated 'mudstones, siltstones and sandstones with subordinate coal, ironstone and fireclay' in the centre and southwest of the site. An unnamed sandstone unit is recorded to be present in the east of the site. The site is shown to be located within three fault blocks. Two conjectured faults, orientated northwest-southeast, with a downthrow to the northeast are recorded to cross the central area of the site. A conjectured fault orientated northeast-southwest, with a downthrow to the southeast, is located to the immediate northwest of the site. The strata in the vicinity of the site are recorded to be dipping c.5^{o} to the northeast.
Coal Seams	The BGS map conjectures the presence of a 'thin' coal seam c. 30m northwest of the site (dipping to the south), beyond the northeast-southwest fault. The Whinmoor (Top Whinmoor) and Low Whinmoor coal seams are conjectured to outcrop c. 10m north and c. 15m northeast of the site respectively, dipping to the northwest. The Whinmoor (Top Whinmoor) and Low Whinmoor coal seams are shown to outcrop beyond the northern most conjectured northwest-southeast orientated fault on site. The seams are recorded to be between 0.4m-0.8m and 0.2m-0.6m in thickness, respectively. The stratigraphical column included on the BGS 1:10,000 geological map indicates the Low Whinmoor to be approximately 10m stratigraphically below the Whinmoor (Top Whinmoor). The Cumberworth Thin Coal (recorded to be c.0-0.4m in thickness) is recorded to be 20m below the Whinmoor (Top Whinmoor) coal. The 1933 geological memoir notes that *'the Whinmoor Coal…has been or is being worked wherever present at shallow depth…it is usually in three bands being separated by dirt partings…'* The memoir notes that the Cumberworth Thin Coal is seldom over 1ft 3in thick (37cm), but commonly has up to 4ft (1.2m) of fireclay, and locally gannister, associated with it. There appears to be a disparity between BGS records and the CA interactive viewer, with CA records indicating an un-named coal seam to outcrop immediately west of the site, with a second seam shown to outcrop c. 100m west and 140m south. The dips and dip directions of the coal seams are not recorded by the CA.
Mining and Quarrying	The CA report states that the site is not within the zone of likely physical influence on the surface from past underground or opencast workings, but that the property is in an area where the Coal Authority believe there is coal at or close to the surface; this coal may have been worked at some time in the past. In the northeast of the site the CA online viewer shows there is a risk of 'probable unrecorded shallow workings'; the same area of the site is recorded as a 'development high risk area'.

Correspondence with the CA indicates 'Our information indicates the Whinmoor and an unnamed coal seam crop in the vicinity of the site. Records of surface workings in the wider locality to the north of the site show the Whinmoor as three leaves at that location'.

The 1:10,000 scale geological map shows two areas of made ground, one located c. 55m north of the site where the Whinmoor Coal seam appears to have been worked from surface and c. 135m northeast of the site, where an unknown seam has been worked from surface.

The CA Mining Report states that there are no known mine entries within 20m of the site. The online CA interactive viewer shows no recorded shafts are present within 250m of the site, with the nearest shaft shown c. 280m south of the site.

The CA's Mining Report states that it is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

2.3 Previous Investigations

Sirius were commissioned in 2020 to undertake a (pre-demolition) geoenvironmental appraisal of the site. The investigation included three rotary open hole boreholes (RO01 to RO03), although access was limited at that stage. The rotary investigation identified two seams / leaves of intact coal within the north of the site at depths of 2.4m and 4.2m bgl, with evidence of possible mine workings towards the south at a depth of 3.8m bgl. No coal or evidence of mine workings were identified within the western area of the site.

Fieldwork forming a supplementary site investigation was carried out by Sirius in May 2021, which included twelve rotary open hole boreholes (RO101 to RO112). A recent programme of post demolition rotary drilling was undertaken in October 2023, which included fourteen rotary open hole boreholes (RO201 to RO214), and a series of trial pits (TP201 to TP223).

2.4 Summary of Relevant Findings

2.4.1 Shallow Coal Mine Workings

Several phases of rotary drilling have been undertaken to investigate the presence of shallow coal seams and any associated shallow mine workings beneath the site, and to confirm the conjectured fault locations (and fault blocks). The locations and depths where coal / associated mine workings have been identified at the site as part of each phase of investigation, in addition to the inferred fault block, are summarised in Table 2.3 below.

Table 2.3 - Coal Seams Encountered

Borehole	Depth to Base of Coal / Workings (m bgl)	Depth to Base of Coal Seam/Workings (m AOD)	Thickness of Coal / Workings Encountered (m)	Thickness of Overlying Competent Strata (m)	Inferred Fault Block
RO102	16.8	122.85	0.3	11.9	Eastern
RO103	13.2	126.25	0.2	9.5	
RO208	14.1	128.47	0.1	12.0	
RO213	11.6	128.09	0.1	9.5	

Borehole	Depth to Base of Coal / Workings (m bgl)	Depth to Base of Coal Seam/Workings (m AOD)	Thickness of Coal / Workings Encountered (m)	Thickness of Overlying Competent Strata (m)	Inferred Fault Block
RO2	3.8	139.27	2.2*	2.8	Central
RO3	2.4	142.73	1.0	NA^	
	4.2	140.93	1.3	0.8	
RO105	2.5	141.00	0.6	NA^	
	4.0	139.50	0.5	0.9	
RO110	10.0	137.93	0.2	8.0	
RO207	3.6	141.71	0.3	1.3	
TP206	0.4	144.2	0.5	NA^	
TP209	2.5	142.8	0.7	NA^	
RO111	10.5	142.77	0.2	9.5	Western
RO112	21.0	126.93	0.6	18.0	

*Broken ground
^Overlain by weathered, residual LCM
NA - Not Applicable

Evidence of shallow mine workings, in the form of broken ground, was recorded in one location in the central fault block (RO02) from top depths of 3.8m to 6.0m bgl (139.2 to 137.0m AOD). Up to two seams / leaves of intact coal were encountered in two locations (RO03 and RO105) within the central fault block. The upper seam was recorded from top depths of between 2.4m and 2.5m bgl (142.7m and 141.0m AOD respectively) and the lower seam was recorded from top depths of between 4.0m and 4.2m bgl (139.5m and 140.9m AOD respectively). Insufficient rock cover was considered to exist above the identified coal seam(s) to mitigate the risk of surface instability from localised shallow mine workings within the central fault block, and as such further plot specific investigation / assessment, and subsequent treatment, as necessary was recommended.

On the basis of the maximum recorded thickness and depths of the inconsistent coal seam(s) across the eastern and western fault blocks, the risk of surface instability if mine workings were to be present was considered to be low, not requiring treatment.

2.4.2 Unrecorded Mine Entries

No mine entries are known to exist on the site. However, the possibility of encountering unrecorded mine entries, including bell pits and crop workings, could not be discounted, and a site strip down to natural subsoil, plus 0.3m, under the supervision of a suitably experienced consultant, to observe for evidence of crown holes, mine entries and bell pits was recommended.

This is currently underway and will be reported under separate cover.

3. Proof Drilling and Stabilisation Works

3.1 Overview

The objective of the works was to investigate the potential for shallow mine workings within the central development area and treat and stabilise where / if necessary.

The objective was achieved through a process of drilling on a domino-5 pattern across building footprints within the central fault block. Boreholes were drilled to approximately 3.5m - 12m bgl in order to target the Whinmoor (Top and / or Low Whinmoor) coal or where sufficient thickness of intact rock was proven. Where the seam(s) were encountered, boreholes were extended through the seam and at least 0.5m into the underlying strata. No evidence of shallow mine workings was encountered.

All boreholes were subsequently backfilled with neat cement grout, to ensure they were appropriately sealed.

3.2 Programme

The works were conducted as a continuous operation between the 18th and 23rd July 2024.

3.3 Drilling Procedure

Boreholes were drilled using open-hole rotary percussive drilling rigs with water flush. Holes were drilled with a minimum diameter of 75mm.

Each rotary borehole was extended to the base of the coal seam, with a minimum 0.5m thickness of solid strata penetrated to prove the presence of competent rock. Sacrificial plastic casing was installed at the top of each borehole to depths of c.1-2m bgl to maintain integrity of the borehole prior to backfilling and sealing.

50 No. boreholes were drilled in total to depths of between 3.5m and 12.0m bgl, to target the Whinmoor (Top and / or Low Whinmoor) coal, where present. This amounts to a total of 419m of drilling. The layout of boreholes, together with the presence of solid coal (where encountered) is shown on Drawing No. C9297C/DG/03 within Appendix A. No evidence of mine workings was recorded.

The ground conditions encountered in each borehole are detailed within SDL's daily drill log sheets, included within Appendix C of this report and are summarised below.

3.4 Ground Conditions Encountered

The rotary boreholes encountered intact coal below plots 22 to 26, inferred to represent the Whinmoor Coal (Top Whinmoor). A second deeper seam was encountered within rotary borehole locations 22/23.1 and 25.2, possibly representing the Low Whinmoor coal seam outcrop within the northern most area of the site. No coal was encountered within plots 8, 9, indicating the Whinmoor coal seam(s) outcrop is to the north of these plots (and dipping to the north, away from plots 8 and 9). The coal was also not encountered within plots 27 to 29, indicating these plots may lie to the west of the conjectured fault (i.e. located within the western fault block).

Solid coal was encountered in 23 No. boreholes (approx. 46%), ranging in thickness between 0.2m and 1.3m, with an average thickness of 0.5m. A second lower coal seam / leaf was encountered in 2 No. of the boreholes (approx. 4%) with thicknesses of 0.2m and 0.4m.

The loss of flush encountered within the original rotary borehole RO02, may represent the fault location, or possibly naturally occurring fractured sandstone in that locality. No other evidence of shallow mine workings have been found across the remainder of the site.

3.5 Gas Monitoring

Continuous gas monitoring was undertaken throughout the drilling works using calibrated Altair 4X Multi-Gas Detectors, worn by the drillers. Elevated gas readings were not observed during the works.

3.6 Grouting Procedure

All boreholes were backfilled with hydrated Ordinary Portland Cement (OPC) up to surface level. This was undertaken to ensure each borehole was appropriately sealed upon completion. A total of 2 tonnes of OPC was added into the boreholes.

4. Conclusions

Key Points

A total of 50 No. boreholes were drilled on site to depths of between 3.5m and 12.0m bgl, using a domino-5 pattern across centrally located proposed plots to assess the presence / absence of any shallow mine workings associated with the outcrop of the Whinmoor Coal (Top and / or Low Whinmoor) coal seams). No evidence of workings was recorded in the Whinmoor Coal seams, and the outcrop was proven to the north of the original area of loss of flush (which was initially attributed to possible shallow mine workings). The loss of flush initially noted within a rotary borehole located to the south of the site is likely to be attributable to naturally occurring geological features (i.e. faulting / fractured sandstone etc), rather than related to shallow mine workings.

2 tonnes of OPC was utilised to backfill the boreholes upon completion to ensure each drill location was adequately sealed.

Closing Statement

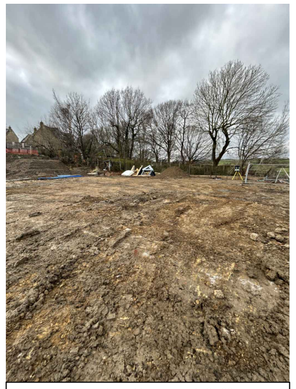
The site observations and drilling records indicate that the proof drilling has been carried out to a satisfactory standard in accordance with the requirements of the Coal Authority permit and the Specification, and that no shallow coal mine workings have been encountered below the site which are considered to pose a risk to surface stability.

5. Regulatory Approvals

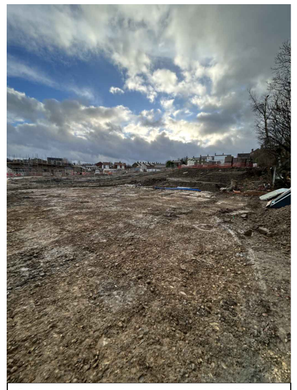
This Completion Report is considered suitable and appropriate based on the works completed. However, it cannot be guaranteed to gain regulatory approval and, therefore, should be passed to the appropriate regulatory authorities and/or other organisations including but not limited to the Coal Authority for their comment and approval prior to commencing any works on site.

APPENDICES

APPENDIX A
Drawings

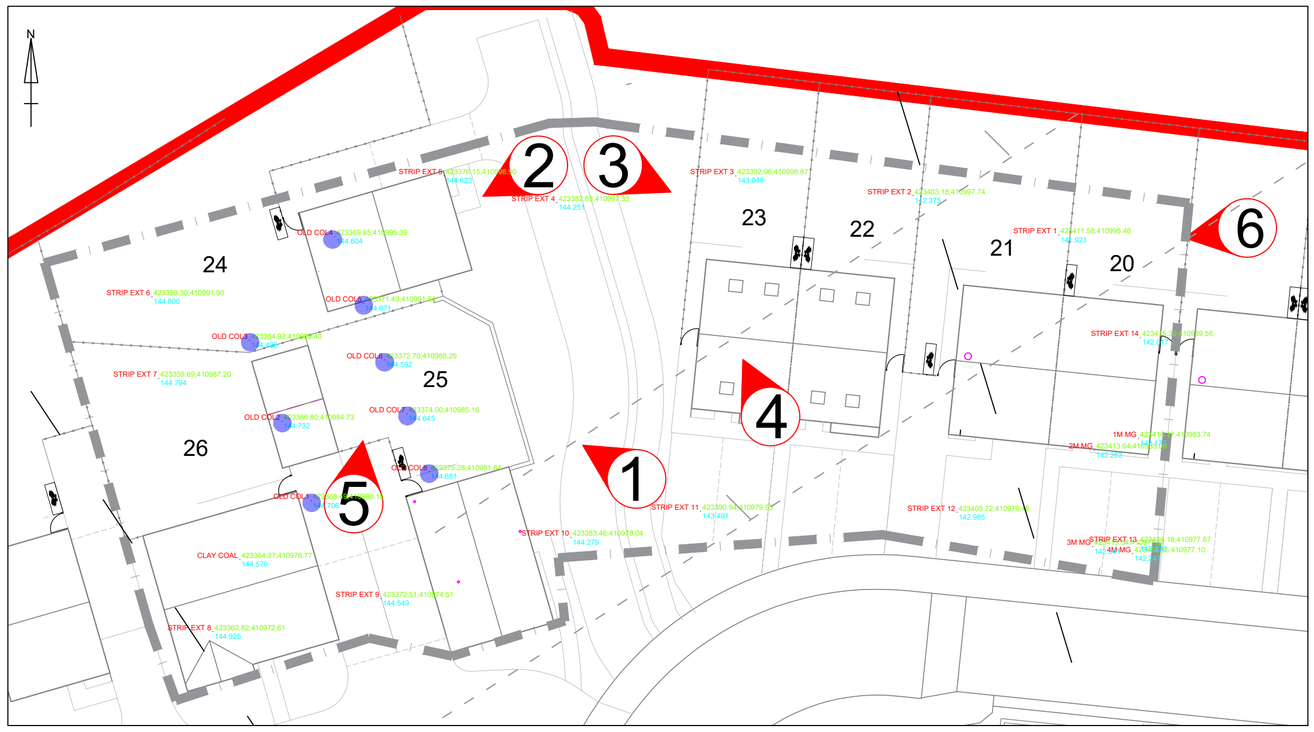


1. View looking northwest towards plots 24-26

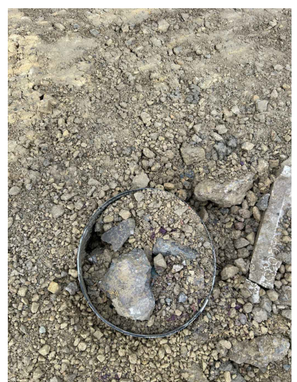


2. View looking towards west towards plot 24-26

3. View looking southeast towards plots 22-23



4. View looking northwest towards plots 22-23



5. Previous metal column location

6. View looking northwest towards plots 20-23

NOTES

- Site Boundary
- Approximate Area of Site Strip
- Photo Location and Direction
- Conjectured coal seam outcrops (with direction of dip)
- Conjectured fault outcrop

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. All marked site features shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

Zoomed Window

REVISION		BY	DATE
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CLIENT

Lovell Partnerships Ltd

SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Strip Site Inspection Plan, 2025 Site Visits

DRAWING NO.	REVISION NO.
C9297B/DG/02	0
DRAWN BY: MF	APPROVED BY: CP
DATE: February 2025	SCALE: 1:250
	PAPER SIZE: A2

Notes:

This drawing, design and concept are copyright of STEN Architecture.

All Dimensions are to be verified on site before any work commences. If any discrepancies, errors or emissions are noted, these are to be reported to STEN Architecture immediately.

If any other drawings are referenced within this layout, please refer to the specific detailed drawing for design, materials and specific working practices.

PLANNING LAYOUT KEY:

Boundary treatments (see separate drawing for details)

- Bin collection point (bin collection day only)
- Secure 6ft (length) x 2ft (width) x 4ft (height) timber cycle store on 8no. 450sq.flags (900mm x 1800mm). Dwellings with garages to have bicycle hook within for storage.
- Bin storage area on 6no. 450sq.flags (900mm x 1350mm)
- Wall mounted - Mode 3, Type 2, 7kW Electric Vehicle Charging Point
- Post mounted - Mode 3, Type 2, 7kW Electric Vehicle Charging Point

REV:	DESCRIPTION:	BY:	DATE:
S	Gate to rear garden of plot 3 leading onto Marsden Street introduced. Bin storage area serving plot 3 repositioned. Both as per clients comments.	LS	18.04.24
R	Bin storage areas updated as per clients comments.	LS	18.04.24
Q	Title boundary line amended. Rear boundaries of plots 15-20 amended to meet title boundary. Both as per clients comments.	LS	10.04.24
P	Rear boundaries of plots 1-4, 7, 24 & 27-30 amended to meet title boundary as per clients comments.	LS	02.04.24
N	plot 09 moved east by 0.5m	BMS	21.06.23
M	'Puttenham' house type renamed as 'Newbury'	BMS	23.03.23
L	EV charging point locations added	BMS	15.03.23
K	Tweaks to bin and cycle store positions as per client mark up	BMS	10.01.23
J	Cycle stores, bin store areas and patios added. Central path added between parking spaces.	BMS	06.01.23
H	'AS' and 'OP' notes added to blocks, 1747 type handing corrected and side door added. Plot 1 amended to client's comments.	DS	08.11.22
G	Bin collection point serving plots 30-34 relocated closer to adoptable highway as per clients comments.	LS	20.07.22
F	Turning head serving plots 12-15 amended., positions of plots 12 and 14 amended to suit. Knee railing introduced to edge of turning head. All as per clients comments.	LS	01.07.22
E	Garage for plot 1 moved away from Saville Road. Plots 35-37 re-orientated to enable adjacent road to be reduced to private drive. Plots 33-34 moved forward to reduce height of retaining walls at rear. Other minor updates to Planning Officer comments.	BMS	17.06.22
D	Green walls moved back from footpath	BMS	31.03.22
C	Semi detached plots handed so entrance doors are on the high side	BMS	24.03.22
B	Plots to Saville Road amended to provide more rontage and opportunities for landscaping. Detached Osbourne removed. Additional footpaths and visitor parking added	BMS	18.03.22
A	Parking arrangement amended for plot 45	BMS	25.11.21

LOVELL

Client	LOVELL
Project	Skelmanthorpe
Job Number	CAD

STEN ARCHITECTURE

Type	Floor Area Sq Ft	Bed	Total Units	Total	% Used
OPEN MARKET					
3 BEDS					
Lansdown	898	3	7	6286	15.2
Lansdown detached	898	3	2	1796	4.3
Newbury semi	1016	3	1	1016	2.2
Newbury detached	1016	3	4	4064	8.7
Osbourne	1205	3	13	15665	28.3
					58.7
4 BEDS					
Tattenham	1530	4	7	10710	15.2
Grassington	1747	4	12	20964	26.1
					41.3
Total			**46**	**60501**	

	ACRES	Hectares
Approx gross area	4.6	1.86
Approx nett area	3.78	1.53
Coverage per Acre	**16006**	**30**

STEN ARCHITECTURE
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CLIENT: LOVELL PARTNERSHIPS

SITE: Greenside Mills
Skelmanthorpe

TITLE: Planning Layout

SCALE AT A1:	DATE:	DRAWN:	CHECKED:
1:500	29.09.21	BMS	--

PROJECT NO:	DRAWING NO:	REVISION:
2156	2156.01	S

N

Scaled @ 1:500

0 10m 20m 50m

APPENDIX 4

Validation of Asbestos and Hydrocarbon Impacted Soils - MDJA

Michael D Joyce Associates LLP
Geotechnical and Geoenvironmental Consultants

Your ref:

Our ref: ADJ/DJM/11458

Date: 7th February 2025

Mr. M. Killip
Lovell Partnerships Limited
Unit 3 Turnberry Park
Gildersome
Leeds LS27 7LE

By Email Only

Dear Matt

Greenside Mills, Skelmanthorpe
Validation Report No. 4446

Michael D Joyce Associates LLP was commissioned by Lovell Partnerships Limited to undertake validation testing and reporting in accordance with specific remediation issues on the above named site. This validation letter report covers the testing of three specific hotspots, and is in accordance with the Remediation Strategy for the site, "Strategy for Remedial and Preparatory Works - Former Greenside Mills, Skelmanthorpe" - Sirius Geotechnical Report Ref: C9297, November 2023. The inspection and sampling took place on 28th January 2025.

The specific brief and scope of works was to verify that 3 "hotspots" of contamination (as identified in the Remediation Strategy) have been removed. These hotspots were as follows;

i. Hydrocarbon Impacted Soils (in the vicinity of TP04/TP206)
ii. Hydrocarbon Impacted Soils (in the vicinity of TP218/TP223)
iii. Asbestos Impacted Soils (in the vicinity of TP06).

These locations are shown on figure 1.

Three near surface samples were obtained from each of these locations, by way of shallow excavation. In respect of the potentially asbestos impacted soils, much of the area is now covered by future access roads.

Reporting

The purpose of verification documentation is to provide transparent reasoning as to why the remediation, was required, a methodology about how it was to be undertaken and proof that the specified works have been undertaken so as 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. The report should be carried out by Michael D Joyce Associates LLP.

Contin....

When hardstanding is proposed, the link between the potential contaminants in the soil and the end users will no longer exist. As such, no special precautions are necessary.

General Rational

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

The aim of this was to make a preliminarily assessment of the level of any contamination on the site in order to determine if there was any remaining risk in respect of both human health and the environment.

Standard Appendix B attached to this report discusses the methodology for the assessment of contamination and should be read in conjunction with the comments overleaf.

The Contaminated Land Report (CLR) series of documents have been produced by the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency, to provide regulators with "relevant, appropriate, authoritative and scientifically based information and advice on the assessment of risk from contamination in soils".

The Environment Agency has issued a number of Soil Guideline Values (SGVs) which, whilst non-binding, may be used as guidance in the assessment of land and in setting remediation targets. They should only be applied to human health assessments.

The SGVs have been derived using the Contaminated Land Exposure Assessment Model (CLEA) and are based on assumptions relating to soil conditions, pollutant type and behaviour, land use patterns and the availability of receptors. SGVs are also subject to statistical assessment. The CLR documentation requires that the results of laboratory testing are subject to statistical analysis to remove uncertainty over a so-called 'averaging area'.

To date selective SGVs have been issued for the following land-uses as follows;

- Residential with and without plant uptake (SGVres)
- Allotments
- Commercial/Industrial (SGVcomm)

DEFRA previously issued “Outcome of the Way Forward Exercise on Soil Guideline Values”. This document was intended to provide guidance to determine if there is a Significant Possibility of Significant Harm (SPOSH) i.e. whether land meets the legal trigger of being contaminated land.

In the context of Part 2A, a risk assessor using an SGV would conclude the following (DEFRA, 2008).

- At a representative average soil concentration at or below an SGV, it is very unlikely that there will be a *significant possibility of significant harm (SPOSH)*.

Contin....

- At a representative average soil concentration above an SGV, there *might* be a *significant possibility of significant harm* with the significance linked to the margin of exceedance, the duration and frequency of exposure, and other site-specific factors that the enforcing authority may wish to take into account. Further investigation and/or detailed evaluation will usually be required.

It should be stressed that where there is any uncertainty as to whether or not there is a SPOSH, it was the policy of this practice to adopt a conservative approach, particularly in the adoption of clean cover systems.

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

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

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

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

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

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

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

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

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

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

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

Contin....

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

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

The guidance clarifies how generic assessment criteria (including the currently available SGVs/GACs) should and should not be used. It states that:

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

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

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

(a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.

(b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.

(c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risks to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.

(d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.

Contin....

(e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.

The way in which the new four category system is intended to operate and the place of the C4SLs within that system, was explained in detail in the Impact Assessment which accompanied the Statutory Guidance. Please note that although the detail of the Impact Assessment is included here to provide clarity on the job expected of C4SLs, the Statutory Guidance, itself, sets out the regime that needs to be delivered under Part 2A.

The C4SLs are intended as "*relevant technical tools*" (in relation to Paragraph 4.2.1(c)) provides to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

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

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

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> *"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soils that, unless stated otherwise, are tolerable or pose a minimal risk to human health".*

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

In 2014 CL:AIRE (Contaminated Land: Application in Real Environments) published "*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*". In it a series of C4SLs were proposed as follows;

Results

The full results are attached.

In respect of the potentially hydrocarbon impacted soils (in the vicinity of TP04/TP206), no elevated hydrocarbons were detected in samples HS1 to HS3.

In respect of the potentially asbestos impacted soils (in the vicinity of TP06), no asbestos fibres or asbestos containing materials were detected in samples HS4 to HS6.

In respect of the potentially hydrocarbon impacted soils (in the vicinity of TP218/TP223), no elevated hydrocarbons were detected. However, slightly elevated Polyaromatic Hydrocarbons were recorded in samples HS7 to HS9.

Contin....

Table 1: Results of Subsoil Testing (HS7 to HS9)

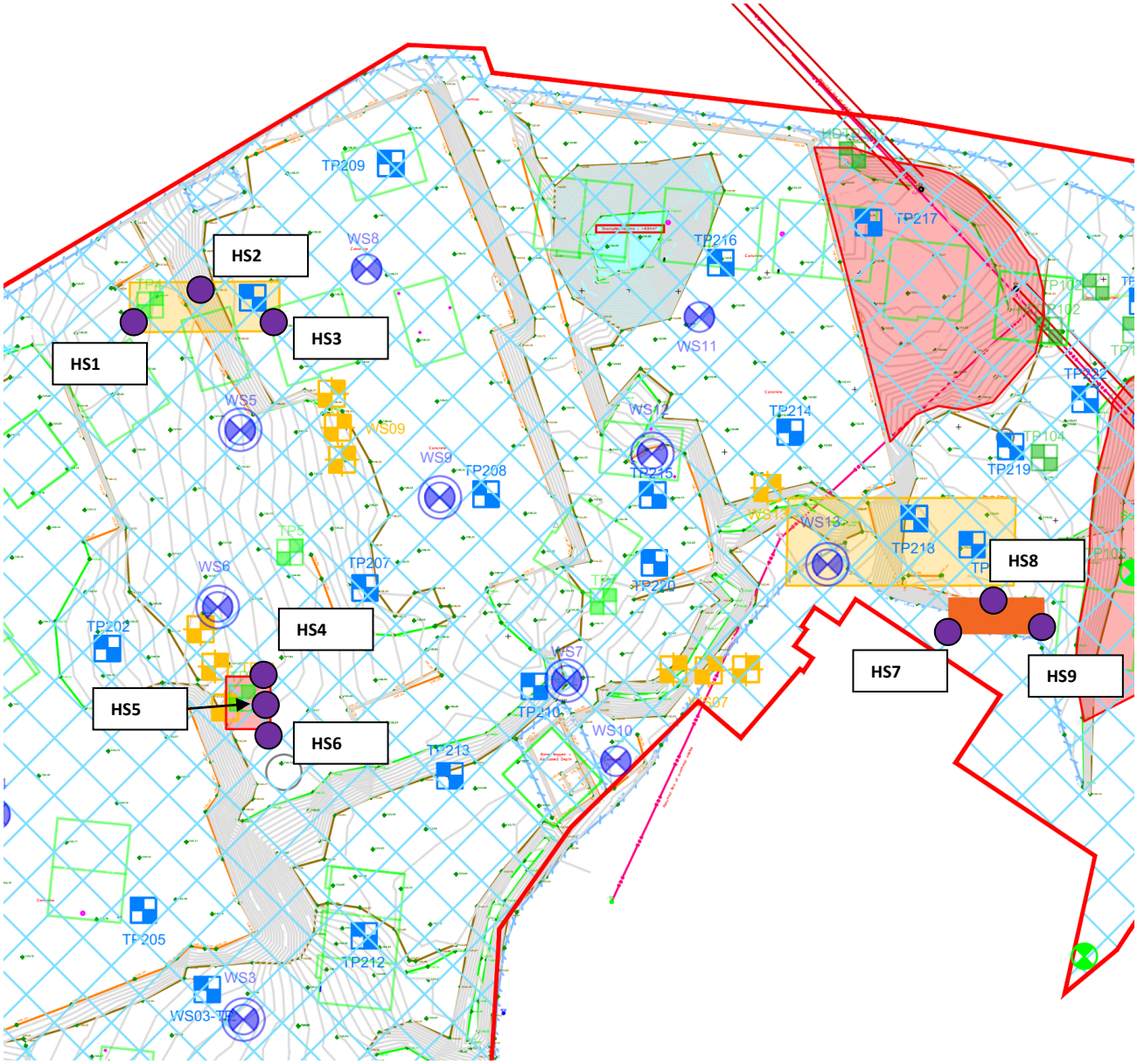
Analyte	Concentration Range (mg/kg)	Maximum Permitted Concentrations (mg/kg)
Phenols (total)	<1.0	420
Naphthalene	0.26 - 0.57	2.3
Acenaphthylene	0.14 - 0.33	170
Acenaphthene	0.33 - 1.00	210
Fluorene	0.44 - 1.40	170
Phenanthrene	3.00 - 8.80	95
Anthracene	1.00 - 3.70	2400
Fluoranthene	8.90 - 21.00	280
Pyrene	7.90 - 18.00	620
Benzo (a) anthracene	4.20 - 9.40	7.2
Chrysene	4.30 - 9.70	15
Benzo (b) fluoranthene	6.30 - 13.00	2.6
Benzo (k) fluoranthene	2.30 - 5.20	77
Benzo (a) pyrene	5.0 - 11.0	5.0
Indeno (1,2,3 cd) pyrene	2.7 - 5.6	27
Dibenz (a,h) anthracene	0.58 - 1.30	0.24
Benzo (g,h,l) perylene	2.60 - 5.60	320

Slightly elevated levels of Benzo (a) anthracene, Benzo (b) fluoranthene, Benzo (a) pyrene and Dibenzo (a,h) anthracene were detected. These were slightly above their respective Maximum Permitted Concentrations. Nevertheless, the 600mm clean cover is considered adequate to afford the necessary protection to end-users.

No further remediation is considered necessary in respect of the three hotspots, although the clean cover across the whole of the site will continue to apply, as do the other recommendations made in the Sirius Remediation Strategy.

Yours sincerely

A D Joyce



Greenside Mills, Skelmanthorpe

Hotspot Locations and Sampling Positions

Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

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Scale: NTS

Figure: 1

STANDARD APPENDIX A

NOTES ON SITE INVESTIGATION PROCEDURE (Dec 2023)

1. **GENERAL.** The ground investigation has been carried out in accordance with the requirements of BS5930: 2015 and A1: 2020 and BS10175: 2011+A1: 2017. By its very nature, any ground investigation only samples a small percentage of the ground. Consequently, changes in ground conditions and soil properties can occur between any two exploratory points, for example local features such as soft ground, pockets of contamination and faults. This is also true of the exploration of mineworkings and such features can extend beneath parts of the site not investigated. Unrecorded bell pits and shafts can also exist between exploratory points. The ground investigation is designed to minimise such risks but they cannot be eliminated.

2. **GROUND INVESTIGATION.**

2.1 **BOREHOLE AND TRIAL PIT RECORDS.** These illustrate the ground conditions only at the location of the particular borehole or trial pit. Correlation between boreholes is for guidance only and its accuracy cannot be guaranteed.

2.2 **SHELL AND AUGER BORING.** This technique uses a tripod winch and an essentially percussive action using a variety of tools. Disturbed and undisturbed samples can be taken. This is the most suitable method for soft ground investigation, enabling the maximum amount of information to be obtained. However, minor changes in lithology may be overlooked unless continuous undisturbed sampling is used.

2.3 **GROUNDWATER**. Groundwater levels vary seasonally and the details given on the borehole logs relate only to the dates and the conditions described in the borehole records. The rate of boring may not have allowed an equilibrium water level to be established and the use of casing may seal off certain seepages.

2.4 **SAMPLING.** Disturbed samples of soils are taken for identification and classification purposes. In cohesive soils 'undisturbed' samples 100mm in diameter are taken by open drive sampler for laboratory testing of strength, permeability and consolidation characteristics.

2.5 **STANDARD PENETRATION TESTS**. S.P.T tests are used in granular and cohesive materials and in soft or weathered rocks. Difficulties in obtaining true 'N' values mean they must only be used as a guide and not as an absolute value in foundation design.

2.6 **ROTARY DRILLING.** Two main types of rotary drilling are carried out in rock. Rock coring using diamond or tungsten carbide tipped core bits provides samples and information on rock types, fissuring and weathering. Openhole drilling only produces small particles for identification purposes and the information gained is therefore limited. The latter is, however, useful as a quick method for detecting major strata changes and for the location of coal seams and old workings. Water, air, foam or drilling muds may be used as the flushing medium in either case.

2.7 **PERMEABILITY TESTS.** These can be carried out in boreholes or trial pits and gives a good indication of in-situ permeability.

2.8 **TRIAL PITTING.** This enables soil conditions to be closely examined at any specific point and samples taken. It also gives useful information on the stability of excavations and ingress of water.

2.9 **WINDOW SAMPLING**. Window sampling consists of driving a series of 1m-long tubes into the ground using a dropping weight. On completion of each 1m run, the tube is withdrawn. The next tube is then inserted and the process repeated to provide a continuous profile of the ground. On each run the tube diameter is reduced in order to assist in its recovery.

2.10 **GAS MONITORING.** This is routinely carried out in trial pits or probe holes to check for elevated levels of methane and carbon dioxide or oxygen deficiency, particularly since risks can exist from natural gases, landfill sites and rising groundwater levels in mine workings below ground. Longer term monitoring is carried out with gas monitoring standpipes.

3. **SOIL DESCRIPTION.** Samples from borings or trial pits are described as specified in the standard procedure outlined in the British Standards. The description includes colour, consistency, structure, weathering, lithological type, inclusions and origin. All descriptions are based on visual and manual identification.

Fire Soils (Cohesive Soils)

The following field terms are used:

Soil Type	Description
Very soft	Exudes between fingers
Soft	Moulded by light finger pressure
Firm	Cannot be moulded by the fingers but can be rolled in hand to 3mm threads.
Stiff	Crumbles and breaks when rolled to 3mm threads but can be remoulded to a lump.
Very stiff	No longer moulded but crumbles under pressure. Can be indented with thumbs.

The following terms are used in accordance with the results of laboratory and field tests.

Description	Undrained Shear Strength Cu (kPa)
Extremely Low	<10
Very Low	10 - 20
Low	20 - 40
Medium	40 - 75
High	75 - 150
Very High	150 - 300

Fine soils can also be classified according to their sensitivity, which is the ratio between undisturbed and remoulded undrained shear strength.

Sensitivity	Ratio
Low	8
Medium	8 - 30
High	>30
Quick	>50

Granular Soils (Non-Cohesive)

The following descriptions are used for granular soils.

Description	Normalised Blow Count (N_1) 60
Very Loose	0 - 4
Loose	4 - 10
Medium	10 - 30
Dense	30 - 50
Very Dense	>50

4. **NATURAL OR IN-SITU MOISTURE CONTENT**. The natural or in-situ moisture content of a soil is defined as the weight of water contained in the pore space, expressed as a percentage of the dry weight of solid matter present in the soil. Soil properties are greatly affected by the moisture content and the test can help to give an indication of likely engineering behaviour.

5. **LIQUID AND PLASTIC LIMITS**. Two simple classification tests are known as the liquid and plastic limits. If a cohesive soil is remoulded with increasing amounts of water, a point will be reached at which it ceases to behave as a plastic material and becomes essentially a viscous fluid. The moisture content corresponding to this change is arbitrarily determined by the liquid limit test. 'Fat' clays, which have high contents of colloidal particles, have high liquid limits; 'lean' clays, having low colloidal particle contents have correspondingly low liquid limits. An increase in the organic content of a clay is reflected by an increase in the liquid and plastic limits.

   If a cohesive soil is allowed to dry progressively, a point is reached at which it ceases to behave as a plastic material, which can be moulded in the fingers, and it becomes friable. The moisture content of the soil at this point is known as the 'plastic limit' of the soil.

   The range of water content over which a cohesive soil behaves plastically, i.e. the range lying between the liquid and plastic limits, is defined as the plasticity index.

   A cohesive soil with a natural water content towards its liquid limit will, in general, be an extremely soft material whereas a cohesive soil with a natural water content below its plastic limit will tend to be a stiff material.

6. **PARTICLE-SIZE DISTRIBUTION.** A knowledge of particle-size distribution is used to classify soils and to indicate likely engineering behaviour. British Standards define soils in relation to their particle-size as shown below:-

Boulders	>200mm	Coarse Sand	2.0 to 0.63mm
Cobbles	200 to 63mm	Medium Sand	0.63 to 0.2mm
		Fine Sand	0.2 to 0.063mm
Coarse Gravel	63 to 20mm	Coarse Silt	0.063 to 0.02mm
Medium Gravel	20 to 6.3mm	Medium Silt	0.02 to 0.0063mm
Fine Gravel	6.3 to 2mm	Fine Silt	0.0063 to 0.002mm
		Clay	<0.002mm

7. **BULK DENSITY.** The bulk density of a material is the weight of that material per unit volume and includes the effects of voids whether filled with air or water. The 'dry density' of a soil is defined as the weight of solids contained in a unit volume of the soil.

8. **PERMEABILITY.** The permeability of a material is defined as the rate at which water flows through it per unit area of soil under unit hydraulic gradient.

9. **CONSOLIDATION CHARACTERISTICS.** When subjected to pressure, a soil tends to consolidate as the air or water in the pore space is forced out and the grains assume a denser state of packing. The decrease in volume per unit of pressure is defined as the 'compressibility' of the soil, and a measure of the rate at which consolidation proceeds is given by the 'coefficient of consolidation' of the soil. These two characteristics Mv and Cv are determined in the consolidation test and the results are used to determine settlement of structures or earthworks.

10. **STRENGTH CHARACTERISTICS.** The strength of geological materials is generally expressed as the maximum resistance that they offer to deformation or fracture by applied shear or compressive stress. The strength characteristics of geological materials depend to an important degree on their previous history and on the conditions under which they will be stressed in practice. Consequently, it is necessary to simulate in the laboratory tests the conditions under which the material will be stressed in the field.

In general, the only test carried out on hard rocks is the determination of their compressive strength but consideration must be given to fissuring, jointing and bedding planes.

The tests at present in use for soils and soft rocks fall into two main categories. Firstly, those in which the material is stressed under conditions of no moisture content change, and secondly those in which full opportunity is permitted for moisture content changes under the applied stresses. Tests in the first category are known as undrained (immediate or quick) tests, while those in the second category are known as drained (slow or equilibrium) tests. The tests are normally carried out in the triaxial compression apparatus but granular materials may be tested in the shear box apparatus.

The undrained triaxial test gives the apparent cohesion C_u and the angle of shearing resistance $\emptyset_u$. In dry sands, $C_u = 0$ and $\emptyset_u$ is equal to the angle of internal friction whereas with saturated non-fissured clays $\emptyset u$ tends to 0 and the apparent cohesion C_u is equal to one-half the unconfined compression strength qu. On site the vane test gives an approximate measure of shear strength.

For some stability problems use is made of a variant of the undrained triaxial test in which the specimen is allowed to consolidate fully under the hydrostatic pressure and is then tested to failure under conditions of no moisture content change. This is known as the consolidated undrained triaxial test. Pore water pressures may be measured during this test or a fully drained test may be carried out. In either case the effective shear strength parameters C' and $\emptyset'$ can be obtained which can be used to calculate shear strength at any given pore water pressure.

11. **COMPACTION.** The density at which any soil can be placed in an earth dam, embankment or road depends on its moisture content and on the amount of work which is used in compaction. The influence of these two factors can be studied in compaction tests, which can determine the maximum dry density (MDD) achievable at a certain optimum moisture content (OMC).

12. **CALIFORNIA BEARING RATIO TEST.** In flexible pavement design a knowledge of the bearing capacity of the subgrade is necessary to enable the thickness of pavement for any particular combination of traffic and site conditions to be determined. The quality of the subgrade can be assessed by means of the California Bearing Ratio Test or approximately by the MEXE cone penetrometer.

13. **ROCK DESCRIPTION.** This is based on;

(i) Strength

Term	**Field Identification**	**Unconfined Compressive Strength (MPa)**
Extremely Weak[a]	Indented by thumbnail.	Less than 1
Very Weak	Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife.	1 to 5
Weak	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer.	5 to 25
Medium Strong	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer.	25 to 50
Strong	Specimen required more than one blow of geological hammer to fracture it.	50 to 100
Very Strong	Specimen requires many blows of geological hammer to fracture it.	100 to 250
Extremely Strong	Specimen can only be chipped with geological hammer.	Greater than 250

[a] Some extremely weak rocks will behave as soils and should be described as soils.

(ii) Structure

Thickness Term	**Spacing Term**	**Thickness or spacing**
Very thickly	Extremely wide	>6m
Very thickly	Very wide	2m – 6m
Thickly	Wide	600mm – 2m
Medium	Medium	200mm – 600mm
Thinly	Close	60mm – 200mm
Very thinly	Very close	20mm – 60mm
Thickly laminated (Sedimentary)		
Narrowly (Metamorphic and Igneous	Extremely close	6mm – 20mm
Thinly laminated (Sedimentary)		
Very narrowly (Metamorphic and Igneous)	Extremely close	<6mm

(iii) Colour
(iv) Texture
(v) Grain size

Description	Predominate Grain Size (mm)
Conglomerate	>2
Coarse - grained	2 - 0.63
Medium - grained	0.63 - 0.20
Fine - grained	0.20 - 0.063
Siltstone	0.063 - 0.002
Mudstone	<0.002

(vi) Rock Name
(vii) Stability
(viii) Weathering

Term	Description	Grades
Fresh/unweathered	No visible sign of rock material weathering; perhaps slight discolouration on major discontinuity surfaces.	0
Slightly weathered	Slight discolouration indicates weathering of rock material and discontinuity surfaces.	1
Moderately weathered/Distinctly weathered	Less than half of the rock material is decomposed or disintegrated. Fresh or discoloured rock is present either as a continuous framework or as core stones.	2
Highly weathered/ Destructed	More than half of the rock material is decomposed or disintegrated. Fresh or discoloured rock is present either as a continuous framework or as core stones.	3
Completely weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still apparent.	4
Residual soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soils has not been significantly transported.	5

(ix) Discontinuities
(x) Weathered of Rock Mass

14. **CHEMICAL TESTS.** A knowledge of water soluble sulphate content and pH of soils and groundwater is important in determining the protection required for concrete or steel in contact with the ground. Other specialist tests may be carried out on sites suspected of being contaminated (see standard appendix B).

15. **REFERENCES**

BS5930: 2015+A1:2020 British Standard Code of Practice for Site Investigations
BS10175: 2011+A1:2017 British Standard Code of Practice for the Investigation of Potentially Contaminated Sites
BS EN ISO 14688-1: 2018 Geotechnical Investigation and Testing: Identification and Classification of Soil
BS EN ISO 14688-2: 2018 Geotechnical Investigation and Testing: Identification and Classification of Soil

STANDARD APPENDIX B

NOTES ON CONTAMINATION INVESTIGATION PROCEDURE (June 2021)

mdja

1. **GENERAL.** The desk study and/or intrusive ground investigation is typically carried out in accordance with the Environment Agency's "Land Contamination Risk Management (LCRM) documents and the requirements of BS5930: 2015 and BS10175: 2011+A1: 2020. In relation to contamination the desk study is referred to as the preliminary investigation in BS10175 and the intrusive ground investigation is referred to as the Exploratory Investigation. This appendix briefly describes the nature of the work carried out and explains the standards against which contamination data has been assessed. The nature of any contamination investigation is such that only a small percentage of the ground, and therefore potential contamination, is sampled. Consequently variations in both ground conditions and contaminant levels can occur between any two sampling positions. The contamination investigation is designed to minimise such risks, but they cannot be eliminated.

2. **REVIEW OF CONTAMINATION ISSUES –** The National Planning Policy Framework (NPPF) and Part 2A of the Environmental Protection Act 1990 create a new regime for the identification and remediation of contaminated land. It introduced a definition of contaminated land described in Section 78A(2) of the Act of:

"any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or

(b) significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused:

Both Part 2A and the planning regime embrace the "suitable for use" approach. In the context of Part IIA, action is necessary only where there are unacceptable risks to health or to the environment, taking into account the current use of the land and its environmental setting.

For humans, significant harm is defined as "death, disease, serious injury ". Specifically, disease is taken to mean an unhealthy condition of the body or part of it. "Significant possibility of significant harm" is described as health effects arising from the intake of a contaminant or other direct bodily contact with the contaminant where the intake or exposure is unacceptable. The assessment should also take into account the total intake from all sources, the relative contribution of the pollutant linkage in question, and the duration of intake or exposure. The various statutory definitions are given overleaf.

The presence of unnatural substances does not automatically constitute a risk unless there is a link or pathway between the contamination (the hazard) and the receptor (the target) be it humans, the environment or property. Therefore the assessment needs to determine whether a hazard is present and whether the necessary pathway exists the so-called "pollution linkage" or "conceptual site model".

The effect of any hazard on a site depends primarily on the site use and groundwater conditions since these determine who and what may be at risk and the routes by which they may be exposed to the hazard. Site uses can include allotments, domestic gardens on residential developments, amenity and recreational areas, public open space and industrial and commercial buildings. On any site, the potential contaminants have to be identified together with the potential receptors. The pathway for that contaminant to reach its target has then to be considered.

3. **PRELIMINARY INVESTIGATION.** The preliminary Phase I Geoenvironmental Assessment (desk study) report normally considers the following key sections:

Introduction	
The Site	Contaminated Land
Site History	Radon
Geology and Mining	Geoenvironmental Risk Assessment
Hydrogeology	Geotechnical Assessment
Groundsure Geo-Insight and Enviro-Insight	Ground Investigation (Recommendations)

The report will summarise the findings and also relate our opinions to the potential for a site to be geoenvironmentally impaired, at levels likely to warrant mitigation or further consideration appropriate to the current or future use. Findings are based on information obtained and described during the desk study and site inspection without intrusive ground investigation. It is possible that further information exists. The absence of indicators of impairment does not mean that such impairment does not exist. Additional investigation including intrusive methods can reduce the risks but cannot eliminate them and may not be cost effective. We can advise on the additional research opportunities, their cost and their possible impact on mitigating risk. Recommendations are normally given based on the redevelopment proposals for the site.

Type of Receptor	Description of harm that is to be regarded as significant harm	Conditions For There Being A Significant Possibility Of Significant Harm
1. Human beings	Death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. For these purposes, disease is to be taken to mean an unhealthy condition of the body or a part of it and can include, for example, cancer, liver dysfunction or extensive skin ailments. Mental dysfunction is included only insofar as it is attributable to the effects of a pollutant on the body of the person concerned.	If the amount of the pollutant in the pollutant linkage represents an unacceptable intake or direct bodily contact, assessed on the basis of relevant information on the toxicological properties of that pollutant. Such an assessment should take into account: • the likely total intake of, or exposure to, the substance or substances which form the pollutant, from all sources including that from the pollutant linkage in question; • the relative contribution of the pollutant linkage in question to the likely aggregate intake of, or exposure to, the relevant substance or substances; and • the duration of intake or exposure resulting from the pollutant linkage in question. The question of whether an intake or exposure is unacceptable is independent of the number of people who might experience or be affected by that intake or exposure. Toxicological properties should be taken to include carcinogenic, mutagenic, teratogenic, pathogenic, endocrine-disrupting and other similar properties.
2. All other human health effects (particularly by way of explosion or fire)		If the probability, or frequency, of significant harm of that description is unacceptable. The pollutant linkage might cause "significant harm which" • would be irreversible or incapable of being treated; • would affect a substantial number of people; • would result from a single incident such as a fire or an explosion; or • would be likely to result from a short-term (lees than 24-hour) exposure to the pollutant.
3. Any ecological system, or living organism forming part of such a system, within a location which is protected.	For any protected location: • harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or • harm which affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location.	If either: • significant harm of that description is more likely than not to result from the pollutant linkage; or • there is a reasonable possibility of significant harm of that description being caused, and if that harm were to occur, it would result in such a degree of damage to features of special interest at the location in question that they would be beyond any practicable possibility of restoration.
4. Property in the form of: • crops, including timber; • produce grown domestically, or on allotments, for consumption; • livestock; • other owned or domesticated animals; • wild animals which are the subject of shooting or fishing rights.	For crops, a substantial diminution in yield or other substantial loss in the value resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage.	If significant harm of that description is more likely than not to result from the pollutant linkage in question.
5. Property in the form of buildings.	Structural failure, substantial damage or substantial interference with any right of occupation.	If significant harm of that description is more likely than not to result from the pollutant linkage in question during the expected economic life of the building.
6. Controlled waters.		

4. **INTRUSIVE INVESTIGATION.** BS10175 describes this as an exploratory investigation. Intrusive ground investigation is described in Standard Appendix A. During the investigation representative or indicative samples are obtained for testing by an accredited laboratory. The aim is to determine (with a degree of confidence appropriate to the objectives), the presence, concentration and distribution of contaminants in respect of those points investigated. The extent of any necessary intrusive investigation will depend on the size of the site and any hazards, either known or suspected.

5. **ASSESSMENT OF CONTAMINATION.** The assessment of contaminated land under the terms of Part II A of the Environmental Protection Act 1990 is based upon pollution linkage (source - pathway - receptor model) and the principles of the Environment Agency's "Contamination Land Risk Management" documentation.

DEFRA previously issued "Outcome of the Way Forward Exercise on Soil Guideline Values". This document was intended to provide guidance to determine if there is a Significant Possibility of Significant Harm (SPOSH) i.e. whether land meets the legal trigger of being contaminated land.

In the context of Part 2A, a risk assessor using an SGV would conclude the following (DEFRA, 2008).

- At a representative average soil concentration at or below an SGV, it is very unlikely that there will be a *significant possibility of significant harm (SPOSH)*.

- At a representative average soil concentration above an SGV, there *might* be a *significant possibility of significant harm* with the significance linked to the margin of exceedance, the duration and frequency of exposure, and other site-specific factors that the enforcing authority may wish to take into account. Further investigation and/or detailed evaluation will usually be required.

It should be stressed that where there is any uncertainty as to whether or not there is a SPOSH, it was the policy of this practice to adopt a conservative approach, particularly in the adoption of clean cover systems.

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

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

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

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

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

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

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

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

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

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

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

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

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

The guidance clarifies how generic assessment criteria (including the currently available SGVs/GACs) should and should not be used. It states that:

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

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

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

(a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.

(b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.

(c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risks to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.

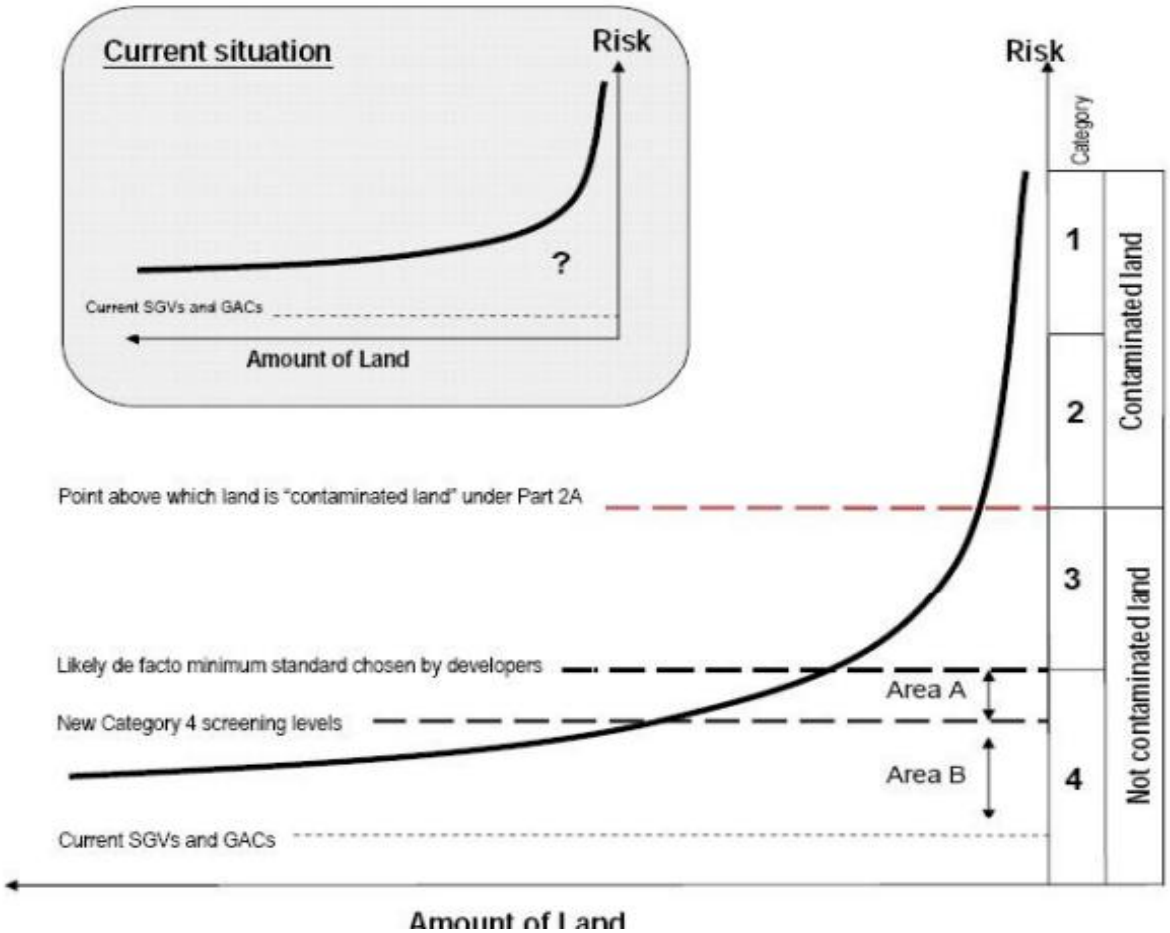
(d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.

(e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.

The way in which the new four category system is intended to operate and the place of the C4SLs within that system, was explained in detail in the Impact Assessment which accompanied the Statutory Guidance. Please note that although the detail of the Impact Assessment is included here to provide clarity on the job expected of C4SLs, the Statutory Guidance, itself, sets out the regime that needs to be delivered under Part 2A.

Paragraph 47 of the Impact Assessment describes the diagram in detail. Of particular relevance to this project is the description of the overall diagram (sub-paragraph a), description of category 4 (sub-paragraphs c (part iv) and h) and the description of how the monetised benefits of the new system will be realised (sub-paragraph h). These sub-paragraphs are reproduced below.

Diagram showing the new Category 1-4 system (compared to current situation)



The diagram above seeks to illustrate, in a simplified manner, broadly what the changes to the statutory guidance on significant possibility of significant harm to human health are intended to achieve. To explain:

(a) The curved line and axes illustrate the spectrum of risk presented by land contamination. The idea is to show that a very large amount of land is low risk, and only a small amount of land would pose sufficient risk to be contaminated land in the legal sense. The axes and lines in the diagrams are not to scale, and they have been compressed for the purposes of illustration (in reality the risks on Category 1 land would probably be orders of magnitude above Category 4 risks, and vastly more land would be in Category 4 compared to the other Categories).

(b) The smaller diagram summarizes the current situation. In the area below the SGV/GACs there is near certainty that land is not contaminated land, however, above the line there is increasing uncertainty. As explained above, currently remediation usually occurs to just below the SGV/GAC level because they are perceived as offering the only cast-iron guarantee of when land is definitely not contaminated land. Sometimes consultants are employed to justify remediating to levels above the SGV/GACs, however the further they go away from the SGV/GACs the more legal risk they and their clients are exposed to.

(c) The new statutory guidance will end the current situation, and it would not be legally possible e.g. for individual regulators to ignore the changes being made. For example, as explained above, the new statutory guidance will specifically say:

(i) that Part 2A cannot be used to force remediation to below a point where it ceases to be contaminated land in the legal sense i.e. the Category 2/3 border in terms of the diagram), although responsible parties can choose to go further;

(ii) that SGV/GACs cannot be used as one size fits all remediation thresholds under either Part 2A of the planning system;

(iii) that normal background levels of contamination are not caught by Part 2A; and

(iv) that SGV/GACs are well into Category 4, sometimes by only a few times and sometimes by orders of magnitude. These changes and others also provide the legal backing for the development e.g. of Category 4 screening levels, as discussed below.

(d) The new Category 1-4 system divides the spectrum of risk posed by contaminated land into four different categories, and the statutory guidance will explain how to decide when land falls into each Category. This is more sophisticated than the current statutory guidance, which in effect has only two categories (contaminated land or not) and does not explain how to decide which category land falls into. The new Category 1-4 system

reflects what assessors find when they investigate real sites i.e. some are clearly contaminated land (Category 1) ; some clearly are not (Category 4) and some are less-straightforward and need some level of detailed assessment before a decision can be taken as to whether or not they are contaminated land (Categories 2 and 3).

(e) In the case of Category 2 and 3 sites, the regulator will have flexibility to take decisions within the parameters set by the new Guidance. There would be less flexibility for Category 2 and 3 sites that clearly pose either a high or low risk. However, the regulator will have considerable flexibility for sites closer to the Category 2/3 border to judge which side of the border a site would fall (e.g. taking account of their understanding of the risks, uncertainties and the interests of the local community). These are often complex decisions which need to be taken case-by-case given the many factors involved.

(f) In the case of Categories 1 and 4 the regulator will have far less flexibility. For example, if a regulator claimed that a site matching the Category 1 description was not contaminated land, or that a site matching the Category 4 description was contaminated land, they would be acting directly against the statutory guidance which the Act requires that they follow, and decisions could be challenged (e.g. in a law court) with a high chance that the challenge would be successful. Among other things, the intention of doing this is to create far more legal certainty around when land is definitely not contaminated land in the legal sense. With the specific wording of the new statutory guidance, and the supporting tools such as the new Category 4 screening levels, it would be very difficult for a regulator e.g. to threaten landowners with the Part 2A regime, and if they tried to determine land as contaminated land they would be operating in direct opposition to the statutory guidance.

(g) In the many consultation meetings held in developing the Category 1-4 system, all the developers, landowners and consultants we spoke to were strongly of the view that they would want the ensure their land is safely within Category 4 (even though in theory they could remediate to a level within Category 3 and still satisfy Part 2A and planning rules). They would do this for various reasons, including the fact that the flexibility granted to regulators in Categories 2 and 3 means that the further into Category 3 a site gets, the greater the risk that the regulator might decide it is in Category 2. Also they would want to be in Category 4 for reasons of marketability, future proofing etc. So developers and others would have a strong incentive to seek the regulatory certainty of being safely within Category 4. Thus, as far as development taking place under the planning system is concerned, Category 3 would, in effect, normally be a buffer which provides added reassurance that development falling within Category 4 will not be caught by the Part 2A regime.

(h) The new statutory guidance will bring about a situation where the current SGV/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land. Above the C4SLs, in Area A on the diagram, there will be much stronger legal backing for experts to use their judgement to make sensible and precautionary decisions on when land should be considered to be towards the top end of Category 4, without fear that land may be caught as contaminated land. This recognizes that the generic C4SLs will not be able to describe the Category 3/4 border itself because they are generic and would therefore have to err on the side of caution whilst a detailed site specific assessment would be able to push further by looking at specific circumstances relating to a specific site.

(i) The very large majority of the monetized benefits of the changes to the regime discussed in this Impact Assessment manifest themselves in Category 4, and in particular in Areas A and B on the diagram. The main effects of moving to the new system would include Low risk land falling within Area B (pre-development) on the diagram would no longer have to be remediated because it would fall below the new C4SLs. Similarly land which is in Area A pre-development would no longer need to be remediated if justified by a detailed site-specific assessment. For these sites the cost of remediation would be removed altogether. The cost of remediating land which is initially in Categories 3, 2 or 1 would fall because it would be remediated to the new C4SL levels (or somewhere within Area A if there has been a detailed assessment) rather than the SGV/GAC level. This will have the overall effect of reducing the cost of remediation, with the effect varying according to specific site circumstances, the type of remediation etc. Generally the cost of remediation would fall for many affected brownfield land sites. This would have the general effect of making such land more economically viable for development. It would also mean that some land that is not currently economically viable to develop becomes reduce pressure to develop Greenfield land in some cases. The C4SLs will also speed up regulatory decisions on the reuse of brownfield land by providing a simple remediation standard.

The C4SLs are intended as "*relevant technical tools*" (in relation to Paragraph 4.2.1(c)) provides to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

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

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

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> *"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soils that, unless stated otherwise, are tolerable or pose a minimal risk to human health".*

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

CL:AIRE (Contaminated Land: Application in Real Environments) has published "*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*". In it a series of C4SLs were proposed as follows;

Analyte	Residential (with home grown produce) (mg/kg)	Residential (without home grown produce) (mg/kg)	Allotments (mg/kg)	Commercial (mg/kg)	POS (mg/kg)
Arsenic	37	40	49	640	79
Benzene	0.87	3.3	0.18	98	140
Benzo(a)Pyrene	5	5.3	5.7	77	10
Cadmium	22	150	3.9	410	880
Chromium (vi)	21	21	170	49	21
Lead	200	310	80	2300	630

Where C4SL's are not available, Generic Assessment Criteria have been used as follows;

Generic Assessment Criteria for Human Health Risk Assessment Comparison
METALS/CYANIDE

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and based on 6% soil organic matter (SOM)
Values are expressed in mg/kg

	S4UL						C4SL						EA SGV			EIC/AGS/CL:AIRE or *ATRISKSOIL		
	Residential with homegrown produce	Residential without homegrown produce	Allotment	Commercial	POSresi	POSpark	Residential with homegrown produce	Residential without homegrown produce	Allotment	Commercial	POSresi	POSpark	Residential	Allotment	Commercial	Residential without consumption of homegrown produce	Allotment	Commercial
Antimony[1]																550	ND	7500
Arsenic (6% SOM)	37	40	43	640	79	170	37	40	49	640	79	170	32	43	640			
Barium[1]																1300	ND	22000
Beryllium (6% SOM)	1.7	1.7	35	12	2.2	63												
Boron (6% SOM)	290	11000	45	240000	21000	46000												
Cadmium (6% SOM)	11	85	1.9	190	120	560	22	150	3.9	410	220	880	10	1.8	230			
Chromium (III) (6% SOM)	910	910	18000	8600	1500	33000												
Chromium (VI) (6% SOM)	6	6	1.8	33	7.7	220	21	21	170	49	21	250						
Copper (6% SOM)	2400	7100	520	68000	12000	44000												
Cyanide (AtriskSoil)																34*	34*	34*
Lead (6% SOM)							200	310	80	2300	630	1300						
Nickel (6%SOM)	130	180	53	980	230	800												
Mercury (Elemental) (6% SOM)	1.2	1.2	21	58	16	30							1.0	26	26			
Mercury (Inorganic) (6% SOM)	40	56	19	1100	120	240							170	80	3600			
Mercury (Methyl) (6% SOM)	11	15	6	320	40	68							11	8	410			
Molybdbenum[1]																670	ND	17000
Selenium (6% SOM)	250	430	88	12000	1100	1800							350	120	13000			
Vanadium (6% SOM)	410	1200	91	9000	2000	5000												
Zinc (6% SOM)	3700	40000	620	730000	81000	170000												

Additional notes for EIC/AGS/CL:AIRE GAC

1 Due to the limitations in time and scope of the EIC/AGS/CL:AIRE project, plant uptake factors were not derived for metals and therefore the metals GAC have only been produced for residential without consumption of homegrown produce and commercial land-uses. Note that the derived GAC are not dependent on SOM.

PETROLEUM HYDROCARBONS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM).
SGVs based on 6% SOM, at a lower SOM the SGV may not be sufficiently protective.
Generic assessment criteria for Petroleum Hydrocarbons will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 10

	S4UL						C4SL						EA SGV			EIC/AGS/CL:AIRE			
Compound	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential**	**Allotment**	**Commercial**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Aliphatic EC 5-6 (1% SOM)	42	42	730	3200 (340)	570000 (304)	95000 (304)													
Aliphatic EC 5-6 (2.5% SOM)	78	78	1700	5900 (558)	590000	130000 (558)													
Aliphatic EC 5-6 (6% SOM)	160	160	3900	12000 (1150)	600000	18000 (1550)													
Aliphatic EC>6-8 (1% SOM)	100	100	2300	7800 (144)	600000	150000 (144)													
Aliphatic EC>6-8 (2.5% SOM)	230	230	5600	17000 (322)	610000	220000 (322)													
Aliphatic EC>6-8 (6% SOM)	530	530	13000	40000 (736)	620000	320000 (736)													
Aliphatic EC>8-10 (1% SOM)	27	27	320	2000 (78)	13000	14000 (78)													
Aliphatic EC>8-10 (2.5% SOM)	65	65	770	4800 (190)	13000	18000 (190)													
Aliphatic EC>8-10 (6% SOM)	150	150	1700	11000 (451)	13000	21000 (451)													
Aliphatic EC>10-12 (1% SOM)	130 (48)	130 (48)	2200	9700 (48)	13000	21000 (48)													
Aliphatic EC>10-12 (2.5% SOM)	330 (118)	330 (118)	4400	23000 (118)	13000	23000 (118)													
Aliphatic EC>10-12 (6%SOM)	760 (283)	770 (283)	7300	47000 (283)	13000	24000 (283)													
Aliphatic EC>12-16 (1% SOM)	1100 (24)	1100 (24)	11000	59000 (24)	13000	25000 (24)													
Aliphatic EC>12-16 (2.5% SOM)	2400 (59)	2400 (59)	13000	82000 (59)	13000	25000 (59)													
Aliphatic EC>12-16 (6% SOM)	4300 (142)	4300 (142)	13000	90000 (142)	13000	26000 (142)													
Aliphatic EC>16-35 (1% SOM)	65000 (8.48)	65000 (8.48)	260000	1600000	250000	450000													
Aliphatic EC>16-35 (2.5% SOM)	92000 (21)	92000 (21)	270000	1700000	250000	480000													
Aliphatic EC>16-35 (6% SOM)	110000	110000	270000	1800000	250000	490000													
Aliphatic EC>35-44 (1% SOM)	65000 (8.48)	65000 (8.48)	260000	1600000	250000	450000													
Aliphatic EC>35-44 (2.5% SOM)	92000 (21)	92000 (21)	270000	1700000	250000	480000													
Aliphatic EC>35-44 (6% SOM)	110000	110000	270000	1800000	250000	490000													
Aromatic EC 5-7 (1% SOM)	70	370	13	26000 (1220)	56000	76000 (1220)													
Aromatic EC 5-7 (2.5% SOM)	140	690	27	46000 (2260)	56000	84000 (2260)													
Aromatic EC 5-7 (6% SOM)	300	1400	57	86000 (4710)	56000	92000 (4710)													
Aromatic EC>7-8 (1% SOM)	130	860	22	56000 (869)	56000	87000 (869)													
Aromatic EC>7-8 (2.5% SOM)	290	1800	51	110000 (1920)	56000	95000 (1920)													
Aromatic EC>7-8 (6% SOM)	660	3900	120	180000 (4360)	56000	100000 (4360)													
Aromatic EC>8-10 (1% SOM)	34	47	8.6	3500 (613)	5000	7200 (613)													
Aromatic EC>8-10 (2.5% SOM)	83	110	21	8100 (1500)	5000	8500 (1500)													
Aromatic EC>8-10 (6% SOM)	190	270	51	17000 (3580)	5000	9300 (3580)													
Aromatic EC>10-12 (1% SOM)	74	250	13	16000 (364)	5000	9200 (364)													
Aromatic EC>10-12 (2.5% SOM)	180	590	31	28000 (899)	5000	9700 (899)													
Aromatic EC>10-12 (6% SOM)	380	1200	74	34000 (2150)	5000	10000													
Aromatic EC>12-16 (1% SOM)	140	1800	23	36000 (169)	5100	10000													
Aromatic EC>12-16 (2.5% SOM)	330	2300 (419)	57	37000	5100	10000													
Aromatic EC>12-16 (6% SOM)	660	2500	130	38000	5000	10000													
Aromatic EC>16-21 (1% SOM)	260	1900	46	28000	3800	7600													
Aromatic EC>16-21 (2.5% SOM)	540	1900	110	28000	3800	7700													
Aromatic EC>16-21 (6% SOM)	930	1900	260	28000	3800	7800													
Aromatic EC>21-35 (1% SOM)	1100	1900	370	28000	3800	7800													
Aromatic EC>21-35 (2.5% SOM)	1500	1900	820	28000	3800	7800													
Aromatic EC>21-35 (6% SOM)	1700	1900	1600	28000	3800	7900													
Aromatic EC>35-44 (1% SOM)	1100	1900	370	28000	3800	7800													
Aromatic EC>35-44 (2.5% SOM)	1500	1900	820	28000	3800	7800													
Aromatic EC>35-44 (6% SOM)	1700	1900	1600	28000	3800	7900													
Aliphatic + Aromatic EC>44-70 (	1600	1900	1200	28000	3800	7800													
Aliphatic + Aromatic EC>44-70 (	1800	1900	2100	28000	3800	7800													
Aliphatic + Aromatic EC>44-70 (	1900	1900	3000	28000	3800	7800													

	S4UL						C4SL						EA SGV			EIC/AGS/CL:AIRE			
Compound	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential**	**Allotment**	**Commercial**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Benzene (1% SOM)	0.087	0.38	0.017	27	72	90													
Benzene (2.5% SOM)	0.17	0.7	0.034	47	72	100													
Benzene (6% SOM)	0.37	1.4	0.075	90	73	110	0.87	3.3	0.18	98	140	230	0.33	0.07	95				
Toluene (1% SOM)	130	880 (869)	22	56000 (869)	56000	87000 (869)													
Toluene (2.5% SOM)	290	1900	51	110000 (1920)	56000	95000 (1920)													
Toluene (6% SOM)	660	3900	120	180000 (4360)	56000	100000 (4360)							610	120	$4.4x10^3$				
Ethyl benzene (1% SOM)	47	83	16	5700 (518)	24000	17000 (518)													
Ethyl benzene (2.5% SOM)	110	190	39	13000 (1220)	24000	22000 (1220)													
Ethyl benzene (6% SOM)	260	440	91	27000 (2840)	25000	27000 (2840)							350	90	$2.8x10^3$				
o-xylene (1%SOM)	60	88	28	6600 (478)	41000	17000 (478)													
o-xylene (2.5% SOM)	140	210	67	15000 (1120)	42000	24000 (1120)													
o-xylene (6% SOM)	330	480	160	33000 (2620)	43000	33000 (2620)							250	160	$2.6x10^3$				
m-xylene (1% SOM)	59	82	31	6200 (625)	41000	17000 (625)													
m-xylene (2.5% SOM)	140	190	74	14000 (1470)	42000	24000 (1470)													
m-xylene (6% SOM)	320	450	170	31000 (3460)	43000	32000 (3469)							240	180	$3.5x10^3$				
p-xylene (1% SOM)	56	79	29	5900 (576)	41000	17000 (478)													
p-xylene (2.5% SOM)	130	180	69	14000 (1350)	42000	23000 (1350)													
p-xylene (6% SOM)	310	430	160	30000 (3170)	43000	31000 (3170)							230	160	$3.2x10^3$				
Methyl tert-butyl ether (1% SOM)																49	73	23	7900
Methyl tert-butyl ether (2.5% SOM)																84	120	44	13000
Methyl tert-butyl ether (6% SOM)																160	220	90	24000

Additional Notes for LQM/CIEH Generic Assessment Criteria

1 For residential land use the inhalation of vapours indoors exposure pathway is the most significant exposure pathway for the lighter end aliphatic and aromatic fractions (up to aliphatic EC>12-16 and aromatic EC>10-12). The ingestion of soil and indoor dust and consumption of homegrown produce exposure pathways are the most significant for the higher end fractions (aliphatics EC>16-35 and EC>35-44; aromatics EC>12-16, EC16-21, EC>21-35, EC>35-44 and EC44-70).

2 For the allotment land use the consumption of homegrown produce exposure pathway is the most significant for the aromatic and lighter end aliphatic fractions. The ingestion of soil and and indoor dust is the most significant exposure pathway for the higher end aliphatics EC>12-16, EC>16-35 and EC35-44.

3 For the commercial land use the indoor inhalation of vapour exposure pathway is a significant exposure pathway for the lighter end aliphatic and aromatic fractions (up to aliphatic EC>12-16 and aromatic EC>10-12.

4 Background exposure represents a significant proportion of the total exposure for all fractions expect aromatic fractions EC>5-7 and EC>7-8 in all land uses.

Notes for SGVs

1 Based on a sandy loam as defined in Environment Agency (2009b) and 6% SOM. At a lower SOM, SGVs may not be sufficient protective.
2 Generic assessment criteria will vary according to SOM for all land uses.
3 SGVs assume that free phase contamination is not present.
4 SGVs based on a sub-surface soil to indoor air correction air correction factor of 10.
5 SGV presented for Toluene Commercial based on the vapour saturation limit.
6 SGV presented for Ethylbenzene Allotment and Xylene Allotment - in applying the rules for non-soil background, the inhalation background ADE is limited to being no larger than the contribution of the inhalation soil ADE.
7 Exposure of all isomers of xylene should be considered together, because the HCV applied is based on intake of total xylene and not an individual isomer in isolation.

Notes for EIC/AGS/CL:AIRE Generic Assessment Criteria

1 GAC have been derived for 4 generic land uses; residential with consumption of homegrown produce, residential without consumption of homegrown produce, allotments and commercial land-use.

POLYAROMATIC HYDROCARBONS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria for Polycyclic Aromatic Hydrocarbons will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	LQM/CIEH						C4SL					
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**
Acenaphthene (1% SOM)	210	3000 (57)	34	84000 (57)	15000	29000						
Acenaphthene (2.5% SOM)	510	4700 (141)	85	97000 (141)	15000	30000						
Acenaphthene (6% SOM)	1100	6000 (336)	200	100000	15000	30000						
Acenaphthylene (1% SOM)	170	2900 (86.1)	28	83000 (86.1)	15000	29000						
Acenaphthylene (2.5% SOM)	420	4600 (212)	69	97000 (212)	15000	30000						
Acenaphthylene (6% SOM)	920	6000 (506)	160	100000	15000	30000						
Anthracene (1% SOM)	2400	31000 (1.17)	380	520000	74000	150000						
Anthracene (2.5% SOM)	5400	35000	950	540000	74000	150000						
Anthracene (6% SOM)	11000	37000	2200	540000	74000	150000						
Benz(a)anthracene (1% SOM)	7.2	11	2.9	170	29	49						
Benz(a)anthracene (2.5% SOM)	11	14	6.5	170	29	56						
Benz(a)anthracene (6% SOM)	13	15	13	180	29	62						
Benzo(a)pyrene (1% SOM)	2.2	3.2	0.97	35	5.7	11						
Benzo(a)pyrene (2.5% SOM)	2.7	3.2	2.0	35	5.7	12						
Benzo(a)pyrene (6% SOM)	3.0	3.2	3.5	36	5.7	13	5.0	5.3	5.7	77	10	21
Benzo(b)fluoranthene (1% SOM)	2.6	3.9	0.99	44	7.1	13						
Benzo(b)fluoranthene (2.5% SOI	3.3	4.0	2.1	44	7.2	15						
Benzo(b)fluoranthene (6% SOM)	3.7	4.0	3.9	45	7.2	16						
Benzo(ghi)perylene (1% SOM)	320	360	290	3900	640	1400						
Benzo(ghi)perylene (2.5% SOM)	340	360	470	4000	640	1500						
Benzo(ghi)perylene (6% SOM)	350	360	640	4000	640	1600						
Benzo(k)fluoranthene (1% SOM)	77	110	37	1200	190	370						
Benzo(k)fluoranthene (2.5% SOI	93	110	75	1200	190	410						
Benzo(k)fluoranthene (6% SOM)	100	110	130	1200	190	440						
Chrysene (1% SOM)	15	30	4.1	350	57	93						
Chrysene (2.5% SOM)	22	31	9.4	350	57	110						
Chrysene (6% SOM)	27	32	19	350	57	120						
Dibenzo(ah)anthracene (1% SOI	0.24	0.31	0.14	3.5	0.57	1.1						
Dibenzo(ah)anthracene (2.5% S	0.28	0.32	0.27	3.6	0.57	1.3						
Dibenzo(ah)anthracene (6% SOI	0.3	0.32	0.43	3.6	0.58	1.4						
Fluoranthene (1% SOM)	280	1500	52	23000	3100	6300						
Fluoranthene (2.5% SOM)	560	1600	130	23000	3100	6300						
Fluoranthene (6% SOM)	890	1600	290	23000	3100	6400						
Fluorene (1% SOM)	170	2800 (30.9)	27	63000 (30.9)	9900	20000						
Fluorene (2.5% SOM)	400	3800 (76.5)	67	68000	9900	20000						
Fluorene (6% SOM)	860	4500 (183)	160	71000	9900	20000						
Indeno(123cd)pyrene (1% SOM)	27	45	9.5	500	82	150						
Indeno(123cd)pyrene (2.5% SOI	36	46	21	510	82	170						
Indeno(123cd)pyrene (6% SOM)	41	46	39	510	82	180						
Naphthalene (1% SOM)	2.3	2.3	4.1	190 (76.4)	4900	1200 (76.4)						
Naphthalene (2.5% SOM)	5.6	5.6	10	460 (183)	4900	1900 (183)						
Naphthalene (6% SOM)	13	13	24	1100 (432)	4900	3000						
Phenanthrene (1% SOM)	95	1300 (36)	15	22000	3100	6200						
Phenanthrene (2.5% SOM)	220	1500	38	22000	3100	6200						
Phenanthrene (6% SOM)	440	1500	90	22000	3100	6300						
Pyrene (1% SOM)	620	3700	110	54000	7400	15000						
Pyrene (2.5% SOM)	1200	3800	270	54000	7400	15000						
Pyrene (6% SOM)	2000	3800	620	54000	7400	15000						
Coal Tar (BaP as surrogate marl	0.79	1.2	0.32	15	2.2	4.4						
Coal Tar (BaP as surrogate marl	0.98	1.2	0.67	15	2.2	4.7						
Coal Tar (BaP as surrogate marl	1.1	1.2	1.2	15	2.2	4.9						

CHLOROALCANES AND ALKANES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
1,1-Dichloroethane (1% SOM)							2.4	2.5	9.2	280
1,1-Dichloroethane (2.5% SOM)							3.9	4.1	17	450
1,1-Dichloroethane (6% SOM)							7.4	7.7	35	850
1,2-Dichloroethane (1% SOM)	0.0071	0.0092	0.0046	0.67	29	21				
1,2-Dichloroethane (2.5% SOM)	0.011	0.013	0.0083	0.97	29	24				
1,2-Dichloroethane (6% SOM)	0.019	0.023	0.016	1.7	29	28				
1,1,1-Trichloroethane (1% SOM)	8.8	9	48	660	140000	57000 (1425)				
1,1,1-Trichloroethane (2.5% SOI	18	18	110	1300	140000	76000 (2915)				
1,1,1-Trichloroethane (6% SOM)	39	40	240	3000	140000	100000 (6392)				
1,1,2-Trichloroethane (1% SOM)							0.6	0.88	0.28	94
1,1,2-Trichloroethane (2.5% SOM)							1.2	1.8	0.61	190
1,1,2-Trichloroethane (6% SOM)							2.7	3.9	1.4	400
1,1,1,2-Tetrachloroethane (1% S	1.2	1.5	0.79	110	1400	1500				
1,1,1,2-Tetrachloroethane (2.5%	2.8	3.5	1.9	250	1400	1800				
1,1,1,2-Tetrachloroethane (6% S	6.4	8.2	4.4	560	1400	2100				
1,1,2,2-Tetrachloroethane (1%SI	1.6	3.9	0.41	270	1400	1800				
1,1,2,2-Tetrachloroethane (2.5%	3.4	8.0	0.89	550	1400	2100				
1,1,2,2-Tetrachloroethane (6%SI	7.5	17	2.0	1100	1400	2300				
1,1-Dichloroethene (1% SOM)							0.23	0.23	2.8	26
1,1-Dichloroethene (2.5% SOM)							0.40	0.41	5.6	46
1,1-Dichloroethene (6% SOM)							0.82	0.82	12	92
Tetrachloroethene (1% SOM)	0.18	0.18	0.65	19	1400	810 (424)				
Tetrachloroethene (2.5% SOM)	0.39	0.40	1.5	42	1400	1100 (951)				
Tetrachloroethene (6% SOM)	0.9	0.92	3.6	95	1400	1500				
Tetrachloromethane (1% SOM)	0.026	0.026	0.45	2.9	890	190				
Tetrachloromethane (2.5% SOM	0.056	0.056	1.0	6.3	920	270				
Tetrachloromethane (6% SOM)	0.13	0.13	2.4	14	950	400				
Trichloroethene (1% SOM)	0.016	0.017	0.041	1.2	120	70				
Trichloroethene (2.5% SOM)	0.034	0.036	0.091	2.6	120	91				
Trichloroethene (6% SOM)	0.075	0.080	0.21	5.7	120	120				
Trichloromethane (1% SOM)	0.91	1.2	0.42	99	2500	2600				
Trichloromethane (2.5% SOM)	1.7	2.1	0.83	170	2500	2800				
Trichloromethane (6% SOM)	3.4	4.3	1.7	350	2500	3100				
Vinyl Chloride (1% SOM)	0.00064	0.00077	0.00055	0.059	3.5	4.8				
Vinyl Chloride (2.5% SOM)	0.00087	0.0010	0.0010	0.077	3.5	5.0				
Vinyl Chloride (6% SOM)	0.0014	0.0015	0.0018	0.12	3.5	5.4				
Chloroethane (1% SOM)							8.3	8.4	110	960
Chloroethane (2.5% SOM)							11	11	200	1300
Chloroethane (6% SOM)							18	18	380	2100
1,2-Dichloropropane (1% SOM)							0.024	0.024	0.62	3.3
1,2-Dichloropropane (2.5% SOM)							0.042	0.042	1.2	5.9
1,2-Dichloropropane (6% SOM)							0.084	0.085	2.6	12
2-Chloronaphthalene (1% SOM)							3.7	3.8	40	390
2-Chloronaphthalene (2.5% SOM)							9.2	9.3	98	960
2-Chloronaphthalene (6% SOM)							22	22	230	2200
Bromodichloromethane (1% SOM)							0.016	0.019	0.016	2.1
Bromodichloromethane (2.5% SOM)							0.030	0.034	0.032	3.7
Bromodichloromethane (6% SOM)							0.061	0.07	0.068	7.6
Chloromethane (1% SOM)							0.0083	0.0085	0.066	1
Chloromethane (2.5% SOM)							0.0098	0.0099	0.13	1.2
Chloromethane (6% SOM)							18	18	380	2100

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
cis -1,2 Dichloroethene (2.5% SOM)							0.19	0.20	0.50	24
cis -1,2 Dichloroethene (6% SOM)							0.37	0.39	1.0	47
trans -1,2 Dichloroethene (1% SOM)							0.19	0.19	0.93	22
trans -1,2 Dichloroethene (2.5% SOM)							0.34	0.35	1.9	40
trans -1,2 Dichloroethene (6% SOM)							0.70	0.71	4.0	81
Dichloromethane (1% SOM)							0.58	2.1	0.1	270
Dichloromethane (2.5% SOM)							0.98	2.8	0.19	360
Dichloromethane (6% SOM)							1.7	4.5	0.34	560
Hexachloroethane (1% SOM)							0.2	0.22	0.27	22
Hexachloroethane (2.5% SOM)							0.48	0.54	0.67	53
Hexachloroethane (6% SOM)							1.1	1.3	1.6	120

Notes for EIC/AGS/CL:AIRE Generic Assessment Criteria

1 GAC have been derived for 4 generic land uses; residential with consumption of homegrown produce, residential without consumption of homegrown produce, allotments and commercial land-use.

EXPLOSIVES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL					
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**
RDX (1% SOM)	120	13000	17	210000	210000	210000
RDX (2.5% SOM)	250	13000	38	210000	26000	49000 (18.7)
RDX (6% SOM)	540	13000	85.0	210000	27000	53000
HMX (1% SOM)	5.7	6700	0.86	110000	13000	23000 (0.35)
HMX (2.5% SOM)	13	6700	1.9	110000	13000	23000 (0.39)
HMX (6% SOM)	26	6700	3.9	110000	13000	24000 (0.48)

PESTICIDES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

Compound	S4UL Residential with home grown produce	Residential without home grown produce	Allotment	Commercial	POSresi	POSpark
Aldrin (1% SOM)	5.7	7.3	3.2	170	18	30
Aldrin (2.5% SOM)	6.6	7.4	6.1	170	18	31
Aldrin (6% SOM)	7.1	7.5	9.6	170	18	31
Dieldrin (1% SOM)	0.97	7	0.17	170	18	30
Dieldrin (2.5% SOM)	2	7.3	0.41	170	18	30
Dieldrin (6% SOM)	3.5	7.4	0.96	170	18	31
Atrazine (1% SOM)	3.3	610	0.5	9300	1200	2300
Atrazine (2.5% SOM)	7.6	620	1.2	9400	1200	2400
Atrazine (6% SOM)	17.4	620	2.7	9400	1200	2400
Dichlorovos (1% SOM)	0.032	6.4	0.0049	140	16	26
Dichlorovos (2.5% SOM)	0.066	6.5	0.010	140	16	26
Dichlorovos (6% SOM)	0.14	6.6	0.022	140	16	27
Alpha-Endosulfan (1% SOM)	7.4	160 (0.003)	1.2	5600 (0.003)	1200	2400
Alpha-Endosulfan (2.5% SOM)	18	280 (0.007)	2.9	7400 (0.007)	1200	2400
Alpha-Endosulfan (6% SOM)	41	410 (0.016)	6.8	8400 (0.016)	1200	2500
Beta-Endosulfan (1% SOM)	7	190 (0.00007)	1.1	6300 (0.00007)	1200	2400
Beta-Endosulfan (2.5% SOM)	17	320 (0.0002)	2.7	7800 (0.0002)	1200	2400
Beta-Endosulfan (6% SOM)	39	440 (0.0004)	6.4	8700	1200	2500
Alpha-Hexachlorocyclohexanes (	0.23	6.9	0.035	170	24	47
Alpha-Hexachlorocyclohexanes (	0.55	9.2	0.087	180	24	48
Alpha-Hexachlorocyclohexanes (	1.2	11	0.21	180	24	48
Beta-Hexachlorocyclohexanes (1	0.085	3.7	0.013	65	8.1	15
Beta-Hexachlorocyclohexanes (2	0.2	3.8	0.032	65	8.1	15
Beta-Hexachlorocyclohexanes (6	0.46	3.8	0.077	65	8.1	16
Gamma-Hexachlorocyclohexane	0.06	2.9	0.0092	67	8.2	14
Gamma-Hexachlorocyclohexane	0.14	3.3	0.023	69	8.2	15
Gamma-Hexachlorocyclohexane	0.33	3.5	0.054	70	8.2	15

CHLOROBENZENES & METHYLBENZENES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Chlorobenzene (1% SOM)	0.46	0.46	5.9	56	11000	1300 (675)				
Chlorobenzene (2.5% SOM)	1.0	1.0	14	130	13000	2000 (1520)				
Chlorobenzene (6% SOM)	2.4	2.4	32	290	14000	2900				
1,2-Dichlorobenzene (1% SOM)	23	24	94	2000 (571)	90000	24000 (571)				
1,2-Dichlorobenzene (2.5% SOM	55	57	230	4800 (1370)	95000	36000 (1370)				
1,2-Dichlorobenzene (6% SOM)	130	130	540	11000 (3240)	98000	51000 (3270)				
1,3-Dichlorobenzene (1% SOM)	0.40	0.44	0.25	30	300	390				
1,3-Dichlorobenzene (2.5% SOM	1.0	1.1	0.6	73	300	440				
1,3-Dichlorobenzene (6% SOM)	2.3	2.5	1.5	170	300	470				
1,4-Dichlorobenzene (1% SOM)	61	61	15	4400 (224)	17000	36000 (224)				
1,4-Dichlorobenzene (2.5% SOM	150	150	37	10000 (540)	17000	36000 (540)				
1,4-Dichlorobenzene (6% SOM)	350	350	88	25000 (1280)	17000	36000 (1280)				
1,2,3-Trichlorobenzene (1% SOI	1.5	1.5	4.7	102	1800	770 (134)				
1,2,3-Trichlorobenzene (2.5% S(	3.6	3.7	12	250	1800	110 (330)				
1,2,3-Trichlorobenzene (6% SOI	8.6	8.8	28	590	1800	1600 (789)				
1,2,4-Trichlorobenzene (1% SOI	2.6	2.6	55	220	15000	1700 (318)				
1,2,4-Trichlorobenzene (2.5% S(	6.4	6.4	140	530	17000	2600 (786)				
1,2,4-Trichlorobenzene (6% SOI	15	15	320	1300	19000	400 (1880)				
1,3,5-Trichlorobenzene (1% SOI	0.33	0.33	4.7	23	1700	380 (36.7)				
1,3,5-Trichlorobenzene (2.5% S(	0.81	0.81	12	55	1700	580 (90.8)				
1,3,5-Trichlorobenzene (6% SOI	1.9	1.9	28	130	1800	860 (217)				
1,2,3,4-Tetrachlorobenzene (1%	15	24	4.4	1700 (122)	830	1500 (122)				
1,2,3,4-Tetrachlorobenzene (2.5	36	56	11	3080 (304)	830	1600				
1,2,3,4-Tetrachlorobenzene (6%	78	120	26	4400 (728)	830	1600				
1,2,3,5-Tetrachlorobenzene (1%	0.66	0.75	0.38	49 (39.4)	78	110 (39)				
1,2,3,5-Tetrachlorobenzene (2.5	1.6	1.9	0.90	120 (98.1)	79	120				
1,2,3,5-Tetrachlorobenzene (6%	3.7	4.3	2.2	240 (235)	79	130				
1,2,4,5-Tetrachlorobenzene (1%	0.33	0.73	0.06	42 (19.7)	13	25				
1,2,4,5-Tetrachlorobenzene (2.5	0.77	1.7	0.16	72 (49.1)	13	26				
1,2,4,5-Tetrachlorobenzene (6%	1.6	3.5	0.37	96	13	26				
Pentachlorobenzene (1% SOM)	5.8	19	1.2	640 (43.0)	100	190				
Pentachlorobenzene (2.5% SOM	12	30	3.1	770 (107)	100	190				
Pentachlorobenzene (6% SOM)	22	38	7.0	830	100	190				
Hexachlorobenzene (1% SOM)	1.8 (0.20)	4.1 (0.20)	0.47	110 (0.20)	16	30				
Hexachlorobenzene (2.5% SOM)	3.3 (0.50)	5.7 (0.50)	1.1	120	16	30				
Hexachlorobenzene (6% SOM)	4.9	6.7 (1.2)	2.5	120	16	30				
1,2,4-Trimethylbenzene (1% SOM)							0.35	0.41	0.38	42
1,2,4-Trimethylbenzene (2.5% SOM)							0.85	0.99	0.93	99
1,2,4-Trimethylbenzene (6% SOM)							2	2.3	2.2	220
Isopropyl benzene (1% SOM)							11	12	32	1400
Isopropyl benzene (2.5% SOM)							27	28	79	3300
Isopropyl benzene (6% SOM)							64	67	190	7700
Propylbenzene (1% SOM)							34	40	34	4100
Propylbenzene (2.5% SOM)							82	97	83	9700
Propylbenzene (6% SOM)							190	230	200	21000
Styrene (1% SOM)							8.1	35	1.6	3300
Styrene (2.5% SOM)							19	78	3.7	6500
Styrene (6% SOM)							43	170	8.7	11000

PHENOLS AND CHLOROPHENOLS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	LQM/CIEH						EA SGV			EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential**	**Allotment**	**Commercial**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**otm**	**Commercial**
Phenol (1% SOM)	120	440 (460)	23	440 (26000)	440 (10000)	440 (7600)							
Phenol (2.5% SOM)	200	690	42	690 (30000)	690 (10000)	690 (8300)							
Phenol (6% SOM)	380	1200	83	1300 (34000)	1300 (10000)	1300 (9300)	420	280	3200 (38000)				
Chlorophenol (1% SOM)	0.87	94	0.13	3500	620	1100							
Chlorophenol (2.5% SOM)	2.0	150	0.30	4000	620	1100							
Chlorophenol (6% SOM)	4.5	210	0.70	4300	620	1100							
Pentachlorophenol (1% SOM)	0.22	27 (16.7)	0.03	400	60	110							
Pentachlorophenol (2.5% SOM)	0.52	29	0.08	400	60	120							
Pentachlorophenol (6% SOM)	1.2	31	0.19	400	60	120							
2,4-Dimethylphenol (1% SOM)										19	210	3	16000
2,4-Dimethylphenol (2.5% SOM)										43	410	7	24000
2,4-Dimethylphenol (6%SOM)										97	730	17	30000
Total Cresols (2-Methylphenol, 3-methylphenol, 4-methylphenol) (1%SOM)										80	3700	12	160000
Total Cresols (2-Methylphenol, 3-methylphenol, 4-methylphenol) (2.5%SOM)										180	5400	27	180000
Total Cresols (2-Methylphenol, 3-methylphenol, 4-methylphenol) (6%SOM)										400	6900	63	180000

PHTHALATES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	EIC/AGS/CL:AIRE			
Compound	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Bis (2-ethylhexyl) phthalate (1%	280	2700	47	85000
Bis (2-ethylhexyl) phthalate (2.5	610	2800	120	86000
Bis (2-ethylhexyl) phthalate (6%	1100	2800	280	86000
Butyl benzyl phthalate (1% SOM	1400	42000	220	940000
Butyl benzyl phthalate (2.5% SO	3300	44000	550	940000
Butyl benzyl phthalate (6% SOM	7200	44000	1300	950000
Diethyl Phthalate (1% SOM)	120	1800	19	1500000
Diethyl Phthalate (2.5% SOM)	260	3500	41	220000
Diethyl Phthalate (6% SOM)	570	6300	94	290000
Di-*n*-butyl phthalate (1% SOM)	13	450	2	15000
Di-*n*-butyl phthalate (2.5% SOM	31	450	5	15000
Di-*n*-butyl phthalate (6% SOM)	67	450	12	15000
Di-*n*-octyl phthalate (1% SOM)	2300	3400	940	89000
Di-*n*-octyl phthalate (2.5% SOM	2800	3400	2100	89000
Di-*n*-octyl phthalate (6% SOM)	3100	3400	3900	89000

OTHER ORGANICS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Carbon disulphide (1% SOM)	0.14	0.14	4.8	11	11000	1300				
Carbon disulphide (2.5% SOM)	0.29	0.29	10	22	11000	1900				
Carbon disulphide (6% SOM)	0.62	0.62	23	47	12000	2700				
Hexachloro-1,3-butadiene (1% S	0.29	0.32	0.25	31	25	48				
Hexachloro-1,3-butadiene (2.5%	0.70	0.78	0.61	66	25	50				
Hexachloro-1,3-butadiene (6% S	1.6	1.8	1.4	120	25	51				
Tributyl tin oxide (1% SOM)							0.25	1.4	0.042	130
Tributyl tin oxide (2.5% SOM)							0.59	3.1	0.1	180
Tributyl tin oxide (6% SOM)							1.3	5.7	0.24	200
Biphenyl (1% SOM)							66	220	14	18000
Biphenyl (2.5% SOM)							160	500	35	33000
Biphenyl (6% SOM)							360	980	83	48000
2,4-Dinitrotoluene (1% SOM)							1.5	170	0.22	3700
2,4-Dinitrotoluene (2.5% SOM)							3.2	170	0.49	3700
2,4-Dinitrotoluene (6% SOM)							7.2	170	1.1	3800
2,6-Dintrotoluene (1% SOM)							0.78	78	0.12	1900
2,6-Dintrotoluene (2.5% SOM)							1.7	84	0.27	1900
2,6-Dintrotoluene (6% SOM)							3.9	87	0.61	1900
Bromoform (1% SOM)							2.8	5.2	0.95	760
Bromoform (2.5% SOM)							5.9	11	2.1	1500
Bromoform (6% SOM)							13	23	4.6	3100

6. GEOENVIRONMENTAL RISK ASSESSMENT

6.1 **Potential Hazard Sources.** Ground contamination can occur through several causes, particularly from historical use of the site and is often linked to the processes of waste disposal, underground storage, open storage, process pipework, leaks, spillages, tanks, site filling and various other reasons. The contamination can either arise from site sources or be the result of migration from other sources off site.

6.2 **Potential Migratory Pathways.** The primary pathways are considered to be laterally or vertically downward through underlying strata or upward to the ground surface. Such pathways also provide the potential for contaminants to migrate towards local watercourses and groundwater.

6.3 **Potential Targets At Risk.** Potential environmental liabilities related to current legislation associated with contaminated land with regard to existing ownership and redevelopment are summarised.

The probability of a hazard, linked with its consequences, can be used to assess risk in accordance with the tables below for use in decision making.

Consequence of Pollution Linkage

Severe	Damage to human health. Substantial pollution of controlled waters. Significant change in ecosystem population. Irreparable damage to property.
Moderate	Non-permanent damage to human health. Minor pollution of controlled waters. Change in ecosystem. Damage to property.
Mild	Short term health effects. Slight pollution of controlled waters. Slight effect on ecosystem. Minor repairable damage to property.
Near Zero	No noticeable effect on human health. No significant pollution to controlled waters. No measurable effect on ecosystem densities. Non-structural cosmetic damage to property.

Decision Making

Probability of a hazard and an associated linkage	**Consequences of a pollution linkage (hazard-pathway-target)**			
	Severe	Moderate	Mild	Near Zero
High	High	High	Medium/low	Negligible
Medium	High	Medium	Low	Negligible
Low	High/medium	Medium/low	Low	Negligible
Unlikely	High/medium/low	Medium/low	Low	Negligible

Final overall risk is based on an assessment of probability of a hazard and its consequences. Risk categories are shown shaded in the table above and defined below.

Risk	**Description**
High	Site probably or certainly unsuitable for present use or environmental setting. Contamination probably or certainly present and likely to have an unacceptable impact on key targets. Urgent action needed.
Medium/ Moderate	Site may not be suitable for present use or environmental setting. Contamination may be present, and likely to have unacceptable impact on key targets. Action may be needed on the medium term.
Low	Site considered suitable for present use and environmental setting. Contamination may be present but unlikely to have unacceptable impacts on key targets. Action unlikely to be needed in present use.
Negligible	Site considered suitable for present use and environmental setting. Contamination may be present but unlikely to have unacceptable impacts on key targets. No action needed while site remains in present use.

The review of the information from the exploratory investigation may be such that a decision is made that there is no need for further investigation. Alternatively, it may be necessary to carry out a further main investigation.

The Environment Agency has set out guidance as to the classification of waste arising from construction sites in its document "The Definition of Waste" dated April 2006. This document outlines how waste is to be handled

The following activities are not regarded as a waste management activity requiring licencing.

1) Construction activities carried out for the purpose of producing a suitably engineered soil e.g. lime stabilisation, vibro-replacement and piling.

2) Uncontaminated materials produced on site (including excavated soils and materials from demolition) which can be reused without further treatment. Examples include site regrading and footing excavations.

   These must be done in accordance with the Planning Permission. Demolition material must be used in accordance with the quality protocols for the production of aggregates from inert waste, subject to appropriate testing and the lack of any harmful constituents. Uses include pipe bedding, backfill and sub-base.

3) Contaminated soils can be moved on-site providing they do not require treatment or containment. There should be no risk to the environment i.e. non-leachable and in accordance with Planning Permission. Relevant activities can include site regarding and use of materials below clean cover systems, capping, buildings and hardstanding.

Where contaminated materials have to be placed in an engineered cell to prevent pollution, then this would be classed as landfilling and require PPC permits. Any material taken off site is considered to be waste. However, this is under review. If material is waste, then there is a duty of care including ensuring material is transported by a registered carrier. The destination of material leaving the site should be regularly checked and Waste Transfer Notes kept.

Clean Cover Systems

According to the Environment Agency's Remediation Position Statements of May 2006, the placement of a cover system using "clean" material is not treatment of waste. Consequently, no licensing/permitting position statements are applicable to this type of remediation. If the cover system uses 'waste materials' in its construction, waste management licensing exemption paragraph 9A may be applicable to its installation. If the installation of the proposed cover system does not meet the criteria for registration of this exemption, the activity may be regulated through a waste management site license.

7. WASTE ACCEPTANCE CRITERIA (WAC)

The main objective of the Landfill Directive is to prevent or reduce as far as possible the negative effects of landfilling waste on the environment and on human health. It is intended to reduce the disposal of waste materials to landfills and to encourage more sustainable approaches to dealing with wastes. It bans the landfill of liquids and certain solid wastes, introduces requirements for the treatment of wastes prior to landfill and provides for the classification of landfills as sites for inert, hazardous or non-hazardous waste and prohibits co-disposal.

It sets out procedures for waste acceptance at landfills and the types of waste for each class of landfill as specified by Waste Acceptance Criteria (WAC). The WAC are predominantly lists of "limit values" for certain parameters obtained from standard leaching tests of wastes going to landfills. WAC are set out in the Landfill Directive itself. Full details can be found in the Environment Agency document "Waste Classification – Guidance on the classification and Assessment of Waste " Technical Guidance WM3 - 2015

8. MAIN REFERENCES

British Standards	BS3882: 2015 British Standard Specification for Topsoil BS5930: 2015+A1:2020 British Standard Code of Practice for Site Investigations BS8485: 2015 British Standard Code of Practice for the design and protective measures from methane and carbon dioxide ground gases for new buildings BS10175: 2011+A2:2017 British Standard Code of Practice for the Investigation of Potentially Contaminated Sites
BRE	Radon: Guidance on protective measures for new dwellings, BR211, 2015 Protective measures for housing on gas-contaminated land, BR414, 2015 Cover systems for land regeneration, 2004 Concrete in aggressive ground. Special Digest SD1, 3rd Edition, 2005 Soakaway Design (DG365)
CIEH	The LQM / CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd Edition)
CIRIA	Assessing risks posed by hazardous ground gases to buildings, CIRIA C665 Asbestos in Soil and Made Ground: a guide to understanding and managing risks, CIRIAC733, 2014 Good Practice on the testing and verification of protection systems for buildings against hazardous ground gases. C735:2014
CL:AIRE	Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, SP1010, 2013
DEFRA	Contaminated Land Report CLR 11, 2002 (7-10 withdrawn) R & D Publications TOX 1 – 12, 14, 16 – 25 R & D Publications SGV 1, 3, 4, 5, 7, 8, 9, 10, 15 and 16 (withdrawn) Improvements to Contaminated Land Guidance - "Outcome of the "Way Forward", 2008 Exercise on Soil Guideline Values. July 2008 Guidance on the Legal Definition of Contaminated Land. July 2008 Simplification of the Contaminated Land Regime Impact Assessment No: Defra 1133
DETR	Circular 02/2000. Contaminated Land, 2000 Guidelines for Environmental Risk Assessment and Management, 2000
Environment Agency	Guidance for the Safe Development of Housing on Land Affected by Contamination, 2000 Protective measures for housing on gas-contaminated land Remediation Position Statements, May 2006 Guidance and monitoring of landfill leachate, groundwater and surface water Human health toxicological assessment of contaminants in soil (Science Report SC050021/SR2) 2008 Updated technical background in the CLEA model (Science Report SC0520021/SR3) Waste Classification – Guidance on the classification and Assessment of Waste - Technical Guidance WM3 (2015) Contaminated Land Risk Management (2021)
HMSO	Part 2A of the Environmental Protection Act Part 2A Statutory Guidance – April 2012 Contaminated Land (England) Regulations 2006 The Contaminated Land (England) (Amendment) Regulations 2012 The Water Act 2003 (Commencement No. 11) Order 2012
Institution of Civil Engineers	Contaminated Land: Investigation, Assessment and Remediation, 2nd Edition
NHBC	Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present, 2007

This list is not intended to be exhaustive.

APPENDIX 5

Validation Report for Eastern Pond Silts – LK Consult

Greenside Mills, Skelmanthorpe

Validation Report
Eastern Pond Silts

Job Number: LKC241349

Date: November 2024

Client: Caldwell Construction Ltd

INCREASING LAND VALUE

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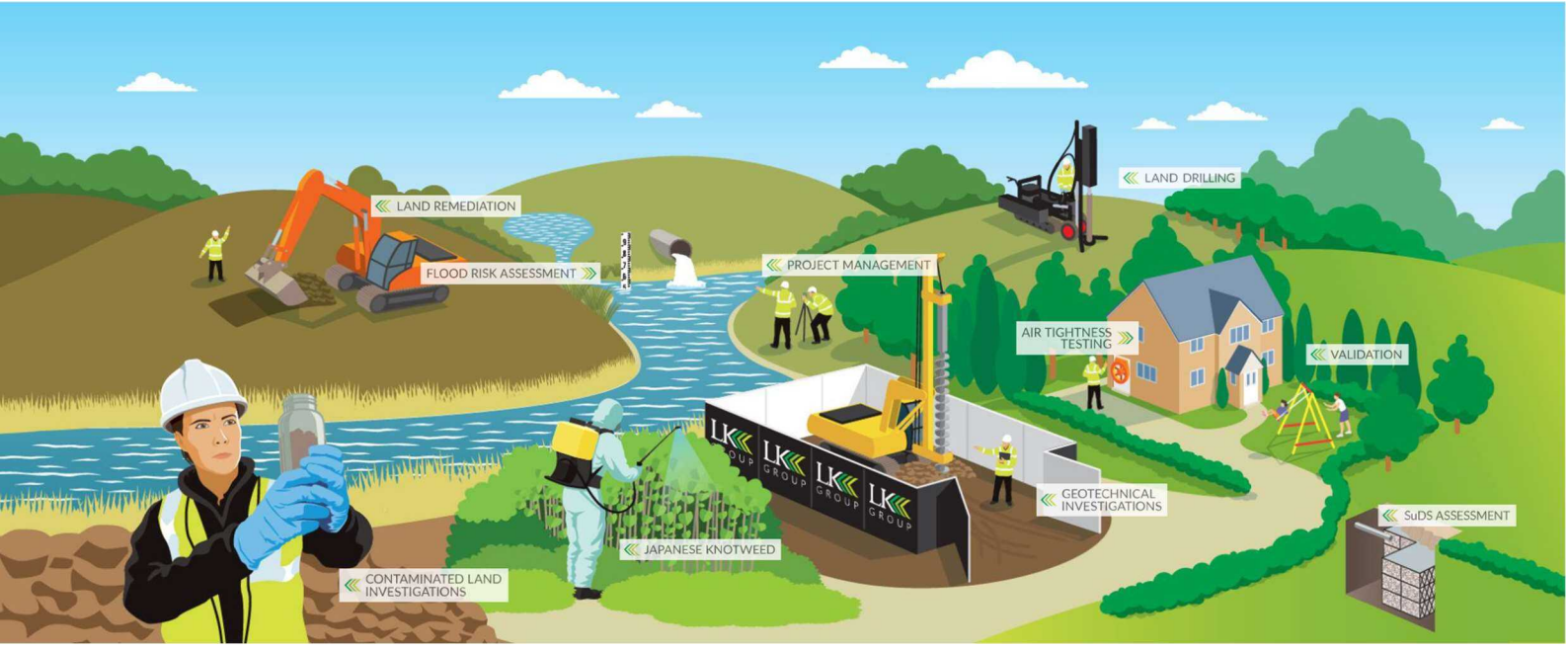

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DOCUMENT QUALITY ASSURANCE

Site Address	Greenside Mills, Saville Road, Skelmanthorpe, Huddersfield, HD8 9EF
Report Title	Validation Report – Eastern Pond Silts
Job Number	LKC241349
Client	Caldwell Construction Ltd

Revision	0	**Date of Issue**	15/11/2024
Document Ref:	LKC241349-D1-Greenside Mills, Skelmanthorpe R0		
Status	Final		
Written By	Charlie Danby		
Approved By	Colin Crompton		

DISCLAIMER

This report has been prepared by LK Consult Ltd (LKC) who have exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant, experienced in preparing reports of a similar scope.

However, to the extent that the report is based or relies upon information contained in records, reports or other materials provided to LKC, which have not been independently produced or verified, LKC gives no warranty, representation, or assurance as to the accuracy or completeness of such information.

This report is issued on the condition that LKC will not be held liable for any loss arising from ground conditions between sampling points (i.e., boreholes/trial pits/hand augers/surface samples) which have not been shown by the sampling points or related testing carried out during the investigation, nor for any loss arising from conditions below the maximum depth of the investigation. Opinions on such conditions, where given, are for general guidance only.

In addition this report does not consider waste licencing or waste exemption requirements which shall be obtained by the developer.

This report is prepared solely for the benefit of the client named above. It may not be relied upon by or submitted to a third party for their reliance for the purposes of valuation, mortgage, insurance, and regulatory approval until all invoices have been settled in full.

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FIGURES

Figure 1 – Site Location and Boundary Plan

APPENDICES

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1. Introduction

1.1. Background

LK Consult Ltd (LKC) has been commissioned to carry out a Validation Report detailing the translocation of pond silts at Greenside Mills, Skelmanthorpe.

LKC have reviewed the following documents by Sirius Geotechnical:

- 'Supplementary Contamination Assessment Letter Report', ref. C9297/AEC/10326, dated 15th November 2023.
- 'Strategy for Remedial and Preparatory Works', ref. C9297/RS, dated November 2023).

These documents in turn reference several previous reports and investigations carried out by Sirius and others.

This document refers to the translocation of silts from the pond and around the surface water feature located at the eastern site boundary. The location of this former pond and surface water feature (hereafter referred to as the 'eastern pond') is illustrated on Sirius "Site Features Plan" ref. C9297/RS/02 and "Proposed Remediation Plan" ref. C9297/RS/04 reproduced in Appendix A.

LKC understand that Lovell Partnerships instructed Caldwell Construction Ltd to place these pond silts in the central area of Public Open Space (POS), located to the south of Plots 25-29. LKC have assumed that Lovell Partnerships have obtained suitable permits or exemptions for this activity. The location of the POS can be seen on Sten Architecture "Planning Layout" ref. 2156.01 Rev. N reproduced in Appendix A.

A summary of the site details is presented in Table 1-1. Figure 1 indicates the site location and boundary plan.

Location	North-east of Saville Road, Skelmanthorpe. National Grid Reference 423365E 410935N.
Area	1.86Ha.
Topography	140-155 metres above ordnance datum (AOD). Site slopes down to the north east.
Current Site Use	Construction site.
Proposed Development	46no. residential properties with private gardens and associated infrastructure, including areas of hardstanding, access roads and public open space (POS).

Table 1-1: Summary of site details.

This report details the remediation works carried out to the eastern pond silts and the subsequent validation of these remediation works.

2. Review of Existing Information

2.1. Site Investigation Information

The previous Sirius reports refer to investigation and risk assessment of the eastern pond silts and extracts from their reports are provided below:

Sirius collected 3 samples of the silt (ref. Pond TP, Sediment 1 and Sediment 2) and subjected the samples to testing for heavy metals, asbestos ID, pH, soluble sulphate, speciated PAH16 and a hydrocarbon suite (TPHCWH and BTEX). The sample locations can be seen on the Proposed Remediation Plan ref. C9297/RS/04 reproduced in Appendix A. Relevant certificates of analysis are provided in Appendix B.

Sirius carried out a generic risk assessment of the results and an extract from their report is presented in Plate 2-1.

Pond Sediment

Table 7.4 - Summary of Soil Analysis - Pond Sediment

Analyte	No. of Samples Tested	Range of Results (mg/kg unless specified)	GAC (5% SOM) (mg/kg unless specified)*	No. of Samples >GAC	Samples Exceeding GAC (location and depth)
Metals and Metalloids					
Copper~	3	76 - 440	200~	1	Pond TP
Lead	3	100 - 260	200	1	Pond TP
Organics - Polycyclic Aromatic Hydrocarbons					
Naphthalene	3	<0.03 - 35+	4.6	1+	Pond TP
Benzo(a)pyrene	3	0.22 - 13+	2.2	1+	Pond TP
Other					
Asbestos	3	<0.001% Chrysotile present as fibre bundles	NAD	1	Sediment 1
Total Organic Carbon	3	3.1 - 11%	3.0%	3	Sediment 1, Sediment 2, Pond TP^
Water Soluble Sulphate	3	300 - 820mg/l	500mg/l	1	Sediment 1^

**Based on Sirius Stage 1 GAC for Residential with Gardens end use. ^Elevated TOC and water soluble sulphate are not considered in human health risk assessment. ~ Copper GAC value based on potential phytotoxic effect.*
+Based on the original PAH result within the Pond-TP sample.

Plate 2-1: Extract from Sirius soil risk assessment.

The Pond TP sample was retested for PAH16. The above plate retains the original test result of 35mg/kg for naphthalene but does not include the original test result of 15mg/kg for benzo(a)pyrene.

Sirius also provided the following commentary (Plate 2-2).

Pond Sediments

A significantly elevated concentration of naphthalene (35mg/kg) was recorded within a sample of sediment, obtained from the eastern most pond. A re-test of the sample indicated a concentration below the relevant GAC, considered attributable to heterogeneity within the sample by the testing laboratory. It is recommended that additional testing of the pond sediment be undertaken as part of enabling works to confirm the characteristic PAH (including naphthalene and benzo(a)pyrene) concentration of the soils.

It should be assumed at this stage that the pond sediments are highly heterogeneous in nature, comprising both decomposing leaf and vegetation wastes as well as anthropogenic materials, such as waste woollen fabrics. It should be assumed that, without significant geotechnical improvement, the pond sediments are highly unlikely to be suitable for use as general fill. The variability within the chemical laboratory test results is also an indication of the possibility of the soils posing a risk to site end users and off site controlled waters, without appropriate remedial measures.

Plate 2-2: Extract from Sirius soil risk assessment.

The Remediation Strategy also provided details of a clean cover system for the site and an extract is provided in Plate 2-3.

8.1 Clean Cover System Thickness

Previous investigation works have identified chemically and texturally unsuitable made ground across the site. Made ground should be overlain by a suitable clean cover system in private gardens / areas of soft landscaping.

The makeup of the required clean cover system (capping layer) shall be as shown in Table 8.1.

Table 8.1 - Required Clean Cover Layer Makeup

	Minimum Thickness (mm)			
	Subsoil	Topsoil	Soil Cover Thickness	Additional 150mm Granular Hard Dig Layer or Geotextile Separator Required at Base?
Private Gardens (front and rear)	450	150	600	Only where asbestos impacted made ground is present at depths of <1m below finished ground levels.
Soft landscaped / POS areas	300	150	450	

Plate 2-3: Extract from Sirius Remediation Strategy.

2.2. LKC Soils Risk Assessment

LKC note that the assessment by Sirius was based upon a residential with homegrown produce end use.

The results may be contrasted to generic assessment criteria (GAC) for the Public Open Space – residential (POS_{resi}) generic land use, in line with the proposed destination for these soils of POS within a housing development. GACs are provided in Appendix C.

Assuming that benzo(a)pyrene may be used as a surrogate marker for other PAHs so the C4SL may be used, and due the minor consequence associated with the phytotoxic

effect to flora (i.e., loss of plants in a landscaping scheme), the human health GAC for copper may be applied.

Therefore, the benzo(a)pyrene remains elevated in the sample from Pond TP (15mg/kg vs the GAC of 10mg/kg and chrysotile asbestos was identified at <0.001% w/w in the sample from Sediment 1.

Therefore, considering the above, the eastern pond silt material may be suitable for relocation in the POS area below a 450mm clean cover layer. It is assumed that this is the basis of the instruction from Lovell Partnerships to Caldwell Construction Ltd.

3. Site Works

3.1. Remedial Excavations

Remedial excavations in the eastern pond area and translocation in the POS were carried out by Caldwell Construction Ltd between 22nd March 2024 and 5th July 2024.

During the works a visual and olfactory assessment of the excavated materials was carried out by UKATA trained operatives. The works were carried out under Caldwell Construction Ltd Construction Health and Safety plan which includes measures for control of potential dust and fibre release.

In considering the risk to site workers from potential fibre release LKC utilised the Joint Industry Working Group (JIWG) Decision Support Tool for receptor risk ranking of Asbestos Containing Materials (ACM) in the eastern pond silts for the remediation and excavation works. This model incorporates guidance from CL:AIRE CAR-SOIL[1]and CIRIA C733[2]. The following assumptions have been incorporated into the model:

- Asbestos type, nature and concentrations as encountered during the site investigation and reported in laboratory data.
- Low respirable index was assumed based on the ACM identified onsite as per RIVM[3].
- The assessment was carried out assuming 'low disturbance' based on ACM at a shallow depth.

The JIWG model output sheet is presented in Appendix D. The JIWG assessment is provided in Plate 3-1 below.

Stage 3

Risk Assessment Outputs

Probable Licensing Status	CAR do not apply
RPE*	None
Dust Suppression**	None
Hygiene/Decontamination***	None

*Where RPE has to be worn continuously for long periods (e.g. more than 1-hour), then powered RPE may be necessary.
**Reduction in control measures possible if natural mitigation factors are present (e.g. raining, wet ground)
***Guide only; suitability of selected personal hygiene measures may be reviewed on a site/contamination-specific basis

Plate 3-1: Extract JIWG Work Categories Assessment.

For added conservatism, the JIWG model does not consider moisture content, which can significantly reduce the potential for airborne fibre release from soil in a typical UK climate. Swartjes and Tromp (2008)[4] based on work by Addison *et al*.[5] note that the addition of 10% water to soil decreases the risk of potential fibre release by a factor of between 2 and 10.

The 1no. moisture content result from the Sirius report (Pond TP sample) which was 53% - making fibre release highly unlikely. It should also be noted that subsequent testing of the silts in the POS area gave moisture contents of between 23.7% and 30.9%.

Data from Addison *et al.* shows that a sandy soil with Chrysotile fibre concentrations of 0.01%w/w (1 order of magnitude lower recorded) when agitated in a moderately

aggressive way, produced between 0.01fibres/ml and no recordable fibres at moisture contents of 5% and above.

Asbestos may affect site users in soft landscaping areas in localised areas of the site, via the inhalation of fibres. The probability is considered to be likely given limited asbestos encountered at shallow depth. With a medium consequence the risk as assumed to be moderate remediation is recommended in soft landscaped areas.

On this basis no specific control measures above those in the Construction Health and Safety plan were required.

Anoxic odours were reported, but no visible evidence of petroleum hydrocarbons or bulk pieces of suspected asbestos containing materials.

Plate 3-2 shows the progress of works from UAV photos and photographs showing the removal works down to natural clay strata are provided in Appendix E.

	January 2024. Standing water visible in eastern pond area (highlighted).
	July 2024 Eastern pond area reduced to brown clay superficial deposits with road layout commenced. Stockpiles present on central POS area (highlighted).

	September 2024. Excavated silt material shown in POS area.

Plate 3-2: Progress of excavations and placement.

LKC understand approximately 4,980m^3 of material was excavated and placed in the central POS area.

4. Validation Testing

4.1. Methodology

LKC attended site on 24th September 2024 to carry out validation testing.

Within the POS area 4 no. trial pits (ref. TP301-TP304) were excavated to 4m to the full depth of the placed eastern pond silts. In the southern area, an excavation face to a depth of 1.2m above pre-existing ground levels was present and this was taken as TP305. 5no. locations were selected to give samples at a nominal rate of 1 per 1,000m^3 in the absence of any guidance in the Remediation Strategy. Within TP305 the material closer to the trench block appeared to have more anthropogenic inclusions so 2no. samples (with the same depth range but from opposing faces) were collected.

In addition, samples were collected from the base and eastern side of the excavation from where the pond silts were excavated and outside of the road box construction. These were referenced Base and East and samples were collected where the basal clay remained exposed.

The approximate sampling locations are shown in Plate 4-1 and photographs are provided in Appendix F.

Plate 4-1: Sampling Locations.

4.2. Ground Conditions

Within the POS area the trial pits encountered dark grey / black silt and occasional inclusions of soft brown clay were noted. Limited anthropogenic inclusions such as brick, rope, concrete were observed. A discernible anoxic and natural organic odour was noted. The silts had a soft consistency and trial pits were unstable.

Within the eastern area of the site, the silts were removed to a firm to stiff sandy brown clay.

4.3. Sampling Protocol

4.3.1. Soil Sampling (Contamination)

Standard sampling protocol and preservation of samples was undertaken as described in the EA guidance on site investigation[6].

Soil samples of approximately 500g were recovered in amber jars and plastic tubs. All the samples were sent to DETS laboratory for chemical testing.

Many of the contamination tests are UKAS or MCERTS accredited and further details are given in the Certificate of Analysis presented in Appendix G. Table 4-1 shows the soil testing undertaken.

Testing	No. Samples	Justification
Metals / metalloids, pH, water soluble sulphate, cyanide suite, phenol, TPHCWG, BTEX, MTBE, speciated PAHs, SOM and asbestos screen.	8	Although no evidence of contamination identified, detailed suite undertaken to confirm the contamination concentrations.
Leaching Test Metals / metalloids, pH, sulphate, cyanide suite, phenol, TPHCWG, BTEX, MTBE, speciated PAHs, SOM and hardness.	4	Tests carried out on translocated silts to determine potential risk to controlled waters.

Table 4-1: Summary of Soil Testing.

Notes:

If asbestos present during screen identification and quantification will be undertaken.

Metal/metalloids=arsenic, cadmium, chromium, (total and hexavalent), copper, lead, mercury, nickel, selenium, vanadium, zinc, and boron; TPHCWG=carbon banded and aromatic/aliphatic split petroleum hydrocarbons; PAH=polycyclic aromatic hydrocarbons, BTEX=benzene, toluene, ethylbenzene, and xylenes; MTBE=Methyl tert-butyl ether, SOM=Soil Organic Matter.

5. Generic Risk Assessment

5.1. Introduction

Current good practice requires that the findings from a site investigation should be evaluated on a site-specific basis, using a risk-based approach. Risk assessment involves identification and evaluation of the hazards presented by the concentrations of contaminants measured followed by an evaluation of the risks which are associated with these hazards (LCRM[7]).

5.2. Soil Risk Assessment

5.2.1. Methodology

With regards to the soil risk assessment LKC will use the following hierarchy:

- Category 4 Screening Levels (C4SLs) [8, 9].
- LQM Suitable 4 Use Levels (S4ULs) [10, 11, 12, 13].
- ATRISK Soil Screening Values (SSVs) and CL:AIRE Generic Assessment Criteria (GACs)[14].

The areas of the site assessed within this report comprise areas of Public Open Space within a housing development, therefore the assessment criteria for POS_{resi} has been used.

All criteria have been generated using the CLEA V1.06 model[15] based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM.

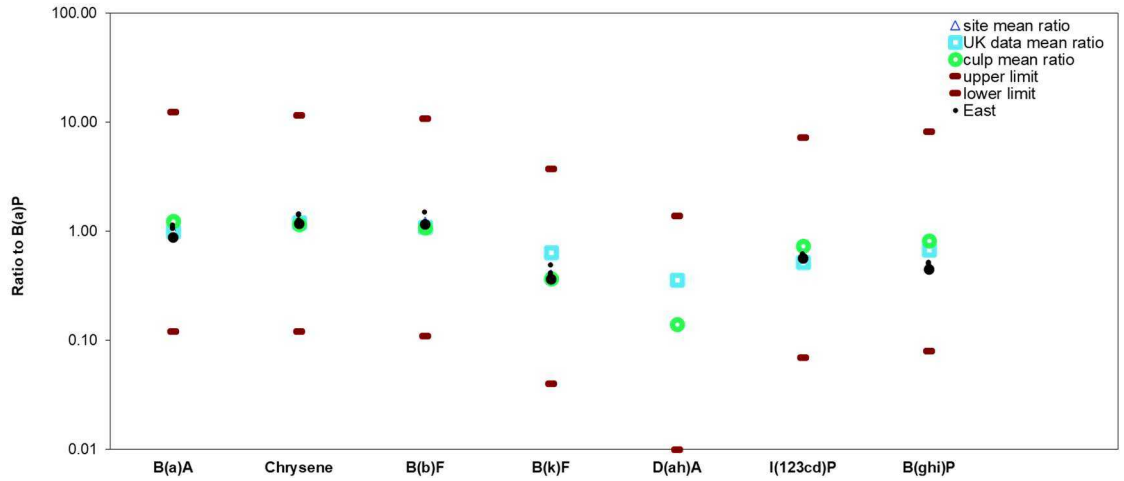
A summary of the generic assessment criteria used in this assessment is provided in Appendix C.

B(a)P as Surrogate Marker

LKC consider the main risk drivers for PAHs are benzo(a)pyrene (B(a)P) and naphthalene. This is due to B(a)P possibly being a carcinogen and most toxic of the PAHs[16,17] and naphthalene the most volatile and soluble[18]. The C4SLs indicate B(a)P as a surrogate marker for carcinogenic PAHs, if it falls within appropriate limits, since the risk from other non-carcinogenic PAHs are considered negligible[19]. For B(a)P to be used as a surrogate marker it should follow the profile described by the HPA (2008)[20] and CL:AIRE (2013). Naphthalene will be treated separately using the LQM S4ULs.

LKC undertook an assessment of the PAH data for the site with regards to using B(a)P as a surrogate marker for carcinogenic PAHs as per HPA and CL:AIRE guidelines. The primary toxicological study related to Culp *et.al*[21], which was based on coal tar mixtures (>80,000mg/kg of total PAHs) fed in food to mice over a two-year carcinogenicity study.

Graph 5-1 summarises the study site data with respect to how the ratios of carcinogenic PAHs relate to B(a)P, within the confidence limits provided in the HPA document.



Graph 5-1: The ratio of PAH to B(a)P in soil for all available data at the site based on 6 samples (where values were >LOD to allow the calculation of a ratio).

Notes:

B(a)P=Benzo(a)pyrene; D(ah)A=Dibenzo(ah)anthracene; B(a)A=Benzo(a)anthracene; B(b)F=Benzo(b)fluoranthene; B(k)F=Benzo(k)fluoranthene; I(123cd)P=Indeno(123cd)pyrene; B(ghi)P=Benzo(ghi)perylene.

All the data points that could be used to calculate ratios fall inside the upper or lower limits.

5.2.2. *Soil Results Comparison against Assessment Criteria*

LKC's results have been compared to the relevant assessment criteria and no elevated contaminants were identified.

5.2.3. *Hazard Quotient*

To examine the potential additivity of toxicological effects between the petroleum hydrocarbon fractions, a Hazard Index (HI) as described by the Environment Agency[22] technical report should be calculated for the samples. As no significant concentrations of petroleum hydrocarbons were identified in any of the soil samples this has not been undertaken.

5.2.4. *Direct Contact Risk – Human Health*

At the concentrations identified, the contaminants are not considered to pose a potential risk to future site users of the POS areas. The principal pathways are the ingestion pathways (soil, dust, fibres) and dermal contact.

The probability of asbestos, PAH, TPH, BTEX and metal contamination affecting site users is unlikely. With a medium consequence, the risk is considered to be low, and on the basis of the results obtained by LKC remediation is not required. However, due recourse should be given to the results obtained by Sirius.

5.2.5. *Risk from Inhalation of Vapours*

No visual / olfactory evidence of volatile contaminants was identified during the investigation. Confirmatory soil analysis did not detect any volatile PAHs or TPH fractions above detection limits.

LKC therefore consider the probability of volatile contaminants affecting site users as unlikely. The consequence is expected to be medium, giving a low risk and on the basis of the results obtained by LKC no remediation is required.

5.3. Controlled Water Assessment

The central POS area is located above a Secondary A Aquifer with a watercourse at the eastern extent of the site.

LKC have compared results above Limits of Detection (LOD). Where relevant the review of priority substances takes precedence considering threshold values for groundwater cannot be used '*as part of site-specific investigations*'. The hierarchy is as follows:

- River Basin District Standards[23] and updated Water Framework Directive[24] for Annual Average / Maximum Allowable Concentration Environmental Quality Standards (AA-MAC-EQS) for priority substances (surface water risk).
- 2016 private water supply standards (UKDWS potable)[25].
- 2001 Environment Agency Values for Environmental Quality Standards (EQS) and UK Drinking Water Standard (UKDWS)[26].

With regards to hydrocarbon mixtures (TPHCWG) for UKDWS, LKC will use the CL:AIRE guidance on petroleum hydrocarbons in groundwater[27] based on WHO guidelines.

The leaching test is aggressive (de-ionised water) and is not in aqueous equilibrium (steady state) with the solid sample. This may cause rapid dissolution and overestimation of the aqueous phase concentrations compared to groundwater in contact with contaminated soils. Although dissolution may be reduced for highly hydrophobic contaminants[28] such as B(a)P, it is likely that the initial leaching will remove the most readily available hydrocarbons and subsequent flushing would reduce the leachable concentrations[29]. Traditionally the leaching test was developed for inorganic constituents and the leaching of organics is poorly understood[30].

Analysis sheets are presented in Appendix G.

No elevated contaminant concentrations were identified in any of the leaching test samples. In particular PAH (as per UKDWS), TPH and BTEX were below limits of detection.

Based on the above, LKC considers the probability of contaminants in the translocated silts within the central POS area on site affecting the Secondary A Aquifer as unlikely.

Given the medium consequence, a low risk is anticipated and no remediation is required.

6. Summary Conclusions and Recommendations

6.1. Conclusions

Based upon the available information LKC conclude the following:

The removal of the silts in the eastern area has been successfully completed and no remnant contamination was noted in the residual natural clay strata.

Testing of the silts in situ in the central POS at an approximate sampling rate of 1 sample per 830m^3 of material did not identify the presence of ACM or elevated naphthalene and lead as noted by Sirius in their testing. The LKC results indicate that the soil does not comprise an unacceptable risk to future site users from direct contact or inhalation. This suggests the Sirius test results are an anomaly or very localised. However, due recourse should be given to these results.

Leaching tests undertaken on the silts has not identified an unacceptable risk to the underlying Secondary A Aquifer.

LKC therefore conclude the remedial works of the eastern pond silts has been carried out appropriately. The moisture content will have reduced risk of any asbestos fibre release and the material is suitable for retention in the central POS area. Notwithstanding this, recourse should be given to the proposed landscaping of this material, the soft consistency of the material and the previous Sirius results.

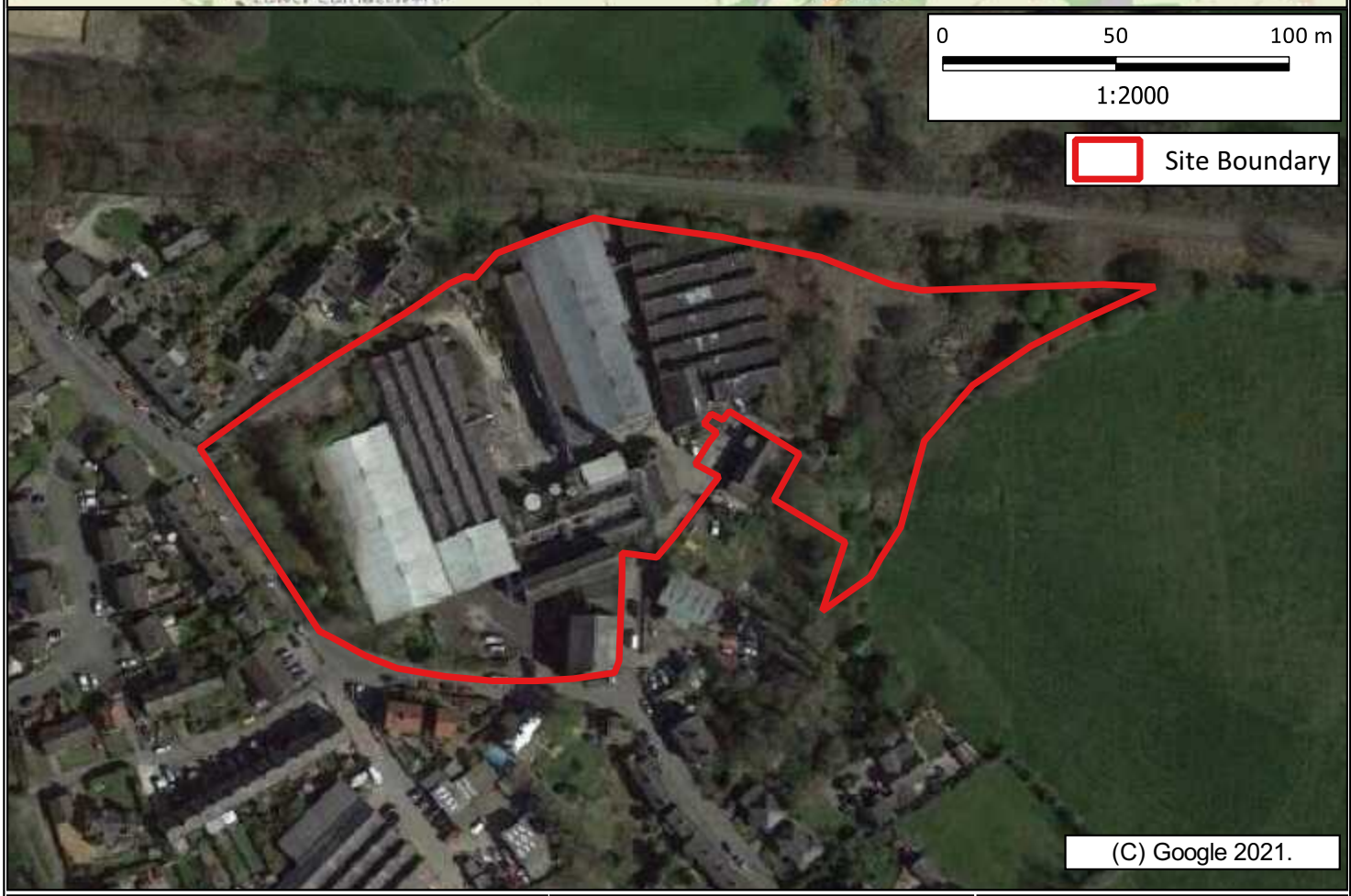
6.2. Recommendations

The POS area has currently been left c. 450mm below finish levels in order to accommodate the capping layer as outlined in the Sirius Remediation Strategy. LKC consider that placing this capping layer would be a suitably conservative approach given the existing Sirius testing data.

Given the soft consistency of the silts the POS area and capping layer should be constructed to allow a suitably durable surface for future site users. This may include a geotextile or drainage layer on top of the existing silts to ensure that the integrity of the surface of the POS is maintained throughout its future use.

Suitable topsoil and subsoil shall be imported for use in the capping layer and validation of the imported soils and the depth and construction of the capping layer shall be carried out as per Section 8 of the Sirius Remediation Strategy.

Figures



Client: Caldwell Construction Ltd				Title: Site Location & Boundary Plan	
Site: Greenside Mills, Skelmanthorpe				Scale (see scale bar): 1:25,000 & 1:2000 @ A4	Figure: 1
Job No.: LKC241349	Drawn By: CD	Checked By: CC	Drawn: November		Revision:

LK CONSULT

Appendix A – Site Plans

1. Photo of pond within east of the site, looking southeast.

2. Photo of pond and surface water feature looking south.

3. Photo of stockpile within east of site, including wooden pole, with area of former infilling and pad beyond to the east.

4. Evidence of former brick lined mill pond and adjacent structures prior to backfilling / clearance.

5. Newly constructed overhead cables and wooden pole, located in close proximity to former AST and sub-station.

6. View of former AST, prior to demolition and clearance.

7. View of former sub-station prior to demolition and clearance.

8. Surface water culvert located in southeast, with black oily substance noted.

9. View of surface water culvert with discarded containers.

10. Evidence of hydrocarbon staining within backfilled mill pond (trial pit TP218).

11. View of black saturated pond sediments during trial pitting.

12. View of varying topography of the site, looking east.

NOTES

Site boundary

Photo Location and Direction

Existing pond and surface water feature

Former brick lined mill pond

Existing stockpile

Former above ground storage tank

Topographical survey reproduced from Sirius Remediation Ltd, Post Demolition Survey, ref. SR4358-TS-001, dated October 2023

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
3. All marked site features (including historical features, potential contaminant constraints, and any other potential constraint or feature of note) shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

REVISION		BY	DATE
0	For Information	MF	08/11/23
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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CLIENT

Lovell Partnerships Ltd

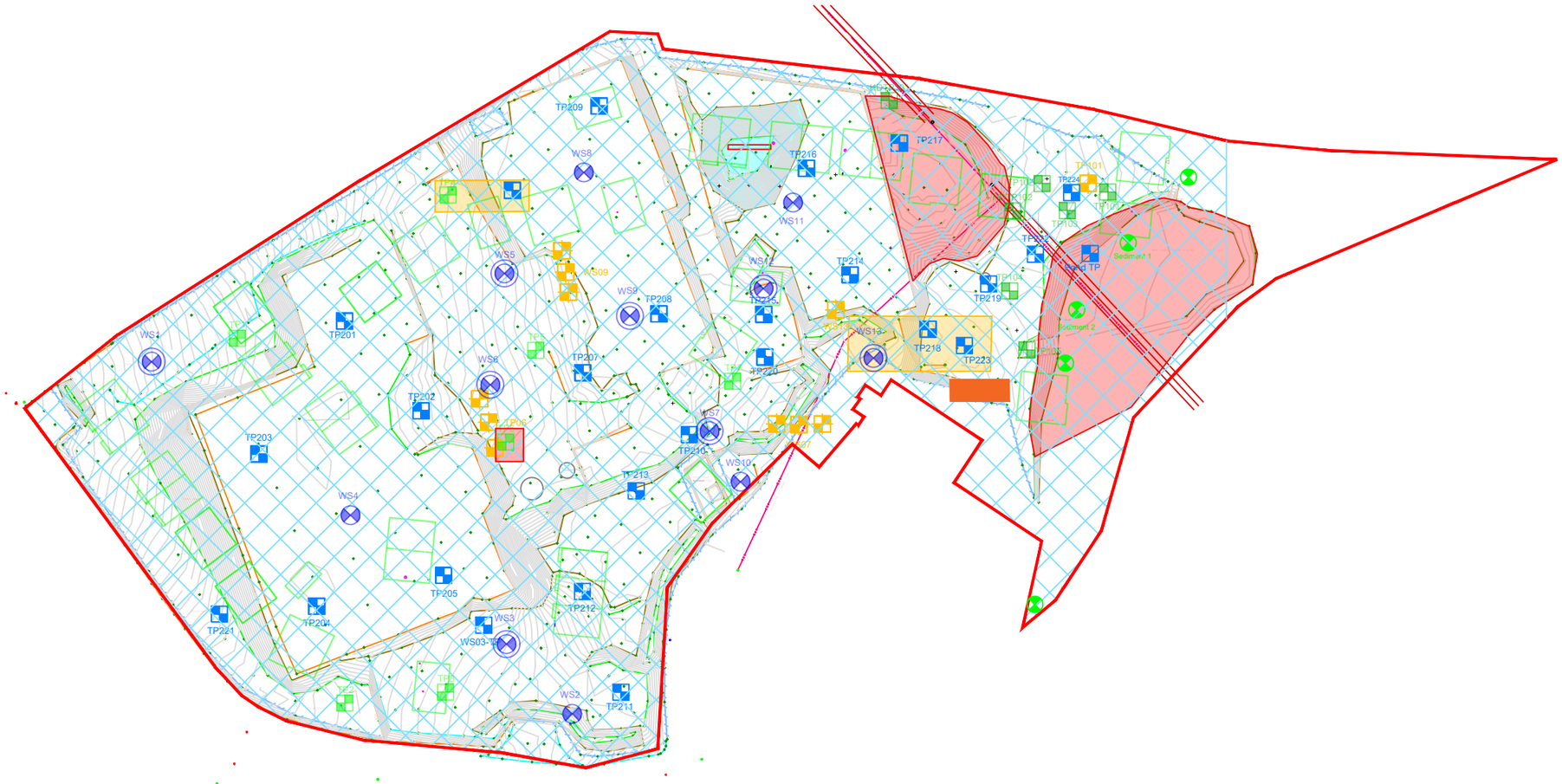
SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Site Features Plan

DRAWING NO.	REVISION NO.
C9297/RS/02	0
DRAWN BY: MF	APPROVED BY: GH
DATE: November 2023	SCALE: 1:1000
PAPER SIZE: A2	



NOTES

Site boundary

2023 Site Investigation

- Trial Pits (TP200 series)
- Hotspot Delineation Trial Pits
- Pond Sediment Samples (2023)
- SW — Surface Water Samples (2023)

2021 Site Investigation

- Trial Pits (TP100 series)

2020 Site Investigation

- Window sample borehole location (WS01 series)
- Trial pit location (TP01 series)
- Proposed Development Outline with Proposed FFLs
- Former building outlines (now demolished to slab level)

Topographical survey reproduced from Stamford Geomatics Ltd survey ref. 2456 / 001 RevA, dated March 2021

- Asbestos impacted soils - to be placed below proposed hardstand where it won't later be disturbed, or below a clean cover. Geotechnical properties of the stockpile and pond sediment soils to be considered for their suitability for re-use.
- Hydrocarbon impacted soils - further investigation in areas of visual / olfactory evidence of hydrocarbons, with grossly impacted soils / perched waters to be treated for re-use and / or disposal off site. Further assessment and consideration of concentrations of naphthalene within pond sediments to be undertaken.
- Site wide made ground - to be placed below areas of proposed hardstand or clean cover.
- Surface water culvert - to be further assessed as part of enabling works

Gas Protection - Gas Protection measures with a minimum score of 3.5 points to be installed in all new builds and validated in accordance with BS8485:2019 to suit CS2 conditions

Topographical survey reproduced from Sirius Remediation Ltd, Post Demolition Survey, ref. SR4358-TS-001, dated October 2023

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. All exploratory hole locations are approximate and based on handheld GPS coordinates unless stated otherwise on the exploratory hole logs.
3. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
4. All marked site features shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

REVISION		BY	DATE
0	For Information	MF	27/10/23
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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CLIENT

Lovell Partnerships Ltd

SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Proposed Remediation Plan

DRAWING NO.	REVISION NO.
C9297/RS/04	0
DRAWN BY: MF	APPROVED BY: GH
DATE: November 2023	SCALE: 1:1000
PAPER SIZE: A3	

Notes:

This drawing, design and concept are copyright of STEN Architecture.

All Dimensions are to be verified on site before any work commences. If any discrepancies, errors or emissions are noted, these are to be reported to STEN Architecture immediately.

If any other drawings are referenced within this layout, please refer to the specific detailed drawing for design, materials and specific working practices.

PLANNING LAYOUT KEY:

Boundary treatments (see separate drawing for details)

- Bin collection point (bin collection day only)
- Secure 6ft (length) x 2ft (width) x 4ft (height) timber cycle store on 8no. 450sq.flags (900mm x 1800mm). Dwellings with garages to have bicycle hook within for storage.
- Bin storage area on 6no. 450sq.flags (900mm x 1350mm)
- Wall mounted - Mode 3, Type 2, 7kW Electric Vehicle Charging Point
- Post mounted - Mode 3, Type 2, 7kW Electric Vehicle Charging Point

REV:	DESCRIPTION:	BY:	DATE:
N	plot 09 moved east by 0.5m	BMS	21.06.23
M	'Puttenham' house type renamed as 'Newbury'	BMS	23.03.23
L	EV charging point locations added	BMS	15.03.23
K	Tweaks to bin and cycle store positions as per client mark up	BMS	10.01.23
J	Cycle stores, bin store areas and patios added. Central path added between parking spaces.	BMS	06.01.23
H	'AS' and 'OP' notes added to blocks, 1747 type handing corrected and side door added. Plot 1 amended to client's comments.	DS	08.11.22
G	Bin collection point serving plots 30-34 relocated closer to adoptable highway as per clients comments.	LS	20.07.22
F	Turning head serving plots 12-15 amended., positions of plots 12 and 14 amended to suit. Knee railing introduced to edge of turning head. All as per clients comments.	LS	01.07.22
E	Garage for plot 1 moved away from Saville Road. Plots 35-37 re-orientated to enable adjacent road to be reduced to private drive. Plots 33-34 moved forward to reduce height of retaining walls at rear. Other minor updates to Planning Officer comments.	BMS	17.06.22
D	Green walls moved back from footpath	BMS	31.03.22
C	Semi detached plots handed so entrance doors are on the high side	BMS	24.03.22
B	Plots to Saville Road amended to provide more rontage and opportunities for landscaping. Detached Osbourne removed. Additional footpaths and visitor parking added	BMS	18.03.22
A	Parking arrangement amended for plot 45	BMS	25.11.21

LOVELL

Client	LOVELL
Project	Skelmanthorpe
Job Number	CAD

STEN ARCHITECTURE

Type	Floor Area Sq Ft	Bed	Total Units	Total	% Used
OPEN MARKET					
3 BEDS					
Lansdown	898	3	7	6286	15.2
Lansdown detached	898	3	2	1796	4.3
Newbury semi	1016	3	1	1016	2.2
Newbury detached	1016	3	4	4064	8.7
Osbourne	1205	3	13	15665	28.3
					58.7
4 BEDS					
Tattenham	1530	4	7	10710	15.2
Grassington	1747	4	12	20964	26.1
					41.3
Total			**46**	**60501**	

	ACRES	Hectares
Approx gross area	4.6	1.86
Approx nett area	3.78	1.53
Coverage per Acre	**16006**	**30**

STEN ARCHITECTURE
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WF1 1PS
Tel: 01924 950955
Web: www.sten-architecture.co.uk
Twitter: @STEN_arch
Facebook: stenarchitectureltd
Linkedin: Sten Architecture

CLIENT: LOVELL PARTNERSHIPS

SITE: Greenside Mills
Skelmanthorpe

TITLE: Planning Layout

SCALE AT A1:	DATE:	DRAWN:	CHECKED:
1:500	29.09.21	BMS	--

PROJECT NO:	DRAWING NO:	REVISION:
2156	2156.01	N

N

Scaled @ 1:500

0 10m 20m 50m

Appendix B – Sirius Certificates of Analysis

Certificate of Analysis

Certificate Number	23-11341	*Issued:*	30-May-23

Client Sirius Geotechnical & Environmental
4245 Park Approach
Thorpe Park
Leeds
LS15 8GB

Our Reference	23-11341
Client Reference	C9297
Order No	23430/C9297/GH
Contract Title	Greenside Mills, Skelmanthorpe
Description	2 Soil samples.
Date Received	15-May-23
Date Started	15-May-23
Date Completed	30-May-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-11341
Client Ref C9297
Contract Title Greenside Mills, Skelmanthorpe

			Lab No	2170984	2170985
			.Sample ID	Sediment 1	Sediment 2
			Depth		
			Other ID		
			Sample Type	ES	ES
			Sampling Date	12/05/2023	12/05/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	11	8.8
Cadmium	DETSC 2301#	0.1	mg/kg	0.9	1.3
Chromium	DETSC 2301#	0.15	mg/kg	120	120
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	97	76
Lead	DETSC 2301#	0.3	mg/kg	130	100
Mercury	DETSC 2325#	0.05	mg/kg	0.21	0.26
Nickel	DETSC 2301#	1	mg/kg	25	24
Selenium	DETSC 2301#	0.5	mg/kg	0.8	0.6
Zinc	DETSC 2301#	1	mg/kg	330	250
Inorganics					
pH	DETSC 2008#		pH	7.1	7.3
Total Organic Carbon	DETSC 2002	0.1	%	11	7.7
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	820	300
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.42	0.17
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	3.6	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	4.1	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-11341
Client Ref C9297
Contract Title Greenside Mills, Skelmanthorpe

			Lab No	2170984	2170985
			.Sample ID	Sediment 1	Sediment 2
			Depth		
			Other ID		
			Sample Type	ES	ES
			Sampling Date	12/05/2023	12/05/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.04	0.07
Fluorene	DETSC 3303	0.03	mg/kg	0.03	0.06
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.41	0.57
Anthracene	DETSC 3303	0.03	mg/kg	0.08	0.13
Fluoranthene	DETSC 3303#	0.03	mg/kg	1.1	1.4
Pyrene	DETSC 3303#	0.03	mg/kg	0.98	1.2
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.31	0.46
Chrysene	DETSC 3303	0.03	mg/kg	0.53	0.66
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.67	0.64
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.54	0.25
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.22	0.39
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.18	0.20
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.06
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.20	0.25
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	5.1	6.2
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	3.9	3.0

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-11341
Client Ref C9297
Contract Title Greenside Mills, Skelmanthorpe

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2170984	Sediment 1	SOIL	Chrysotile	Chrysotile present as fibre bundles	Robertas Ciparis
2170985	Sediment 2	SOIL	NAD	none	Robertas Ciparis

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-11341
Client Ref C9297
Contract Greenside Mills, Skelmanthorpe

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2170984	Sediment 1 SOIL	12/05/23	GJ 250ml, GJ 60ml, PT 1L		
2170985	Sediment 2 SOIL	12/05/23	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

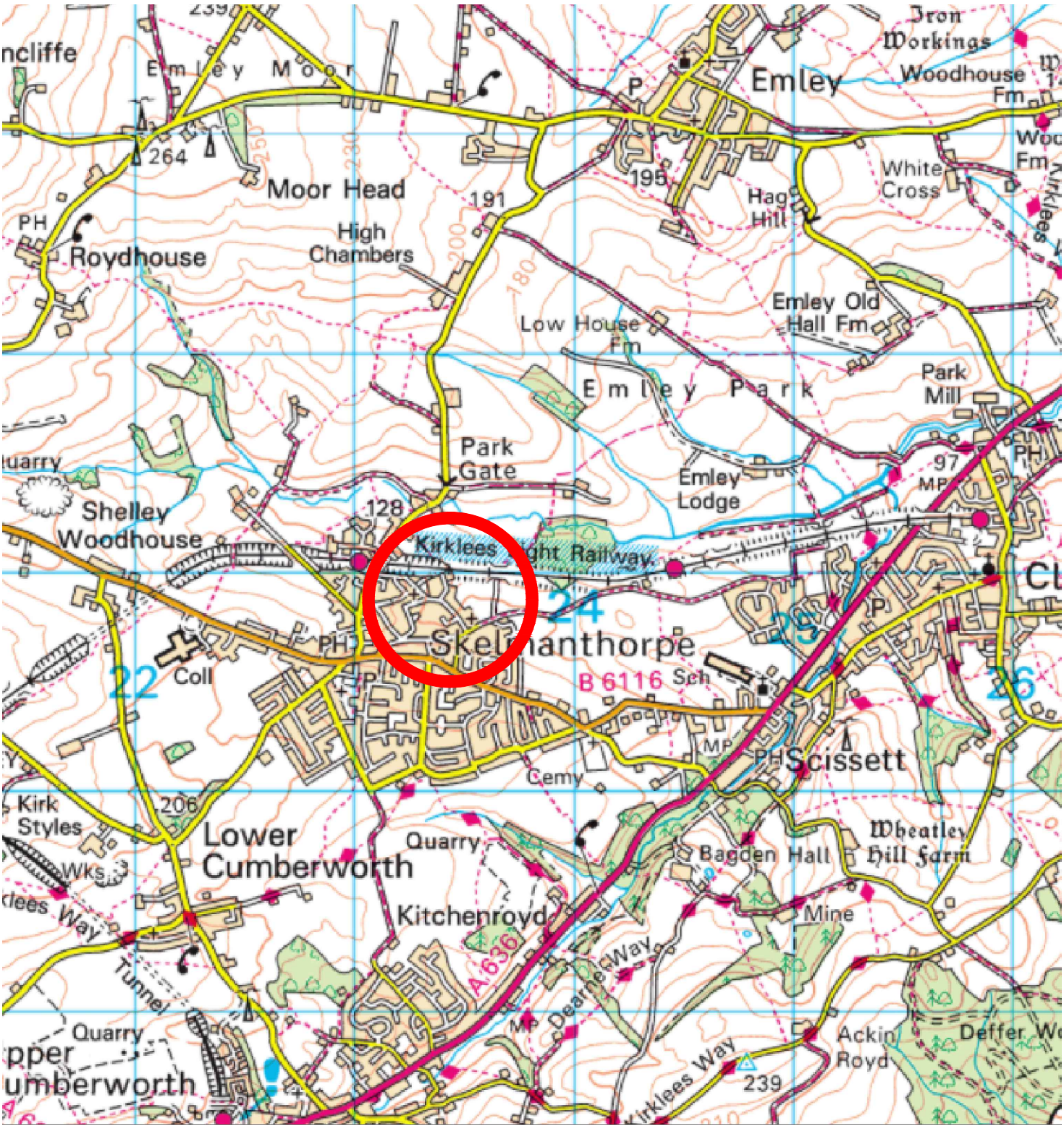
The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report



Reproduced from the Ordnance Survey 1:50,000 scale Landranger® map with the permission of The Controller of Her Majesty's Stationary Office, © Crown Copyright. All rights reserved.Sirius Geotechnical Ltd, Suite 2, Russel House, Mill Road, Langley Moor, Durham DH7 8HJ. Licence No. 100042005

NOTES

Site Location

REVISION	
0	For Information
A	>>
B	>>
C	>>
D	>>

SIRIUS GEOTECHNICAL LTD
4245 Park Approach, Thorpe Park, Leeds LS15 8GB
www.thesiriusgroup.com
TEL: 0113 264 9960
FAX: 0113 264 9962

CLIENT	DRAWING NO.	REVISION NO.
Lovell Partnerships Ltd	C9297C/DG/01	0
SITE: Former Greenside Mills, Skelmanthorpe	DRAWN BY: MF	APPROVED BY: GH
DRAWING TITLE: Site Location Plan	DATE: September 2024	SCALE: 1:25,000

A4

1. Photo of pond within east of the site, looking southeast.

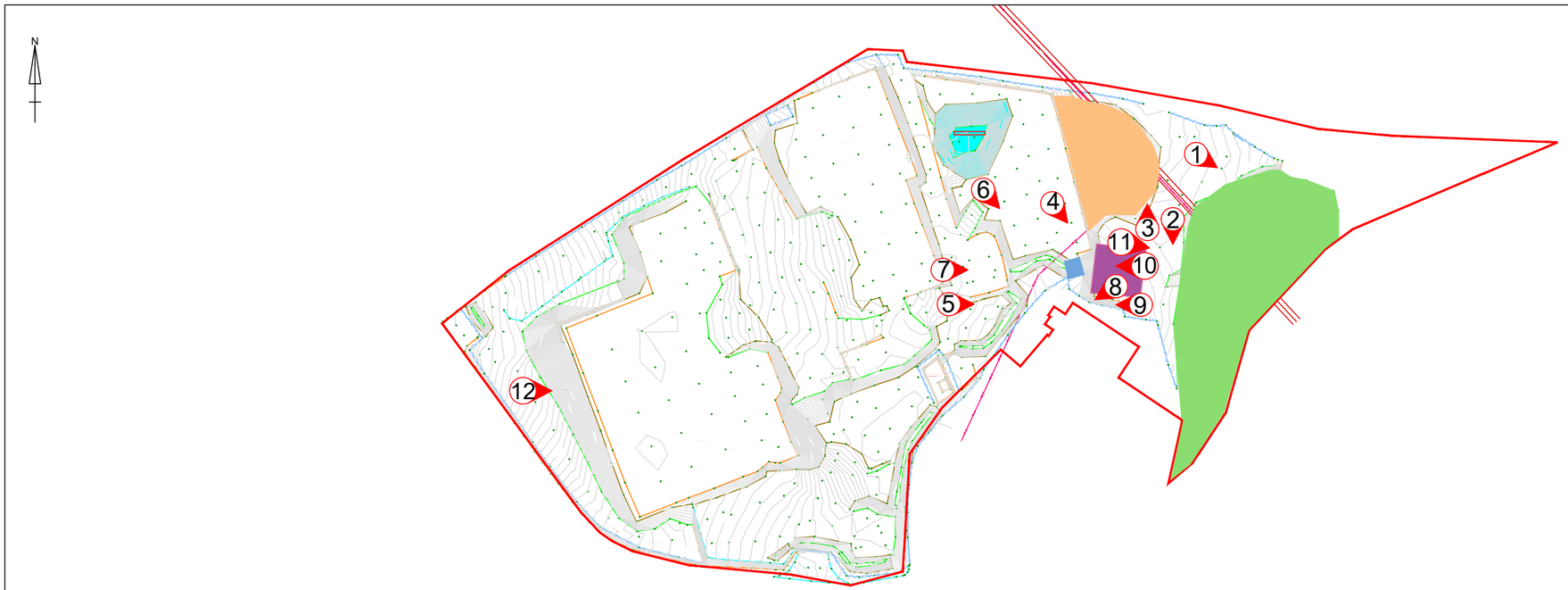
2. Photo of pond and surface water feature looking south.

3. Photo of stockpile within east of site, including wooden pole, with area of former infilling and pond beyond to the east.

4. Evidence of former brick lined mill pond and adjacent structures prior to backfilling / clearance.

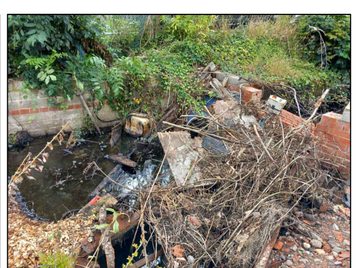
5. Newly constructed overhead cables and wooden pole, located in close proximity to former AST and sub-station.

6. View of former AST, prior to demolition and clearance.



7. View of former sub-station prior to demolition and clearance.

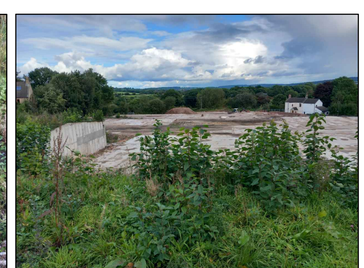
8. Surface water culvert located in southeast, with black oily substance noted.



9. View of surface water culvert with discarded containers.

10. Evidence of hydrocarbon staining within backfilled mill pond (trial pit TP218).

11. View of black saturated pond sediments during trial pitting.



12. View of varying topography of the site, looking east.

NOTES

Site boundary

Photo Location and Direction

Existing pond and surface water feature

Former brick lined mill pond

Existing stockpile

Former above ground storage tank

Topographical survey reproduced from Sirius Remediation Ltd, Post Demolition Survey, ref. SR4358-TS-001, dated October 2023

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
3. All marked site features (including historical features, potential contaminant constraints, and any other potential constraint or feature of note) shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

REVISION		BY	DATE
0	For Information	MF	08/11/23
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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Thorpe Park,
Leeds
LS15 8GB
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TEL: 0113 264 9960
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CLIENT

Lovell Partnerships Ltd

SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Site Features Plan

DRAWING NO.	REVISION NO.
C9297C/DG/02	0
DRAWN BY: MF	APPROVED BY: GH

DATE	SCALE	PAPER SIZE
September 2024	1:1000	A2

N

24.4
24.1
24.3
24.5
24.2
26.1
26.2
28.1
28.2
26.2
25.2
25.1
26.1
27.2
27.1
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25.3
27.3
26.5
25.4
25.5
26.4
27.4
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29.1
29.2
28.2
28.1
28.3
28.5
28.4
22-23.1
22-23.2
22-23.3
22-23.4
22-23.5
22-23.6
22-23.7
9.1
9.4
9.3
9.2
9.5
9.1
9.2
8.2
8.3
8.4
8.1
8.5

23
22
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28
09
08
VP
VP

POS

NOTES

Development site boundary

Drill hole location (no coal enountered)

Drill hole location (intact coal encountered)

Conjectured coal seam outcrops(with direction of dip)

Conjectured fault outcrop

Notes

1. This drawing should not be viewed in isolation from the accompanying report.

2. All marked site features shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

Zoomed Window

REVISION		BY	DATE
0	For Information	MF	16/09/24
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

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Leeds
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www.thesiriusgroup.com
TEL: 0113 264 9960
FAX: 0113 264 9962

CLIENT

Lovell Partnerships Ltd

SITE

Former Greenside Mills, Skelmanthorpe

DRAWING TITLE

Shallow Mine Workings Proof Drilling Location Plan

DRAWING NO.	REVISION NO.
C9297C/DG/03	0
DRAWN BY	APPROVED BY
MF	GH

DATE	SCALE	PAPER SIZE
September 2024	1:500	A3

Notes:

This drawing, design and concept are copyright of STEN Architecture.

All Dimensions are to be verified on site before any work commences. If any discrepancies, errors or emissions are noted, these are to be reported to STEN Architecture immediately.

If any other drawings are referenced within this layout, please refer to the specific detailed drawing for design, materials and specific working practices.

PLANNING LAYOUT KEY:

Boundary treatments (see separate drawing for details)

- Bin collection point (bin collection day only)
- Secure 6ft (length) x 2ft (width) x 4ft (height) timber cycle store on 8no. 450sq.flags (900mm x 1800mm). Dwellings with garages to have bicycle hook within for storage.
- Bin storage area on 6no. 450sq.flags (900mm x 1350mm)
- Wall mounted - Mode 3, Type 2, 7kW Electric Vehicle Charging Point
- Post mounted - Mode 3, Type 2, 7kW Electric Vehicle Charging Point

REV:	DESCRIPTION:	BY:	DATE:
N	plot 09 moved east by 0.5m	BMS	21.06.23
M	'Puttenham' house type renamed as 'Newbury'	BMS	23.03.23
L	EV charging point locations added	BMS	15.03.23
K	Tweaks to bin and cycle store positions as per client mark up	BMS	10.01.23
J	Cycle stores, bin store areas and patios added. Central path added between parking spaces.	BMS	06.01.23
H	'AS' and 'OP' notes added to blocks, 1747 type handing corrected and side door added. Plot 1 amended to client's comments.	DS	08.11.22
G	Bin collection point serving plots 30-34 relocated closer to adoptable highway as per clients comments.	LS	20.07.22
F	Turning head serving plots 12-15 amended., positions of plots 12 and 14 amended to suit. Knee railing introduced to edge of turning head. All as per clients comments.	LS	01.07.22
E	Garage for plot 1 moved away from Saville Road. Plots 35-37 re-orientated to enable adjacent road to be reduced to private drive. Plots 33-34 moved forward to reduce height of retaining walls at rear. Other minor updates to Planning Officer comments.	BMS	17.06.22
D	Green walls moved back from footpath	BMS	31.03.22
C	Semi detached plots handed so entrance doors are on the high side	BMS	24.03.22
B	Plots to Saville Road amended to provide more rontage and opportunities for landscaping. Detached Osbourne removed. Additional footpaths and visitor parking added	BMS	18.03.22
A	Parking arrangement amended for plot 45	BMS	25.11.21

LOVELL

Client	LOVELL
Project	Skelmanthorpe
Job Number	CAD

STEN ARCHITECTURE

Type	Floor Area Sq Ft	Bed	Total Units	Total	% Used
OPEN MARKET					
3 BEDS					
Lansdown	898	3	7	6286	15.2
Lansdown detached	898	3	2	1796	4.3
Newbury semi	1016	3	1	1016	2.2
Newbury detached	1016	3	4	4064	8.7
Osbourne	1205	3	13	15665	28.3
					58.7
4 BEDS					
Tattenham	1530	4	7	10710	15.2
Grassington	1747	4	12	20964	26.1
					41.3
Total			**46**	**60501**	

	ACRES	Hectares
Approx gross area	4.6	1.86
Approx nett area	3.78	1.53
Coverage per Acre	**16006**	**30**

STEN ARCHITECTURE
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Tel: 01924 950955
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Twitter: @STEN_arch
Facebook: stenarchitectureltd
Linkedin: Sten Architecture

CLIENT: LOVELL PARTNERSHIPS

SITE: Greenside Mills
Skelmanthorpe

TITLE: Planning Layout

SCALE AT A1:	DATE:	DRAWN:	CHECKED:
1:500	29.09.21	BMS	--

PROJECT NO:	DRAWING NO:	REVISION:
2156	2156.01	N

N

Scaled @ 1:500

0 10m 20m 50m

NORTH

KIRKLEES LIGHT RAILWAY

LAUREL BANK

PD PLOTS 25-29

PD PLOT 24

POS

PD PLOTS 30-35

ROAD 1 TH

MARSDEN ST

ROAD 1

SAVILLE ROAD

150.9m

144.8m

Hall

Garage

FFL: 151.625
FFL: 151.775
FFL: 150.25
FFL: 149.50
FFL: 148.90
FFL: 148.45
FFL: 147.10
FFL: 146.95
FFL: 147.55
FFL: 147.85
FFL: 155.750
FFL: 155.300
FFL: 154.450
FFL: 154.000
FFL: 151.60
FFL: 151.85
FFL: 150.60
FFL: 150.85
FFL: 149.65
FFL: 149.90
FFL: 149.90
FFL: 149.05
FFL: 147.80
FFL: 147.95
FFL: 146.925
FFL: 145.625
FFL: 145.475
FFL: 144.40
FFL: 144.60
FFL: 146.175
FFL: 144.45
FFL: 144.85
FFL: 143.475
FFL: 143.025
FFL: 143.025
FFL: 142.575
FFL: 142.10
FFL: 141.65
FFL: 140.800
FFL: 140.575
FFL: 139.80
FFL: 140.025
FFL: 138.225
FFL: 138.75
FFL: 142.150
FFL: 141.00
FFL: 143.875
FFL: 141.925
FFL: 140.775
FFL: 139.70
FFL: 138.80
FFL: 138.95
FFL: 144.45
FFL: 144.30
FFL: 146.325
FFL: 146.85
FFL: 147.15
FFL: 147.15
FFL: 147.15
FFL: 146.850
FFL: 146.850
FFL: 138.375

REFER TO NOTE 2 REQUIREMENTS FOR METER BOXES IN THE VICINITY OF

REFER TO NOTE 2 REQUIREMENTS FOR METER BOXES IN THE VICINITY OF

REFER TO NOTE 2 REQUIREMENTS FOR METER BOXES IN THE VICINITY OF

FOR MORE DETAIL ON THE WATERCOURSE DIVERSION PLEASE SEE DRAWING 180

12 STEPS
11 STEPS
12 STEPS

DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS DRAWING HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

1. THIS DRAWING IS BASED FROM:
   1.1. TOPO SURVEY – 2456/001 (MAR 21)
   1.2. ARCHITECT LAYOUT – 2156.01 K (12/01/23)
2. DO NOT SCALE FROM THIS DRAWING AS IT MAY NOT BE REPRODUCED TO SCALE.
3. THIS DRAWING IS TO BE REPRODUCED IN COLOUR.
4. PLEASE REPORT ANY DISCREPA DUDLEY'S CONSULTING ENGINEE CONSTRUCTION.

KEY

+31.940 PROPOSED LEVELS
38.909 EXISTING TOPO SURVEY LEVELS
FFL: 30.000 FINISHED FLOOR LEVEL
1:4 EMBANKMENT SLOPE
RW 0.75m TRADITIONAL BRICK RETAINING WALL (WITH WEEPHOLES)
OB 0.15m OVERBUILD RETAINING WALL DETAIL
RW 0.15m INDICATES THAT EXTERNAL GL IS THE SAME AS THE FFL – DETAIL TO BE CONFIRMED BY ARCHITECT
WATERCOURSE DIVERSION
(ROOT LOCK – GEOGROW) OR (FLEX M RETENTION TBC.
RW 0.15m TANKING (DETAIL TBC)

Date	Revision	By	Chkd	Ref
27.01.23	TANKING ADDED TO GARAGES	MDJ	PD	P10
12.01.23	PLOT 1 UPDATED TO SUIT NEW LAYOUT	MDJ	PD	P9
09.01.23	REVIEWED AT DETAILED DESIGN	MDJ	PD	P8
29.11.22	UPDATED TO SUIT COMMENTS	MDJ	PD	P7
28.06.22	UPDATED TO SUIT NEW LAYOUT	MDJ	PD	P6
08.04.22	UPDATED TO SUIT NEW LAYOUT	MDJ	PD	P5
25.11.21	UPDATED TO SUIT NEW LAYOUT	MDJ	PD	P4
24.11.21	UPDATED TO SUIT CLIENT COMMENTS	MDJ	PD	P3
08.11.21	REVIEWED INTERNALLY	MDJ	PD	P2
05.11.21	INITIAL ISSUE	SR	PD	P1

dudleys
Structural & Civil Consultants
Tithe House
35 Town Street
Leeds
LS18 5LJ
T:0113 258 3611
E:info@dudleys.co.uk

Project
LOVELL HOMES
SAVILE ROAD, SKELMANTHORPE
HD8 9EF

Title
EXTERNAL LEVELS PLAN

Scale	Paper	Drawn	Check
1:250	A0	SDR	PD
Date	Status		
NOV. 21	PRELIMINARY		
Job No.	Drg. No.	Rev.	
21374	155	P10	

APPENDIX B
Coal Authority Permit

The Coal Authority

Permit to Enter or Disturb Coal Authority Interests

Permit 28129

Name and Address of Permit Holder:

Lovell Partnerships Ltd
Unit 3 Turnberry Park
Morley
Leeds
LS27 7LE

Site Location:

Former Greenside Mills
Saville Road
Skelmanthorpe
Huddersfield
HD8 9EF

This certificate hereby grants the above named Permit Holder a Permit to carry out:-

Treatment of shallow mine workings by drilling and grouting to 25m on 3m grid within the Authority's interests at the identified site location above as shown on the Grant Permit Boundary (overleaf) for the period of **12 months** from the granted date shown below. *The granting of this Permit does not constitute advice given by the Authority in relation to the proposed operations. It is the Permit Holder's responsibility to obtain appropriate health, safety, environmental, technical and legal advice.*

Conditions:

- *Manned entry (i.e.) into mine entries/workings) is strictly prohibited.*
- *Water flush*
- *Gas Monitoring CO, CH_4, CO_2, O_2, H_2S at borehole and rig*
- *Operators undertaking the work must be in possession of this certificate and the Permit boundary plan at the time of works*
- *Appropriate borehole sealing without delay and to withstand site level changes*

Signed: Jake Morris Granted Date: ***22/04/2024***

For and on behalf of The Coal Authority

Nominated Representative: Jake Morris, Permitting Manager;
The Coal Authority, Permitting Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG
Tel: 01623 637450; E-Mail: permissions@coal.gov.uk

The Coal Authority

Granted Permit Boundary

Permit Ref: 28129

Permit Boundary:

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APPENDIX C
Drill Logs and Summary Table

C9297C Skelmanthorpe
Drilling Summary

				Seam 1				Seam 2					
Borehole ID	Drilled by	Date Drillled	Superficials (m bgl)	Strata	From (m bgl)	To (m bgl)	Thickness (m)	Strata	From (m bgl)	To (m bgl)	Thickness (m)	BH Depth (m bgl)	Casing (m bgl)
8.1	R. EDWARDS	23/07/2024	1.00									9.00	1.00
8.2	R. EDWARDS	22/07/2024	1.00									9.00	1.00
8.3	R. EDWARDS	23/07/2024	1.30									12.00	1.00
8.4	R. EDWARDS	23/07/2024	1.50									9.00	1.00
8.5	R. EDWARDS	23/07/2024	1.00									9.00	1.00
G9.1	R. EDWARDS	22/07/2024	1.20									12.00	1.00
G9.2	R. EDWARDS	22/07/2024	1.20									12.00	1.00
9.1	R. EDWARDS	22/07/2024	1.40									9.00	1.00
9.2	R. EDWARDS	22/07/2024	1.50									9.00	1.00
9.3	R. EDWARDS	22/07/2024	1.40									9.00	1.00
9.4	R. EDWARDS	22/07/2024	1.50									9.00	1.00
9.5	R. EDWARDS	22/07/2024	1.50									9.00	1.00
22/23.1	R. EDWARDS	19/07/2024	1.40	COAL	1.40	2.20	0.80	COAL	2.80	3.00	0.20	6.00	1.00
22/23.2	R. EDWARDS	19/07/2024	1.30	COAL	1.30	1.60	0.30					6.00	1.00
22/23.3	R. EDWARDS	19/07/2024	1.50	COAL	1.50	1.80	0.30					6.00	1.00
22/23.4	R. EDWARDS	19/07/2024	1.20	COAL	1.80	2.50	0.70					4.00	1.00
22/23.5	R. EDWARDS	19/07/2024	2.80	COAL	3.20	3.50	0.30					6.00	1.00
22/23.6	R. EDWARDS	19/07/2024	2.80	COAL	2.80	3.30	0.50					6.00	1.00
22/23.7	R. EDWARDS	19/07/2024	2.50	COAL	2.70	3.00	0.30					9.00	1.00
24.1	R. EDWARDS	18/07/2024	3.00	COAL	3.60	4.20	0.60					5.00	2.00
24.2	R. EDWARDS	18/07/2024	2.60	COAL	3.20	4.00	0.80					5.00	2.00
24.3	R. EDWARDS	18/07/2024	3.00	COAL	3.20	4.00	0.80					5.00	2.00
24.4	R. EDWARDS	18/07/2024	3.00	COAL	3.60	4.00	0.40					9.00	2.00
24.5	R. EDWARDS	18/07/2024	2.70	COAL	3.20	4.00	0.80					5.00	2.00
25.1	R. EDWARDS	19/07/2024	2.00	COAL	3.50	4.00	0.50					6.00	1.00
25.2	R. EDWARDS	19/07/2024	1.80	COAL	1.80	2.10	0.30	COAL	3.60	4.00	0.40	5.00	1.00
25.3	R. EDWARDS	19/07/2024	2.50	COAL	2.70	3.00	0.30					9.00	1.00
25.4	R. EDWARDS	19/07/2024	1.50	COAL	1.50	2.00	0.50					6.00	1.00
25.5	R. EDWARDS	19/07/2024	1.50	COAL	1.50	2.00	0.50					6.00	1.00
G26.1	R. EDWARDS	18/07/2024	1.70	COAL	2.00	3.00	1.00					3.50	1.70
G26.2	R. EDWARDS	18/07/2024	1.30	COAL	1.50	2.50	1.00					3.50	1.00
26.1	R. EDWARDS	18/07/2024	0.50	COAL	2.00	2.30	0.30					9.00	1.00
26.2	R. EDWARDS	18/07/2024	0.50	COAL	0.70	2.00	1.30					5.00	1.00
26.3	R. EDWARDS	18/07/2024	0.70	COAL	2.00	2.20	0.20					9.00	1.00
26.4	R. EDWARDS	19/07/2024	0.80									9.00	1.00
26.5	R. EDWARDS	19/07/2024	0.70	COAL	0.70	1.20	0.50					6.00	1.00
27.1	R. EDWARDS	22/07/2024	1.00									9.00	1.00
27.2	R. EDWARDS	22/07/2024	0.80									9.00	1.00
27.3	R. EDWARDS	22/07/2024	1.20									9.00	1.00
27.4	R. EDWARDS	22/07/2024	1.50									9.00	1.00
27.5	R. EDWARDS	22/07/2024	1.50									9.00	1.00
G28.1	R. EDWARDS	22/07/2024	4.00									12.00	2.00
G28.2	R. EDWARDS	22/07/2024	3.80									12.00	2.00
28.1	R. EDWARDS	22/07/2024	3.00									12.00	2.00
28.2	R. EDWARDS	22/07/2024	3.50									12.00	2.00
28.3	R. EDWARDS	22/07/2024	3.00									12.00	2.00
28.4	R. EDWARDS	22/07/2024	2.00									12.00	2.00
28.5	R. EDWARDS	22/07/2024	3.20									12.00	2.00
G29.1	R. EDWARDS	22/07/2024	2.30									12.00	2.00
G29.2	R. EDWARDS	22/07/2024	2.30									12.00	2.00

OPENHOLE DRILL LOG

Job No. SDL 4119a
Contract Name: SKELMANTHORPE
Working Day: Thursday

Date: 18-7-2024
Client: LOVELL HOMES
Sheet: 1 of

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
24.4	GL	3.0	W	2.0	Overburden
	3.0	3.6			Mudstone
	3.6	4.0			Coal
	4.0	9.0			Mudstone
24.5	GL	2.7	W	2.0	Overburden
	2.7	3.2			Mudstone
	3.2	4.0			Coal
	4.0	5.0			Mudstone
24.3	GL	3.0	"	2.0	Overburden
	3.0	3.2			Mudstone
	3.2	4.0			Coal
	4.0	5.0			Mudstone.
24.1	GL	3.0	"	2.0	Overburden
	3.0	3.6			Mudstone
	3.6	4.2			Coal
	4.2	5.0			Mudstone.
24.2	GL	2.6	"	2.0	Overburden
	2.6	3.2			Mudstone
	3.2	4.0			Coal
	4.0	5.0			Mudstone
G26.1	GL	1.7	"	1.7	Overburden
	1.7	2.0			Mudstone
	2.0	3.0			Coal
	3.0	3.5			Mudstone.
G26.2	GL	1.3	"	1.0	Overburden
	1.3	1.5			Mudstone
	1.5	2.5			Coal
	2.5	3.5			Mudstone.
26.2	GL	0.5	"	1.0	Overburden
	0.5	0.7			Mudstone
	0.7	2.0			Coal
	2.0	5.0			Mudstone
26.1	GL	0.5	"	1.0	Overburden
	0.5	2.0			Mudstone
	2.0	2.3			Coal
	2.3	9.0			Mudstone / Sandstone.

Rig Type: CGTP-3

Crew Details: R EDWARDS
S WOODHALL

Remarks: NO STANDPIPE
STANDING RIG
08.00 – 14.00.

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	0	0	0
Mid	20.8	0	0	0
End	20.8	0	0	0

Weather Conditions: FINE

Boreholes Total	
Today	9
Previous	
To Date	

Drilled Total	
Today	50.0
Previous	
To Date	

Casing Total	
Today	14.7
Previous	
To Date	

T - Temporary, S - Sacrificial

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OPENHOLE DRILL LOG

Job No. SDL 4119a
Contract Name: SKELMANTHORPE
Working Day: FRIDAY

Date: 19th July 2024
Client: LOVELL
Sheet: 1 of

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
26.3	GL	0.7	W	1.0	Overburden
	0.7	2.0			Mudstone
	2.0	2.2			Coal
	2.2	9.0			Mudstone.
26.4	GL	0.8	"	"	Overburden
	0.8	9.0			Sandstone / Mudstone.
26.5	GL	0.7	"	"	Overburden
	0.7	1.2			Coal
	1.2	6.0			Sandstone / Mudstone.
25.3	GL	2.5	"	"	Overburden
	2.5	2.7			Mudstone.
	2.7	3.0			Coal
	3.0	9.0			Mudstone / Sandstone.
25.1	GL	2.0	"	"	Overburden
	2.0	3.5			Mudstone
	3.5	4.0			Coal
	4.0	6.0			Mudstone.
25.2	GL	1.8	"	"	Overburden
	1.8	2.1			Coal
	2.1	3.6			Mudstone
	3.6	4.0			Coal
	4.0	5.0			Mudstone.
25.4	GL	1.5	"	"	Overburden
	1.5	2.0			Coal
	2.0	6.0			Mudstone
25.5	GL	1.5	"	"	Overburden
	1.5	2.0			Coal
	2.0	6.0			Mudstone.
22/23.1	GL	1.4	"	"	Overburden
	1.4	2.2			Coal
	2.2	2.8			Mudstone
	2.8	3.0			Coal
	3.0	6.0			Mudstone.
22/23.5	GL	2.8	"	"	Overburden
	2.8	3.2			Mudstone
	3.2	3.5			Coal
	3.5	6.0			Mudstone.

Rig Type: CGXP-3

Crew Details:
R EDWARDS
S WOODHALL

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	0	0	0
Mid	20.8	0	0	0
End	20.8	0	0	0

Weather Conditions: HOT / FINE

Boreholes Total	
Today	
Previous	
To Date	

Drilled Total	
Today	
Previous	
To Date	

Casing Total	
Today	
Previous	
To Date	

T - Temporary, S - Sacrificial

White - Office Copy Pink - Site Copy

OPENHOLE DRILL LOG

Job No. 4119a
Contract Name: SKELMANTHORPE
Working Day: Friday

Date: 19th July 2024
Client: LOVELL
Sheet: 2 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
22/23.6	GL	2.8	W	1.0	Overburden
	2.8	3.3			Coal
	3.3	6.0			Mudstone.
22/23.4	GL	1.2	"	"	Overburden
	1.2	1.8			Mudstone
	1.8	2.5			Coal
	2.5	4.0			Mudstone.
22/23.7	GL	2.5	"	"	Overburden
	2.5	2.7			Mudstone
	2.7	3.0			Coal
	3.0	9.0			Mudstone/ Sandstone.
22/23.2	GL	1.3	"	"	Overburden
	1.3	1.6			Coal
	1.6	6.0			Mudstone.
22/23.3	GL	1.5	"	"	Overburden
	1.5	1.8			Coal
	1.8	6.0			Mudstone.
			NO AREAS READY		
			STANDING 13.00 - 15.00		
			SITE CLOSED AT 15.00		

Rig Type: C6+P.3

Crew Details:
R EDWARDS
S WOODHALL

Remarks:
NO AREAS READY
STANDING TIME
13.00 - 15.00

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start				
Mid				
End				

Weather Conditions:

Boreholes Total	
Today	15
Previous	
To Date	

Drilled Total	
Today	99.0
Previous	
To Date	

Casing Total	
Today	15.0
Previous	
To Date	

T - Temporary, S - Sacrificial

White - Office Copy Pink - Site Copy

OPENHOLE DRILL LOG

Job No. SDL 4199a
Contract Name: SKELMANTHORPE
Working Day: MONDAY

Date: 22nd JULY
Client: LOVELL
Sheet: 1 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
28.5	GL	3.2	W	2.0	Overburden
	3.2	12.0			Mudstone / Sandstone
G28.2	GL	3.8	W	2.0	Overburden
	3.8	12.0			Mudstone / Sandstone
G28.1	GL	4.0	W	2.0	Overburden
	4.0	12.0			Mudstone / Sandstone
28.2	GL	3.5	"	"	Overburden
	3.5	12.0			Mudstone / Sandstone
28.1	GL	3.0	"	"	Overburden
	3.0	12.0			Mudstone / Sandstone
28.3	GL	3.0	"	"	Overburden
	3.0	12.0			Mudstone / Sandstone
G29.1	GL	2.3	"	"	Overburden
	2.3	12.0			Mudstone / Sandstone
G29.2	GL	2.3	"	"	Overburden
	2.3	12.0			Mudstone / Sandstone
28.4	GL	2.0			Overburden
	2.0	12.0			Mudstone / Sandstone
27.2	GL	0.8	"	1.0	Overburden
	0.8	9.0			Mudstone / Sandstone
27.1	GL	1.0	"	"	Overburden
	1.0	9.0			Mudstone / Sandstone
27.3	GL	1.2	"	"	Overburden
	1.2	9.0	"		Mudstone / Sandstone
27.4	GL	1.5	"	"	Overburden
	1.5	9.0			Mudstone / Sandstone
27.5	GL	1.5	"	"	Overburden
	1.5	9.0			Mudstone / Sandstone
9.3	GL	1.4	"	"	Overburden
	1.4	9.0			Mudstone / Sandstone
9.1	GL	1.4	"	"	Overburden
	1.4	9.0			Mudstone / Sandstone

Rig Type: CGP-3

Crew Details: R EDWARDS S WOODALL

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	0	0	0
Mid	20.8	0	0	0
End	20.8	0	0	0

Weather Conditions: FINE

Boreholes Total	
Today	
Previous	
To Date	

Drilled Total	
Today	
Previous	
To Date	

Casing Total	
Today	
Previous	
To Date	

Signed by Client:

T - Temporary, S - Sacrificial

White - Office Copy Pink - Site Copy

OPENHOLE DRILL LOG

Job No. 4199a
Contract Name: SKELMANTHORPE
Working Day: Monday

Date: 22-7-24
Client: LOVELL
Sheet: 2 of 2

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
9.2	GL	1.5	W	1.0	Overburden
	1.5	9.0			Mudstone / Sandstone
	~~9.0~~				
G9.1	GL	1.2	"	"	Overburden
	1.2	12.0			Mudstone / Sandstone
G9.2	GL	1.2	"	"	Overburden
	1.2	12.0			Mudstone / Sandstone
9.4	GL	1.5	"	"	Overburden
	1.5	9.0			Mudstone / Sandstone
9.5	GL	1.5	"	"	Overburden
	1.5	9.0			Mudstone / Sandstone
8.2	GL	1.0	"	"	Overburden
	1.0	9.0			Mudstone / Sandstone

Rig Type: C6xp-3

Crew Details:

Remarks: Hydraulic Hose Burst 1.45pm

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start				
Mid				
End				

Weather Conditions:

Boreholes Total	
Today	
Previous	
To Date	

Drilled Total	
Today	
Previous	
To Date	

Casing Total	
Today	
Previous	
To Date	

Signed by Client:

T - Temporary, S - Sacrificial

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OPENHOLE DRILL LOG

Job No. 4199a
Contract Name: SKELMANTHORPE
Working Day: TUESDAY

Date: 23-7-24
Client: LOVELL HOMES
Sheet: 1 of 1

Hole No.	From	To	Flush (W/A/M)	Casing T/S (m)	Strata Description
B.1	GL	1.0	W	1.0	Overburden
	1.0	9.0			Mudstone / Sandstone
B.3	GL	1.3	"	"	Overburden
	1.3	12.0			Mudstone / Sandstone
B.4	GL	1.5	"	"	Overburden
	1.5	9.0			Mudstone / Sandstone
B.5	GL	1.0	"	"	Overburden
	1.0	9.0			Mudstone / Sandstone
					ALL HOLES GROUTED WITH NEET OPC
					80 BAGS USED
					NO GAS DETECTED
					WATER STANDPIPE READING
					START 396
					FINISH 434

Rig Type: C6XP-3

Crew Details:
R EDWARDS
S WOODHALL

Remarks:

Gas Monitoring

%	O_2	CO_2	CH_4	CO
Start	20.8	6	0	0
Mid	20.8	0	0	0
End	20.8	0	0	0

Weather Conditions:

Boreholes Total

Today	
Previous	
To Date	

Drilled Total

Today	
Previous	
To Date	

Casing Total

Today	
Previous	
To Date	

Signed by Sirius Drilling Ltd:

Signed by Client:

T - Temporary, S - Sacrificial

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APPENDIX D
Drill and Grout Specification Report

Geotechnical

SPECIFICATION FOR THE INVESTIGATION AND STABILISATION BY DRILLING AND GROUTING OF SHALLOW MINEWORKINGS

Former Greenside Mills, Skelmanthorpe

for Lovell Partnerships Ltd

Date: **November 2023**

Report reference: C9297/D&G

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QUALITY ASSURANCE

Issue / Revision	First Issue	Second Issue	Third Issue
Report Status	FINAL		
Prepared For	Lovell Partnerships Ltd		
Prepared By	Gemma Halliday Principal Engineer		
Signature			
Checked By	A G Thomas		
Signature			
Report Reference	C9297/D&G		
Report Revision	0		

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C9297/DG/01	Site Location Plan	1:25,000
C9297/DG/02	Post Demolition Site Features Plan	1:1,000
C9297/DG/03	Indicative Mining Risk Plan	1:1,000
C9297/DG/04	Proposed Shallow Mine Workings Investigation and Treatment Plan	1:1,000
2156.01 RevN	STEN Architecture Planning Layout, last dated June 2023	1:500
21374 155 P10	Dudleys Structural and Civil Consultants, External Levels Plan, last dated January 2023	1:250

1. Introduction

1.1 Authorisation

Sirius Geotechnical Ltd (Sirius) were commissioned by Lovell Partnerships Ltd (Lovell) to prepare a specification for the investigation and stabilisation of shallow mine workings below land at the former Greenside Mills, Skelmanthorpe (henceforth referred to as the 'site').

1.2 Development Plans

It is understood that Lovell are proposing the development of the site for 46 no. low rise (2-3 storey) residential properties with private gardens and associated infrastructure, including areas of hardstanding, access roads and public open space (POS). A proposed development layout has been provided to Sirius (STEN Architecture drawing ref. 2156.01 Rev N, last dated June 2023), a copy of which is included in Appendix A of this report.

Review of the proposed development levels (as shown on Dudleys Structural and Civil Consultants, External Levels Plan, drawing ref. 21374 155 P10, last dated January 2023, a copy of which is included in Appendix A of this report) indicates that proposed finished floor levels will range between 138.225m and 155.750m Above Ordnance Datum (AOD). This will necessitate localised cut and fill earthworks, with a maximum cut of c.2.5m and a maximum uplift of c.3.5m, in conjunction with the construction of a number of retaining walls up to a maximum of c.3m in height.

The red line site boundary shown in Figure 1.1 below indicates the proposed development area, whilst the blue line boundary indicates an extended area of ownership.

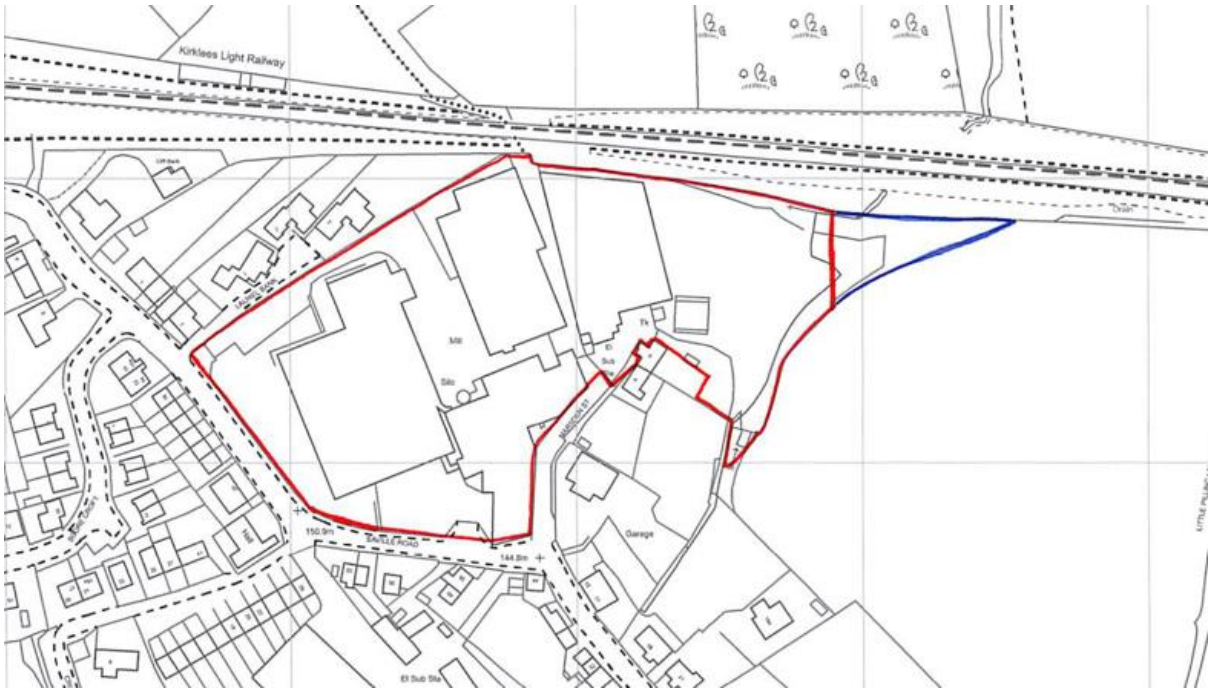


Figure 1.1 Plan showing Development and Ownership Site Boundaries

1.3 Sources of Information

The site has been subject to a number of previous reports, as detailed below:

- Geo-environmental Appraisal of Land at Greenside Mills, Skelmanthorpe (Ref. C7340, dated December 2020).
- Gas Risk Assessment Letter Report for Greenside Mills, Skelmanthorpe (Ref. C7340/GH/9548, dated April 2021).
- Supplementary Site Investigation Letter Report for land at the former Greenside Mills, Skelmanthorpe (Ref. C7340/RC/9607, dated June 2021).
- Supplementary Contamination Assessment Letter Report, Greenside Mills, Skelmanthorpe (Ref. C9297/AEC/10326, dated 15th November 2023).
- Strategy for Remedial and Preparatory Works, Former Greenside Mills, Skelmanthorpe (Ref. C9297, dated November 2023).

This document should be read in conjunction with the previous reports for the site, which present in detail the site setting and the findings of the previous phases of intrusive investigation – the findings are summarised in Section 4 of this document.

Previous site investigations have identified a potential risk to surface stability from localised shallow mine workings underlying the central area of the site. This potential risk indicates that a programme of proof drilling of boreholes, followed by stabilisation where / if necessary, by means of injecting a PFA/ cement grout into workings, is required.

Boreholes shall be drilled to sufficient depth to encounter the Whinmoor (Top and / or Low Whinmoor) coal seams unless otherwise instructed by the supervising engineer, or where sufficient thickness of intact rock is proven in individual boreholes. Where the seam(s) are encountered, boreholes shall extend through the seam and at least 0.5m into the underlying strata. Evidence of shallow mine workings have been identified within one rotary borehole (RO02) located towards the south of the site.

Boreholes will be initially drilled on a domino-5 pattern across building footprints within affected areas. Should shallow mine workings be encountered then drilling should revert to a 3m x 3m grid, with the nominal zone of consolidation extending up to 3m beyond the plot and / or beyond the fault lines once confirmed. Treatment of any retaining walls/structures greater than 1.5m in height (or where the retaining feature is considered integral to supporting plot / highway stability) should also be undertaken utilising a 3m x 3m grid, where considered necessary.

Should extensive mineworkings be encountered, treatment of adoptable highways will be undertaken utilising a 3m x 3m grid across the highway footprint within affected areas with the nominal zone of consolidation extending up to 3m beyond the highway and / or fault lines (once confirmed). Treatment of unadopted roads and areas of hardstand may be treated on a 6m grid with central borehole within affected areas if considered necessary by the supervising engineer.

Stabilisation works will be undertaken (where necessary) by injecting a PFA / cement grout into any identified workings via the boreholes with the aim of substantially filling any mining related voiding.

A mineworkings risk plan summarising the areas of identified coal mining is included as Drawing No. C9297/DG/03 within Appendix A of this specification. A plan showing the proposed areas of investigation and mineworkings treatment, together with the development proposals, is included as Drawing No. C9297/DG/04 in Appendix A. It should be noted that the position of the on-site faults marked within the drawings have in parts been inferred from BGS mapping. The specific alignment of both faults is therefore subject to change during drilling / treatment works.

The Client will supply the Contractor with details of all known underground and above ground services, equipment, property etc. prior to commencing operations.

All works shall be carried out in accordance with the Construction Design Management (CDM) Regulations and the Construction Phase Health and Safety Plan.

This specification is divided into two sections; the first including general site details and previous investigations and their findings, and the second part comprising a general specification for the works to be undertaken.

Based upon currently available information, it appears that proposed plot refs. 8, 9 and 22 to 28 are underlain by the Whinmoor (Top and / or Low Whinmoor) coal seams within the central site area and will require proof drilling and stabilisation (where necessary, and where within influencing depth).

Notwithstanding this, as works progress, seam thicknesses, seam depths and the nature and form of the seams, in addition to the location of the faults, will be reviewed in order to assess the effect on the anticipated zones of consolidation.

On completion of the programme of investigation and treatment, a validation report containing copies of borehole records, a borehole location plan, procedures followed during the works, the results of validation boreholes and pressure tests, and a record of any deviation from this specification will be produced and issued to the Client and all other relevant parties.

This specification has been prepared for the sole use of Lovell Partnerships Ltd. No other third party may rely upon or reproduce the contents of this report without the written approval of Sirius. If any unauthorised third party comes into possession of this report, they rely on it entirely at their own risk and the authors do not owe them any Duty of Care or Skill.

2. Site Details and Description

2.1 Site Details

A summary of the pertinent site details are summarised Table 2.1, below.

Table 2.1 - Current Site Overview

Location	The overall site comprises an irregularly shaped parcel of land covering an area of approximately 2 hectares, located to the north of Saville Road and west of Marsden Street in the village of Skelmanthorpe, approximately 10km southeast of Huddersfield town centre. The location of the site is shown on Drawing No. C9297/DG/01, presented in Appendix A.
Site Area (ha)	2 hectares.
National Grid Ref.	423390mE, 410930mN
Topography and Features	In general, the site slopes downward from northwest to southeast / east, with levels of approximately 156.5m AOD adjacent to the northwestern site boundary, and 138m AOD to the eastern site boundary, and is formed by approximately four development plateaus. The western and central site areas formerly comprised a number of mill buildings and associated structures, with areas of asphalt hardstanding and roughly overgrown areas of landscaping. The site has recently undergone demolition and clearance (by a third party demolition contractor), leaving concrete slabs and crushed demolition hardsurfaced ground / remnant asphalt hardstand elsewhere. The perimeter of the site is secured by bunding formed by crushed demolition materials and herras fencing, with several stockpiles of crushed demolition materials present across the site. Steep vegetated slopes are present along the western site boundary retaining the off site adjacent highway (Saville Road), with level changes of c. 6m within the northwest and c.2m within the southwest, sloping down towards the east / southeast. An approximately 3m high concrete retaining wall is located to the north of the slope, orientated approximately east-west. The eastern area of the site comprises a former mill pond (which has recently undergone infilling with crushed demolition materials) and an unlined reservoir / pond feature to the east with water levels at 137.5m AOD. The reservoir / pond feature is largely filled with sediment and vegetation, with an unnamed stream recorded to run from south to north, within the locality of the pond. An overgrown stockpile of soil arisings (c. 1m to 2m high and covering an area of c. 0.06 hectares) is present within the northwest of the eastern site area. Overhead cables run northwest-southeast across the site area, with associated wooden pylons located within the stockpile. Newly constructed overhead electricity cables and an associated temporary wooden pole is located within the southeast of the site, orientated approximately southwest-northeast. The key, post-demolition, site features are summarised on Drawing C9297/DG/02, in Appendix A.

Invasive Plants	An ecological assessment is outwith the scope of this report, and it is recommended that advice is sought from a suitably qualified ecologist. The treatment of any invasive plant species, if identified, should be undertaken prior to construction.
Site Boundaries	The site is bound to the north by Kirklees Light Railway and residential properties, with open fields beyond. The site is bound to the east by Marsden Street and residential properties, a car garage, and open fields beyond. The site is bound to the south and west by Saville Road, with residential properties beyond. Laurel Bank is located to the northwest, with residential properties beyond.

3. Geological Setting

A summary of available published geological information is provided in Table 3.1 below.

Table 3.1 - Published Geological Summary

Sources of Information	BGS 1:10,000 scale geological map (Sheet name, SE21SW). BGS 1:50,000 scale geological map (Glossop, Sheet 86). The Geology of the Country around Holmfirth and Glossop, Memoirs of the Geological Survey, Explanation of Sheet 86, dated 1933. Geology of the Glossop District, a brief explanation of the geological map Sheet 86 Glossop, dated 2012. BGS Geology of Britain Viewer (on-line service). BGS Lexicon of Named Rock Units (on-line service). BGS borehole records (on-line service). Coal Authority (CA) Interactive Map Viewer (on-line service). Non-Residential Coal Authority Mining Report (ref. 51001106919001), dated 24th February 2016.
Made Ground	None recorded on the published maps. Two large areas of made ground are shown on the 1:10,000 scale geological map to the north of the light railway, one located c. 55m north of the site, which appears to relate to opencast working of the Whinmoor coal seam. The second is located c. 135m northeast of the site and appears to relate to coal mining, though no seam name is given.
Drift Geology	No superficial deposits are recorded to underlie the site.
Solid Geology	The site is shown to be underlain by Carboniferous Pennine Lower Coal Measures (LCM) strata, comprising undifferentiated 'mudstones, siltstones and sandstones with subordinate coal, ironstone and fireclay' in the centre and southwest of the site. An unnamed sandstone unit is recorded to be present in the east of the site. The site is shown to be located within three fault blocks. Two conjectured faults, orientated northwest-southeast, with a downthrow to the northeast are recorded to cross the central area of the site. A conjectured fault orientated northeast-southwest, with a downthrow to the southeast, is located to the immediate northwest of the site. The strata in the vicinity of the site are recorded to be dipping c.5° to the northeast.
Coal Seams	The BGS map conjectures the presence of a 'thin' coal seam c. 30m northwest of the site (dipping to the south), beyond the northeast-southwest fault. The Whinmoor (Top Whinmoor) and Low Whinmoor coal seams are conjectured to outcrop c. 10m north and c. 15m northeast of the site respectively, dipping to the northwest. The Whinmoor (Top Whinmoor) and Low Whinmoor coal seams are shown

	to outcrop beyond the northern most conjectured northwest-southeast orientated fault on site. The seams are recorded to be between 0.4m-0.8m and 0.2m-0.6m in thickness, respectively. The stratigraphical column included on the BGS 1:10,000 geological map indicates the Low Whinmoor to be approximately 10m stratigraphically below the Whinmoor (Top Whinmoor). The Cumberworth Thin Coal (recorded to be c.0-0.4m in thickness) is recorded to be 20m below the Whinmoor (Top Whinmoor) coal. The 1933 geological memoir notes that *'the Whinmoor Coal…has been or is being worked wherever present at shallow depth…it is usually in three bands being separated by dirt partings…'* The memoir notes that the Cumberworth Thin Coal is seldom over 1ft 3in thick (37cm), but commonly has up to 4ft (1.2m) of fireclay, and locally gannister, associated with it. There appears to be a disparity between BGS records and the CA interactive viewer, with CA records indicating an un-named coal seam to outcrop immediately west of the site, with a second seam shown to outcrop c. 100m west and 140m south. The dips and dip directions of the coal seams are not recorded by the CA.
Mining and Quarrying	The CA report states that the site is not within the zone of likely physical influence on the surface from past underground or opencast workings, but that the property is in an area where the Coal Authority believe there is coal at or close to the surface; this coal may have been worked at some time in the past. In the northeast of the site the CA online viewer shows there is a risk of 'probable unrecorded shallow workings'; the same area of the site is recorded as a 'development high risk area'. Correspondence with the CA indicates 'Our information indicates the Whinmoor and an unnamed coal seam crop in the vicinity of the site. Records of surface workings in the wider locality to the north of the site show the Whinmoor as three leaves at that location'. The 1:10,000 scale geological map shows two areas of made ground, one located c. 55m north of the site where the Whinmoor Coal seam appears to have been worked from surface and c. 135m northeast of the site, where an unknown seam has been worked from surface. The CA Mining Report states that there are no known mine entries within 20m of the site. The online CA interactive viewer shows no recorded shafts are present within 250m of the site, with the nearest shaft shown c. 280m south of the site. The CA's Mining Report states that it is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

4. Previous Investigations

Sirius were commissioned in 2020 to undertake a (pre-demolition) geoenvironmental appraisal of the site. The investigation included three rotary open hole boreholes (RO01 to RO03). Access was not possible within the eastern site area at the time of the 2020 investigation due to overgrown dense brambles / vegetation and fencing. Access was also limited across the remainder of the site because of former buildings and buried / overhead services.

Made ground was encountered within the accessible parts of the site, typically to depths less than 1 to 2m bgl, in turn underlain by a variable thickness of natural residual LCM soils, to depths of between 0.95m and >2.7m bgl. The weathering profile of the LCM was generally found to comprise medium to high strength clays underlain by destructured siltstone bedrock. The rotary investigation identified two seams / leaves of intact coal within the north of the site at depths of 2.4m and 4.2m bgl, with evidence of mine workings towards the south at a depth of 3.8m bgl. No coal or evidence of mine workings were identified within the western area of the site.

Fieldwork forming a supplementary site investigation were carried out by Sirius following clearance of the eastern site area in May 2021. The fieldworks included twelve rotary open hole boreholes (RO101 to RO112), which were positioned across both the previously inaccessible eastern site area, and the wider site area.

Ground conditions were found to comprise made ground across the eastern site area to depths of up to 2 to 3m bgl, underlain by locally softened / low strength residual LCM strata, recorded from depths of between 1.6m and 3.5m bgl, grading into competent LCM sandstone bedrock. A 0.2m to 0.3m thick intact coal seam was encountered at a depth of 13m and 16.5m bgl within the eastern site area within RO102 and RO103. No evidence of coal or associated mine workings were identified within RO101 or RO104 to a maximum depth of 30m bgl, indicating a generally thin and inconsistent coal seam.

The rotary investigation also identified a 0.6m thick intact coal seam within the western site area, at a depth of 21m bgl within RO112. In addition, a 0.2m thick intact coal seam was encountered within RO110 and RO111 at depths of 10.0m and 10.5m bgl. RO105, positioned centrally within the site, encountered intact coal seams / leaves at depths of 2.5m and 4.0m (at respective thicknesses of 0.6m and 0.5m). No evidence of coal and / or associated mine workings were recorded within RO106 to RO109 located within central and western site areas to a maximum depth of 30m bgl.

A recent programme of post demolition rotary drilling was undertaken in October 2023 to further investigate the presence of shallow mine workings and shallow coal seams beneath the central site area, and to further assess and delineate the two conjectured fault locations. The fieldworks included fourteen rotary open hole boreholes (RO201 to RO214), and a series of trial pits (TP201 to TP223).

The locations and depths where coal / associated mine workings have been identified at the site as part of each phase of investigation are summarised in Table 4.1 below. Copies of all rotary borehole logs are included within Appendix B.

Table 4.1 - Coal Seams Encountered

Borehole	Depth to Base of Coal / Workings (m bgl)	Depth to Base of Coal Seam/Workings (m AOD)	Thickness of Coal / Workings Encountered (m)	Thickness of Overlying Competent Strata (m)	Inferred Fault Block
RO102	16.8	122.85	0.3	11.9	Eastern
RO103	13.2	126.25	0.2	9.5	
RO208	14.1	128.47	0.1	12.0	
RO213	11.6	128.09	0.1	9.5	

Borehole	Depth to Base of Coal / Workings (m bgl)	Depth to Base of Coal Seam/Workings (m AOD)	Thickness of Coal / Workings Encountered (m)	Thickness of Overlying Competent Strata (m)	Inferred Fault Block
RO2	3.8	139.27	2.2*	2.8	Central
RO3	2.4	142.73	1.0	NA^	
	4.2	140.93	1.3	0.8	
RO105	2.5	141.00	0.6	NA^	
	4.0	139.50	0.5	0.9	
RO110	10.0	137.93	0.2	8.0	
RO207	3.6	141.71	0.3	1.3	
TP206	0.4	144.2	0.5	NA^	
TP209	2.5	142.8	0.7	NA^	
RO111	10.5	142.77	0.2	9.5	Western
RO112	21.0	126.93	0.6	18.0	

*Broken ground
^Overlain by weathered, residual LCM
NA - Not Applicable

4.1 Summary of Relevant Findings

4.1.1 Shallow Coal Mine Workings

Published geological information indicates that the site is located within three fault blocks. Two conjectured faults, orientated northwest-southeast, with a downthrow to the northeast are recorded to cross the central area of the site. The Whinmoor (Top Whinmoor) and Low Whinmoor coal seams are conjectured to outcrop c. 10m north and c. 15m northeast of the site respectively, dipping to the northwest. The Whinmoor (Top Whinmoor) and Low Whinmoor coal seams are shown to outcrop beyond the northern most conjectured northwest-southeast orientated fault on site. The seams are recorded to be between 0.4m-0.8m and 0.2m-0.6m in thickness, respectively.

Phases of rotary drilling has been undertaken to investigate the presence of shallow coal seams and any associated shallow mine workings beneath the site, and to confirm the two central conjectured fault locations.

Drawing No. C9297/DG/03, included within Appendix A, indicates the locations of the inferred faults and coal outcrops, and a proposed shallow mineworkings investigation and treatment plan is included as Drawing No. C9297/DG/04.

Central Fault Block

Evidence of shallow mine workings, in the form of broken ground, has been recorded in one location in the central fault block (RO02) from top depths of 3.8m to 6.0m bgl (139.2 to 137.0m AOD). Up to two seams / leaves of intact coal have been encountered in two locations (RO03 and RO105) within the central fault block. The upper seam has been recorded from top depths of between 2.4m and 2.5m bgl (142.7m and 141.0m AOD respectively) and the lower seam has been recorded from top depths of between 4.0m and 4.2m bgl (139.5m and 140.9m AOD respectively).

Single seams of intact coal have been recorded at top depths of between 0.4m bgl (142.6m AOD) and 3.3m bgl (142.0m AOD) in TP206, TP209 and RO207. A single thin intact seam (0.2m thickness) was identified within RO110 at a depth of 10.0m bgl (137.9m AOD).

The coal appears to only locally be split into two seams / leaves, and inconsistent in thickness across the central site area. The inconsistency of the Whinmoor (Top Whinmoor) and Low Whinmoor coal seams are indicative of the complex geology and likely fault disturbance within the site area. Insufficient rock cover exists above the identified coal seam(s) to mitigate the risk of surface instability from localised shallow mine workings however, and as such should be subject to further plot specific investigation / assessment, and subsequent treatment, as necessary.

Eastern Fault Block

Within the inferred eastern fault block, intact coal and coal traces of up to 0.3m in thickness were recorded in four locations (RO102, RO103, RO208 and RO213) from depths of between 11.5m and 16.5m bgl (123.1m to 128.1m AOD.

Sufficient rock cover exists above the inconsistent coal seam to mitigate the risk of surface instability if mine workings were to be present, and as such is considered to pose a low risk to surface stability, not requiring treatment.

Western Fault Block

In the northwest of the western fault block, a 0.2m intact coal seam was recorded in RO111 at a depth of 10.5m bgl (142.7m AOD), and a 0.6m thick intact coal seam was recorded in RO112 from 21m bgl (126.9m AOD), located within the southwest of the inferred western fault block. It is unclear which seam(s) these relate to, although the BGS reference the conjectured presence of a 'thin' coal seam c. 30m northwest of the site (dipping to the south), beyond the northeast-southwest fault.

On the basis of the maximum recorded thickness and depths of the inconsistent coal seam(s), the risk of surface instability if mine workings were to be present is considered to be low, not requiring treatment.

4.1.2 Unrecorded Mine Entries

No mine entries are known to exist on the site. However, the possibility of encountering unrecorded mine entries, including bell pits and crop workings, cannot be discounted. It is therefore recommended that the central area of the site be stripped down to natural subsoil, plus 0.3m, under the supervision of a suitably experienced consultant, to observe for evidence of crown holes, mine entries and bell pits.

All other excavations into natural ground site wide made during enabling and earthworks should be inspected for evidence of crown holes, mine entries and bell pits etc.

Drawing No. C9297/DG/04 included within Appendix A, indicates the proposed extent of the site to be stripped and inspected for shallow mine entries.

5. Construction Design Management Requirements

The Drilling and Grouting Contractor (the 'Contractor) will be supplied with details of all known underground services prior to commencement of the Contract. It shall be the Contractor's responsibility to confirm that each borehole is clear of all underground services, above ground services, equipment and property prior to commencing operations.

The Contractor shall be responsible for preparing and providing a Method Statement and Risk Assessment for the works, and for gaining all approvals and Permissions for undertaking the work from the Coal Authority, prior to commencing operations. No works shall commence without obtaining Permission from the Coal Authority.

All works shall be carried out in accordance with the Construction Design Management (CDM) Regulations current at the time of the contract, and the Contractor's Method Statement and Risk Assessment, as agreed with the Coal Authority, and where applicable, with the Client's Health and Safety Plan.

6. Supervising Resident Engineer

In advance of commencement of the Contract, the Client shall appoint a suitably experienced and qualified Resident Engineer (RE) to supervise the works as required, and to provide support and advise on relevant matters.

The RE shall attend site as required to ensure that the requirements of this specification are complied with. The responsibilities of the RE shall include, but not be limited to, the following:

- Liaison with the Client and statutory bodies in relation to the treatment works;
- Supervision and quality control of the works;
- Implementation of contingency measures if unexpected conditions are found during the works;
- Review of site records and test results as they become available and make comment and act upon those results accordingly; and,
- Production of a validation report, covering the treatment of the mine workings.

7. General Specification

7.1 Constituent Materials for Grouting

Water shall be from the mains supply or other source approved by the RE and supplied by the Client.

Cement shall be CEM II 32.5 conforming to BS EN 197-1:2011.

Pulverised Fuel Ash (PFA) complying with BS EN 12715: 2020 shall be conditioned hopper ash, or dry powder ash, or a type suitable as a constituent for grout and obtained from an approved supplier.

Sand shall generally comply with BS882 and be of a grading suitable for use in the Contractor's plant and approved by the RE.

Pea gravel shall comply with BS882:1992, and be of grading approved by the RE.

Thixotropic admixtures shall be bentonite or another admixture approved by the RE.

7.2 Storage and Use of Materials

Storage of materials shall be such as to prevent contamination and deterioration. Cement shall be kept in a dry location, and the sequence of deliveries recorded so that cement can be used in rotation.

PFA shall be stored within a pre-defined area and will be kept dampened to mitigate against fugitive dust.

7.3 Grouting Plant

The Contractor shall submit to the RE, for approval, details of the proposed method of mixing, and pumping of grout to the injection points, together with the means of monitoring grouting pressures and the quantities injected. The materials shall be introduced into the mixer via approved volumetric methods.

The grout mixer shall be capable of producing a homogenous mix, all particles being thoroughly wetted without segregation.

7.4 Grout Mixes

With consideration to the future use of the area, the filing material shall generally consist of a PFA: cement grout which should be generally mixed in the proportions of up to 10:1.

The mixes shall produce cubes with crushing strengths of not less than 1.0 MN/m^2 at 28 days (Note: the 7 day test is performed to indicate that the 28 day strength is achievable i.e. a 7 day value of about 0.4MN/m^2 would probably be considered on target).

Where excessive lateral flow of grout is anticipated or when voids greater than 500mm are encountered, sand or pea gravel may be introduced into the workings in accordance with CIRIA C758D. The specified grout mix shall have the minimum water content consistent with effective pumping.

The actual proportions to be used initially for the various grouts shall be agreed with the RE paying due regard of the conditions met in drilling and the results of any trial grouting carried out before work commences.

7.5 Grout Properties and Testing

With water / (cement and PFA) ratios generally in the range of 0.4 to 0.45, (including the moisture in the aggregates), the mixes proposed should produce pumpable grout with flowability readings of between 300 to 600mm, when measured in a flowmeter of the "Colcrete" type.

The sample for the flowability test shall be obtained by the grouting Contractor at the point of injection i.e. from the end of the tremie pipe.

A minimum of two flowability tests per week shall be performed by the Contractor or as directed by the RE.

High-bleed grouts shall be avoided. Bleed capacity should be limited to 5% maximum unless agreed otherwise with the RE.

A minimum of two bleed capacity tests shall be performed by the Contractor per shift or as directed by the RE. The sample of grout for the test shall be taken from the point of injection i.e. the end of the tremie pipe.

Bleed capacity shall be measured in a clear plastic or glass graduated cylinder which has an internal diameter not less than 50mm and with a volume of approximately 1000ml. After placing the grout, a cover shall be placed over the cylinder to avoid evaporation. Bleed capacity shall be read at hourly intervals for neat cement grout, and readings should continue for not less than 3 hours. For PFA: cement grouts, readings should continue for not less than 6 hours.

The Contractor shall prepare two sets of test cubes of grout per week, or as directed by the RE. Each cube shall be of 100mm side, or as agreed with the RE, and shall be taken from the grout at the point of injection i.e. the end of the tremie pipe.

At the instruction of the RE, the Contractor shall arrange for them to be tested by crushing at 7 and 28 days in accordance with BS1881-101:1983.

The testing shall be carried out by an independent laboratory or as agreed with the RE.

As stated previously mixes shall produce cubes with crushing strengths of not less than 1.0 MN/m^2 at 28 days.

If the RE considers the results of the test indicate that a change of mix proportions is required, the Contractor shall make such modifications as the RE may direct.

7.6 Drilling Procedures for the Investigation and Treatment of Shallow Mineworkings

All boreholes to be used for the investigation of shallow mineworkings and potential treatment by the injection of grout, including those which strike coal pillars, shall be drilled by rotary or rotary percussive techniques down to a minimum of 0.5m beyond the base of the old workings in the seam or the floor of the seam itself whichever is greater. The drilling system and flushing medium to be used shall be as instructed on the Coal Authority Permit, and approved by the RE. The Contractor shall allow for the provision of appropriate dust suppression for those holes that are to be drilled near sensitive receptors (e.g., nearby houses, highways, active commercial properties, car parks and public footpaths).

The Contractor shall undertake gas monitoring at the drill rig during the drilling operation.

Boreholes shall be drilled to sufficient depth to encounter the Whinmoor (Top and / or Low Whinmoor) coal seams unless otherwise instructed by the supervising engineer, or where sufficient thickness of intact rock is proven in individual boreholes. Where the seam(s) are encountered, boreholes shall extend through the lower seam and at least 0.5m into the underlying strata.

Due to the uncertainty regarding the extent of potential shallow mining at the site, the works will be undertaken in a staged manner, with treatment only undertaken where the initial probe drilling proves it is required. Boreholes will be drilled on a domino-5 pattern across building footprints within central site areas. Should evidence of shallow mine workings exhibiting inadequate competent rock cover be encountered then treatment will be undertaken utilising a 3m x 3m grid of holes extending across the nominal zone of consolidation i.e. up to 3m beyond the plot and / or beyond the fault lines once confirmed. Treatment of any retaining walls/structures greater than 1.5m in height (or where the retaining feature is considered integral to supporting

plot / highway stability) within central site areas should also be undertaken utilising a 3m x 3m grid where considered necessary.

Should extensive mineworkings be encountered, treatment of adoptable highways will be undertaken utilising a 3m x 3m grid across the highway footprint within affected areas with the nominal zone of consolidation extending up to 3m beyond the highway and / or fault lines (once confirmed). Treatment of unadopted roads and areas of hardstand will be treated on a 6m grid with central borehole within affected areas.

Stabilisation works will be undertaken (where necessary) by injecting a PFA / cement grout into any identified workings via the boreholes with the aim of substantially filling any mining related voiding.

Site investigation monitoring well boreholes should be grouted during mine treatment works to prevent them acting as potential preferential pathways for mines gases.

The minimum diameter of the holes shall be 75mm unless otherwise specified by the RE. When it is impracticable to drill at the minimum diameter for the full depth, the diameter of the boreholes shall be increased in the upper lengths.

Boreholes shall be temporarily cased through any made ground and residual deposits down to the rockhead. The boreholes shall be kept open until grout injection into the workings and rock is complete.

Where a borehole proves abortive because it becomes obstructed, it shall be re-drilled in a suitable location as directed by the RE, at a larger diameter and re-cased.

A mineworkings risk plan summarising the areas of identified coal mining is included as Drawing No. C9297/DG/03 within Appendix A of this specification. A plan showing the proposed areas of mineworkings treatment, together with the development proposals, is included as Drawing No. C9297/DG/04 in Appendix A. It should be noted that the position of the on-site faults marked within the drawings have in parts been inferred from BGS mapping. The specific alignment of both faults is therefore subject to change during drilling / treatment works.

Any deviation from this proposed layout shall be recorded by the Contractor and a revised plan provided to the RE.

During the course of the works, the RE will review the borehole records generated, and will review the potential for the presence of workings at shallow depth below rockhead elsewhere on the site.

If so required, the RE shall instruct the Contractor to undertake supplementary investigation boreholes in areas outwith the proposed drill and grout programme, to confirm the presence or otherwise of workings at shallow depth. If such workings are suspected or identified, the drill and grout programme shall be extended to treat such areas.

The Principal Contractor shall be responsible for managing surface water run-off from site as part of the stabilisation works.

7.7 Grouting Procedures for Treatment of Shallow Mineworkings

The aim of the stabilisation work is to substantially fill any old workings within the identified seams as well as any voids or broken ground found within the overlying strata in order to mitigate the development of crown holes at the surface \ foundation level.

Perimeter grout walls, if required, shall be formed by filling boreholes with a viscous grout composed of appropriate proportions of cement, PFA, sand or pea gravel and water. The mix, proportions and method must be agreed with the RE.

Pressure need not be applied to the grout in affected boreholes unless required by the RE.

Unless specified otherwise, the section of the perimeter wall at the deepest part of the seam shall be constructed first if required .

Immediately prior to grouting each borehole, the Contractor shall check that it is unobstructed to the required depth to receive the tubing or tremie pipes for grout injection. Obstructions shall be dealt with as described in 'drilling procedures' above.

Grout shall be injected into each hole via an approved flexible tube with grout placed to the base of the hole.

Grouting shall proceed upwards from the base of each borehole to the base of the surface deposits. It is not intended that, as a general rule, significant quantities of grout shall be injected into the surface deposits unless specified otherwise. This requirement will be subject to RE review.

The grout shall be injected at the approved rates until grout appears near the point of injection, when the borehole shall be deemed complete. If this criteria is reached quickly, the grout tubes shall be lifted to check that a local obstruction is not preventing flow of the grout into the strata.

Hydrostatic pressure shall be applied to the grout in every borehole. If grout has not appeared at the point of injection after 5 tonnes of grouting materials have been introduced, then sand and/or pea gravel (gravel which passes through a 6.33mm sieve and is retained on a 2.36mm sieve) may be added to the mix or placed down the borehole.

7.8 Stabilisation Procedures for the Treatment of Unrecorded Mine Shafts

Should any unrecorded mine shafts be identified on site, they shall be stabilised in accordance with the recommendations given in the NCB handbook 'The Treatment of Disused Mine Shafts and Adits.' and CIRIA C758D.

All work on or about mine shafts must be carried out from a safety platform of adequate dimensions that will span the potential collapse zone and support the crew and equipment should a catastrophic failure of the shaft occur.

Prior to work commencing the area will be inspected to ensure that the safe movement of heavy equipment can proceed. This will be carried out by a competent, experienced person who will be securely fastened to the surface by means of a full body harness anchored at an appropriate safe distance away from the potential shaft collapse zone.

If any shaft is found to be open from the surface, then it shall be backfilled with graded material. Any such material will be introduced directly into the shaft from the surface utilising equipment such as a 360 excavator or conveyor.

If the shaft is backfilled then reversed stage pressure grouting of the infill material will be undertaken. Such treatment is achieved by a combination of permeation grouting and low pressure compaction grouting of the infill material which forms an enhanced bond between the infill and the shaft lining \ country rock.

Treatment will therefore be undertaken in the following manner:-

A rigid steel and wooden shaft frame will be mounted over the shaft mouth to ensure that any slumping of the shaft infill will not jeopardise the stability of the drilling rig and the safety of the crew.

Once the safety frame is in place, the drill rig will be positioned over the shaft to allow the sinking of a centrally located borehole through fill material.

Treatment will involve the drilling of a single borehole to the base of the shaft and at least six metres into natural strata, this is to ensure that no "staging" is present within the shaft and that the actual shaft base has been reached. Shaft staging would typically be encountered within the first 50m below ground within shafts although no hard or fast rules can be applied to this. Staging can be a problem if, over time, it deteriorates to such an extent that catastrophic failure of the infill material occurs.

On completion of the first borehole temporary steel casing may then be inserted into the borehole. This casing forms the basis of the reversed stage pressure grouting technique.

The grouting operation will commence on completion of the borehole and will involve direct injection down the borehole under pressure through the drill rods or casing in ascending 3.0m stages.

The grout will possess water: solids ratio of no more than 40% giving an approximate compressive strength of 1.0 MN/m2 @ 28 days.

Grout will be mixed by loading hopper conditioned PFA and bagged cement directly into the mixer via a front-loading shovel and by hand. Water supplied from the approved water source will then be added to the mix to produce grout of the correct consistency.

The grout mixer will be capable of producing a homogenous mix, with all particles being thoroughly wetted without segregation occurring.

The grout will be mixed and injected using a 50mm diaphragm pump operating at around 100 psi and will be pumped via 50mm reinforced grout hoses into borehole. This will continue until either a maximum pressure is reached, or refusal of grout occurs. A length of casing will then be extracted, and the process repeated until the complete length of the shaft has been treated.

Should any significant thickness of permeable / granular fill be present on site, grouting may need to be terminated at the level of the base of such material.

If any significant voids are encountered during the operation, a grout \ pea gravel mix will be introduced into the borehole to restrict excessive movement of grout. However, should any major mining feature such as roadways running off the shaft are suspected these will require investigation and treating separately from the shaft.

Depending on the location of the shaft, a capping solution may be required such as a reinforced concrete cap.

Any cap will be designed by a competent structural engineer with its orientation founding depth and ultimate design agreed by the Coal Authority prior to construction. As a minimum any reinforced cap will be typically twice the shaft diameter.

7.9 Services

The Contractor shall take all necessary precautions, including making all reasonable liaison with the Client and Principal Contractor to ascertain the positions and depths of underground services and drains passing through the site, making full allowance for working around and protecting live services and drains.

The Principal Contractor and Contractor shall be responsible for maintaining close liaison with the Local Authority and the Public Utility Authorities so as to avoid any disruption of the existing services.

When introducing grout into any borehole the Contractor shall ensure by regular inspections throughout the day that the grout is not entering adjacent drains, services, culverts and ducts. In the event that any such leakage is detected the Contractor shall immediately suspend the grouting operations and commence to remove any accumulated grout.

7.10 In Situ Testing

When directed by the RE, the Contractor shall test the consolidated ground for permeability and strength.

Permeability by grout acceptance testing shall be checked by drilling test holes in positions to be selected by the RE and injecting grout at pressures appropriate to the depth, all in accordance with the requirements for infilling grouting. If the RE considers that the quantities of grout accepted are excessive, further holes shall be drilled and grouted at the rates and prices agreed.

After testing, boreholes shall be completed in accordance with the requirements for grouting infill holes.

7.11 Records

The Contractor shall prepare and keep available for inspection on site, plans showing the positions of all boreholes, daily drilling records (see below), together with the total amounts of grout injected. Levels shall be given with reference to a datum to be confirmed by the RE.

The plans shall be updated daily in conformity with the Records noted below. On completion of the works, the Contractor shall give fair copies of the plans and sections to the RE within one week of completion of the programme of grouting.

As works proceed, the Contractor shall maintain separate daily records for drilling, for grouting and for materials and plant received in a form to be approved by the RE. The daily records signed by the Contractor's agent shall be submitted each day to the RE for their agreement. The Contractor shall provide one copy of the agreed record for the RE's retention and keep a further copy available for inspection on site.

Daily drilling records shall be provided for each borehole and contain the following information:

1. Job title and location
2. Borehole reference number
3. Date
4. Contractor's name
5. Plant in use, crew members and hours worked
6. Method of boring or drilling
7. Type, diameter and depth of casing used
8. Diameter and depth of hole at the beginning and end of each working day or shift
9. Loss of any flushing medium during drilling
10. Standing time, with reason, or time lost overcoming obstructions
11. Details of underground services located
12. Details of any settlement or ground heave
13. Daily and cumulative length drilled
14. Depth to each major change of stratum
15. Description, with identification, of the stratum and whether it is intact or broken
16. Each depth at which groundwater is encountered (if apparent), the depth to which it rose and any steps taken to stop the flow

17. Depths at which any samples are taken
18. Details and results of any permeability tests instructed by the RE
19. Details of any voids or suspected workings
20. Details of any emissions of gas, water, etc.
21. Depth of completed borehole

Daily grouting records shall be provided for each borehole and contain the following information:

1. Job title and location
2. Borehole reference number
3. Date
4. Contractor's name
5. Plant in use, crew members and hours worked
6. Details of type of injection grout-line dimensions and length of standpipes inserted
7. Type of grout mix and volumetric quantity injected including total quantity by weight by each type of grouting material introduced
8. Grout pressures recorded, with the corresponding depths
9. The results of all flow and bleed tests
10. Details of casing abandoned
11. Details of grouting materials delivered to the site and a running total of each of the materials delivered
12. The nature, frequency and results of all inspections of services to check for grout penetration
13. Details of all stoppages or delays and any other relevant information.

The daily records of materials and plant received shall show in particular that day's quantities by weight of each type of material and cumulative quantities. With the daily records, the Contractor shall submit to the RE copies of receipts or invoices for all materials delivered and he shall keep them on site until the works are complete.

Notwithstanding the information listed above, the Contractor shall provide any other information required by the RE.

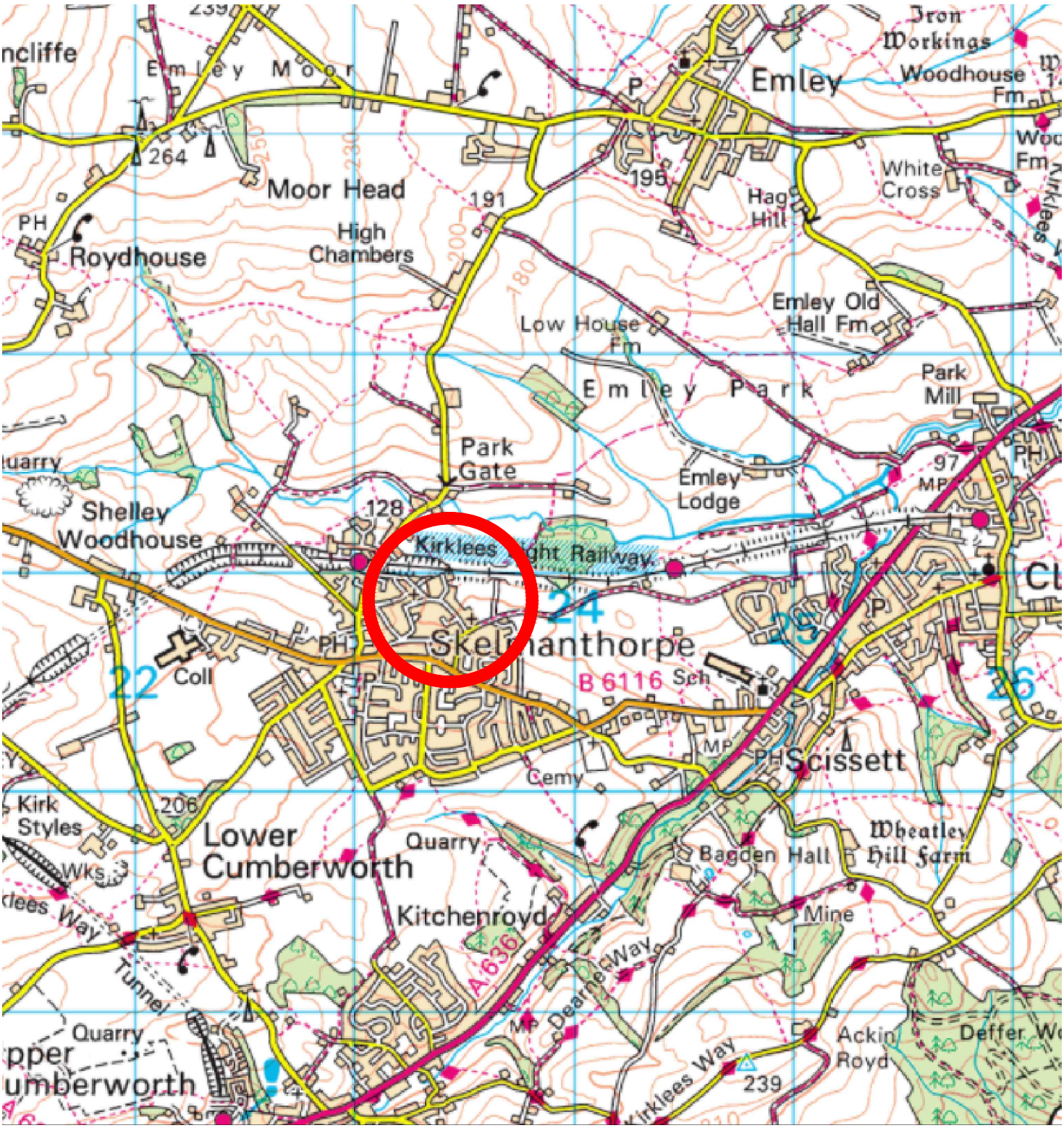
On completion of the drill and grout programme, the RE shall prepare a validation report containing copies of borehole records, a borehole location plan, procedures followed during the works, the results of validation boreholes and pressure tests, and a record of any deviation from this specification.

8. Regulatory Approvals

This Specification is considered suitable and appropriate based on the findings of the site investigations. However, it cannot be guaranteed to gain regulatory approval and, therefore, should be passed to the appropriate regulatory authorities and/or other organisations including but not limited to the Coal Authority for their comment and approval prior to commencing any works on site.

APPENDICES

APPENDIX A
Drawings



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NOTES

Site Location

REVISION	
0	For Information
A	>>
B	>>
C	>>
D	>>

SIRIUS GEOTECHNICAL LTD
4245 Park Approach, Thorpe Park, Leeds LS15 8GB
www.thesiriusgroup.com
TEL: 0113 264 9960
FAX: 0113 264 9962

CLIENT	DRAWING NO.	REVISION NO.
Lovell Partnerships Ltd	C9297/DG/01	0
SITE: Former Greenside Mills, Skelmanthorpe	DRAWN BY: MF	APPROVED BY: GH
DRAWING TITLE: Site Location Plan	DATE: November 2023	SCALE: 1:25,000

A4

Certificate of Analysis

Certificate Number	23-12751	*Issued:*	05-Jun-23

Client Sirius Geotechnical & Environmental
4245 Park Approach
Thorpe Park
Leeds
LS15 8GB

Our Reference	23-12751
Client Reference	C9297
Order No	23430/C9297/GH
Contract Title	Greenside Mills, Skelmanthorpe
Description	One Soil sample.
Date Received	15-May-23
Date Started	31-May-23
Date Completed	05-Jun-23
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Asbestos Analysis

Samples

Our Ref 23-12751
Client Ref C9297
Contract Title Greenside Mills, Skelmanthorpe

Lab No	Sample ID	Sample Location	Material Type	Result	Comment*	Analyst

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 23-12751
Client Ref C9297
Contract Title Greenside Mills, Skelmanthorpe

Lab No	2178983
.Sample ID	Sediment 1
Depth	
Other ID	
Sample Type	ES
Sampling Date	12/05/2023
Sampling Time	

Test	Method	Units	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	201.79
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	na
% Chrysotile bundles in sample		Mass %	<0.001
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by
by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

Information in Support of the Analytical Results

Our Ref 23-12751
Client Ref C9297
Contract Greenside Mills, Skelmanthorpe

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2178983	Sediment 1 SOIL	12/05/23	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-32249-1
Initial Date of Issue:	10-Oct-2023
Re-Issue Details:	
Client	Sirius Geotechnical Ltd
Client Address:	4250 (Downstairs) Thorpe Park Park Approach Leeds West Yorkshire LS15 8GB
Contact(s):	Gemma Halliday Jack Clarke
Project	C9297A Greenside Mills

Quotation No.:		**Date Received:**	27-Sep-2023
Order No.:	23935/C9297A/GLH	**Date Instructed:**	27-Sep-2023
No. of Samples:	34		
Turnaround (Wkdays):	5	**Results Due:**	03-Oct-2023
Date Approved:	10-Oct-2023		
Approved By:			

Details:	Stuart Henderson, Technical Manager

Results - Soil

Project: C9297A Greenside Mills

Client: Sirius Geotechnical Ltd				**Chemtest Job No.:**	23-32249	23-32249	23-32249	23-32249	23-32249	23-32249	23-32249	23-32249	23-32249
Quotation No.:				**Chemtest Sample ID.:**	1707918	1707919	1707920	1707921	1707922	1707923	1707924	1707925	1707927
				Client Sample ID.:	WS09-TPA	WS09-TPB	WS13-TP	TP101	TP06A	TP06B	TP06C	POND TP	TP210
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	1.00	0.20	0.30	0.40	0.10	0.10	0.10	0.50	0.50
				Date Sampled:	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023
				Asbestos Lab:					DURHAM	DURHAM	DURHAM	DURHAM	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
ACM Type	U	2192		N/A					-	-	-	-	
Asbestos Identification	U	2192		N/A					No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	
Asbestos by Gravimetry	U	2192	%	0.001									
Total Asbestos	U	2192	%	0.001									
Moisture	N	2030	%	0.020	15	22	12	10				53	
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones and Roots	Stones	Stones	Stones	Roots and	Stones and Roots
Soil Texture	N	2040		N/A	Clay	Loam	Clay	Clay	Clay	Loam	Clay	sludge	Loam
pH at 20C	M	2010		4.0								8.1	
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010								0.35	
Sulphate (Total)	U	2430	%	0.010								2.2	
Arsenic	M	2455	mg/kg	0.5								14	
Cadmium	M	2455	mg/kg	0.10								1.4	
Chromium	M	2455	mg/kg	0.5								91	
Copper	M	2455	mg/kg	0.50								440	
Mercury	M	2455	mg/kg	0.05								0.52	
Nickel	M	2455	mg/kg	0.50								28	
Lead	M	2455	mg/kg	0.50								260	
Selenium	M	2455	mg/kg	0.25								1.0	
Zinc	M	2455	mg/kg	0.50								240	
Chromium (Hexavalent)	N	2490	mg/kg	0.50								< 0.50	
Aliphatic VPH >C5-C6	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05				< 0.05	
Aliphatic VPH >C6-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05				< 0.05	
Aliphatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05				< 0.05	
Aliphatic VPH >C6-C8 (Sum)	N	2780	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10				< 0.10	
Aliphatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05				< 0.05	
Total Aliphatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25				< 0.25	
Aliphatic EPH >C10-C12	M	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	< 2.0				< 2.0	
Aliphatic EPH >C12-C16	M	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0				49	
Aliphatic EPH >C16-C21	M	2690	mg/kg	2.00	< 2.0	12	< 2.0	< 2.0				210	
Aliphatic EPH >C21-C35	M	2690	mg/kg	3.00	< 3.0	24	< 3.0	< 3.0				340	
Aliphatic EPH >C35-C40	N	2690	mg/kg	10.00	< 10	< 10	< 10	< 10				34	
Total Aliphatic EPH >C10-C35	M	2690	mg/kg	5.00	< 5.0	36	< 5.0	< 5.0				610	
Total Aliphatic EPH >C10-C40	N	2690	mg/kg	10.00	< 10	36	< 10	< 10				640	
Aromatic VPH >C5-C7	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05				< 0.05	
Aromatic VPH >C7-C8	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05				< 0.05	
Aromatic VPH >C8-C10	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05				< 0.05	

Results - Soil

Project: C9297A Greenside Mills

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		23-32249	23-32249	23-32249	23-32249	23-32249	23-32249	23-32249	23-32249	23-32249
Quotation No.:			**Chemtest Sample ID.:**		1707918	1707919	1707920	1707921	1707922	1707923	1707924	1707925	1707927
			Client Sample ID.:		WS09-TPA	WS09-TPB	WS13-TP	TP101	TP06A	TP06B	TP06C	POND TP	TP210
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.00	0.20	0.30	0.40	0.10	0.10	0.10	0.50	0.50
			Date Sampled:		22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023
			Asbestos Lab:						DURHAM	DURHAM	DURHAM	DURHAM	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Total Aromatic VPH >C5-C10	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25				< 0.25	
Aromatic EPH >C10-C12	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0				< 1.0	
Aromatic EPH >C12-C16	U	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	< 1.0				38	
Aromatic EPH >C16-C21	U	2690	mg/kg	2.00	14	21	14	65				160	
Aromatic EPH >C21-C35	U	2690	mg/kg	2.00	< 2.0	< 2.0	< 2.0	150				330	
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00	< 1.0	< 1.0	< 1.0	13				38	
Total Aromatic EPH >C10-C35	U	2690	mg/kg	5.00	15	21	14	210				530	
Total Aromatic EPH >C10-C40	N	2690	mg/kg	10.00	15	21	14	230				570	
Total VPH >C5-C10	U	2780	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50				< 0.50	
Total EPH >C10-C35	U	2690	mg/kg	10.00	15	58	14	210				1100	
Total EPH >C10-C40	N	2690	mg/kg	10.00	15	58	14	230				1200	
Total Organic Carbon	M	2625	%	0.20								8.2	
Naphthalene	M	2700	mg/kg	0.10								35	
Acenaphthylene	M	2700	mg/kg	0.10								11	
Acenaphthene	M	2700	mg/kg	0.10								26	
Fluorene	M	2700	mg/kg	0.10								41	
Phenanthrene	M	2700	mg/kg	0.10								49	
Anthracene	M	2700	mg/kg	0.10								23	
Fluoranthene	M	2700	mg/kg	0.10								38	
Pyrene	M	2700	mg/kg	0.10								45	
Benzo[a]anthracene	M	2700	mg/kg	0.10								15	
Chrysene	M	2700	mg/kg	0.10								18	
Benzo[b]fluoranthene	M	2700	mg/kg	0.10								20	
Benzo[k]fluoranthene	M	2700	mg/kg	0.10								9.1	
Benzo[a]pyrene	M	2700	mg/kg	0.10								15	
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10								8.8	
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10								2.3	
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10								12	
Total Of 16 PAH's	M	2700	mg/kg	2.0								370	
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0				< 1.0	
Toluene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0				< 1.0	
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0				< 1.0	
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0				< 1.0	
o-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0				< 1.0	
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0				< 1.0	
PCB 81	N	2815	mg/kg	0.010									
PCB 77	U	2815	mg/kg	0.010									
PCB 105	N	2815	mg/kg	0.010									
PCB 114	N	2815	mg/kg	0.010									

Results - Soil

Project: C9297A Greenside Mills

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		23-32249	23-32249	23-32249	23-32249	23-32249	23-32249	23-32249	23-32249	23-32249
Quotation No.:			**Chemtest Sample ID.:**		1707918	1707919	1707920	1707921	1707922	1707923	1707924	1707925	1707927
			Client Sample ID.:		WS09-TPA	WS09-TPB	WS13-TP	TP101	TP06A	TP06B	TP06C	POND TP	TP210
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.00	0.20	0.30	0.40	0.10	0.10	0.10	0.50	0.50
			Date Sampled:		22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023	22-Sep-2023
			Asbestos Lab:						DURHAM	DURHAM	DURHAM	DURHAM	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
PCB 118	N	2815	mg/kg	0.010									
PCB 123	N	2815	mg/kg	0.010									
PCB 126	N	2815	mg/kg	0.010									
PCB 156	N	2815	mg/kg	0.010									
PCB 157	N	2815	mg/kg	0.010									
PCB 167	N	2815	mg/kg	0.010									
PCB 169	N	2815	mg/kg	0.010									
PCB 189	N	2815	mg/kg	0.010									
Total PCBs (12 Congeners)	N	2815	mg/kg	0.12									
Total Phenols	M	2920	mg/kg	0.10								0.64	

Test Methods

SOP	Title	Parameters included	Method summary
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
2010	pH Value of Soils	pH at 20°C	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C40	Acetone/Heptane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2780	VPH A/A Split	Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8-C10 Aromatics: >C5–C7,>C7-C8,>C8–C10	Water extraction / Headspace GCxGC FID detection
2810	Polychlorinated Biphenyls (PCB) as Aroclors in Soils by GC-ECD	Polychlorinated Biphenyls expressed as an Aroclor (normally reported as *Aroclor 1242)	Extraction of a soil sample, as received, into hexane/acetone (50:50) followed by gas chromatography (GC) using mass spectrometric (MS) detection for identification of polychlorinated biphenyls and electron capture detection (ECD) for quanitation if present.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS

Test Methods

SOP	Title	Parameters included	Method summary
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

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N	Unaccredited
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SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-35727-1
Initial Date of Issue:	02-Nov-2023
Re-Issue Details:	
Client	Sirius Geotechnical Ltd
Client Address:	4250 (Downstairs) Thorpe Park Park Approach Leeds West Yorkshire LS15 8GB
Contact(s):	Gemma Halliday Jack Clarke
Project	C9297A Greenside Mills

Quotation No.:		**Date Received:**	25-Oct-2023
Order No.:	24037/C9297A/GLH	**Date Instructed:**	25-Oct-2023
No. of Samples:	1		
Turnaround (Wkdays):	5	**Results Due:**	31-Oct-2023
Date Approved:	02-Nov-2023		
Approved By:			

Details:	Stuart Henderson, Technical Manager

Results - Soil

Project: C9297A Greenside Mills

Client: Sirius Geotechnical Ltd			**Chemtest Job No.:**		23-35727
Quotation No.:			**Chemtest Sample ID.:**		1721840
			Client Sample ID.:		Retest sample 1707925
			Sample Location:		POND TP
			Sample Type:		SOIL
			Date Sampled:		22-Sep-2023
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Moisture	N	2030	%	0.020	53
Naphthalene	U	2700	mg/kg	0.10	[B] 1.6
Acenaphthylene	U	2700	mg/kg	0.10	[B] 1.9
Acenaphthene	U	2700	mg/kg	0.10	[B] 3.5
Fluorene	U	2700	mg/kg	0.10	[B] 5.6
Phenanthrene	U	2700	mg/kg	0.10	[B] 20
Anthracene	U	2700	mg/kg	0.10	[B] 8.3
Fluoranthene	U	2700	mg/kg	0.10	[B] 21
Pyrene	U	2700	mg/kg	0.10	[B] 26
Benzo[a]anthracene	U	2700	mg/kg	0.10	[B] 12
Chrysene	U	2700	mg/kg	0.10	[B] 14
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	[B] 17
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	[B] 6.4
Benzo[a]pyrene	U	2700	mg/kg	0.10	[B] 13
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	[B] 8.1
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	[B] 2.2
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	[B] 11
Total Of 16 PAH's	U	2700	mg/kg	2.0	[B] 170

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1721840		Retest sample 1707925	POND TP	22-Sep-2023	B	Amber Glass 250ml
1721840		Retest sample 1707925	POND TP	22-Sep-2023	B	Amber Glass 60ml
1721840		Retest sample 1707925	POND TP	22-Sep-2023	B	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)

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customerservices@chemtest.com

Appendix C – Generic Assessment Criteria Values

Generic Assessment Criteria Values

	Contaminant	SOM	Res +	Res -	Allot.	Comm.	POSresi	POSpark	Source
Metals	Inorganic Arsenic	N/A	37	40	49	640	79	168	DEFRA C4SL
	Beryllium	N/A	1.7	1.7	35	12	2.2	63	LQM S4UL
	Boron	N/A	290	11,000	45	240,000	21,000	46,000	LQM S4UL
	Cadmium	N/A	26	149	4.9	410	220	880	DEFRA C4SL
	Chromium (III)	N/A	910	910	18,000	8,600	1,500	33,000	LQM S4UL
	Chromium (VI)	N/A	21.0	21.0	170.0	49	23.0	250	DEFRA C4SL
	Copper	N/A	2,400	7,100	520	68,000	12,000	44,000	LQM S4UL
	Lead	N/A	200	310	80	2,330	630	1,300	DEFRA C4SL
	Elemental Mercury	N/A	1.2	1.2	21	58 (25.8) vap	16	30 (25.8) vap	LQM S4UL
	Inorganic Mercury	N/A	40	56	19	1,100	120	240	LQM S4UL
	Methylmercury	N/A	11	15	6.0	320	40	68	LQM S4UL
	Nickel (2015 update)	N/A	130	180	53	980	230	800	LQM S4UL
	Selenium	N/A	250	430	88	12,000	1,100	1,800	LQM S4UL
	Vanadium	N/A	410	1,200	91	9,000	2,000	5,000	LQM S4UL
	Zinc	N/A	3,700	40,000	620	730,000	81,000	170,000	LQM S4UL
Polycyclic Aromatic Hydrocarbons (PAHs)	Acenaphthene	1%	210	3,000 (57.1) sol	34	84,000 (57.0) sol	15,000	29,000	LQM S4UL
		2.5%	510	4,700 (141) sol	85	97,000 (141) sol	15,000	30,000	LQM S4UL
		6%	1,100	6,000 (336) sol	200	100,000	15,000	30,000	LQM S4UL
	Acenaphthylene	1%	170	2,900 (86.1) sol	28	83,000 (86.1) sol	15,000	29,000	LQM S4UL
		2.5%	420	4,600 (212) sol	69	97,000 (212) sol	15,000	30,000	LQM S4UL
		6%	920	6,000 (506) sol	160	100,000	15,000	30,000	LQM S4UL
	Anthracene	1%	2,400	31,000 (1.17) vap	380	520,000	74,000	150,000	LQM S4UL
		2.5%	5,400	35,000	950	540,000	74,000	150,000	LQM S4UL
		6%	11,000	37,000	2,200	540,000	74,000	150,000	LQM S4UL
	Benz(a)anthracene	1%	7.2	11	2.9	170	29	49	LQM S4UL
		2.5%	11	14	6.5	170	29	56	LQM S4UL
		6%	13	15	13	180	29	62	LQM S4UL
	Benzo(a)pyrene (only)	1%	5.0	5.3	5.70	77	10.0	21	DEFRA C4SL
		2.5%	5.0	5.3	5.70	77	10.0	21	DEFRA C4SL
		6%	5.0	5.3	5.70	77	10.0	21	DEFRA C4SL
	Benzo(a)pyrene (surrogate marker Coal Tar)	1%	0.8	1.2	0.32	15	2.2	4	LQM S4UL
		2.5%	1.0	1.2	0.67	15	2.2	5	LQM S4UL
		6%	1.1	1.2	1.20	15	2.2	5	LQM S4UL
	Benzo(b)fluoranthene	1%	2.6	3.9	0.99	44	7.1	13	LQM S4UL
		2.5%	3.3	4.0	2.1	44	7.2	15	LQM S4UL
		6%	3.7	4.0	3.9	45	7.2	16	LQM S4UL
	Benzo(ghi)perylene	1%	320	360	290	3,900	640	1,400	LQM S4UL
		2.5%	340	360	470	4,000	640	1,500	LQM S4UL
		6%	350	360	640	4,000	640	1,600	LQM S4UL
	Benzo(k)fluoranthene	1%	77	110	37	1,200	190	370	LQM S4UL
		2.5%	93	110	75	1,200	190	410	LQM S4UL
		6%	100	110	130	1,200	190	440	LQM S4UL
	Chrysene	1%	15	30	4.1	350	57	93	LQM S4UL
		2.5%	22	31	9.4	350	57	110	LQM S4UL
		6%	27	32	19	350	57	120	LQM S4UL
	Dibenzo(ah)anthracene	1%	0.24	0.31	0.14	3.5	0.57	1.1	LQM S4UL
		2.5%	0.28	0.32	0.27	3.6	0.58	1.3	LQM S4UL
		6%	0.3	0.32	0.43	3.6	0.58	1.4	LQM S4UL
	Fluoranthene	1%	280	1,500	52	23,000	3,100	6,300	LQM S4UL
		2.5%	560	1,600	130	23,000	3,100	6,300	LQM S4UL
		6%	890	1,600	290	23,000	3,100	6,400	LQM S4UL
	Fluorene	1%	170	2,800 (36.0) sol	27	63,000 (30.9) sol	9,900	20,000	LQM S4UL
		2.5%	400	3,800 (76.5) sol	67	68,000	9,900	20,000	LQM S4UL
		6%	860	4,500 (183) sol	160	71,000	9,900	20,000	LQM S4UL
	Indeno(123-cd)pyrene	1%	27	45	9.5	500	82	150	LQM S4UL
		2.5%	36	46	21	510	82	170	LQM S4UL
		6%	41	46	39	510	82	180	LQM S4UL
	Naphthalene	1%	15	15	65	1,600*	11,000*	8,400*	DEFRA C4SL
		2.5%	36	36	130	3,700*	15,000*	17,00*	DEFRA C4SL
		6%	85	85	200	8,400*	1,200*	1,900*	DEFRA C4SL
	Phenanthrene	1%	95	1,300 (36.0) sol	15	22,000	3,100	6,200	LQM S4UL
		2.5%	220	1,500	38	22,000	3,100	6,200	LQM S4UL
		6%	440	1,500	90	22,000	3,100	6,300	LQM S4UL
	Pyrene	1%	620	3,700	110	54,000	7,400	15,000	LQM S4UL
		2.5%	1,200	3,800	270	54,000	7,400	15,000	LQM S4UL
		6%	2,000	3,800	620	54,000	7,400	15,000	LQM S4UL
	Coal Tar (B(a)P as surrogate marker)	1%	0.79	1.2	0.32	15	2.2	4.4	LQM S4UL
		2.5%	0.98	1.2	0.67	15	2.2	4.7	LQM S4UL
		6%	1.1	1.2	1.2	15	2.2	4.8	LQM S4UL

Generic Assessment Criteria Values

	Contaminant	SOM	Res +	Res -	Allot.	Comm.	POSresi	POSpark	Source
BTEX Compounds	Benzene	1%	0.87	0.38	0.017	27	72	90	LQM S4UL
		2.5%	0.17	0.70	0.034	47	72	100	LQM S4UL
		6%	0.37	1.4	0.075	90	73	110	LQM S4UL
	Toluene	1%	130	880 (869) vap	22	56,000 (869) vap	56,000	87,000 (869) vap	LQM S4UL
		2.5%	290	1,900	51	110,000 (1,920) vap	56,000	95,000 (1,920) vap	LQM S4UL
		6%	660	3,900	120	180,000 (4,360) vap	56,000	100,000 (4,360)	LQM S4UL
	Ethylbenzene	1%	47	83	16	5,700 (518) vap	24,000	17,000 (518) vap	LQM S4UL
		2.5%	110	190	39	13,000 (1,220) vap	24,000	22,000 (1,220) vap	LQM S4UL
		6%	260	440	91	27,000 (2,840) vap	25,000	27,000 (2,840) vap	LQM S4UL
	o-xylene	1%	60	88	28	6,600 (478) sol	41,000	17,000 (478) sol	LQM S4UL
		2.5%	140	210	67	15,000 (1,120) sol	42,000	24,000 (1,120) sol	LQM S4UL
		6%	330	480	160	33,000 (2,620) sol	43,000	33,000 (2,620) sol	LQM S4UL
	m-xylene	1%	59	82	31	6,200 (625) vap	41,000	17,000 (625) vap	LQM S4UL
		2.5%	140	190	74	14,000 (1,470) vap	42,000	24,000 (1,470) vap	LQM S4UL
		6%	320	450	170	31,000 (3,460) vap	43,000	32,000 (3,460) vap	LQM S4UL
	p-xylene	1%	56	79	29	5,900 (576) sol	41,000	17,000 (576) sol	LQM S4UL
		2.5%	130	180	69	14,000 (1,350) sol	42,000	23,000 (1,350) sol	LQM S4UL
		6%	310	430	160	30,000 (3,170) sol	43,000	31,000 (3,170) sol	LQM S4UL
Petroleum Hydroc	**Aliphatic**								
	EC 5-6	1%	42	42	730	3,200 (304) sol	570,000(304)sol	95,000 (304) sol	LQM S4UL
	EC>6-8	1%	100	100	2,300	7,800 (144) sol	600,000	150,000 (144) sol	LQM S4UL
	EC>8-10	1%	27	27	320	2,000 (78) sol	13,000	14,000 (78) vap	LQM S4UL
	EC>10-12	1%	130 (48) vap	130 (48) vap	2,200	9,700 (48) sol	13,000	21,000 (48) vap	LQM S4UL
	EC>12-16	1%	1,100 (24) sol	1,100 (24) sol	11,000	59,000 (24) sol	13,000	25,000 (24) sol	LQM S4UL
	EC>16-35	1%	65,000 (8.48)	65,000 (8.48) f ,sol	260,000 f	160,000 f	250,000 f	450,000 f	LQM S4UL
	EC>35-44	1%	65,000 (8.48)	65,000 (8.48) f ,sol	260,000 f	160,000 f	250,000 f	450,000 f	LQM S4UL
	Aliphatic								
	EC 5-6	2.5%	78	78	1,700	5,900 (558) sol	590,000	130,000 (558) sol	LQM S4UL
	EC>6-8	2.5%	230	230	5,600	17,000 (322) sol	610,000	220,000 (322) sol	LQM S4UL
	EC>8-10	2.5%	65	65	770	4,800 (190) vap	13,000	18,000 (190) vap	LQM S4UL
	EC>10-12	2.5%	330 (118) vap	330 (118) vap	4,400	23,000 (118) vap	13,000	23,000 (118) vap	LQM S4UL
	EC>12-16	2.5%	2,400 (59) sol	2,400 (59) sol	13,000	82,000 (59) sol	13,000	25,000 (59) sol	LQM S4UL
	EC>16-35	2.5%	92,000 (21)	92,000 (21) f ,sol	270,000 f	1,700,000 f	250,000 f	480,000 f	LQM S4UL
	EC>35-44	2.5%	92,000 (21)	92,000 (21) f ,sol	270,000 f	1,700,000 f	250,000 f	480,000 f	LQM S4UL
	Aliphatic								
	EC 5-6	6%	160	160	3,900	12,000 (1,150) sol	600,000	180,000 (1,150)	LQM S4UL
	EC>6-8	6%	530	530	13,000	40,000 (736) sol	620,000	320,000 (736) sol	LQM S4UL
	EC>8-10	6%	150	150	1,700	11,000 (451) vap	13,000	21,000 (451) vap	LQM S4UL
	EC>10-12	6%	760 (283) vap	760 (283) vap	7,300	47,000 (283) vap	13,000	24,000 (283) vap	LQM S4UL
	EC>12-16	6%	4,300 (142) sol	4,400 (142) sol	13,000	90,000 (142) sol	13,000	26,000 (142) sol	LQM S4UL
	EC>16-35	6%	110,000f	110,000f	270,000 f	1,800,000f	250,000 f	490,000 f	LQM S4UL
	EC>35-44	6%	110,000f	110,000f	270,000 f	1,800,000f	250,000 f	490,000 f	LQM S4UL
	Aromatic								
	EC5-7(benzene as non-	1%	70	370	13	26,000 (1,220) sol	56,000	76,000 (1,220) sol	LQM S4UL
	EC>7-8(toluene)	1%	130	860	22	56,000 (869) vap	56,000	87,000 (869) vap	LQM S4UL
	EC>8-10	1%	34	47	8.6	3,500 (613) vap	5,000	7,200 (613) vap	LQM S4UL
	EC>10-12	1%	74	250	13	16,000 (364) sol	5,000	9,200 (364) sol	LQM S4UL
	EC>12-16	1%	140	1,800	23	36,000 (169)sol	5,100	10,000	LQM S4UL
	EC>16-21	1%	260 f	1,900 f	46 f	28,000 f	3,800 f	7,600 f	LQM S4UL
	EC>21-35	1%	1,100 f	1,900 f	370 f	28,000 f	3,800 f	7,800 f	LQM S4UL
	EC>35-44	1%	1,100 f	1,900 f	370f	28,000 f	3,800 f	7,800 f	LQM S4UL
	Aromatic								
	EC5-7(benzene as non-	2.5%	140	690	27	46,000 (2,260) sol	56,000	84,000 (2,260) sol	LQM S4UL
	EC>7-8(toluene)	2.5%	290	1,800	51	110,000 (1,920) sol	56,000	95,000 (1,920) sol	LQM S4UL
	EC>8-10	2.5%	83	110	21	8,100 (1,500) vap	5,000	8,500 (1,500) vap	LQM S4UL
	EC>10-12	2.5%	180	590	31	28,000 (899) sol	5,000	9,700 (899) sol	LQM S4UL
	EC>12-16	2.5%	330	2,300 (419) sol	57	37,000	5,100	10,000	LQM S4UL
	EC>16-21	2.5%	540 f	1,900 f	110 f	28,000 f	3,800 f	7,700 f	LQM S4UL
	EC>21-35	2.5%	1,500 f	1,900 f	820 f	28,000 f	3,800 f	7,800 f	LQM S4UL
	EC>35-44	2.5%	1,500 f	1,900 f	820 f	28,000 f	3,800 f	7,800 f	LQM S4UL
	Aromatic								
	EC5-7(benzene as non-	6%	300	1,400	57	86,000 (4,710) sol	56,000	92,000 (4,710) sol	LQM S4UL
	EC>7-8(toluene)	6%	660	3,900	120	180,000 (4,360)vap	56,000	100,000 (4,360)	LQM S4UL
	EC>8-10	6%	190	270	51	17,000 (3,580) vap	5,000	9,300 (3,580) vap	LQM S4UL
	EC>10-12	6%	380	1,200	4	34,000 (2,150) sol	5,000	10,000	LQM S4UL
	EC>12-16	6%	660	2,500	130	38,000	5,100	10,000	LQM S4UL
	EC>16-21	6%	930f	1,900 f	260 f	28,000 f	3,800 f	7,800 f	LQM S4UL
	EC>21-35	6%	1,700 f	1,900 f	1,600 f	28,000 f	3,800 f	7,900 f	LQM S4UL
	EC>35-44	6%	1,700 f	1,900 f	1,600 f	28,000 f	3,800 f	7,900 f	LQM S4UL
	Aliphatic +Aromatic >EC44	1%	1,600 f	1,900 f	1,200 f	28,000 f	3,800 f	7,800 f	LQM S4UL
		2.5%	1,800 f	1,900 f	2,100 f	28,000 f	3,800 f	7,800 f	LQM S4UL
		6%	1,900 f	1,900 f	3,000 f	28,000 f	3,800 f	7,900 f	LQM S4UL

	Contaminant	SOM	Res +	Res -	Allot.	Comm.	POSresi	POSpark	Source
Chloalkanes and Alkenes & Explosives	1,2 Dichloroethane (DCA)	1%	0.0071	0.0092	0.0046	0.67	29	21	LQM S4UL
		2.5%	0.0110	0.0130	0.0083	0.97	29	24	LQM S4UL
		6%	0.0190	0.0230	0.0160	1.7	29	28	LQM S4UL
	1,1,1 Trichloroethane (TCA)	1%	8.8	9.0	48	660	140,000	57,000 (1,425) vap	LQM S4UL
		2.5%	18	18	110	1,300	140,000	76,000 (2,915) vap	LQM S4UL
		6%	39	40	240	3,000	140,000	100,000 (6,392)	LQM S4UL
	1,1,2,2-Tetrachloroethanes (PCA)	1%	1.6	3.9	0.41	270	1,400	1,800	LQM S4UL
		2.5%	3.4	8.0	0.89	550	1,400	2,100	LQM S4UL
		6%	7.5	17	2.0	1,100	1,400	2,300	LQM S4UL
	1,1,1,2-Tetrachloroethanes (PCA)	1%	1.2	1.5	0.79	110	1,400	1,500	LQM S4UL
		2.5%	2.8	3.5	1.9	250	1,400	1,800	LQM S4UL
		6%	6.4	8.2	4.4	560	1,400	2,100	LQM S4UL
	Tetrachloroethene (PCE)	1%	0.31	0.32	2.00	24	3,200	1400	DEFRA C4SL
		2.5%	0.70	0.71	4.8	55	3,300	1900	DEFRA C4SL
		6%	1.60	1.60	11.0	130	3,400	2,500	DEFRA C4SL
	Tetrachloromethane (carbon tetrachloride)	1%	0.03	0.03	0.45	2.9	890	190	LQM S4UL
		2.5%	0.06	0.06	1.0	6.3	920	270	LQM S4UL
		6%	0.13	0.13	2.4	14	950	400	LQM S4UL
	Trichloroethene (TCE)	1%	0.009	0.010	0.032	0.7	76.0	41.0	DEFRA C4SL
		2.5%	0.020	0.020	0.072	1.5	78.0	51.0	DEFRA C4SL
		6%	0.043	0.045	0.160	3.4	79.0	69.0	DEFRA C4SL
	cis 1,2-dichloroethene	1%	0.46	0.50	0.890	38	3,800	2,000	DEFRA C4SL
		2.5%	0.78	0.84	1.70	64	3,800	2,400	DEFRA C4SL
		6%	1.50	1.60	3.60	120	3,900	3,100	DEFRA C4SL
	Trichloromethane (chloroform)	1%	0.91	1.2	0.42	99	2,500	2,600	LQM S4UL
		2.5%	1.7	2.1	0.83	170	2,500	2,800	LQM S4UL
		6%	3.4	4.2	1.7	350	2,500	3,100	LQM S4UL
	Trans-1,2 Dichloroethene	1%	0.9	0.9	3.7	69	13,000	5,600	DEFRA C4SL
		2.5%	1.6	1.7	7.5	120	13,000	7,000	DEFRA C4SL
		6%	3.3	3.4	16.0	260	13,000	9,100	DEFRA C4SL
	Chloroethene (vinyl chloride)	1%	0.006	0.015	0.0017	1.1E+00	7.8	18.0	DEFRA C4SL
		2.5%	0.010	0.019	0.0031	1.4E+00	7.8	19.0	DEFRA C4SL
		6%	0.017	0.029	0.0058	2.20	7.8	19.0	DEFRA C4SL
	2,4,6-Trinitritoluene (TNT)	1%	1.6	65	0.24	1,000	130	260	LQM S4UL
		2.5%	3.7	66	0.58	1,000	130	270	LQM S4UL
		6%	8.1	66	1.4	1,000	130	270	LQM S4UL
	RDX	1%	120	13,000	17	210,000	26,000	49,000 (18.7) sol	LQM S4UL
		2.5%	250	13,000	38	210,000	26,000	51,000	LQM S4UL
		6%	540	13,000	85	210,000	27,000	53,000	LQM S4UL
	HMX	1%	5.7	6,700	0.86	110,000	13,000	23,000 (0.35) vap	LQM S4UL
		2.5%	13	6,700	1.9	110,000	13,000	23,000 (0.39) vap	LQM S4UL
		6%	26	6,700	3.9	110,000	13,000	24,000 (0.48) vap	LQM S4UL
Pesticides	Aldrin	1%	5.7	7.3	3.2	170	18	30	LQM S4UL
		2.5%	6.6	7.4	6.1	170	18	31	LQM S4UL
		6%	7.1	7.5	9.8	170	18	31	LQM S4UL
	Dieldrin	1%	0.97	7.0	0.17	170	18	30	LQM S4UL
		2.5%	2.0	7.3	0.41	170	18	30	LQM S4UL
		6%	3.5	7.4	0.96	170	18	31	LQM S4UL
	Atrazine	1%	3.3	610	0.5	9,300	1,200	2,300	LQM S4UL
		2.5%	7.8	620	1.2	9,400	1,200	2,400	LQM S4UL
		6%	17.4	620	2.7	9,400	1,200	2,400	LQM S4UL
	Dichlorvos	1%	3.2E-02	6.4	4.9E-03	140	16	26	LQM S4UL
		2.5%	6.6E-02	6.5	1.0E-02	140	16	26	LQM S4UL
		6%	0.14	6.6	2.2E-02	140	16	27	LQM S4UL
	Endosulfanns (2 isomers)	1%	7.4	160 (3.0E-03) vap	1.2	5,600 (3.0E-03) vap	1,200	2,300	LQM S4UL
		2.5%	18	280 (7.0E-03) vap	2.9	7,400 (7.0E-03) vap	1,200	2,400	LQM S4UL
		6%	41	410 (1.6E-02) vap	6.8	8,400 (1.6E-02) vap	1,200	2,500	LQM S4UL
	Hexachlorocyclohexane (3 isomers), inc Lindane	1%	8.5E-02	3.7	1.3E-02	65	8.1	15	LQM S4UL
		2.5%	0.2	3.8	3.2E-02	65	8.1	15	LQM S4UL
		6%	0.46	3.8	7.7E-02	65	8.1	16	LQM S4UL
Chlorobenzenes	Chlorobenzene	1%	0.46	0.46	5.9	56	11,000	1,300 (675) sol	LQM S4UL
		2.5%	1.0	1.0	14	130	13,000	2,000 (1,520) sol	LQM S4UL
		6%	2.4	2.4	32	290	14,000	2,900	LQM S4UL
	Dichlorobenzenes (3 isomers)	1%	23	24	94	2,000 (571) sol	90,000	24,000 (571) sol	LQM S4UL
		2.5%	55	57	230	4,800 (1,370) sol	95,000	36,000 (1,370) sol	LQM S4UL
		6%	130	130	540	11,000 (3,240) sol	98,000	51,000 (3,270) sol	LQM S4UL
	Trichlorobenzenes (3 isomers)	1%	2.6	2.6	55	220	15,000	1,700 (318) vap	LQM S4UL
		2.5%	6.4	6.4	140	530	17,000	2,600 (786) vap	LQM S4UL
		6%	15	15	320	1,300	19,000	4,000 (1,880) vap	LQM S4UL
	Tetrachlorobenzenes (3 isomers)	1%	0.66	0.75	0.38	49 (39.4) vap	78	110 (39) vap	LQM S4UL
		2.5%	1.6	1.9	0.90	120 (98.1) vap	79	120	LQM S4UL
		6%	3.7	4.3	2.2	240 (235) vap	79	130	LQM S4UL
	Pentachlorobenzene	1%	5.8	19	1.2	640 (43.0) sol	100	190	LQM S4UL
		2.5%	12	30	3.1	770 (107) sol	100	190	LQM S4UL
		6%	22	38	7.0	830	100	190	LQM S4UL
	Hexachlorobenzene	1%	1.8 (0.20) vap	4.1 (0.20) vap	0.47	110 (0.20) vap	16	30	LQM S4UL
		2.5%	3.3 (0.50) vap	5.7 (0.50) vap	1.1	120	16	30	LQM S4UL
		6%	4.9	6.7 (1.2) vap	2.5	120	16	30	LQM S4UL

Generic Assessment Criteria Values

	Contaminant	SOM	Res +	Res -	Allot.	Comm.	POSresi	POSpark	Source
Chlorophenol	Chlorophenols (4 congeners)	1%	0.87 [g]	94	0.13 [g]	3,500	620	1,100	LQM S4UL
		2.5%	2.0	150	0.30	4,000	620	1,100	LQM S4UL
		6%	4.5	210	0.70	4,300	620	1,100	LQM S4UL
	Pentachlorophenol	1%	0.22	27 (16.4) [vap]	3.0E-02	400	60	110	LQM S4UL
		2.5%	0.52	29	8.0E-02	400	60	120	LQM S4UL
		6%	1.2	31	0.19	400	60	120	LQM S4UL
Others	Carbon Disulphide	1%	0.14	0.14	4.8	11	11,000	1,300	LQM S4UL
		2.5%	0.29	0.29	10	22	11,000	1,900	LQM S4UL
		6%	0.62	0.62	23	47	11,000	2,700	LQM S4UL
	Hexachlorobutadiene	1%	0.29	0.32	0.25	31	25	48	LQM S4UL
		2.5%	0.7	0.78	0.61	66	25	50	LQM S4UL
		6%	1.6	1.8	1.4	120	25	51	LQM S4UL
	Phenol	1%	120	440 (460)	23	440 [dir] (26,000)	440 [dir] (10,000)	440 [dir] (7,600)	LQM S4UL
		2.5%	200	690	42	690 [dir] (30,000)	690 [dir] (10,000)	690 [dir] (8,300)	LQM S4UL
		6%	380	1,200	83	1,300 [dir] (34,000)	1,300 [dir] (10,000)	1,300 [dir] (9,300)	LQM S4UL

sol/vap = solubility/vapour limit (potenitally use if free product identified, although highly conservative)
*=naphthalene C4SL exceeds the CLEA calculated soil saturation concentration (76 mg kg-1 for 1% SOM,
183 mg kg-1 for 2.5% SOM and 432 mg kg-1 for 6% SOM)
f = oral, dermal and inhalation exposures compared to oral HCV
dir = S4ULs based on threshold protective of direct skin contact with phenol)brackets long term exposure for illustration purposes)
g = derived based on 2,3,4-tetrachlorophenol

Appendix D – JIWG Output Sheets

JIWG

Joint Industry Working Group

Asbestos in Soil and Construction & Demolition Materials

Project Reference	LKC241349
Site Name	Greenside Mills, Skelmanthorpe
Client	Caldwell Construction Ltd
Run by	CC
Date	18-Apr-24
Scenario details	Excavation of eastern pond silts

Decision Support Tool for CAR2012 Work Categories

Stage 1

Hazard Factors

		Score
Select ACM type (run model for each type to generate 'Worst Case' output)	Free dispersed fibres/fibre bundles	2
Extent of degradation of ACMs at outset of work	Disaggregated (dominated by loose fibrous material; extreme degradation in ACM and/or free asbestos fibres/fibre bundles)	4
Friability and degree of bonding by matrix (ACM matrix, not ground materials)	Friable ACM or ACM with fibres not linked in any matrix (free dispersed fibres/fibre bundles)	4
Distribution of Visible Asbestos Across Affected Area	No visible ACMs/fibre bundles	0
Amount of asbestos fibre in selected ACM/fibre type as % of host material	Trace quantities - <0.0001 to 0.001 %wt/wt	0
Sub-total		**0**

Note: the asbestos licensing regime is unaffected by the type of asbestos fibre present in ACMs

Hazard ranking **Negligible**

No warranty, expressed or implied, or reliance, is provided in relation to the use of this tool.
It is contingent on users to satisfy themselves that the output from the tool is relevant and appropriate to the assessment being made.

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Stage 2

Exposure Factors

		Score
Anticipated airborne fibre concentration - Control Limit or SALI?	<0.01 fibres/ml	1
Anticipated duration of exposure to asbestos	> 2 hours in a 7 day period and Up to 10 hours in a day (e.g. full time occupational exposure)	4
Activity type and effect on deterioration of ACMs during work	Sampling, manual or mechanical (significant deterioration expected)	2
Best description of primary host material matrix (soil/made ground)	Fine Silt and/or Clay	1
Respirable fibre index for ACM - RIVM report 711701034 (2003)	Low	2
Sub-total		**10**
Exposure ranking		Low
Combined hazard and exposure ranking	**10**	Very Low

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Stage 3

Risk Assessment Outputs

Probable Licensing Status	CAR do not apply
RPE*	None
Dust Suppression**	None
Hygiene/Decontamination***	None

*Where RPE has to be worn continuously for long periods (e.g. more than 1-hour), then powered RPE may be necessary.
**Reduction in control measures possible if natural mitigation factors are present (e.g. raining, wet ground)
***Guide only; suitability of selected personal hygiene measures may be reviewed on a site/contamination-specific basis

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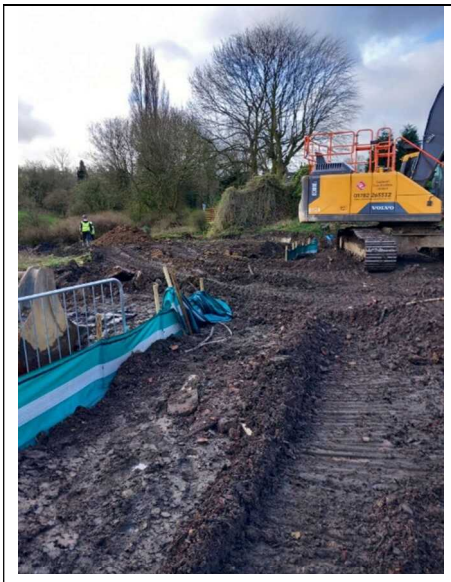
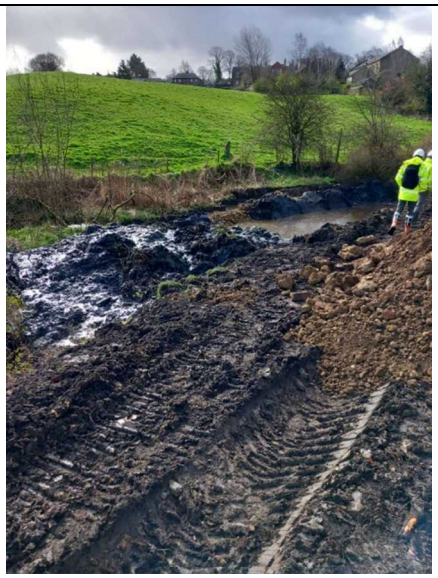
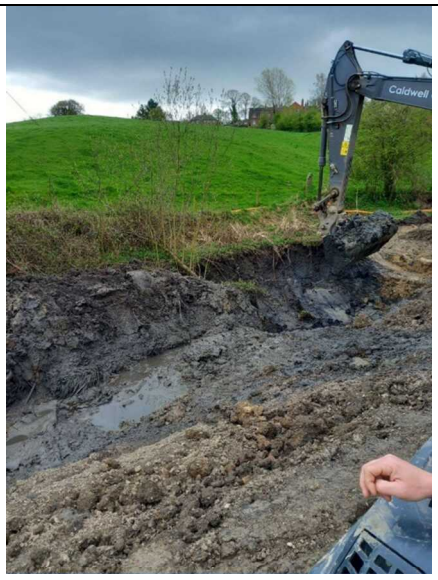
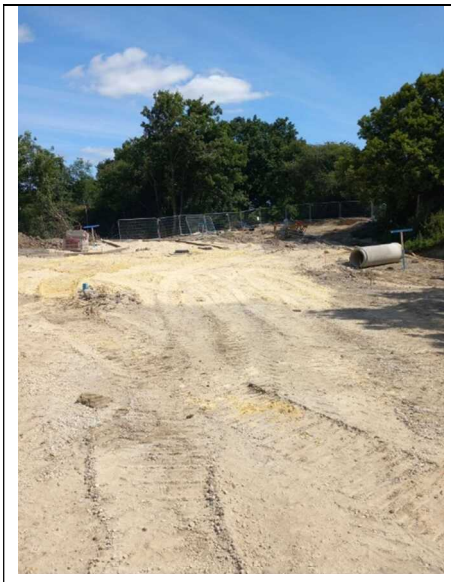
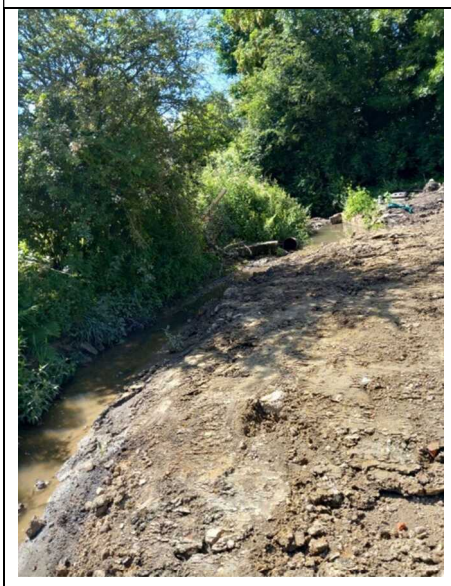
Appendix E – Photographs of Remedial Works






Caldwell





Appendix F – Photographs of Validation Works

Photographs of eastern part of the site reduced to natural clay strata.

POS Area left c. 450mm below finish levels

Validation Sampling in POS Area

Appendix G – LKC Certificates of Analysis

Colin Crompton
LK Consult Limited
Unit 29 Eton Business Park
Eton Hill Road
Manchester
M26 2ZS

Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 24-11405

Site Reference:	Greenside Mills, Skelmanthorpe
Project / Job Ref:	LKC241349
Order No:	PO-C000411
Sample Receipt Date:	26/09/2024
Sample Scheduled Date:	26/09/2024
Report Issue Number:	1
Reporting Date:	03/10/2024

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 24-11405	**~Date Sampled**	24/09/24	24/09/24	24/09/24	24/09/24	24/09/24
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	TP301	TP301	TP302	TP302	TP303
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: PO-C000411	**~Depth (m)**	0.00 - 2.20	0.00 - 2.20	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00
Reporting Date: 03/10/2024	**DETS Sample No**	740306	740307	740308	740309	740310

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected		Not Detected		Not Detected
pH	pH Units	N/a	MCERTS	7.4		7.5		7.5
Total Cyanide	mg/kg	< 1	NONE	< 1		< 1		< 1
Free Cyanide	mg/kg	< 1	NONE	< 1		< 1		< 1
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	603		327		376
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.60		0.33		0.38
Organic Matter (SOM)	%	< 0.1	MCERTS	7.3		7.5		7
Arsenic (As)	mg/kg	< 2	MCERTS	12		12		12
W/S Boron	mg/kg	< 1	NONE	1.3		1.2		< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.6		0.5		0.5
Chromium (Cr)	mg/kg	< 2	MCERTS	58		70		54
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		< 2		< 2
Copper (Cu)	mg/kg	< 4	MCERTS	104		82		85
Lead (Pb)	mg/kg	< 3	MCERTS	332		130		114
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1		< 1		< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	28		29		27
Selenium (Se)	mg/kg	< 2	MCERTS	< 2		< 2		< 2
Vanadium (V)	mg/kg	< 1	MCERTS	30		30		29
Zinc (Zn)	mg/kg	< 3	MCERTS	169		153		161
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2		< 2		< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)
~Sample details provided by customer and can affect the validity of results
(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation

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4480

Soil Analysis Certificate						
DETS Report No: 24-11405	**~Date Sampled**	24/09/24	24/09/24	24/09/24	24/09/24	24/09/24
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	TP303	TP304	TP304	TP305	TP305
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: PO-C000411	**~Depth (m)**	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00	0.00 - 1.50	0.00 - 1.50
Reporting Date: 03/10/2024	**DETS Sample No**	740311	740312	740313	740314	740315

Determinand	Unit	RL	Accreditation				(n)	
Asbestos Screen (S)	N/a	N/a	ISO17025		Not Detected		Not Detected	Not Detected
pH	pH Units	N/a	MCERTS		7.4		7.7	7.9
Total Cyanide	mg/kg	< 1	NONE		< 1		< 1	< 1
Free Cyanide	mg/kg	< 1	NONE		< 1		< 1	< 1
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS		657		1220	1070
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS		0.66		1.22	1.07
Organic Matter (SOM)	%	< 0.1	MCERTS		8.4		7.5	6.9
Arsenic (As)	mg/kg	< 2	MCERTS		13		12	12
W/S Boron	mg/kg	< 1	NONE		< 1		< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS		1.6		0.6	0.6
Chromium (Cr)	mg/kg	< 2	MCERTS		73		56	62
Chromium (hexavalent)	mg/kg	< 2	NONE		< 2		< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS		112		98	85
Lead (Pb)	mg/kg	< 3	MCERTS		139		291	110
Mercury (Hg)	mg/kg	< 1	MCERTS		< 1		< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS		28		29	28
Selenium (Se)	mg/kg	< 2	MCERTS		< 2		< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS		32		31	32
Zinc (Zn)	mg/kg	< 3	MCERTS		188		171	156
Total Phenols (monohydric)	mg/kg	< 2	NONE		< 2		< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)
~Sample details provided by customer and can affect the validity of results

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 24-11405	**~Date Sampled**	24/09/24	24/09/24	24/09/24	24/09/24	24/09/24
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	TP301	TP302	TP303	TP304	TP305
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: PO-C000411	**~Depth (m)**	0.00 - 2.20	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00	0.00 - 1.50
Reporting Date: 03/10/2024	**DETS Sample No**	740306	740308	740310	740312	740314

Determinand	Unit	RL	Accreditation					(n)
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	0.14	0.13	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.48	0.66	0.79	0.74	0.56
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.17	0.17	0.16	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	1.22	1.39	1.77	1.64	1.19
Pyrene	mg/kg	< 0.1	MCERTS	1.06	1.21	1.52	1.40	1.08
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.39	0.47	0.57	0.52	0.42
Chrysene	mg/kg	< 0.1	MCERTS	0.53	0.62	0.71	0.69	0.58
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.43	0.64	0.58	0.59	0.54
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.15	0.21	0.18	0.19	0.19
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.37	0.43	0.50	0.49	0.46
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.23	0.25	0.28	0.26	0.25
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.19	0.22	0.21	0.23	0.23
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	5	6.4	7.4	6.9	5.5

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 24-11405	**~Date Sampled**	24/09/24				
LK Consult Limited	**~Time Sampled**	None Supplied				
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	TP305				
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied				
~Order No: PO-C000411	**~Depth (m)**	0.00 - 1.50				
Reporting Date: 03/10/2024	**DETS Sample No**	740315				

Determinand	**Unit**	**RL**	**Accreditation**					
Naphthalene	mg/kg	< 0.1	**MCERTS**	< 0.1				
Acenaphthylene	mg/kg	< 0.1	**MCERTS**	< 0.1				
Acenaphthene	mg/kg	< 0.1	**MCERTS**	< 0.1				
Fluorene	mg/kg	< 0.1	**MCERTS**	< 0.1				
Phenanthrene	mg/kg	< 0.1	**MCERTS**	0.68				
Anthracene	mg/kg	< 0.1	**MCERTS**	0.14				
Fluoranthene	mg/kg	< 0.1	**MCERTS**	1.47				
Pyrene	mg/kg	< 0.1	**MCERTS**	1.31				
Benzo(a)anthracene	mg/kg	< 0.1	**MCERTS**	0.51				
Chrysene	mg/kg	< 0.1	**MCERTS**	0.68				
Benzo(b)fluoranthene	mg/kg	< 0.1	**MCERTS**	0.67				
Benzo(k)fluoranthene	mg/kg	< 0.1	**MCERTS**	0.21				
Benzo(a)pyrene	mg/kg	< 0.1	**MCERTS**	0.58				
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	**MCERTS**	0.33				
Dibenz(a,h)anthracene	mg/kg	< 0.1	**MCERTS**	< 0.1				
Benzo(ghi)perylene	mg/kg	< 0.1	**MCERTS**	0.26				
Total EPA-16 PAHs	mg/kg	< 1.6	**MCERTS**	6.8				

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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 24-11405	**~Date Sampled**	24/09/24	24/09/24	24/09/24	24/09/24	24/09/24
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	TP301	TP301	TP302	TP302	TP303
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: PO-C000411	**~Depth (m)**	0.00 - 2.20	0.00 - 2.20	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00
Reporting Date: 03/10/2024	**DETS Sample No**	740306	740307	740308	740309	740310

Determinand	**Unit**	**RL**	**Accreditation**					
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01		< 0.01		< 0.01
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05		< 0.05		< 0.05
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	**MCERTS**	< 2		< 2		< 2
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	**MCERTS**	< 2		< 2		< 2
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	**MCERTS**	< 3		< 3		< 3
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	**MCERTS**	< 3		< 3		< 3
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	**MCERTS**	< 10		< 10		< 10
Aliphatic >C34 - C44 : EH_CU_1D_AL	mg/kg	< 10	NONE	< 10		< 10		< 10
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21		< 21		< 21
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01		< 0.01		< 0.01
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05		< 0.05		< 0.05
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	**MCERTS**	< 2		< 2		< 2
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	**MCERTS**	< 2		< 2		< 2
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	**MCERTS**	< 2		< 2		< 2
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	**MCERTS**	3		15		6
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	**MCERTS**	< 10		17		< 10
Aromatic >C35 - C44 : EH_CU_1D_AR	mg/kg	< 10	NONE	< 10		< 10		< 10
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21		32		< 21
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Total	mg/kg	< 42	NONE	< 42		< 42		< 42

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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 24-11405	**~Date Sampled**	24/09/24	24/09/24	24/09/24	24/09/24	24/09/24
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	TP303	TP304	TP304	TP305	TP305
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: PO-C000411	**~Depth (m)**	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00	0.00 - 1.50	0.00 - 1.50
Reporting Date: 03/10/2024	**DETS Sample No**	740311	740312	740313	740314	740315

Determinand	Unit	RL	Accreditation				(n)	
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE		< 0.01		< 0.01	< 0.01
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE		< 0.05		< 0.05	< 0.05
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS		< 2		< 2	< 2
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS		< 2		< 2	< 2
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS		< 3		< 3	< 3
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS		< 3		< 3	< 3
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS		< 10		< 10	< 10
Aliphatic >C34 - C44 : EH_CU_1D_AL	mg/kg	< 10	NONE		< 10		< 10	< 10
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE		< 21		< 21	< 21
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE		< 0.01		< 0.01	< 0.01
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE		< 0.05		< 0.05	< 0.05
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS		< 2		< 2	< 2
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS		< 2		< 2	< 2
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS		< 2		< 2	< 2
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS		9		9	7
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS		< 10		< 10	< 10
Aromatic >C35 - C44 : EH_CU_1D_AR	mg/kg	< 10	NONE		< 10		< 10	< 10
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE		< 21		< 21	< 21
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Total	mg/kg	< 42	NONE		< 42		< 42	< 42

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 24-11405	**~Date Sampled**	24/09/24	24/09/24	24/09/24	24/09/24	24/09/24
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	TP301	TP302	TP303	TP304	TP305
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: PO-C000411	**~Depth (m)**	0.00 - 2.20	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00	0.00 - 1.50
Reporting Date: 03/10/2024	**DETS Sample No**	740306	740308	740310	740312	740314

Determinand	Unit	RL	Accreditation					(n)
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 24-11405	**~Date Sampled**	24/09/24				
LK Consult Limited	**~Time Sampled**	None Supplied				
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	TP305				
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied				
~Order No: PO-C000411	**~Depth (m)**	0.00 - 1.50				
Reporting Date: 03/10/2024	**DETS Sample No**	740315				

Determinand	Unit	RL	Accreditation					
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2				
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5				
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2				
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2				
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2				
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5				

~Sample details provided by customer and can affect the validity of results

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UKAS TESTING
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Leachate Analysis Certificate						
DETS Report No: 24-11405	**~Date Sampled**	24/09/24	24/09/24	24/09/24	24/09/24	24/09/24
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	TP301	TP301	TP302	TP302	TP303
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: PO-C000411	**~Depth (m)**	0.00 - 2.20	0.00 - 2.20	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00
Reporting Date: 03/10/2024	**DETS Sample No**	740306	740307	740308	740309	740310

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	ISO17025		8.2		7.3	
Total Cyanide	ug/l	< 5	ISO17025		< 5		< 5	
Free Cyanide	ug/l	< 5	NONE		< 5		< 5	
Sulphate as SO_4	mg/l	< 1	ISO17025		56		51	
Dissolved Organic Carbon (DOC)	mg/l	< 1.0	ISO17025		13.8		12.7	
Hardness - Total	mgCaCO3/l	< 0.25	NONE		129		126	
Arsenic	ug/l	< 0.2	ISO17025		2.8		3.6	
Boron	ug/l	< 1	ISO17025		31		33	
Cadmium	ug/l	< 0.2	ISO17025		< 0.2		< 0.2	
Chromium	ug/l	< 0.2	ISO17025		0.3		0.6	
Chromium (hexavalent)	ug/l	< 20	NONE		< 20		< 20	
Copper	ug/l	< 0.2	ISO17025		10.8		10.0	
Lead	ug/l	< 0.2	ISO17025		0.5		1.0	
Mercury	ug/l	< 0.04	ISO17025		< 0.04		< 0.04	
Nickel	ug/l	< 0.2	ISO17025		1.0		1.5	
Selenium	ug/l	< 0.2	ISO17025		0.4		0.4	
Vanadium	ug/l	< 0.2	ISO17025		1.6		2.3	
Zinc	ug/l	< 1	ISO17025		14		16	
Calcium	mg/l	< 0.1	ISO17025		35.6		34.9	
Total Phenols (monohydric)	ug/l	< 10	ISO17025		< 10		< 10	

Subcontracted analysis (S)
~Sample details provided by customer and can affect the validity of results
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UKAS TESTING
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Leachate Analysis Certificate						
DETS Report No: 24-11405	**~Date Sampled**	24/09/24	24/09/24	24/09/24	24/09/24	24/09/24
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	TP303	TP304	TP304	TP305	TP305
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: PO-C000411	**~Depth (m)**	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00	0.00 - 1.50	0.00 - 1.50
Reporting Date: 03/10/2024	**DETS Sample No**	740311	740312	740313	740314	740315

Determinand	**Unit**	**RL**	**Accreditation**				(n)	
pH	pH Units	N/a	**ISO17025**	8.2		7.9		
Total Cyanide	ug/l	< 5	**ISO17025**	< 5		< 5		
Free Cyanide	ug/l	< 5	NONE	< 5		< 5		
Sulphate as SO_4	mg/l	< 1	**ISO17025**	50		73		
Dissolved Organic Carbon (DOC)	mg/l	< 1.0	**ISO17025**	12.5		14.1		
Hardness - Total	mgCaCO3/l	< 0.25	NONE	124		149		
Arsenic	ug/l	< 0.2	**ISO17025**	3.6		3.5		
Boron	ug/l	< 1	**ISO17025**	32		33		
Cadmium	ug/l	< 0.2	**ISO17025**	< 0.2		< 0.2		
Chromium	ug/l	< 0.2	**ISO17025**	0.5		0.5		
Chromium (hexavalent)	ug/l	< 20	NONE	< 20		< 20		
Copper	ug/l	< 0.2	**ISO17025**	10.0		10.5		
Lead	ug/l	< 0.2	**ISO17025**	1.0		0.6		
Mercury	ug/l	< 0.04	**ISO17025**	< 0.04		< 0.04		
Nickel	ug/l	< 0.2	**ISO17025**	1.1		1.8		
Selenium	ug/l	< 0.2	**ISO17025**	0.4		0.5		
Vanadium	ug/l	< 0.2	**ISO17025**	2.8		1.9		
Zinc	ug/l	< 1	**ISO17025**	12		13		
Calcium	mg/l	< 0.1	**ISO17025**	33.2		41.9		
Total Phenols (monohydric)	ug/l	< 10	**ISO17025**	< 10		< 10		

Subcontracted analysis (S)
~Sample details provided by customer and can affect the validity of results

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Leachate Analysis Certificate - Speciated PAH						
DETS Report No: 24-11405	**~Date Sampled**	24/09/24	24/09/24	24/09/24	24/09/24	
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	TP301	TP302	TP303	TP304	
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	
~Order No: PO-C000411	**~Depth (m)**	0.00 - 2.20	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00	
Reporting Date: 03/10/2024	**DETS Sample No**	740307	740309	740311	740313	

Determinand	**Unit**	**RL**	**Accreditation**					
Naphthalene	ug/l	< 0.01	NONE	0.03	0.05	0.02	0.03	
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Acenaphthene	ug/l	< 0.01	NONE	0.04	0.06	0.03	0.05	
Fluorene	ug/l	< 0.01	NONE	0.03	0.03	< 0.01	0.03	
Phenanthrene	ug/l	< 0.01	NONE	0.09	0.03	< 0.01	0.03	
Anthracene	ug/l	< 0.01	NONE	0.03	< 0.01	< 0.01	0.02	
Fluoranthene	ug/l	< 0.01	NONE	0.07	< 0.01	0.04	0.08	
Pyrene	ug/l	< 0.01	NONE	0.05	0.07	0.03	0.07	
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(ghi)perylene	ug/l	< 0.008	NONE	< 0.008	< 0.008	< 0.008	< 0.008	
Total EPA-16 PAHs	ug/l	< 0.16	NONE	0.34	0.24	< 0.16	0.31	

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Leachate Analysis Certificate - TPH CWG Banded						
DETS Report No: 24-11405	**~Date Sampled**	24/09/24	24/09/24	24/09/24	24/09/24	
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	TP301	TP302	TP303	TP304	
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	
~Order No: PO-C000411	**~Depth (m)**	0.00 - 2.20	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00	
Reporting Date: 03/10/2024	**DETS Sample No**	740307	740309	740311	740313	

Determinand	**Unit**	**RL**	**Accreditation**					
Aliphatic >C5 - C6 : HS_1D_MS_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	
Aliphatic >C6 - C8 : HS_1D_MS_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	
Aliphatic >C8 - C10 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	
Aliphatic >C10 - C12 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	
Aliphatic >C12 - C16 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	
Aliphatic >C16 - C21 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	
Aliphatic >C21 - C34 : EH_CU_1D_AL	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	
Aromatic >C5 - C7 : HS_1D_MS_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	
Aromatic >C7 - C8 : HS_1D_MS_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	
Aromatic >C8 - C10 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	
Aromatic >C10 - C12 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	
Aromatic >C12 - C16 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	
Aromatic >C16 - C21 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	
Aromatic >C21 - C35 : EH_CU_1D_AR	ug/l	< 10	NONE	< 10	< 10	< 10	< 10	

~Sample details provided by customer and can affect the validity of results

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Leachate Analysis Certificate - BTEX / MTBE						
DETS Report No: 24-11405	**~Date Sampled**	24/09/24	24/09/24	24/09/24	24/09/24	
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	TP301	TP302	TP303	TP304	
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied	None Supplied	None Supplied	
~Order No: PO-C000411	**~Depth (m)**	0.00 - 2.20	0.00 - 4.00	0.00 - 4.00	0.00 - 4.00	
Reporting Date: 03/10/2024	**DETS Sample No**	740307	740309	740311	740313	

Determinand	Unit	RL	Accreditation					
Benzene : HS_1D_MS	ug/l	< 1	ISO17025	< 1	< 1	< 1	< 1	
Toluene : HS_1D_MS	ug/l	< 5	ISO17025	< 5	< 5	7	9	
Ethylbenzene : HS_1D_MS	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	
p & m-xylene : HS_1D_MS	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	
o-xylene : HS_1D_MS	ug/l	< 5	ISO17025	< 5	< 5	< 5	< 5	
MTBE : HS_1D_MS	ug/l	< 10	ISO17025	< 10	< 10	< 10	< 10	

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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 24-11405	
LK Consult Limited	
~Site Reference: Greenside Mills, Skelmanthorpe	
~Project / Job Ref: LKC241349	
~Order No: PO-C000411	
Reporting Date: 03/10/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
740306	TP301	None Supplied	0.00 - 2.20	24.8	Brown loamy sand with stones
740308	TP302	None Supplied	0.00 - 4.00	22.9	Brown loamy sand with stones and vegetation
740310	TP303	None Supplied	0.00 - 4.00	24.3	Brown loamy sand with stones and vegetation
740312	TP304	None Supplied	0.00 - 4.00	27	Brown loamy sand with stones and vegetation
740314	TP305	None Supplied	0.00 - 1.50	30.9	Brown clay with vegetation
740315	TP305	None Supplied	0.00 - 1.50	23.7	Brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S
~Sample details provided by customer and can affect the validity of results

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 24-11405
LK Consult Limited
~Site Reference: Greenside Mills, Skelmanthorpe
~Project / Job Ref: LKC241349
~Order No: PO-C000411
Reporting Date: 03/10/2024

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received
~Sample details provided by customer and can affect the validity of results

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Water Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 24-11405
LK Consult Limited
~Site Reference: Greenside Mills, Skelmanthorpe
~Project / Job Ref: LKC241349
~Order No: PO-C000411
Reporting Date: 03/10/2024

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	F	Ammoniacal Nitrogen	Determination of ammoniacal nitrogen by discrete analyser.	E126
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	F	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	UF	Biological Oxygen Demand (BOD)	Determination using BOD sensors measuring the change of pressure	E133
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by c	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR detec	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethan	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered
~Sample details provided by customer and can affect the validity of results

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List of HWOL Acronyms and Operators
DETS Report No: 24-11405
LK Consult Limited
~Site Reference: Greenside Mills, Skelmanthorpe
~Project / Job Ref: LKC241349
~Order No: PO-C000411
Reporting Date: 03/10/2024

Acronym	**Description**
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total
~	Sample details provided by customer and can affect the validity of results

Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH - Aliphatic >C34 - C44 - raw data - EH_CU_1D_AL
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C34 - C44 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C35 - C44 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C44 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS

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ME17 2JN
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DETS Report No: 24-11406

Site Reference:	Greenside Mills, Skelmanthorpe
Project / Job Ref:	LKC241349
Order No:	PO-C000411
Sample Receipt Date:	26/09/2024
Sample Scheduled Date:	26/09/2024
Report Issue Number:	1
Reporting Date:	02/10/2024

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

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Soil Analysis Certificate						
DETS Report No: 24-11406	**~Date Sampled**	24/09/24	24/09/24			
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied			
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	East	Base			
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied			
~Order No: PO-C000411	**~Depth (m)**	None Supplied	None Supplied			
Reporting Date: 02/10/2024	**DETS Sample No**	740316	740317			

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected			
pH	pH Units	N/a	MCERTS	6.3	6.6			
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1			
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1			
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	44	27			
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.04	0.03			
Organic Matter (SOM)	%	< 0.1	MCERTS	1	2.3			
Arsenic (As)	mg/kg	< 2	MCERTS	7	6			
W/S Boron	mg/kg	< 1	NONE	< 1	< 1			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	0.2			
Chromium (Cr)	mg/kg	< 2	MCERTS	32	50			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	41	37			
Lead (Pb)	mg/kg	< 3	MCERTS	29	40			
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	35	32			
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2			
Vanadium (V)	mg/kg	< 1	MCERTS	24	23			
Zinc (Zn)	mg/kg	< 3	MCERTS	88	106			
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)
~Sample details provided by customer and can affect the validity of results

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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 24-11406	**~Date Sampled**	24/09/24	24/09/24			
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied			
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	East	Base			
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied			
~Order No: PO-C000411	**~Depth (m)**	None Supplied	None Supplied			
Reporting Date: 02/10/2024	**DETS Sample No**	740316	740317			

Determinand	**Unit**	**RL**	**Accreditation**					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6			

~Sample details provided by customer and can affect the validity of results

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Soil Analysis Certificate - TPH CWG Banded							
DETS Report No: 24-11406	**~Date Sampled**	24/09/24	24/09/24			
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied			
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	East	Base			
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied			
~Order No: PO-C000411	**~Depth (m)**	None Supplied	None Supplied			
Reporting Date: 02/10/2024	**DETS Sample No**	740316	740317			

Determinand	**Unit**	**RL**	**Accreditation**					
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01			
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05			
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	**MCERTS**	< 2	< 2			
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	**MCERTS**	< 2	< 2			
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	**MCERTS**	< 3	< 3			
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	**MCERTS**	< 3	< 3			
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	**MCERTS**	< 10	< 10			
Aliphatic >C34 - C44 : EH_CU_1D_AL	mg/kg	< 10	NONE	< 10	< 10			
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21	< 21			
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01			
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05			
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	**MCERTS**	< 2	< 2			
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	**MCERTS**	< 2	< 2			
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	**MCERTS**	< 2	< 2			
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	**MCERTS**	< 3	< 3			
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	**MCERTS**	< 10	< 10			
Aromatic >C35 - C44 : EH_CU_1D_AR	mg/kg	< 10	NONE	< 10	< 10			
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21	< 21			
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Total	mg/kg	< 42	NONE	< 42	< 42			

~Sample details provided by customer and can affect the validity of results

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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 24-11406	**~Date Sampled**	24/09/24	24/09/24			
LK Consult Limited	**~Time Sampled**	None Supplied	None Supplied			
~Site Reference: Greenside Mills, Skelmanthorpe	**~TP / BH No**	East	Base			
~Project / Job Ref: LKC241349	**~Additional Refs**	None Supplied	None Supplied			
~Order No: PO-C000411	**~Depth (m)**	None Supplied	None Supplied			
Reporting Date: 02/10/2024	**DETS Sample No**	740316	740317			

Determinand	Unit	RL	Accreditation					
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2			
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5			
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2			
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2			
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2			
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5			

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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 24-11406	
LK Consult Limited	
~Site Reference: Greenside Mills, Skelmanthorpe	
~Project / Job Ref: LKC241349	
~Order No: PO-C000411	
Reporting Date: 02/10/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
740316	East	None Supplied	None Supplied	9	Brown sandy clay
740317	Base	None Supplied	None Supplied	11.2	Brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S
~Sample details provided by customer and can affect the validity of results

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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-11406

LK Consult Limited

~Site Reference: Greenside Mills, Skelmanthorpe

~Project / Job Ref: LKC241349

~Order No: PO-C000411

Reporting Date: 02/10/2024

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received
~Sample details provided by customer and can affect the validity of results

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List of HWOL Acronyms and Operators
DETS Report No: 24-11406
LK Consult Limited
~Site Reference: Greenside Mills, Skelmanthorpe
~Project / Job Ref: LKC241349
~Order No: PO-C000411
Reporting Date: 02/10/2024

Acronym	**Description**
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total
~	Sample details provided by customer and can affect the validity of results

Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH - Aliphatic >C34 - C44 - raw data - EH_CU_1D_AL
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C34 - C44 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C35 - C44 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C44 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS

Appendix H – References

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Swindon
SN4 7DB

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- Geotechnical
- Contaminated
- SuDS & Flood Risk
- Project Management
- Land Remediation
- Land Drilling
- Japanese Knotweed
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APPENDIX 6

Project Management Plan - Lovell Partnerships Limited

LOVELL
safetyalways

PROJECT MANAGEMENT PLAN (PMP)

Incorporating the Construction Phase Health, Safety and Environment Plan

Project: Skelmanthorpe, Saville Rd, Huddersfield, HD8 9EF

What3words location: ///cuddling.chats.gallons

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1. REVISION HISTORY

ISSUE	DATE	DESCRIPTION OF CHANGE	SIGNED
Rev: 1	20/02/24	Initial plan	D Osborne
Rev: 2	24/05/24	Revised version- Prior to Lovell taking over PC role Site team updated Water management arrangements updated Overhead services updated Delivering safely information updated	D Osborne
Rev: 3	24/5/24	Caldwells Groundworking contractor staying as PC until further update	Ben Adderley
Rev: 4	23/7/24	Update with taking Principal Contractor role	Dan Sanderson
Rev: 5	19/8/24	Fire evacuation	Ben Adderley
Rev: 6	27/8/24	New TW checker updated	Ben Adderley
Rev: 7	27/8/24	New Groundworks supervisor	Ben Adderley
Rev: 8	04/09/24	Updated scaffolder	Ben Adderley
Rev: 9	01/10/24	LIMS Desk moniotoring audit by N.Baily	Ben Adderley
Rev: 10	11/10/24	Project environmental inspection	Ben Adderley
Rev: 11	21/10/24	2nd Monthly project review	Ben Adderley
Rev: 12	28/10/24	Covering site Manager	James Igram/Ben Adderley
Rev: 13	5/11/24	Crisis Management updated for November	Ben Adderley
Rev: 14	11/11/24	Fire drill completed	Ben Adderley
Rev: 15	18/11/24	Monthly project review	Ben Adderley
Rev: 16	18/11/24	Monthly H+S audit	Ben Adderley
Rev: 17	30/11/24	New public liability insurance displayed	Ben Adderley
Rev: 18	16/12/24	Monthly project review	Ben Adderley
Rev: 19	16/12/24	Monthly H+S audit (advisory)	Ben Adderley
Rev: 20	20/12/24	Xmas shut down form completed	Ben Adderley
Rev: 21	15.01.25	Glynn Rhodes been added and signatures	Dan Osborne
Rev: 22	10.02.25	Reviewed GR contact details added	Glynn Rhodes
Rev: 23	11.02.25	Transferred over to new version PMP	Emma Morris
Rev:23	07.04.25	Reviewed following project review- No amendments required	G Rhodes/ D Sanderson
Rev: 24	09.05.25	Reviewed no changes at this time	G Rhodes
Rev: 25	23.06.25	Reviewed no changes added	G Rhodes
Rev: 26	30.06.25	Personal update	Emma Morris
Rev: 27	24.07.25	Personal update	Emma Morris

2. SIGN OFF

By signing below, I agree to undertake the responsibilities as detailed within this PMP;

Discipline:	Name	Signed:	Date:
Regional Operations Director	Simon Gordon		23.07.24
Contracts Manager			
Project Manager	Glynn Rhodes		15.01.25

Assistant Site Manager	Dan Benson	24.07.25
Temporary Works Co-ordinator	Glynn Rhodes	24.07.25
Temporary Works Supervisor	Dan Benson	24.07.25
Health, Safety and Environment team	Emma Morris	11.02.25
Regional Managing Director	Robert Adams	23.07.24

Expand or delete as necessary

3. DESCRIPTION OF THE PROJECT

This project management plan outlines our strategies for handling significant health, safety, and environment risks in accordance with P3 and other relevant Lovell policies and procedures during the construction phase. It serves as the primary means of communicating these strategies to everyone involved in the construction phase, so it should be clear and straightforward.

Project description:

46 Plots for open market sale including all associated infrastructure works.

DETAILS OF KEY MEMBERS OF THE PROJECT TEAM:

NAME AND ADDRESS	KEY CONTACT NAME	PHONE No	EMAIL ADDRESS
CLIENT: Lovell Partnerships Ltd Lovell Homes Unit 3	Robert Adams	0113 202 2200	Robert.adams@lovell.co.uk

Turnberry Park Leeds LS27 7LE			
PRINCIPAL DESIGNER: Lovell Partnerships Ltd Lovell Homes Unit 3, Turnberry Park Leeds LS27 7LE	Mark Ballantyne	01113 202 2200	Mark.ballanyne@lovell.co.uk
ARCHITECTURAL DESIGNER: Geoff Perry Associates Limited The Shubbery, 28 Erdington Road, Aldridge, Walsall, WS9 8UH			enquiries@geoffperryassoc.co.uk
PRINCIPAL CONTRACTOR: Lovell Partnerships Ltd Lovell Homes Unit 3, Turnberry Park, Leeds, LS27 7LE	Simon Gordon	0113 202 2200	Simon.gordon@lovell.co.uk
TEMPORARY WORKS CHECKING ENGINEER Morgan Sindall Engineering Solutions (MSES) 210 Euston Road Euston London NW1 2DA	Kai Qu	07789 617695	kai.qu@morgansindall.com

LOVELL MANAGEMENT TEAM:

Expand or delete as necessary

Position	Name	Location	Phone No.
Regional Managing Director	Robert Adams	Lovell regional office	0113 202 2200
Regional Operations Director	Simon Gordon	Lovell regional office	0113 202 2200
Regional Commercial Director	Tim Kelly	Lovell regional office	0113 202 2200
Health, Safety and Environment Manager		Lovell regional office and roving	
Health, Safety and Environment Advisor	Emma Morris	Lovell regional office and roving	07586 556754
Quantity Surveyor	Marin Parker Nick Vale George O'Donovan	Lovell regional office	0113 202 2200
Buyer	Darren Smith	Lovell regional office	01827 305600
Estimator	Dan Wain	Lovell regional office	0113 202 2200
Resident Liaison Officer	Nicola Bailey	Lovell regional office and roving	07811 158244
Contracts Manager		Lovell regional office and roving	
Project Manager	Glynn Rhodes	Site	07966 160347
Assistant site Manager	Dan Benson	Site	07866 071445
Site Fire/Emergency Marshal(s)	Glynn Rhodes Dan Benson	Site	07966 160347 07866 071445
Site First Aider(s)	Glynn Rhodes Dan Benson	Site	07966 16034 07866 0714457
Mental Health First Aider(s)	Emma Morris Dan Benson	Lovell regional office and roving site	07586 556754 07866 071445
Temporary Works Co-ordinator (TWC) As appointed by the Designated Individual	Glynn Rhodes	Site	07966 160 347
Temporary Works Supervisor (TWS) As appointed by the Designated Individual	Dan Benson	Site	07866 071445

DESIGNATED RESPONSIBILITIES

Description	Duty holder	Frequency
Project Management Plan (PMP)	Contracts Manager Site Manager	Initial compilation, reviewed regularly and updated as required during project development
Traffic management (PAVES) plan	Contracts Manager Site Manager	Prior to commencement - updated during project development
PAVES co-ordination	Site Management	Implementation and monitoring of traffic management measures.
Emergency plans	Contracts Manager Site Manager	Prior to commencement - updated during project development
Incident reporting	Contracts Manager Site Manager	As required
Site Induction	Site Management	Prior to individuals' commencement on site - content updated to suit project development
Statutory inspections and registers	Site Management	Weekly/following adaptation/following event likely to affect strength and stability/following fall of material (Lovell operated plant only and all working platforms)
Welfare provision	Site Management	Daily visual inspection
Permits to work (all types)	Site Management	As required
Monitoring and toolbox talks.	Site Management	Monitoring daily. Weekly recorded HSE inspection. Toolbox talks as necessary
Communication and consultation	Site Management	Communication daily. Minuted meetings with workforce representatives as required.
Quality issues	Site Management	Various stages of construction as works proceed
Fire safety	Site Management	Prior to commencement - daily monitoring during project development, fire risk assessment updates
First aid and mental health first aid	Site Management	As required
Temporary works	Temporary Works Co-ordinator (TWC) Temporary Works Supervisor (TWS)	TWC to maintain temporary works register as required. TWS to issue permits to load/strike when appropriate and check adequacy of materials prior to erection. Refer to Temporary Works policy for full responsibilities.
Lifting operations	Site Management	Management of all lifting operations other than basic lifts.
Electrical appointed person	Site Management	As required
Temporary hole and void protection co-ordinator	Site Management	Monitoring daily. Weekly recorded HSE inspection. Toolbox talks as necessary
Environment controls	Site Management	Prior to commencement - daily monitoring during project development
Health and safety file	Contracts Manager Site Management	Relevant information collected monthly. Forwarded to Principal Designer as appropriate

KEY DATES

Start date: 21.02.24

End date: 29.08.25

4. MANAGEMENT OF THE WORK

HEALTH AND SAFETY AIMS FOR THE PROJECT:

The aims are to complete the project on time and to achieve zero accidents and incidents, ill health, or occupational disease throughout the duration of the project through careful planning and where possible, elimination of known hazards.

ARRANGEMENTS TO ENSURE COOPERATION BETWEEN PROJECT TEAM MEMBERS AND COORDINATION OF THEIR WORK.

Effective communication is essential for addressing any health and safety issues that may impact this plan. All contractors should actively encourage their staff to promptly report any health and safety concerns, especially unsafe acts or conditions, to our site management.

If remedial action is necessary and within the contractor's authority, they must address the issue and review the actions taken with site management. If the required action is beyond the contractor's authority or affects other contractors, it must be immediately reported to site management.

Health, safety and the environment will be a standing agenda item in all formal meetings involving Lovell, the Client, the project team, or other contractors.

The meeting agenda will include discussions on health and safety implications arising from design changes, proposals, or site situations, and whether these need to be reported to the Principal Designer or Designer(s). Any apparent gaps in communication between the Designer(s) and Principal Designer will be highlighted in these meetings and reported to the Client or their representative.

Health and safety will be a key topic at regular meetings between the site management team and representatives from each contractor working on the site. All health, safety and environment matters in accordance with P3 and other Lovell policies and procedures will be discussed and documented. Each contractor's representative will be responsible for informing their team members about any relevant issues.

These meetings will also cover and record any design changes implemented since the last meeting. Once design changes are received from any designer, the contracts manager will notify the relevant contractor, update the drawing registers, and forward the updated drawings. It is then the contractor's responsibility to inform their on-site workforce. Our site management will ensure that all current drawing revisions are being used on site.

Lovell will coordinate meetings with other contractors, and interested parties, to discuss any matters affecting the project's health and safety objectives.

We will assess the impact of any design changes issued during the project and discuss any implications, delays, or necessary rescheduling that affect health, safety, and environmental matters if we cannot proceed with the originally planned safe systems of work.

ARRANGEMENTS FOR INVOLVING WORKERS

Lovell employs various methods to inform and encourage consultation on health, safety, and environment matters.

At the project level, induction procedures and site/project meetings are conducted.

For workgangs, toolbox talks, supervisor briefings, and minuted contractors' meetings are held. On an individual level, an open door policy ensures direct communication with employees and contractors.

Lovell's approach includes a direct management approach, adherence to P3 and other health, safety, and environment policies and procedures, and the Lovell Integrated Management System (LIMS). This system encompasses a structured approach to work activities, corrective and preventative actions, management reviews by senior staff, best practice policies, training and personal development, induction processes, pre-commencement meetings with service providers, risk assessments, method statements, and compliance with CDM regulations. Safety representatives and recognition of SRSCR, toolbox talks, and project management plans are also integral parts of this system.

Information is disseminated through site and office notice boards, circulation of HSE policies and procedures, and notifications of relevant legislative or practice changes. Regular minuted contractor health and safety meetings are held on-site with relevant contractors' representatives. Lovell's Managing Director signs all policy statements, and warning signage and poster campaigns are used to reinforce messages. Health, safety, and environmental objectives, targets, and initiatives are continually evaluated and communicated.

Non/low English speaking workers
Contractors are to provide suitable interpreters where non or low English speaking workers are employed to effectively communicate essential health and safety information.

WORKING HOURS AND SUPERVISION REQUIREMENTS

Site hours are from 07.30am to 18.00pm Monday to Friday and 8.30am to 13.30pm on Saturday. Working outside of these hours is not permitted unless by prior agreement.

A competent member of the Lovell site management team must be present on the project at all times, this includes any weekend working.

Risk assessment may determine more than one member of the site management team may be required proportionate to the size and complexity of a project.

Competent contractor supervision is to be provided in accordance with our 'Trade Supervisor to Worker' ratios requirement.

SITE INDUCTION

All new staff and visitors, if not escorted, will receive a site specific induction upon arrival to the site. Induction is not intended to provide general health and safety training but will include a site specific explanation of the project.

All personnel receiving an induction are obliged to complete our Induction register as proof of understanding and receipt.

Each induction should:
Be delivered in a clear and engaging way by a competent individual with suitable knowledge and experience of the site.
Be concise and relevant to the project.
Deliver information people need to work safely and effectively.
Be given to all new staff and visitors, if not escorted.
Be relevant to the audience.

Induction content should include;

Project details	What is being constructed
Project expectations	The overriding health and safety message, e.g. *Everyone going home safe and well at the end of each day* *Conforming to expected behaviours* PPE requirements Site rules
Site set-up	Site layout - *PAVES routes, delivery routes, restricted areas, storage areas, welfare facilities*
Personnel	Lovell management team Other key team members
Individual responsibility	Working in accordance with information provided Following agreed risk assessments and method statements Permit to work requirements Looking out for fellow workers Stopping work and reporting any concerns Right to remove themselves from dangerous situations without fear of reprisal
Site specific information	High risk activities that day or week Other contractors on site Local community Smoking and vaping (e-cigarettes) restrictions Security arrangements Drug and alcohol random and 'for cause' testing arrangements Environmental controls in place or necessary for the project
Accidents and incidents	All near misses (learning events), incidents, accidents and unsafe conditions to be reported to: *Supervisor, Lovell management, own employer* Details will be entered onto our Project Plus incident recording system
Emergency procedures	What to do in the event of: *Accident, fire, or any other incident* Location of: *Alarms, fire extinguishers, First aid personnel and equipment, and site exit routes*
Wellbeing	Raising concerns about a colleague's wellbeing: *Mental health support available* *Recognising and reporting suspected modern slavery*
Further information	Arrangements for: *Task specific briefings, toolbox talks, or significant changes on site*
Consulting the workforce	How this will take place on the project

WELFARE AND STORAGE ARRANGEMENTS

Welfare and storage arrangements for this project will consist of the following;

Item	Arrangement/Size
Initial welfare	Eco Oasis unit with Hybrid generator
Site office/ meeting room	4 Double stacked Eco cabins
Canteen[2]/ drying room[3]	Ground floor cabins
Toilet[1]	Gents and ladies on ground floor
Accommodation access paving	Footpaths located around the permitter of the compound set up
Power[5]	Mains fed
Water[4]	Mains fed
Compound/external lighting	Mains fed security lighting, motion sensor
Site parking	Adjacent compound parking for 20 cars
Smoking area	Designated smoking and vaping shelters identified
Storage containers	4
Mortar mixing areas	Adjacent mortar silo area
Material compounds (bricks, drainage, rings, soakaway crates etc.)	Material storage on hard standing within compound area
Haul roads	Temporary haul roads within the site will be compacted hardcore. The constructed road within the site will be utilised
Roof trusses and other large components i.e. spandrel panels	Roof trusses will be stored on a truss rack
Timber	Timber racking within storage containers.
Plant and equipment	Plant and equipment will be stored with compound
Scaffold components	Laydown area with site stillages and clip bins
End of project welfare	Not applicable

NB. *If units are to be double stacked, they must be designed and constructed to meet the criteria as laid down in the Fire Prevention on Construction Sites JCoP.*

Automatic fire detection is to be fitted within all temporary buildings and temporary accommodation and is to be linked to the overall project fire alarm. All automatic fire detection is to be compatible with chosen fire alarm systems.

linked fire detection must be provided in both units and access doors arranged at opposite sides.

All accommodation and storage units are to be decorated in Lovell corporate colours.

[1]Hot (or warm) and cold running water will be provided, and basins will be large enough to immerse forearm into.

[2]To include suitable and sufficient seating (with backs), a means of boiling water, cups, microwave oven and fridge, a sink with hot or warm running water (for washing up) and a means of drying, adequate comfort and heating and drinking water.

[3] To include lockable storage for clothing and PPE

If generators are used for power, full consideration to the free escape of exhaust fumes is to be given.

[4] To reduce the risk of frozen water supply pipes during low temperatures in winter months, supply pipes are to be buried into the ground to a minimum depth of 600mm. Any pipework above ground, including entry points into units, must be properly insulated by boxing in and filling with suitable insulating materials such as Rockwool or similar.

[5] When demobilising welfare accommodation with power supplies, only competent electricians are to de-energise, disconnect and remove cabling. A certificate is to be obtained from the electrical contractor carrying out these works. Where possible, all cabling, buried or otherwise, is to be fully removed and retained for future use on other projects.

DELIVERING SAFELY INFORMATION

To provide information and expectations when delivering and collecting goods to / from this site.

Site address:	Saville Road, Skelmanthorpe, Huddersfield, HD8				
What3words location:	///cuddling.chats.gallons				
Site contact details:	Glynn Rhodes- 07966 160 347				
Site hours:	No deliveries before 9am or after 15.30pm Monday to Friday. Weekend deliveries not permitted.				
Date:	24.05.24	Initial information		Updated information	X

Risks associated with this site	Controls
Residential area / schools etc.	Site is located in a heavily built-up residential area. Skelmanthorpe Academy is sited on the junction of Saville Road and Piling Lane.
Site pedestrians	Pedestrians and vehicles should be effectively segregated at all times. No unauthorised reversing. A safe area is provided for the driver within the site
Overhead risks (electricity / BT cables)	2 11kv overhead cables are on the development, see accompanying GS6 survey for permittable working distances.
Low / narrow bridges	No Low or Narrow bridges on the route
Adjacent activities	There is a local business situated on Marsden Street. There is a community railway line to the south of site.
Road conditions	Well maintained trunk/ access roads around and within the site. The roads around the proposed development will be narrow with parked cars sited, deliveries to be by a ridged vehicle only.
Major Road Works	None at the time of completion- to be reviewed.
Falls from height	There is no provision of fall protection measures on this site. If access onto the vehicle is necessary/likely, haulier MUST inform how falls will be prevented or risks reduced.
Visitor Parking	Visitor parking is available at the compound location (as depicted)
Use of lifting equipment	Hauliers using their own lifting equipment (i.e. HIAB/Moffett) a suitable lifting plan/risk assessment MUST have been completed prior to commencing the lift.
Contamination (Mud)	Wheel washing Facilities will be provided in the form of jet wash and wash out located at the main site construction area access. A road sweep will be deployed as and when required.

Visit Crashmap for collision history/hotspots near site to assist when establishing a safe route. Enter post code on 'Map' tab once open.

Procedures the visiting driver needs to follow:

- Upon contacting the site office, you will be provided with specific (un)loading details. The following (un)loading equipment is available on this site. This is strictly for use by trained and authorised Lovell employees:

Telehandler Type	JCB Load All 540-140	Telehandler reach	13.9M
Telehandler SWL	4000kg	Accessories (delete/expand)	Extended forks / Truss Jib

Drivers must;

- report to the site office on arrival.
- refer to all instructions displayed on approach to site and follow any isntruciton s given by the gate attendant or logistics manager.
- Remain with their vehicle unless authorised and accompapnied by Lovell personnel. Vehicles are to be secured when leaving unattended with keys removed.
- ensure that it is safe and legal before using your mobile phone.

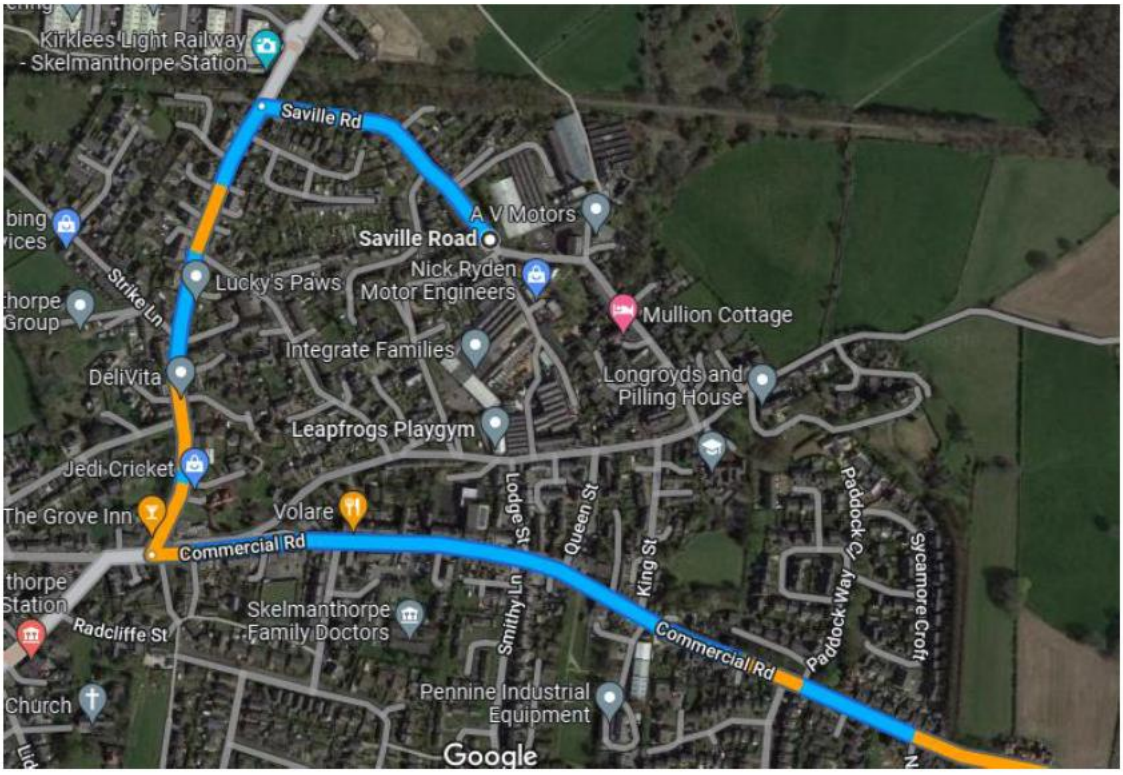
- wear minimum PPE (safety helmet/task suitable gloves/upper body hi-vis clothing/safety footwear) wheb exsitign their vehilce
- not reverse without the aid of a competent banksman.
- provide a lift plan / risk assessment prior to lifting. Use of HIAB / Moffett / FLT must be agreed in advance. Equipment must be maintained and suitable. Operators to be trained in accordance with the ACoP.
- report any accidents immediately to our Site Management. If you have any concerns please inform our Site Management ASAP.
- only smoke or vape in designated areas.

Information required from the Subcontractor or supplier:

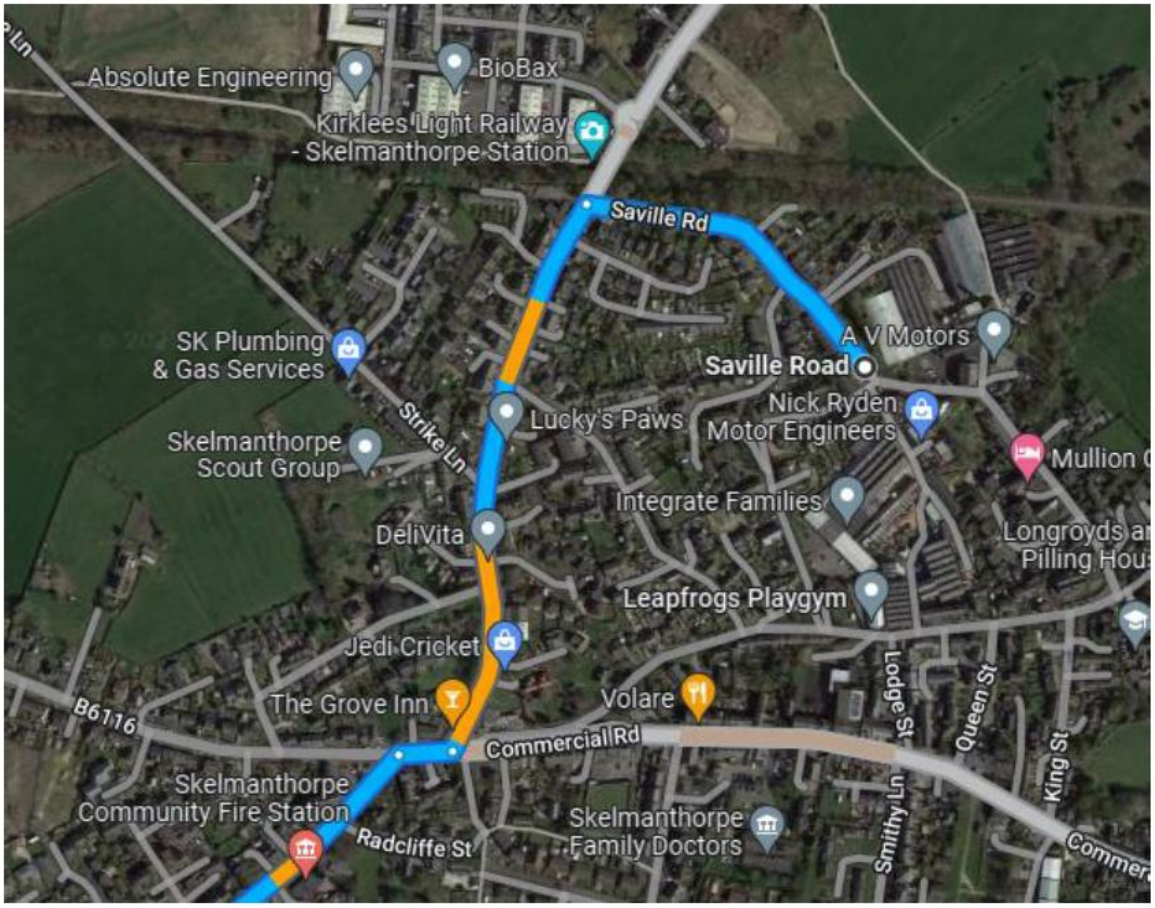
- any specific unloading arrangements.
- if access onto the vehicle is necessary/likely, you must inform how falls will be prevented or risks reduced.
- any other information you feel we need to be aware of prior to deliveries commencing on site that may affect the health and safety of either your driver, the public or another member of the site team.
- if the vehicle or load is classified as 'abnormal', you must apply for the necessary movement order and provide a copy to Lovell before movement of abnormal loads.

Site Plan:

Routes for construction traffic:
From the North via the M1:
Access will be via Commercial road on to Saville Road.



From the South via M1:
Access will be via Cumberworth Road on to Saville Road



Hazard details shown on drawing above:

1. Road not suitable for articulated Lorries.
2. Lovell site entrance. Park vehicle in site approach then contact office. No reversing from site unless authorised by SM and under guidance of a Banksman.
3. Occupied area - these houses are now occupied. Please exercise extreme caution.

FIRE AND EMERGENCY PROCEDURES

Fire Risk Assessment

A competent and responsible person must conduct a fire risk assessment, which includes a thorough evaluation of the site, activities, and potential fire hazards.

For complex projects, independent risk assessors or fire engineers must be employed.

The fire risk assessment must be periodically reviewed to accommodate any changes in construction hazards.

It is essential to communicate identified risks and control measures to all relevant parties.

Fire Marshals

Fire marshals must be volunteers who are adequately trained and sufficient in number to ensure coverage during absences.

They are responsible for ensuring safe evacuation, tackling small fires, and liaising with emergency services.

Training for fire marshals must be kept up to date, and they must be informed of any changes in building usage or layout.

Fire Safety Plan

The fire safety plan, based on the fire risk assessment, must be specific to the project and updated as necessary.

The plan must include details on precautions, fire detection systems, escape routes, and communication plans.

It must address fire service access, storage of flammable materials, and security measures to prevent arson.

Liaison With Emergency Services

During the design phase, engage with the fire and rescue service to identify access requirements.

At the start of construction, discuss the project with emergency services to agree on water supplies and establish review periods.

For high risk projects, consider providing a fire information box with key details, such as access routes, sprinkler installations, and hazardous materials.

Timber Frame Structures

Fire risks for all timber frame projects must be assessed by a competent person, considering both onsite and offsite risks.

Independent risk assessors should be employed for complex projects, and minimum controls must include CCTV, automated heat detection, and regular fire risk assessments.

Compliance with the Structural Timber Association's 16 Steps to Fire Safety and the Fire Prevention on Construction Sites JCoP is mandatory.

Ensure early installation of final cladding, avoid generators in exposed timber structures, and store flammable materials safely.

Automated heat detection linked to the project fire alarm must be in place until the timber frame is enclosed with fire resistant materials.

For large structures, consider non-combustible ground floors, pressurised fire protection treatments, and early compartmentalisation and firestopping. Temporary buildings are not allowed within large timber frame structures.

High Rise Construction

High rise construction projects must have a specific fire risk assessment conducted by a competent person in consultation with the fire and rescue service before work exceeds mechanical rescue height.

Fire doors with self-closers must protect escape stairs, and at least one staircase should be designated for firefighting.

Firefighting lifts must be operational early in the project.

Buildings should be horizontally compartmented every five floors to prevent smoke and flame spread, using temporary firestopping materials until permanent installations are complete.

All openings must be closed off, and temporary firestopping must be replaced after working hours.

Atriums, stairways, and lift shafts must have doors with 30minute fire resistance. Early detection systems must be fitted and operational until the permanent system is live.

Emergency Procedures

Means of Warning:

Establish a proportionate means of warning of fire on all projects, with alarms that are loud, distinctive, and continuous.

Install permanent alarm systems as soon as possible; manual fire bells are not permitted.

Conduct weekly tests and biannual inspections of alarm systems.

Evacuation:

Written emergency procedures must be prominently displayed, clearly identifying assembly points.

All workers must be aware of these procedures.

Establish suitable emergency assembly points, including secondary points if necessary.

Conduct regular evacuation drills and ensure that emergency routes remain unobstructed and clearly marked.

Fire doors and emergency lighting must be regularly checked.

Develop Personal Emergency Evacuation Plans (PEEPs) for employees with special needs.

Automatic Fire Detection

Wireless systems must be Class 1 radio linked and manufactured to EN54 standards.

Implement automated detection in buildings where materials that add to fire loading are stored.

Smoke detection at ceiling level within all temporary accommodations must be linked to the project fire alarm.

All automatic fire detection systems must be compatible with the chosen fire alarm systems.

Access control systems, such as turnstiles, should interface with fire alarms to allow free exit during a fire. If integration is not possible, alternative methods must be effectively managed by the site team.

Temporary Protective Covering Materials

The fire spread potential of any temporary protective material must be carefully considered.

Vulnerable features should be installed late or use temporary products like reusable fire doors.

Flexible protective coverings must meet LPCB LPS 1207 or TS 63 standards for fire performance, with approval marks printed on the material.

Scaffold sheeting must be flame retardant, meeting LPS 1215 or TS 62 standards, and livery printing must not compromise fire performance.

Scaffold stair towers or escape ladders should not be enclosed with sheeting to minimise smoke in escape routes and aid fire and rescue access.

At least one fire escape stairway should be free of protective coverings.

Marketing banners must comply with DIN 4102B1 standards, and their fire performance must be verified despite livery printing.

Portable Fire Extinguishers

Fire extinguishers are for tackling emerging fires or aiding escape. Larger fires must be handled by the fire and rescue service, which should be called immediately.

Provide an adequate number of 13A rated extinguishers based on the fire risk assessment.

P50 service free extinguishers complying with BS EN 37 are allowed but must be visually inspected annually and included in weekly checks.

Alternatives to powder extinguishers are recommended for exit routes due to visibility and respiratory issues.

Extinguishers must be easily visible, mounted on brackets or stands, and regularly maintained.

Weekly checks must ensure extinguishers are in place, undamaged, unobstructed, and have clear operating instructions.

All firefighting equipment must be serviced annually by a qualified person.

Workers must be competent in using the equipment, and its adequacy should be reviewed as work progresses.

Mobile plant should carry appropriate extinguishers where practicable.

Security Against Arson

Arson protection must be part of the fire risk assessment and safety plan.

High risk projects require separate assessments for wilful fire raising.

Buildings must be protected against theft, damage, and deliberate fires per the fire risk assessment and Site Security policy.

Accessible openings should be secured, and access to upper levels via scaffolding prevented.

Flammable liquid and LPG stores must be protected with clear signage.

Site illumination is recommended to deter unauthorised access.

Fire risk assessments should be reviewed during project suspensions, and intruder alarms considered for temporary buildings.

Temporary Buildings and Temporary Accommodation

Temporary buildings include prefabricated cabins, site huts, and portable buildings used during works. Temporary accommodation includes segregated parts of buildings under construction or refurbishment.

The fire risk assessment must detail arrangements for these structures and be reviewed periodically.

Temporary buildings should be separated from other structures by a fire break, ideally 10m wide, but at least 6m where practicable.

Fire breaks should be clear of combustible materials.

Temporary buildings must be constructed with materials that do not significantly contribute to fire growth or smoke propagation, meeting criteria in the Fire Prevention on Construction Sites JCoP.

Where the floor of a temporary building is raised above ground level, the space beneath must be enclosed to prevent rubbish accumulation, whilst still allowing underfloor ventilation.

No combustible materials should be stored under any temporary building.

Fire exits should lead directly to the open air, and escape routes must be inspected periodically.

Automatic fire detection linked to the project fire alarm is required in all temporary buildings and accommodation. Detection systems must be compatible with chosen fire alarms and installed where flammable materials are stored or used.

Open plan areas should be subdivided by fire resisting construction where necessary.

Sleeping accommodation is discouraged and permitted only under exceptional circumstances, separated from work areas with no interconnecting routes.

Heaters and Cooking Appliances

Heaters in temporary buildings must be fixed above floor level, fitted with metal guards, and maintained. Coat stands and drying racks must be positioned safely away from heaters.

Use 110v electric heaters with safety features for heating or drying buildings under construction. If gas heaters are necessary, a risk assessment and hot works permit are required.

Heaters must be securely placed away from flammable materials, provided with ventilation, and not left unattended. Regular monitoring and prompt issue resolution are essential.

Cooking appliances must be properly installed with adequate ventilation. Microwave ovens are preferred, but if not possible, use electrical or gas cookers. Countertop deep fat fryers are prohibited; commercial fryers require a kitchen fire suppression system and cleaning protocols.

Site Storage of Flammable Liquids and LPG

Flammable liquids and LPG cylinders must be stored in open, securely fenced compounds, shaded from the sun and away from pits, drains, and low lying areas.

Liquid fuel stores must have an imperforate bund to contain the largest drum's contents plus 10%.

Flammable liquids and LPG should not be stored together. If stored differently, only a day's supply should be kept in fire resistant containers.

Storage areas must be as far as possible from buildings, ideally 20m away for high risk projects. Containers should not be stored within 10m of buildings or boundaries unless the boundary is a fire resistant wall.

Warning signs must be displayed at store entrances.

Floors must be paved or compacted, and the area kept clear of combustible materials.

All workers must be trained to operate and shut down storage tanks and handling facilities. Portable fire extinguishers must be provided based on the fire risk assessment.

Where practicable, store containers at the lowest accessible point, supported by flame retardant pallets to minimise fire spread.

Acetylene

The use of acetylene must be minimized, and alternative cutting and welding methods should be employed whenever possible.

If the use of acetylene is unavoidable, the number of cylinders onsite must be kept to an absolute minimum.

Acetylene cylinders must not be stored onsite overnight; they should be removed daily or immediately after use.

Hot Work

Hot work, including activities using open flames, grinding, welding, or generating sparks, must be avoided whenever possible. Alternative methods should be used.

When hot work is unavoidable, it must be conducted in designated areas away from workspaces and storage areas.

Only trained personnel may perform hot work, using equipment that is well maintained and inspected regularly.

A comprehensive risk assessment and a Lovell Hot Work Permit are required for all hot work activities.

A fire watch must be maintained during and after the work, utilizing thermal imaging cameras in high risk areas.

The work area must be cleared of combustible materials before starting, with checks on both sides of walls or partitions.

Combustible materials that cannot be moved must be protected with non-combustible covers.

Fire extinguishers must be readily available, and all operatives must be briefed on emergency procedures.

Roofing trades using flaming torches must adhere to NFRC Safe2 Torch guidelines.

Electricity and Gas

All electrical installations must comply with BS 7671 and the Electricity at Work Regulations.

Portable electric equipment must be regularly inspected, tested, and clearly labelled with inspection dates.

Electric cabling should be adequately protected from potential damage.

Temporary lighting must be kept away from combustible materials, with sealed fluorescent tubes being recommended.

A dedicated area must be provided for battery charging to avoid ad hoc charging practices.

Only genuine chargers and batteries should be used to prevent fire hazards.

Main electrical switches should be turned off when not in use to reduce risks.

Photovoltaic panels must be installed according to specifications and isolated during construction.

Permanent gas supplies must be installed by registered gas installers, with gas appliances connected via fixed piping or armoured tubing.

Gas cylinders must be stored outside, secured, and protected from interference.

Waste Materials

Combustible waste must be regularly removed from the site and must not be stored on scaffolding, roofs, or inside buildings.

Metal bins with lids should be used for storing combustible materials before disposal.

Rubbish chutes should be made of fire resistant materials and must not obstruct escape routes.

Waste awaiting disposal must be kept at a safe distance from buildings, smoking shelters, and equipment.

Dry vegetation around the site should be cleared regularly.

The burning of waste is strictly forbidden.

Plant and Vehicles

Stationary plant with internal combustion engines should be located in open air or well-ventilated enclosures, away from combustible materials.

Refuelling of plant and vehicles must only take place in designated areas, and engines must be turned off and allowed to cool before refuelling.

Compressors should be housed separately to minimize fire risk.

Plant and equipment must be protected from impact, with air intakes kept free from flammable gases.

Sand trays or similar non-combustible absorbent agents should be provided to capture fuel or lubricant drips, with regular replacement.

Long term vehicle parking should be away from buildings, with a separate parking area for workers' vehicles. Vehicles should only park within 10 meters of a building for unloading or reloading.

Lithium-Ion Battery Charging - battery operate tools, electric vehicles (cars, bike, scooters), smartphones, e-cigarettes etc.

Where battery charging cabinets are provided, these must be CE compliant fire resistant safety cabinets.

Charging stations should be positioned external to the building undergoing construction/refurbishment.

If located within the building under construction/refurbishment charging stations require suitable fire resistant compartmentation (minimum 60 minutes) and an active means of fire detection should be provided.

Charging of electric vehicles should be conducted at least 10m away from buildings, temporary structures, combustible storage, and hazardous installations where reasonably practicable.

If the required distance is not feasible, a fire risk assessment must be conducted to determine appropriate control measures.

Charging stations should ideally be installed on a time clock switch to prevent out of working hours charging.

Suitable class fire extinguishers must be in proximity of the charging point. (e.g., Lithium Battery Fire (LFX) available via Bull Safety.

The charging of site equipment within the project offices or welfare environments is not permitted.

Suitable arrangements should be provided for the workforce to dispose of Lithium-ion batteries. Contact your waste disposal contractor for advice.

Suitable arrangement for the storing of e-bikes/scooters must be provided. These should be located external to the building away from fire exits and emergency escape routes.

The charging of this equipment must not be permitted on site.

Only use chargers, devices, and batteries from reputable manufacturers and do not mix between different manufacturers.

Chargers and batteries must be maintained in good condition.

Do not store batteries in direct sunlight.

Do not store or transport batteries in tool bags loose with other conducting tools/materials.

Place insulation tape over the terminals of batteries to prevent sparks - dead batteries can still spark. Tape helps prevent sparking and the discharge of energy.

If batteries are damaged use battery disposal bags / plastic zip bags and only dispose of them in designated areas.

Stored Materials

Combustible materials should be stored outside buildings under construction, ideally in locked metal containers.

Internal storage areas must have controlled access, be located away from hot work areas, be covered by fire detection systems or subject to regular checks, have firefighting equipment nearby, and must not be under staircases or escape routes.

Roof storage should be limited to materials for immediate use and must be subject to a fire risk assessment if unavoidable.

Smoking and E-cigarettes

Smoking and the use of e-cigarettes are strictly prohibited within Lovell workplaces.

Designated smoking or vaping areas may be established, constructed from non-combustible materials, and located away from buildings.

These areas must be equipped with facilities for safely extinguishing smoking materials and kept free of combustible waste.

Disposable vapes should be disposed of in dedicated recycling containers.

Signage

All signage must be well maintained, securely fastened, and clearly visible.

Fire safety signs must be illuminated in poor lighting conditions.

Emergency exits must be clearly marked, with exit signs displayed above doorways and openings.

Additional signage may be required to enhance clarity, particularly for escape routes.

Directional arrows should be used to guide people along escape routes without causing confusion.

The locations of firefighting equipment must be indicated with clear signs, including directional arrows if the equipment is not immediately visible.

Training

Training needs must be identified and conducted according to the Training Matrix, with refresher training provided as needed.

Records of all fire safety training must be kept for future reference and compliance purposes.

Testing and Maintenance

Fire alarms must be tested weekly by a nominated person, with any faults identified and addressed promptly.

Emergency lighting must undergo an annual test by a competent person and a monthly test by a nominated person. All tests and any defects must be documented.

Fire extinguishers require regular maintenance, including an annual check by a specialist engineer and a weekly check by a nominated person.

Incidents

All incidents must be recorded in the H&S Incident Report section on Project Plus, and line management informed promptly.

EMERGENCY CONTACTS

Site: Saville Road, Huddersfield, HD8 9EF			
What3words location: ///cuddling.chats.gallons			
Site Manager: Glynn Rhodes		Site Telephone No.: 07966 160347	
Service	**Tel No.**	**Contact Name**	**Address**

Fire	999 or 01484 863514	Ask for commanding officer	Skelmanthorpe Police station 30 Cumberworth Road, Skelmanthorpe, Huddersfield HD8 9AP
Police	999 or 01484 436876	Ask for local PCSO	West Yorkshire police Huddersfield Road, Thongsbridge, Holmfirth, HD9 3JL
Ambulance	999	N/A	Barnsley Hospital Gawber Road, Barnsley, Yorkshire, S75 2EP
A & E Hospital	01226 730000	N/A	Barnsley Hospital Gawber Road, Barnsley, Yorkshire, S75 2EP
Lovell health and safety team	07586 556754	Emma Morris	Unit 3, Turnberry Park, Leeds, LS27 7LE

UTILITIES/CONTRACTORS	
Electricity	Northen Powergrid- 150
Telecommunications	BT 0800 800 150
Water	Yorkshire Water- 0345 1 24 24 24
Gas	Northern Gas Network- 0800 111 999
Check a Gas engineer	0800 408 5500 Gas Safe Register
Tower Crane	N/A
Scaffolder	
Other	

ENFORCING AUTHORITIES		
Health and Safety Executive (HSE)	HSE switchboard - 0151 951 4000	Merton Road, Bootle, L20 7HS
Environment Agency (EA)	Emergency Hotline - 0800 80 70 60 General enquiries - 03708 506 506 (Mon-Fri, 8am - 6pm) Floodline - 0845 988 1188 (24 hour service)	Environment Agency regional offices

WASTE SIC CODE: 41202

Use Energynetworks dial-before-you-dig to obtain contact info on buried electric and gas services in the area

EMERGENCY SAFETY PLAN

Site address:	Saville Road, Skelmanthorpe, Huddersfield, HD8 9EF

What3words location:	///cuddling.chats.gallons

Defibrillator location(s):	///cuddling.chats.gallons

Fire Marshal(s):	Glynn Rhodes

Deputy:	Dan Benson

Means of raising alarm:	Cygnus Wireless

Location of alarm(s):	See traffic management plan

Location of assembly point(s):	Footpath outside compound

Fire point location(s):	Footpath outside compound

Spill kit location(s):	Near the bowers

Review Dates:					

FIRE ACTION

	Operate the nearest alarm
	Call the Fire Brigade on 999
	Leave the building by the nearest available exit
	Report to the assembly point: Footpath- outside compound
	Do not stop to collect personal belongings
	Do not return to the building until authorised to do so

Lovell development, Saville Road, Skelmanthrope, HD8 9ED

What3words location: ///cuddling.chats.gallons

INCIDENT REPORTING AND INVESTIGATION

All work related accidents, incidents and learning events (incidents with potential to cause harm), no matter how minor must be reported to site or office management, or First Aider and the injured persons' supervisor and employer at the earliest opportunity and never later than one day after the event.

The reporting and investigation of work related incidents without undue delay can enable hazards to be eliminated and associated risks to be minimised as soon as possible.

All work related incidents are to be recorded electronically using Project Plus ensuring adequate information is detailed. Submitted entries alert relevant employees automatically.

Line management are to be notified of more serious work related incidents at the earliest opportunity.

First aiders to treat injuries and other issues in accordance with training.

Upon notification of a work related incident, the health, safety and environment team will determine the level of investigation appropriate for the adverse event.

A full investigation may also be required in order to brief lawyers for the purpose of obtaining legal advice in contemplation of possible litigation and/or to prevent recurrence.

By discovering all causes, we intend to learn from work related accidents and incidents and aim to prevent recurrence.

Where appropriate, policies and procedures will be updated accordingly.

National learning bulletins will be published to all relevant employees to ensure effective communication of lessons learnt as necessary.

Where an investigation is deemed appropriate, the following will be applied:

- The injured person(s) supervisors or person in charge shall be interviewed and their comments recorded.
- Witnesses will be interviewed to gather a first hand account of how the incident occurred.
- The scene of the incident shall remain untouched as much as practically possible to establish the cause of the incident.
- Timed and dated photographs and film shall be taken of the incident scene.
- A full sequence of events shall be established following inspection of the incident scene and evidence gained from witness statements.
- If there is any obvious damage to structures, then a competent structural engineer's advice shall be sought immediately.
- If there are signs of damage or defects to any plant or materials, relevant industry expert advice shall be sought immediately.
- All relevant documentation relating to the incident or any injured person(s) tasks shall be made available and inspected for compliance
- The relevant HSE statutory report will be completed by the party responsible for all reportable incidents.

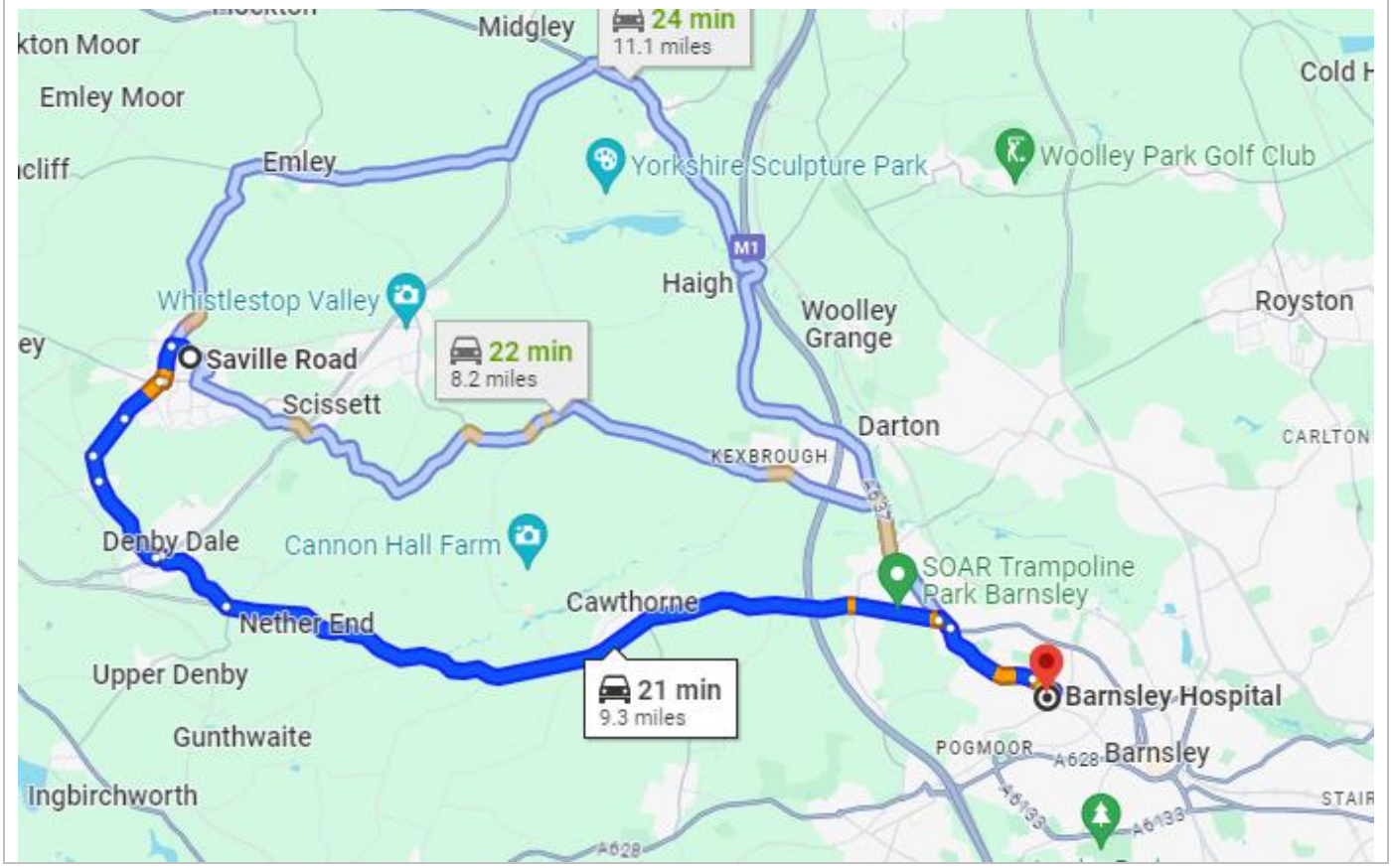
Project management will inform the Client of any RIDDOR notifiable incident.

NEAREST A & E HOSPITAL TO PROJECT
Barnsley Hospital, Gawber Road, Barnsley,

Yorkshire,
S75 2EP

What 3 words- ///charge.deed.switch

Tel: 01226 730000



For route, follow green arrow to orange marker

Use NHS Choices to locate the nearest A & E Hospital and then Google Maps or similar to find directions from site.
Use the Snipping Tool where available to copy the map and paste into the space above, cropping image to suit.

5. ARRANGEMENTS FOR CONTROLLING SIGNIFICANT SITE RISKS

Safety risks including; (delete or expand each section as appropriate ensuring information detailed is relevant to the project)

For further guidance, refer to relevant risk assessments on Project Plus for activities involving Lovell personnel and links to Guidance Documents and relevant Lovell policies.

Contractors' risks assessments and associated method statements will further detail required specific controls

Access	Access routes must be always kept clear and free from obstructions. Properly constructed ramps must be provided at entrances, ensuring a maximum height of 225mm below the internal floor level. No step from any location or equipment, such as the base of scaffold staircases, is to exceed 225mm. It is good practice to create plot ramps when forming scaffold margins around plots, helping to clearly identify doorways allowing scaffolders to accurately position standards. Holes or openings must be adequately protected. General lighting levels must be sufficient around the workplace. Unobstructed plot access through scaffolding must be provided. Ground conditions caused by adverse weather (e.g., ice, snow, puddles) must be suitably managed. Temporary floor coverings must be secured properly and kept in neat order, with fire retardant material used as necessary. Wet or slippery floors must be managed by isolation, proper signage, and prompt cleaning. Minor changes in floor level must be managed and highlighted. The base of stairs or ladders must be free of debris or stacked materials, and steps must not exceed 225mm. Out of bounds areas must be physically blocked off and clearly marked with signage. Internal studwork sole plates must not be fitted without studs or uprights in place to indicate their presence.
Housekeeping Refer to Housekeeping risk assessment for further information	Work areas must be kept in reasonable order to prevent the risk of injury. Walkways, stairs, and work areas must be kept clear and free from obstructions. Cables must be managed, particularly on landings and along corridors, to prevent trip hazards. Material, spoil, and waste storage areas must be kept tidy and away from walkways and access routes. Roads must be kept in reasonable order. Working platforms and the area beneath must be maintained and cleared before dismantling or adapting. Fixings and other protruding sharp objects must be folded over or removed from waste or stored materials.
Erection of metal mesh fencing Refer to Erection of metal mesh fencing risk assessment for further information	Where possible, mechanical means used to distribute materials to desired locations around the site. Panels and bases to be lifted using good lifting techniques - weights to be assessed prior to lifting. Team lifting is to be used when lifting or carrying panels with only one panel or one base be lifted/carried each time. Panels to be carried so each operative does not need to twist their body trunk at any time – panels should be put down if the handling position is to be altered. Access to and from work area to be assessed and cleared of all trip hazards where as far as possible. Suitable gloves are to be worn to prevent cuts or abrasions from sharp ends or edges of either the mesh or welds. Bases to be rubber not concrete and to be moved around the site using mechanical aids loaded to a weight the user finds acceptable. Panels to be properly engaged into base holes correctly before leaving unattended. All panels are to be secured using clips supplied before leaving unattended for any length of time - i.e. break times etc. Panels to be laid flat when stored and are not to be stored any higher than 1.5m.

	Bases are to be stored in a half lap fashion to prevent tipping. Works are to cease in strong winds ensuring materials are adequately secured to prevent wind displacement. All panels are to be double clipped to prevent unauthorised persons from lifting them from their bases and twisting them open enough to gain entry to the site. Panels are to be suitably stabilised according to site conditions. Reference can be made to the fencing stabilisation guidance document for stabilisation options. Termination points are to be secured to prevent entry, i.e. by plugging and screwing to a solid masonry structure or additional panels used to prevent movement etc. The use of cable ties, rope, tie wire etc. should not be used as a means of securing fence panels as these can easily be cut to allow unauthorised entry. Metal mesh panels are not to be laid flat to protect open excavations; they must always be erected and stabilised as per manufacturers' instructions. Where panels are to be clad with sheeting, netting, or large banners, a temporary works design and checking may be necessary.
Material delivery and storage Delivery and storage of materials and equipment policy Refer to Material storage risk assessment for further information	Before delivery, notify the supplier or haulier of any restrictions on vehicle type, delivery hours, access routes, or access points using our Delivering Safely Information (available via Form Builder on Project Plus). When abnormal loads are necessary for our projects, conduct thorough checks with all relevant parties (i.e., subcontractor, plant company, haulier etc.) to confirm the relevant authorities have been informed. Obtain a copy of any granted movement order for our records before the movement of abnormal loads. Refer to the Transporting abnormal loads website for additional information, guidance, and an online application form. An 'abnormal load' is defined as a vehicle that has any of the following: • a weight of more than 44,000kg • an axle load of more than 10,000kg for a single non-driving axle and 11,500kg for a single driving axle • a width of more than 2.9 metres • a rigid length of more than 18.65 metres This may include piling rigs, large excavators, mobile cranes, cabins, tower crane units, prefabricated concrete sections, large steel sections, large roof trusses, attenuation tanks and so on. Upon arrival, identify a safe parking area for the delivery vehicle and ensure a nominated person is responsible for monitoring the delivery. Provide the driver with site-specific rules, ensuring adherence to all prevailing rules, including PPE requirements. If necessary, assign a responsible person to assist with reversing, and request evidence of the driver's training or competence for lifting operations, such as RTITB, ALLMI, or CPCS certification. A lift plan should be obtained if using a truck mounted forklift (TMF)/Moffat. During delivery, provide a safe, recognised route around the site that minimises reversing, and designate clearly identified, obstruction-free, and well-lit off-loading areas on firm, level ground suitable for lifting operations and stable stacking. Ensure unloading or loading does not take place next to pedestrian walkways unless robust people exclusion zones are in place. Ensure the driver has a safe refuge, such as the vehicle cab, allowing full visibility. Drivers accessing the trailer bed must follow their employer's safe systems of working for fall prevention. Any issues, injuries, or learning events during the delivery should be reported to the supplier or haulier. Refer to the Managing Deliveries on Construction Sites risk assessment for further controls. Storage areas must be designed to allow safe movement of goods, materials, and people, with a safe system of traffic management (PAVES) that includes methods and procedures for arrival, reception, unloading, loading, and movement of vehicles, ensuring segregation of people and vehicles as much as possible. Storage must be included in the site fire risk assessment to ensure fire safety, prevention measures, and precautions are in place. Good housekeeping practices must be maintained to prevent the accumulation of combustible materials, and waste should be stored in suitable containers until removal.

	Storage should not spread onto footpaths or walkways, obstruct access routes, rest against fencing or hoardings, or interfere with emergency escape. Storage platforms and racking must be designed to safely withstand required loading, with designs checked according to the Temporary Works policy. Fully designed tube and fitting storage platforms over containers with material containment (e.g., brickguards), stair access and fully formed loading bays is encouraged. Material storage directly on top of containers is not permitted due to risk of falling materials and potential roof collapse. Container doors must be equipped with checks or stays to prevent injuries caused by doors being blown by the wind. Storage areas at height should have robust edge protection and brickguards, with suitable staircase access for stacking or collecting materials or equipment. Adequate lighting should be provided to ensure safe work activities. Loads must be lifted according to manufacturers' recommendations. Palletised loads should be placed on a firm, level base, stacked stably, and typically not exceed two pallets high unless a specific risk assessment permits. Stacks must be periodically checked for stability, with necessary corrective action taken. Pallets should be inspected upon delivery for damage, and any damaged pallets marked, isolated, and repaired or disposed of. Reused pallets must be suitable for the intended load and purpose and inspected each time they are used to ensure they are safe; any damaged pallets should be replaced before use. Stacks must be periodically checked for stability, with corrective action taken as needed, and adequate clearance maintained between rows for safe stacking and withdrawal. Board materials, such as plasterboard and plywood, should be laid flat on a suitable floor space rather than stacked against walls. If stacking against walls is unavoidable, limit unsecured plasterboard stacks to a maximum of six boards and conduct a risk assessment for heavier materials due to their weight. Where appropriate, use a purpose-designed rack for storage. IBC water tanks must be placed on proprietary or fully designed stands. Makeshift stands, such as multiple timber pallets, are not permitted. Containers of flammable liquids and LPG cylinders must be stored upright, secured in open compounds that are fenced, shaded, and remote from pits, drains, and low-lying areas. Liquid fuel stores should be surrounded by a bund sufficient to contain the maximum contents of the largest drum stored plus 10%, and flammable liquids and LPG must not be stored together. When storing flammable liquids and gases outside of these conditions, the quantity stored should be minimised and never exceed one day’s supply, with containers kept in fire-resistant storage. The use of acetylene should be avoided whenever possible; if unavoidable, the number of cylinders should be kept to a minimum, and acetylene cylinders must be removed from the site after use - storage is not permitted. Cylindrical objects, other than compressed gas cylinders, should be laid flat and stabilised with chocks and wedges. Drums and containers must be clearly marked with their contents. Vehicles, plant, machinery, and tools should be stored securely out of sight when the site is closed, with ignition keys removed and immobilisers activated when not in use. Racking must be designed to safely withstand required loading, with bespoke designs checked according to our Temporary Works policy. Weekly visual inspections for stability, overloading, or damage are mandatory, with corrective actions recorded in the Site Management Health, Safety, and Environment Monitoring Report. If racking is constructed from tube and fitting, inspections must be conducted by trained and competent personnel. Climbing on or underneath racking is prohibited; if access is required, it must be risk assessed with loads reduced or removed, and safe access considered. Timber racks within storage containers must adhere to our Material Storage Racks design.

	During adverse weather, review and secure or relocate vulnerable materials and equipment as necessary.
Demolition Demolition policy	Demolition or dismantling of a structure must be planned and carried out by competent NFDC demolition contractors. Demolition contractor to ensure compliance with regulations related to waste management, dust, noise, vibration, traffic management, environmental protection, occupational health and safety, planning, building regulations, and highways. Demolition contractor to obtain all necessary permissions for road closures, temporary structures, plant use, vehicle storage, and impacts on adjoining properties or utilities. This includes addressing heritage or archaeological site considerations and securing permissions from relevant authorities or local environmental health departments. Apply for all required licenses for plant and waste management. The contractor's written plan must include site security, control of site visitors, exclusion zone requirements, and containment of demolition materials. Method statements must ensure structural stability, avoid unplanned collapses, and maintain stability with appropriate temporary supports, with design checks conducted by our design checking service. Demolition contractor to assess and control noise, dust, waste, material haulage, bunding, and handling of hazardous materials. Demolition contractor to establish access platforms, working spaces, exclusion zones, and effective communication measures to protect workers. Implement robust management of hazardous materials, control exposure to harmful substances, and provide necessary health surveillance and welfare provisions. Demolition contractor to ensure all existing plant and equipment are fully decommissioned before removal, including the safe handling of refrigeration systems, natural gases, fuel storage, and similar elements. Demolition contractor to manage noise and vibration to prevent hearing damage and safety risks. Ensure demolition and structural work is performed by competent contractors with industry recognised training for managers, supervisors, and operatives. Maintain competent supervision appropriate to the work's complexity, ensuring adherence to planned methods and addressing onsite conditions. Update the fire plan for structural alterations, ensure effective alarm systems, and manage fire risks associated with hot work.
Excavations Excavations policy	All excavation works must include thorough planning and implementation of necessary temporary supports, such as trench sheets or props, or battering of excavation sides to a safe angle of repose. In wet conditions, a flatter slope is required, while granular soils necessitate a less steep slope before excavation begins. Methods of support are temporary works and must be designed and used in accordance with our Temporary Works policy. Groundworker contractors are required to identify a competent Buried Services Co-ordinator who will be accountable for safe digging practices. The identified person is to agree their duties by signing our Buried Services Co-ordinator - letter of identification. All required equipment and safety measures must be onsite and ready before beginning any excavation work. Suitable, robust edge protection such as toeboards or projecting trench sheets to prevent materials from falling into excavations must be in place. Head protection must be worn by all personnel. Plant and vehicles must not be parked close to excavation edges to avoid additional loadings that could cause collapse. Excavation edges must be protected with substantial barriers, guard rails, toe boards, or trench box extensions to prevent falls into the excavation. Utilise the excavation support system itself to provide adequate protection, ensuring it extends or is properly supported as needed. Undermining of scaffold footings, buried services, or foundations of nearby structures must be considered. Seek structural engineer advice if necessary. Additional support for adjacent structures must be determined and implemented as required before starting excavation. Underground services must be identified, and risks addressed before excavation begins to prevent damage, explosions, or burns. See Underground services section for further information. Excavation near overhead power lines is to be avoided to prevent contact or arcing. Alternative methods should be considered if excavation is required in such areas. Refer to the OVERHEAD POWER LINES section within this document for further information.

	Excavation supports are to be designed to control groundwater entry. Sumps and pumps should be used to manage water considering the stability impact. Evaluate alternative dewatering methods if appropriate. Damage to trees and their roots must be avoided to avoid safety hazards. Follow guidance from the National Joint Utilities Group (NJUG) to mitigate risks. Safe means of access to and from the excavation, such as ladders that are firm, secured, and extend 1m above the landing place must be provided. Petrol or diesel engines must not be used in excavations without adequate fume ventilation. Avoid placing engines near excavation edges. A competent person must conduct recorded inspections of the excavation at the start of each shift and after any event affecting stability. Maintain detailed records of inspections, including identified risks, actions taken, and any further actions needed. Reports must include the inspector's name, location, and date of inspection. Our Excavations Register can be used for this purpose. If a contractor uses their own register, a copy is to be obtained. Completion of both is not necessary. A record of inspection must be retained for three months.
Buried service protection Excavations policy Refer to Avoiding danger from underground services (HSG47) for further guidance as required	Always assess if the work can be completed without excavation. Where reasonably practicable, vacuum, or suction excavation methods should be used, with air tools as needed. Before work starts, check with utility companies and the landowner for the existence of services, and obtain service plans. The free to use Line search safe digging service should be referred to also . Gas service plans and Line search plans are to be no greater than 28 days old, all other plans must be not older than 90 days. Determine if live services can be temporarily isolated and obtain written confirmation. Maintain safe digging practices regardless of isolation status. Thorough risk assessments must be completed for all ground-breaking activities, including emergency plans. Contractors must assess the need for specialised PPE when working near non-isolatable electric services. Groundworkers contractors are required to identify a competent Buried Services Co-ordinator who will be accountable for briefing their team and overseeing safe digging practices. Lovell management must issue our Permit to Break Ground, in coordination with the Buried Services Coordinator and work team. A competent person must perform Genny and C.A.T scans routinely, using calibrated, GPS-enabled equipment. Non-conductive or non-penetrating road and fence pins are to be used where practical - never use metal pins for marking service routes. Carefully dig trial holes, spaced no more than 4m apart, to expose services before excavation. Consider vacuum excavation or air tools before using hand tools. All hand tools used must be fully insulated. Regularly check for indications of services, assume they are live, and stop work if unidentified services are found. Do not use excavators or power tools within 500mm of known services without additional precautions. Avoid breaking concrete around services without a thorough risk assessment. Properly support and protect services, ensuring they are not used as handholds. Record any new service discoveries, update service plans with accurate data, and apply appropriate markers and covers as specified.
Overhead power lines Electricity policy	Where overhead power lines are within or near the work area or across any access routes, information about the utility owner must be consulted and a robust risk assessment and method statement developed in full compliance with GS6 and utility owner requirements. Sufficient time must be allowed for lines to be diverted, de-energised, or for other precautions to be implemented. All lines must be assumed live unless confirmed otherwise by their owners. Avoidance of work under or near lines by redesigning must be considered. The possibility of diverting the lines clear of the work area and/or making them dead while work is in progress must also be explored.

If eliminating the danger is not possible, the risk must be robustly controlled.
Control access by using suitable physical barriers to prevent close approach where no scheduled work or passage of plant under the lines is necessary.
Where plant will pass beneath the lines, defined passageways must be made.
The danger area must be made as small as possible by restricting the width of the passageway to the minimum needed for the safe crossing of largest plant. It is safest if the passageway crosses the route of the line at right angles.
If work beneath live overhead lines cannot be avoided, barriers, goal posts at the agreed safe clearance limit, and warning notices must be provided.
Plant, equipment, or hand tools that could reach beyond the safe clearance limit must not be taken under the line.
Modification of plant such as cranes and excavators by the addition of suitable physical restraints so they cannot reach beyond the safe clearance limit must be considered where necessary. Cranes with telescopic or fly jibs may need additional restraining devices to prevent alteration in length of jib or angle of fly jib.
Access for plant and materials and the working of plant must be under the direct supervision of a suitable person appointed to ensure agreed safety precautions are observed.
Remember contact with a power line is not necessary for danger; close proximity to live conductors can cause a flashover.

Working at height

Working at height policy

Work at height must be properly planned and carried out in accordance with the Work at Height Regulations.
When planning work at height the hierarchy of control must always be followed ensuring options at the top of the hierarchy are considered before moving down.

1	Avoid working at height	Assemble on the ground and lift into position using a crane or by fixing guard-rails to structural steelwork on the ground before lifting and fixing at height.
2	Prevent falls from occurring	Use an existing safe place of work such as parapet walls, defined access points, or existing edge protection.
3	Prevent falls by providing *collective* protection	Scaffolding, edge protection, handrails, podium steps, mobile towers, MEWPs etc.
4	Prevent falls by providing *personal* protection	Using a work restraint (travel restriction) system that prevents a worker getting into a fall position
5	Minimise the distance and/or consequences of a fall using *collective* protection	Safety netting or airbags.
6	Minimise the distance and/or consequences of a fall using *personal* protection	Industrial rope access (working on a building facade) or a fall-arrest system (safety harness and fall-arrest lanyard) using a suitable, high-level anchor point.

ADVERSE WEATHER
Where adverse weather conditions, particularly high winds, severe icy conditions, heavy rain or extremes of temperature could compromise worker safety, work should be stopped.
Work at height equipment is to be inspected by competent persons following adverse weather to establish if it remains safe for use.
Review storage of vulnerable materials, tools and equipment when severe weather is forecast - relocate or robustly secure as appropriate.

Working at height

SAFE ACCESS
A suitable means of access is to be provided to all work at height equipment to ensure workers can get to and from their workplace safely.

cont. Working at height policy	Stairways must be used on scaffolding to buildings 2 storeys and over. Single lift ladders may be used for scaffolding in public areas ensuring the ground to first lift ladder can be removed after each shift. Refer to our Site Security policy for further instruction. Makeshift platforms or equipment are never permitted. **SELECTION AND MAINTENANCE OF EQUIPMENT** The most suitable equipment appropriate for the work must be selected for working at height, taking into account the working conditions, the nature of the work, and potential safety risks. Equipment from which users could fall 2m or more must be visually inspected by competent persons before its first use, every seven days, after any modifications, or following any event that could affect its strength or stability. Inspection results must be recorded in a statutory register, and if a contractor or third party uses their own register, a copy must be obtained. Defects must be promptly addressed by competent persons. If a defect is severe or the equipment is incomplete, access and use must be robustly prevented, with clear notices displayed to indicate that the equipment is not to be used. **ACCESS PLATFORM DECKING SYSTEMS** (e.g. Trad Deck, G Deck, Safe Deck etc.) A comprehensive installation guide must be provided for every system selected for use. Installers must be competent to install, adjust, or dismantle a system which is to be evidenced by having attended the FASET Access Platform Decking Installers course, which includes system-specific training. To be considered competent for installing, inspecting, altering, and safely dismantling the Access Platform Decking System, the operative must have been GSA-4 assessed and possess a Blue Skilled Worker CSCS Card with an Access Platform Decking Installer endorsement. Trainees must be supervised by a Blue Carded Installer. All systems must undergo a post-erection inspection and handover by a competent installer. This inspection must be documented and include information on the system's load capacity for users. Before each use, the system must be visually inspected to ensure it remains fit for purpose according to the manufacturer's installation guide. Additionally, the system and its components must be inspected every 7 days, as well as after any incident, alterations, or adverse weather conditions that might compromise structural integrity. Inspections must be carried out by a competent person, evidenced by holding a Blue Skilled Worker CSCS Card in Access Platform Decking or a valid FASET Access Platform Decking for Managers certificate. All inspections must be recorded. If the system is found to be defective or altered, it must be taken out of service until the issues are rectified. **DROPPED OBJECTS** (including mobile devices, bolts and fixings, safety helmets, construction components and materials etc.) Suitable arrangements to manage prevention of dropped objects must be considered, as the following hierarchy; 1. ***Full height containment*** - climbing screens, full height edge protection. 2. ***Collective measures*** - protection fans, public protection gantries, exclusion zones, Monarflex, brickguards, netting to MEWPs. 3. ***Individual measures*** - tool and equipment tethering. 4. ***Management arrangements*** - material storage, prohibiting work in certain areas. Robust exclusion zones must be in place where not possible to eliminate the risk of dropped objects through containment or collective measures or tool and
Working at height cont.	

Working at height policy **Working at height cont.**	equipment tethering. Suitable signage is to be displayed to inform all to not enter the zone at any time. A risk assessment must be undertaken to determine the size and extent of the exclusion zone - a good rule of thumb is a minimum of 2m or a height to area ratio of 5:1, whichever is the greater. For example, where the drop height is 20m, the exclusion zone should extend 4m beyond the drop point. Where an exclusion zone of 5:1 or 2m cannot be achieved, additional controls such as protection decks, safety nets or other controls must be considered. Where there is a risk of objects falling beyond our project boundary, or where a public area exists within the 5:1 ratio, additional protection must be provided. Examples could include protected walkways, protection fans and catch nets, organising footpath closures to divert the public or providing temporary pedestrian management for short duration requirements. Where on-site access routes are through exclusion zones, they must be robustly protected by safety nets or protection decks. Welfare accommodation or PPE free zones should be located outside of exclusion zones or be provided with additional protection above. **FALL ARREST SAFETY NETTING** Consider other fall prevention measures first. The use of fall arrest safety netting must be justified by a risk assessment. Safety net installation must be designed by a competent person in accordance with FASET and safety net rigging standards. Net riggers must hold a Safety Net Riggers CSCS card, and inspectors must have a FASET net inspector qualification. Safety nets must be inspected by a competent user before use, and every 7 days, after any impact or damage, or following adverse weather. Rescue plans must be in place and practiced when safety nets are used. **FALLING OBJECTS** (also refer to the dropped objects section Storage platforms/racking to be suitably designed so they can safely withstand the required loading. Designs are to be checked in accordance with our Temporary Works policy. Materials, tools and equipment stored or used at height are to remain inside edge protection measures provided (i.e., toeboards, brickguards.) Review storage of vulnerable materials, tools and equipment when severe weather is forecast - relocate or robustly secure as appropriate. Loading bays shall be fitted with double guardrail up and over scaffold loading bay gates that when open prevent access to the loading platform during loading operations, and fully protect operatives from the exposed edge and prevent falls of operatives and/or materials when closed. Loading bay gates are to be fully meshed and fitted in accordance with manufacturers assembly instructions - the use of brickguards on loading bay gates is not permitted. Falling object protection on loading/landing bays is to be established using scaffold boards or compatible proprietary mesh guarding fitted in accordance with manufacturers' assembly instructions. The use of brickguards on loading/landing bays for this purpose is strictly prohibited. Edge protection around loading bays should be increased in height to match materials being landed/stored to ensure materials are not above the top guardrail. Persons must be excluded from the base of loading bays whilst it is being loaded. Access points and staircases should be sited away from loading bays, or additional protection put in place to protect them. Pedestrian routes should be so arranged that walking directly below the loading area is not possible to avoid injury from falling materials. Gaps in platform boarding are to be kept to a minimum. Platforms are to be positioned as close as is practical to the structure to suit the works in progress. Access underneath a platform should be restricted or controlled to prevent persons being struck by loose material or debris falling from above. Avoid leaving materials, tools and equipment at height when the site is closed, especially at weekends and during holiday periods. If materials are left at height, they must be properly secured so they cannot be blown off in high wind.

Working at height policy	Fire retardant debris netting/sheeting complying with Loss Prevention Standard LPS 1215, is to be installed to areas of scaffold adjacent to site boundaries, public spaces, roads, footpaths and any areas accessed by the general public. Uncontrolled dropping of materials, waste, tools etc. from height is strictly prohibited. **FRAGILE SURFACES** (roof lights, cement sheeting, slates and tiles, glass etc) Carry out works from underneath from a suitable working platform wherever possible. If work cannot be done from underneath and access is needed to the topside of the roof, consider use a mobile elevating work platform (MEWP) that allows people to work from within the basket without standing on the fragile surface. If access onto the fragile surface cannot be avoided, install robust perimeter edge protection, and use stagings/platforms with guard rails on the fragile surface to spread loads. Seek specialist advice to establish the surface will withstand loads to be introduced onto it before access is attempted. If the above is not possible, birdcage scaffolding, or safety nets should be installed underneath by appropriate competent persons. Proprietary covers may be available to prevent someone who is passing or working near fragile material from falling through. **HOP UPS** Hop ups may only be used to a maximum height of 600mm. The minimum platform size for a hop up over 450mm high is 600mm x 600mm; smaller hop ups should only be considered due to access restrictions. All stays/legs must be fully extended with locks engaged where provided. The work area must be firm and even and clear of obstacles. **LADDERS AND STEPLADDERS** Suitable ladders may be used for work at height where risk assessment shows using equipment offering a higher level of fall protection is not justified because of the low risk and short duration of use; or there are existing workplace features which cannot be altered. Short duration should not be the deciding factor in establishing whether use of a ladder is acceptable or not, the overall risk is to be considered. As a guide, if the task requires staying up a leaning ladder or stepladder for more than 30 minutes at a time, alternative equipment is to be selected. Ladders may only be used where they can be used safely, e.g., where the ladder will be level and stable, and where reasonably practicable to do so, the ladder can be secured. Before use, visual checks to spot any obvious defects to make sure the ladder is in a safe condition for use must be carried out. Ladders and stepladders used are to be either British Standard (BS) Class 1 Industrial, BS EN31 or EN131 Professional Grade. Domestic grade or EN131 Non-professional equipment is not permitted. Ensure leaning ladders are secured to a stable point whenever possible. Both stiles should be tied, and the upper resting point must be strong. Avoid resting the ladder against weak surfaces like glazing or plastic gutters. If securing the ladder isn't practical, use an effective ladder stability device. If none of the above options are possible, have someone foot the ladder, however, this should be a last resort. Refer to our Use of ladders and stepladders risk assessment for further instruction. **LIFT SHAFTS** Lift shaft areas are restricted to authorised personnel only. Authorisation from Lovell site management, in the form of a permit to work, is required to prevent unauthorised access. Rescue plans must be established for all works inside lift shafts, these should be practiced at suitable intervals .
Working at height cont.	

Working at height policy	Individuals installing and maintaining lift systems must possess the correct skills card for their role and have received formal, machine-specific familiarisation training for the system they are installing. Once formed, lift shaft openings must be fully protected in accordance with temporary works requirements. Proprietary lift shaft protection must be installed at the earliest possible opportunity with solid protection fitted in accordance with the fire strategy. Those installing proprietary lift shaft protection must have received manufacturer training on installation. Training documentation must be available upon request. Lift shaft protection is subject to daily visual checks and must be formally inspected weekly, with records entered into an inspection register. **MOBILE ELEVATED WORKING PLATFORMS (MEWPS)** (cherry pickers, scissor lifts etc) MEWP operators must provide valid proof of training, e.g., CPCS or IPAF. When selecting MEWPS consider height, general space restrictions and ground conditions, and other obstructions (particularly overhead to prevent trapping/crushing injuries) Any operative inside the basket must wear a suitable short work restraint lanyard secured to a suitable manufacturer-provided anchorage point within the basket as required by risk assessment and manufacturers instruction. Robust exclusion zones must be in place around all MEWP operations whilst the basket is at height. A rescue plan must be in created and be practiced. MEWP is only to operate on good ground conditions. Work must cease in poor weather conditions such as high wind or snow, etc. Life jackets must be considered when working near a body of water. Consideration of dropped objects must be given with a focus on containment of equipment within the basket using basket protectors for example. Proprietary handling equipment for MEWPs should be considered, such as pipe cradles or panel or board carriers. Note any accessory added to a MEWP will impact the SWL and wind rating of the machine - always check with the provider. The MEWP is to have a current 6 month thorough examination certificate provided with the machine and a lifting equipment register is to be provided for proof of an inspection regime by a competent person. Refer to our Use of MEWP risk assessment for further information **MOBILE TOWERS** Mobile towers are to be erected and dismantled by competent PASMA trained persons only. Towers must be erected and used in accordance with manufacturers' instructions and recommendations, inclusive of the use of outriggers where necessary. Operatives are to access the platforms by using ladders provided on the inside of the tower only - no external or additional ladders are to be introduced. Mobile towers are to be visually inspected by a competent person before first use, every 7 days, following alteration or adaptation or following any event that may have affected its strength or stability - a new inspection and report is not required every time it is moved to a new location on the same site. A separate risk assessment is to be carried out where excessive horizontal forces are expected to prevent overturning - suitable ties may be required. Refer to our Mobile tower risk assessment for further information **OPEN STAIRWELL EDGE PROTECTION** MK (or similar approved proprietary systems) edge protection with a minimum 100mm toeboard of suitable material (timber) must be correctly fitted around open stairwells. Makeshift edge protection is not permitted. Edges where there is a risk of persons falling must be adequately protected. This includes studwork with vertical centres greater than 450mm against open
Working at height cont.	

Working at height policy	stairwells until boarded. Permanent horizontal noggins or appropriate suitable temporary surface mounted rails should be fitted to at least halve the gap between the flooring and the board noggin (typically fitted around 1200mm). Access to upper floors must be restricted if temporary or permanent stairs are not in place on traditional build projects. **PODIUMS** A competent person must select the most suitable size to suit the task. Podiums must be erected and used strictly according to the manufacturer's instructions and should only be placed on a firm, level surface. Only two-wheeled podiums are permitted - four-wheeled versions not allowed. Ensure brakes are applied when in use. Podium gates must remain closed at all times during use. **RISERS** Riser protection design and selection must be functional for installers, maintainers, follow-on trades, and future use. Riser selection/coordination meetings with relevant stakeholders are likely to ensure the design is suitable. Consider using pre-formed risers to reduce the risk of operatives working at height. Riser protection should be installed during frame construction wherever practical. The use of proprietary riser systems is preferred. **ROOF VOIDS** Whenever possible avoid working in roof voids by working from below or by designing equipment that can be lifted in during roof assembly, e.g. PV platforms Walking on and working from ceiling cords and floor joists is forbidden. Ceilings must not be boarded until all work that can be completed from below, such as plumbing and electrical installations, is finished. Where work in roof voids is unavoidable, activities must be conducted under strict protocols, including; • use of appropriate, secure temporary platforms, • authorisation from Lovell site management by way of a permit to work, • team working, • adequate lighting. • safe and secure access into the void is provided. **SCAFFOLDING** Scaffolding of all types is to be erected, adapted and dismantled in accordance with our National Scaffold specification. Scaffolders must hold CISRS cards in accordance with our National Scaffold specification. Bandstands must be fully boarded and fitted with a proprietary stability and integral edge protection system incorporating a handrail, brickguards, toe board and ladder access. Boards/stagings are to be supported at the manufacturers' recommended centres. Works are to be programmed to permit tasks such as painting, mastic sealants, cleaning and removal of protective material to be completed prior to the dismantling of scaffolds/working platforms where possible. Birdcage scaffolding/internal fall prevention platforms are to be installed to suit the appropriate build stage. Scaffolding or any working platform must not be used until it has been handed over to Lovell site management following an initial inspection.
Working at height cont.	

Working at height policy	Gaps in scaffold platforms must be covered if there is a risk of items falling through and causing harm to persons below. Emergency access and egress arrangements should be considered when selecting appropriate access systems. Stair access systems must be the primary means of access for plots of two storeys or more, with ladders reserved for secondary emergency access only. Where ladders are used, they must be fitted at right angles to the platform with rung heights aligned with working platforms of the main scaffold as closely as possible and have self-closing ladder gates provided. Internal ladders must have a trapdoor installed. Debris netting or similar must be installed to areas of scaffold adjacent to site boundaries, public spaces, roads, footpaths, and any areas accessed by the public. This is to be incorporated within design or when creating a TG20 compliance sheet. If scaffolding is intended as part of the means of escape, any scaffold sheeting used must be flame-retardant adhering to requirements stated in either LPS 1215 or TS 62 for fire performance. The relevant approval mark must be printed on the material. To minimise smoke in the escape route and make fire and rescue service access easier, do not use sheeting to enclose scaffold stair towers or escape ladders. Scaffolding is subject to daily visual checks and must be formally inspected weekly by a competent person, or more frequently if required, with records entered into a scaffold register. Scaffold handover certificates must be filed, and records maintained. **TEMPORARY HOLE AND VOID PROTECTION** Holes and penetrations in floors, roofs, risers, and other areas must be safeguarded to prevent objects that could cause injury from falling through. Protection must be made of robust material and secured in place with clear signage, such as "Hole Below - Do Not Remove," and must indicate the safe working load (SWL) if applicable. If proprietary systems are not used, or if the area could support people, plant, or equipment, temporary works design is required for protection covers exceeding 200mm x 200mm. Temporary hole and void protection must be visually checked daily and formally inspected weekly, or more frequently if necessary, with records maintained in our work equipment register. The removal and reinstatement of hole and void protection must be planned, and risk assessed.
Lifting operations LOLER guidance. LOLER policy Refer to Use of telehandler risk assessment for further information	Lifting equipment and accessories must be carefully selected to ensure they are best suited for the tasks, providing full visibility and protecting operators from overturning, electrical hazards, noise, and vibration. They should also minimise environmental impacts to avoid disturbing neighbours. All equipment must be visually inspected by the user before each use, with defects reported to supervisors. Repairs must only be undertaken by competent persons - makeshift repairs are not permitted. Regular inspections and servicing must follow the manufacturer's instructions and specific task or equipment risks, conducted by a competent person. Plant hire companies must supply safety information with all equipment. Spill kits must be available and used where appropriate to prevent environmental contamination. Lifting operations must be planned, supervised, and executed safely by competent personnel. All relevant duty holders, as required by LOLER regulations, must be appointed. Where appropriate, a suitable, and proportionate lifting plan is to be produced by an Appointed Person. Lifting accessories and lifting equipment used for lifting persons must be thoroughly examined at least every 6 months. All other lifting equipment must be examined at least annually (or at intervals laid down in an examination scheme drawn up by a competent person). Declarations of conformity should accompany new equipment.

	The safe working load (SWL) of any lifting equipment and accessories must never be exceeded. Operators of all lifting equipment (including excavators when used for lifting) must hold a recognised certificate of training such as CPCS or IPAF, including any necessary endorsements for lifting attachments or accessories. Operators must also be authorised and familiar with the specific machine to be used. All project features such as overhead power lines, unstable ground conditions and neighbouring properties, must be identified and adequately controlled. Lifting operations must not commence/cease during adverse weather in accordance with equipment design capabilities and lift plan controls. Effective communication must be in place during lifting operations. When hoists, mast climbers (MCWP), or mobile or tower cranes are employed, suitable designs, including foundations that reflect ground conditions, mast fixings, and load capacities, are required from the supplier. These designs must be checked and verified in compliance with our Temporary Works policy. MCWP must be fitted with a mechanical device (centrifugal brake) to automatically prevent an excessively fast descent. Robust exclusion zones must be established around the lift and drop zone before and during all lifting operations, with access restricted to those involved in the work. Excavators used for lifting must be properly planned and risk assessed. Hooking devices must be attached to the designated lifting point on the machine ensuring lifting slings are able to hang freely at all times. Suspension from bucket teeth is strictly prohibited. Lifting of persons is never permitted. Operators must physically ensure all quick hitches are securely locked before starting work with a new attachment. Loads should not be suspended over occupied areas or outside the project boundary whenever possible. If unavoidable, risks to people must be minimised by implementing safe systems of work and appropriate precautions, such as erecting barriered exclusion zones. Lifting hooks for chains or slings must have safety catches. Where lifting equipment or its load may be affected by high winds, appropriate devices must be available and used to detect dangerous situations, allowing measures to be taken to cease equipment use. Mobile crane operations must be hired under a Contract Lift crane hire agreement, noting that tower cranes cannot be hired under such agreements. Rescue procedures for tower crane operators must be established and practiced regularly by competent personnel. Lovell management must complete and issue a Permit to Lift before lifting operations can begin. This permit must be accepted by the competent person in charge. Each individual lift plan requires its own separate Permit to Lift.
Work equipment and plant LOLER and Work equipment policies Refer to Use of hand and power tools risk	**GENERAL** Work equipment and plant must be carefully selected to ensure they are best suited for the tasks, providing full visibility and protecting operators from overturning, electrical hazards, noise, and vibration. They should also minimise environmental impacts to avoid disturbing neighbours. All plant and equipment must be visually inspected by the user before each use, with defects reported to supervisors. Results must be recorded in a suitable register to ensure faults are detected in good time so risk to health and safety is managed. Our Work and Lifting Equipment Register should be used for this purpose. If a contractor or third party inspector uses their own register, a copy is to be obtained. Repairs must only be undertaken by competent persons - makeshift repairs are not permitted. Regular inspections and servicing must follow the manufacturer's instructions and specific task or vehicle risks, conducted by a competent person. Plant hire companies must supply safety information with all equipment. Spill kits must be available and used where appropriate to prevent environmental contamination. **HAND AND POWER TOOLS** A suitable, stable workbench must be used to minimise the need to hold materials by hand or rely on makeshift benches.

assessment for further information	Power tools and equipment must be adjusted to suit the material being worked on, cutting depths etc, with all guards fully operational. Knives must have automatic retractable blades and should only be used as a last resort when safer equipment is unsuitable for the task. If using automatic-retractable blade knives poses additional risks, a risk assessment must justify their non-use. Operators of nail guns and shot-fired fixings must be manufacturer-trained and competent. Nail guns must have safety catches to prevent unintentional firing and be stored in lockable containers with controlled access. All used and misfired cartridges must be collected and disposed of properly. Toolchests/vaults must be fitted with damper arms to prevent sudden uncontrolled closure. Dust creation must be managed in accordance with Construction dusts. Electric tools must be double insulated, be PAT tested every 3 months and display a valid PAT label. All guards must be in place and functioning correctly. The HAVS magnitude, noise emission levels and weight of each tool are to be displayed or at least readily available. Battery powered or 110v electric tools are preferred to fuel powered equipment. Fit whip checks across all compressed air hose connection points A suitable spill control or containment method must be placed under fuel-driven equipment both during use and refuelling. **MOBILE PLANT** Projects must be designed to accommodate the necessary equipment, with one-way routes where feasible, avoiding blind spots and overhead obstacles, and managing gradients and slopes to suit the equipment used. Operators of mobile plant must be trained, experienced, and hold the relevant competence card for the specific machine and accessories they use, especially quick hitch attachments and any lifting accessory. They must fully understand and adhere to the operating procedures of their vehicles and all associated accessories. Additionally, they must be familiar with site emergency procedures and the signal systems used on site. Equipment must always be operated according to the manufacturer's instructions, considering weather, ground conditions, maximum loads and gradients. All telehandler operators, regardless of their employment status, must be briefed into the Lovell 'Use of telehandler' risk assessment and possess a valid, full driving license in addition to their training qualification/card. The basic lift plan on the Use of telehandler risk assessment must be completed. Operators of other types of mobile plant are not required to hold a valid, full driving license in addition to their training qualification/card unless the equipment is intended to be driven on public highways, or roads and pavements shared with homeowners, occupiers or the general public on our projects. Evaluation of the potential of this interface is to be based on robust risk assessment by the relevant employer. All telehandlers, irrespective of the provider, must comply with Lovell specifications. Bucket attachments (general purpose or material handling) and non-integrated working platform attachments are not permitted on telehandlers. Integrated working platform attachments may only be used as a last resort when no other suitable equipment is reasonably practicable and must undergo thorough risk assessment. All other attachments must be compatible with the machine. Operators must be aware of the effect on centre of gravity and SWL attachments may impose. Operators must physically ensure all quick hitches (mechanical or hydraulic) are securely locked before starting work with a new attachment. Bucket fitting/removal must be carried out in designated, contained areas ensuring all other personnel are excluded. Unused buckets must be stored in these areas.
Work equipment and plant	Lifting and travelling with suspended loads on telehandlers must be avoided using other more suitable equipment. Where unavoidable, it must be ensured the task is properly planned and risk assessed, the telehandler is suitable for the task, and a suitable lifting hook or attachment is used. Operators must be trained and competent to undertake a suspended load task.

LOLER and Work equipment policies	Ensure all mobile plant driven on a public highway complies with relevant road traffic legislation. All mobile plant operators must be at least eighteen years of age. If employees are carried on the mobile plant, the machine must be suitable for that purpose. Seat belts must always be worn when mobile plant is in use, a green beacon must be used to confirm seat belt use. Engines must be turned off and keys removed from the ignition when leaving unattended. Seat belts must be left unfastened. Proper procedures must be followed for mounting and dismounting the machine, using fixed access and maintaining three points of contact. Loading operations for dumpers, including cabbed dumpers, must not commence until the operator has applied the handbrake, turned off the engine, and exited the vehicle. The operator must move to the safe zone where they are clearly visible to the loading operator until loading is complete. Forward tipping dumpers are not permitted on non-engineered stockpiles. Dumpers above 4.2t unladen must be fully cabbed from April 2025 onwards. Work must be stopped if unauthorised personnel enter exclusion zones, and all unsafe conditions, defects, and behaviours must be reported to a supervisor. Breaking ground must not commence until briefed into and fully understood a permit to break ground. Operators on public highways must hold a valid license with the appropriate category. Full site-defined PPE is required when leaving the machine, with non-loose-fitting PPE to prevent catching on controls, and additional PPE worn as determined by task-specific risk assessments. All plant and equipment must comply with current UK legislation and adhere to the European Commission (EC) Machinery Directive 2006/42/EC or have United Kingdom Conformity Assessed (UKCA) certification as appropriate. A declaration of conformity must be supplied.
Work on or near water where there is a risk of drowning	Provision and maintenance of robust barriers/fencing, edge protection, guardrails or similar. Provision of suitable emergency procedures, information and training to respond effectively. Means to raise a suitable alarm capable of being heard above ambient noise. Auto-inflating life jackets and similar buoyancy aids. Grab line downstream of the work. Suitable brightly coloured, buoyant throw lines. Suitably constructed rescue boat and competent operator.
Traffic management PAVES PEDESTRIANS AND VEHICLES EFFECTIVELY SEGREGATED Traffic management (PAVES) policy	**PEDESTRIANS** Separate entry and exit points must be provided for pedestrians and vehicles and kept closed when not in use. Pedestrian walkways must be 900mm wide whenever possible, and be firm, even, and follow the most direct route possible. Walkways must be firm and even and constructed from fully compacted MOT Type 1 as a minimum, with tarmac considered for longer-term use. Where mats are used, the ground must still be prepared beneath to provide an even surface. Walkways should be raised above ground level to prevent water pooling. Designated crossing points must be provided where walkways cross roads, clearly signed so drivers and pedestrians can see each other. Crossing points must be positioned opposite each other whenever possible. Pedestrians must establish eye contact and receive a 'thumbs up' from vehicle operators before crossing. Walkways must remain clear of materials to prevent pedestrians from stepping into vehicle routes. Physical barriers must be provided between pedestrians and vehicle routes, maintained, and adjusted to suit work progression. Barrier tape is not an acceptable

	substitute. Directional signage is to be displayed to help workers navigate the site and avoid unofficial shortcuts across vehicle routes. Designated routes must be followed by all on site. A PAVES plan must be implemented, updated as necessary, and communicated to all site personnel. Induction training should ensure all drivers and pedestrians understand the routes and traffic rules. **VEHICLES** (includes cars, vans, all mobile plant Vehicle routes must be wide enough for the safe movement of the largest vehicles expected and kept clear of obstructions. Physical barriers must be provided where temporary obstructions occur, clearly marked, and signposted. Vehicle route surfaces must be firm, even, and properly maintained, with robust edge protection and clear signage where necessary. Ensure routes are adequately drained, avoiding steep slopes, sharp corners, and blind bends. Any temporary haul roads must have a temporary works design approved by our design checker. Ensure drivers can see both ways along the footway before moving onto it, adjusting vehicle entrances as necessary. Consider one-way routes, controlled turning points, and selecting appropriately sized vehicles. Delivery timing must avoid conflicts with neighbouring activities and adhere to planning conditions, with holding areas provided if necessary. Vehicle entry should be restricted unless authorised by management, with parking provided away from work areas whenever possible. Standard road signs and agreed speed limits must be consistently applied and adhered to.
Roof Trusses Roof truss policy	Thorough risk assessments must be completed by competent persons for the whole process, especially the method of temporary bracing. These must be reviewed in accordance with our RAMS review process. The manufacturers' designs for roof truss installation must always be followed. Only experienced and qualified operatives are permitted to install trussed rafters and spandrel panels. Obtain truss pack and spandrel panel dimensions and weights from manufacturers to allow correct selection of handling equipment. Insist on pre-slung packs facilitating ground-level strap release. Ensure lay down areas are firm, level, clear of overhead obstructions, and large enough for the delivery vehicle and equipment. Ensure ground conditions are suitable for crane use, meeting both the manufacturer's specifications and our Temporary Works requirements. All lifting operations must be carefully planned, with compliance to LOLER requirements and relevant duty holders in place. Produce a suitable lifting plan and ensure all lifting equipment and accessories have proper certification. A Permit to Lift must be completed by Lovell management and issued to, and accepted by, the competent person in charge before lifting operations are permitted to commence. A separate Permit to Lift is required for each individual lift plan. Establish a physical exclusion zone around lifting equipment and delivery vehicles to separate plant and pedestrians. Use a mobile crane to lift trusses either from truss racks or preferably, directly from the delivery vehicle to the roof. Telehandlers may only be used for single-storey structures with standard trusses. When storing trusses from a delivery, telehandlers may be used to transport them to truss racks, loading bays, or gable end scaffolds, provided the load is within the telehandler's safe working load (SWL) and takes into account span, pitch, obstructions, and equipment capabilities. Ensure loads are secured with ropes rather than lifting straps. Travel routes must be carefully planned to avoid occupied areas and obstacles. A competent slinger/signaller must guide the telehandler operator, ensuring trusses remain within 600mm of the ground.

	Use an anemometer to monitor wind conditions and do not move trusses if wind speeds exceed 7 m/s (16 mph). Before commencing truss placement, ensure a suitable and well maintained safe working platform is in place. Ideally, this should be a tube and fitting birdcage scaffold positioned directly below the bottom truss chords. This method is preferred over access platform decking systems, although these may be used where reasonably practicable ensuring they are assembled and maintained in accordance with our Work at height policy requirements. Keep truss packs under chain tension until they are safely laid or temporarily braced. as per the agreed method.
Street Works	Work is to be planned and organised in accordance with the requirements of the NRSWA Code of Practice (Red book) and Highways Agency guidance. Competent, qualified banksmen are to supervise vehicle movement. The correct signs, lighting and information boards to draw the public's attention to the work are to be used. Excavations are to be reinstated as quickly as possible with any left open securely fenced. Uneven surfaces are to be either covered or the public alerted to their presence. Materials are to be stored safely – storage near entrances and busy pedestrian areas is to be avoided. Store materials within the site perimeter, preferably in a separate compound away from any perimeter fencing; Plant and equipment is to be removed from site at the end of the shift - if not possible, isolate and secure it; and select and use the least hazardous materials and chemicals. Tools are to be fitted with dust and noise suppression. Dusty and noisy equipment should be enclosed where possible. Workforce to be suitably trained and competent in accordance with the New Roads and Street Works Act and any plant and equipment in use, particularly supervisors and banksmen.
Stability of structures whilst carrying out construction work, including temporary structures and existing unstable structures Temporary works policy	During the preparation of Temporary Works designs, the Temporary Works Designer (TWD) will assess the risks associated with the design. Any residual risks will be identified and communicated to the project team. Residual risks may include, but not be limited to, collapsing structures (falling from or onto), hit by falling materials, excavation collapse, falling into poorly guarded excavations, plant/equipment damage arising from any of the aforementioned or manual handling injuries. The control measures for all Temporary Work will be as follows; the allocation of duties and responsibilities to competent staff for all temporary works activities, the formal appointment, in writing, or as appointed in this PMP, of persons to carry out individual duties, including as appropriate Temporary Works Co-ordinator (TWC), Temporary Works Designer(s) (TWD), Temporary Works Design Checker(s) (TWDC) and a Temporary Works Supervisor(s) (TWS), the production and maintenance of a Temporary Works register, the correct classification and assessment of all Temporary Works, the preparation of the concept and design brief based on hazard identification and risk assessment, the checking of all materials for adequacy, prior to erection, the formal checking of the Temporary Works design, the thorough inspection of the Temporary Works arrangement before any works or loadings commence, the provision of safe access, egress and protective measures to all elevated areas, work areas below ground level, and routes over and across works, regular inspection and maintenance of Temporary Works, formal confirmation that the Temporary Works is no longer required so that it can be dismantled,

	the provision of and compliance with the wearing of all required personal protective equipment.
Confined spaces Confined spaces policy	Whenever possible, entry to confined spaces is to be avoided, e.g., by doing the work from outside using remote cameras. If it cannot be avoided, a risk assessment must be carried out for all confined space work which includes suitable rescue arrangements. The risk assessment is to be reviewed in accordance with our RAMS review process. Entry to a confined space must be controlled by issue of a Confined Space Permit to Work to ensure all necessary precautions as detailed in the Entry/Access checklist have been taken and provisions made to secure the health and safety of those entering the confined space. Subcontractor permits may be acceptable providing they are comparable and Lovell site management provides overall authorisation. Effective emergency arrangements must be put into place, covering supervision, relevant rescue equipment, communication and alarms, training, and practice drills. All equipment used must be properly maintained and fit for purpose. Those involved in confined space work must have sufficient experience and training for the type of work to be carried out. They must be physically fit, agile, and if confined space has a constrained layout, not be claustrophobic. Rescuers need to be properly trained, sufficiently fit to carry out their task, ready at hand, and capable of using any equipment provided for rescue, e.g., breathing apparatus, lifelines, and firefighting equipment. Rescuers also need to be protected against the cause of the emergency. Where risk assessment determines atmosphere testing and/or continuous atmospheric monitoring is necessary, it must be carried out prior to entry by a suitably trained and competent person using suitable detection equipment which is correctly calibrated. Air purging and natural or mechanical ventilation may prove beneficial but must be monitored by a suitably trained and competent person(s). Combustion engine (petrol/diesel) equipment is never permitted in confined spaces due to the risk of carbon monoxide poisoning. Where possible, the confined space should be certified as safe to work in without respiratory protective equipment (RPE). If the risk assessment identifies RPE is required, it must be suitable for the hazards present and be compatible with other required PPE. Individuals wearing close fitting RPE must be appropriately face fit tested to ensure that RPE is of the correct size and type and be clean shaven whilst wearing it. No sparking tools and specially protected lighting are essential where flammable or potentially explosive atmospheres are likely. In certain confined spaces suitable precautions to prevent electric shock may be necessary e.g., use of extra low voltage equipment (typically less than 25v).
Electricity safety Electricity	Electrical work must only be undertaken by those who are trained and competent to do so. Electrical contractors must follow safe working practices and plan and execute their electrical work safely, there should be adequate information available about the electrical system and the work to be done. Electrical contractors must avoid working on live systems whenever possible and must not energise systems before completing all installations and verifying that they are correct. Work on live electrical circuits is only permitted under strict conditions, which include: Testing and verification of electrical circuits may only be conducted under the supervision of a competent individual. Live work will only be allowed if a comprehensive risk assessment has been conducted by a qualified person and approved by site management. In such cases, the Lovell 'Permit to Test Live Electrical Apparatus' or 'Permit to Work on High Voltage Equipment' must be issued before any live work begins. Safe isolation procedures must be always followed. Relevant parts of a live system must be isolated when other construction or refurbishment work may disturb it or expose workers to electrical danger. Battery operated or 110v centre tapped to earth (CTE) tools and equipment are to be used. Any repairs of servicing must be carried out by qualified electricians only makeshift repairs are not permitted. On the rare occasions where 230v use is unavoidable, a residual current (trip) devices (RCD) must be used. These must be properly installed and checked daily.

<table>
<tr><td></td><td>Only use chargers, devices, and batteries from reputable manufacturers and do not mix between different manufacturers. Refer to Lithium-ion battery charging section within this document for more information.
Lighting systems must have bulb protection to protected against breakage. Halogen lighting is not permitted.

MAINTENANCE INTERVALS
Users are to check equipment is in good repair before each use.
Any faults must be reported to the relevant manager and the equipment taken out of use immediately.
The following is to be inspected and tested by a competent person;
<table>
<tr><td>Equipment</td><td>Combined inspection and test</td></tr>
<tr><td>Temporary building* equipment fitted with plugs (kettles, laptops, fridges etc.)</td><td>Each time a site is established or every 12 months, whichever is soonest.</td></tr>
<tr><td>Temporary building* permanent wiring</td><td>Every 12 months</td></tr>
<tr><td>Temporary electrical distribution systems</td><td>Every 3 months</td></tr>
<tr><td>On site tools and equipment</td><td>Every 3 months</td></tr>
</table>
*Temporary buildings include portable and sectional buildings used as site offices, stores, workshops, welfare facilities etc.</td></tr>
<tr><td>Piling</td><td>A suitable and sufficient risk assessment must be completed before piling work begins which considers the impact on adjacent structures. The risk assessment is to be reviewed in accordance with our RAMS review process. All workers must receive a briefing on the safe system of work.
Plant operators are required to hold valid certifications (e.g., CPCS), with copies of these certifications to be recorded.
The type and size of rigs, traffic management, bearing pressures, and safe working spaces, including exclusion zones and storage areas must be assessed by a competent person.
Pile mats must be designed, constructed, and maintained according to best practices, adhering to our Temporary Works policy. Regular inspections must be conducted to ensure their condition and prevent damage.
Foundations must be designed to accommodate adequate working space for guarded rigs, with surcharge loads and limits clearly defined.
All moving machinery parts must be guarded to prevent entanglement, using physical barriers or protective devices as necessary.
Consider using quiet hammers or non-percussive installation methods and enforce hearing protection zones appropriately.
Identify underground services prior to piling. A permit to break ground and appropriate service records must be issued by Lovell management.
For work near overhead power lines, confirm clearances with utility companies and implement safe working systems.
If there is a risk of unexploded ordnance (UXO), a detailed risk assessment with emergency response plans must be completed by a competent person.
Avoid leaving pile bores open whenever possible. If unavoidable, erect robust physical barriers to protect them.
Use mechanical pile croppers or other non-hand-held tools to minimise vibration risks. Consider debonding reinforcement above the cut-off level.
Fit protection caps on bars after pile trimming and before placing foundation concrete.
Ensure safe access to pile heads with secure access and egress points, avoiding steep excavation sides.
All lifting operations must be carefully planned, with compliance to LOLER requirements and relevant duty holders in place. Produce a suitable lifting plan and ensure all lifting equipment and accessories have proper certification.
A Permit to Lift must be completed by Lovell management and issued to, and accepted by, the competent person in charge before lifting operations are permitted to commence. A separate Permit to Lift is required for each individual lift plan.
Eliminate use of acetylene where possible. If its use is unavoidable, limit the number of cylinders, inform site management, and conduct a dedicated risk assessment with an enhanced hot works permit. Acetylene cylinders must be removed from the site after use.</td></tr>
</table>

	Assess and monitor environmental impacts such as noise and vibration. Implement control measures to ensure noise levels are managed, protecting neighbouring residents.

Health risks including; (delete or expand each section as appropriate ensuring information detailed is relevant to the project)

For further guidance, refer to relevant Risk assessments on Project Plus for activities involving Lovell personnel and follow links to Guidance Documents and Health and Wellbeing

Construction dusts CoSHH and PPE policies Also refer to the trade specific dust minimum	Construction dust is not just a nuisance; it can seriously damage health and some types can eventually kill. There are three primary types of dust commonly encountered on a construction site: • Silica dust created when working on silica containing materials like concrete, mortar, and sandstone (also known as respirable crystalline silica or RCS); • Wood dust created when working on softwood, hardwood, and wood based products like MDF and plywood. • Lower toxicity dust created when working on materials containing little or no silica. The most common include gypsum (e.g., in plasterboard), limestone, marble

standards on our SharePoint page.	and dolomite. Before work starts, ways of stopping or reducing the amount of dust the task might make must be looked at. Use of different materials, less powerful tools or other work methods must be considered. Dust needs to be controlled, the 2 main ways of doing this are by using water, or on tool extraction. **WATER SUPPRESSION** - use tools with water attachments whenever possible. Where unavailable, use water spray bottles or similar methods to wet the work surface. Ensure continuous water supply throughout the work merely wetting material beforehand is ineffective. **ON TOOL EXTRACTION SYSTEMS** - these include the tool, captor/extraction hoods, minimum M class extraction units and hoses/connections. On-tool dust capture bags or domestic vacuums, such as Henry, must not be used for this purpose. Extraction units must clearly indicate their filter class. All equipment is to be used and regularly maintained in accordance with manufacturers' instructions including use of the correct internal dust bags. The use of dust bags attached directly to a tool is not permitted. Hand mixing areas must be enclosed, with safe access provided and clear "Wear a mask" signage displayed. RPE must be worn as below. In addition to using either water or on tool extraction, RPE must also be worn. All RPE used on Lovell projects must be CE marked and have an Assigned Protection Factor (APF) of 20 (FFP3 or P3). RPE must be: • Suitable for the work disposable tight fitting RPE (masks or half masks) may become uncomfortable for extended periods; powered RPE can help alleviate this discomfort, especially when individuals work for more than an hour without a break; • Compatible with other protective equipment; • Used and maintained in accordance with manufacturers' instructions. • Worn correctly to ensure a specific make, model, and size of tight fitting RPE can achieve a good fit to an individual, a fit test needs to be conducted by a competent person and the wearer must have no facial hair in the region of the face seal as this can prevent RPE from forming a good seal allowing contaminants to be inhaled by the wearer. • Facial hair includes stubble, beard, moustache, and sideburns. • Individuals with facial hair that may compromise the seal should use a loose fitting powered respirator or should be tasked alternative work arrangements that avoid exposure to construction dust. • Records of face fit tests must be available upon request. RPE is the final line of protection and should not be solely relied upon as the primary means of protection. Refer to the trade specific dust minimum standards on our SharePoint page. Subcontractors must make worker health surveillance records available on request.
The removal of asbestos containing materials (ACM) Asbestos policy	If work is required in buildings built before 2000, an appropriate asbestos survey must be obtained from the Client before any works commence. Where Lovell commission asbestos surveys, only competent asbestos surveyors are to be used to identify location and type of asbestos containing materials in our workplaces. All work must be carried out under strictly controlled conditions by registered, competent contractors only. Risk assessment and safe systems of work must be in place before works commence. The risk assessment is to be reviewed in accordance with our RAMS review

	process. All workers involved in working with or removal of asbestos must be appropriately trained and competent. If asbestos is identified as licensable, the licence from the HSE must be in place before work commences unless special dispensation has been granted. Asbestos must be disposed of in accordance with prevailing waste regulations and all required documentation is to be obtained and retained. If workers unexpectedly come across or unearth potential asbestos containing material during their works work must stop immediately, and line management informed. A competent contractor must be engaged to risk assess the situation and act accordingly. Refer to the Asbestos in soil guidance on our SharePoint page for further guidance. Analysis and clearance testing must be carried out by UKAS accredited organisations. Any worker liable to disturb asbestos during their day-to-day work is to receive appropriate awareness training annually to enable them to protect themselves and others. All workers involved in working with or removal of asbestos must be appropriately trained (non-licensable and/or licensable) and competent. Subcontractors must make worker medical records available on request.
Manual handling Manual handling policy Refer to the Manual handling risk assessment for further information	Subcontractors are to provide risk assessments for their significant manual handling tasks and are to ensure their workers are trained relevant to the task. The risk assessment is to be reviewed in accordance with our RAMS review process. Evidence of training is to be made available. Manual handling risk assessments should consider four main areas: the nature of the task, capabilities of individuals, characteristics of the load and layout of the environment. These four factors can be easily remembered by using the acronym TILE. The following must always be considered: • Whether the object needs to be moved at all, e.g., can the work be carried out where it already is, or can materials be delivered to the point of use. • Use of automated mechanical aids, e.g., telehandler • The use of smaller components or quantities, especially through design. • Whether the load can be broken down into smaller, lighter and more manageable sizes, or easier to grasp such as liaising with manufacturers to provide handles for example. • If individual(s) have existing or previous medical conditions which could be worsened by manual handling, this must be brought to the attention of site management. Subcontractors must make worker health surveillance records available on request. Refer to our Material handling guide for typical weights of common construction materials. **Plasterboard handling -** Load out boards by machine and plan to make sure the site is organised so they can be delivered close to where they need to be. Use panel trolleys or other mechanical aids to move boards around site. Keep them well maintained. Use plasterboard lifts or adjustable props to position boards safely for fixing. For low-level wall panels, use a foot-operated board lifter to avoid stooping. Where positioning aids cannot be used, for example in stairwells or tight spaces, use smaller size boards that are easier to handle. Make reasonable checks to ensure workers are trained to use lifting equipment and handling aids safely. Where letterbox method used to transfer boards to upper floors, ensure aperture dimensions suit the board width by 80mm maximum. Ensure a cover or lid is replaced following use.

	Handling heavy blocks - the lightest block that has the required strength, unless otherwise specified by a designer for genuine technical reason is to be selected - if using large foundation (trench) blocks, consider units with handholds to help grip. Avoid double handling by carrying from block stacks to the work area. Use handling equipment to take the blocks to where they are to be laid. Organise site traffic routes and scaffolding bays to deliver blocks close to where they will be laid. Where possible, use lightweight foundation (trench) blocks that have handholds and consider using half-size blocks. Consider widening trenches so blocks can be laid at foot level, not below it. Adapt scaffolding and working platforms to allow blocks to be laid between chest and knee height. It places less stress on the body and work rate is faster. Always try to lay between shoulder and waist height, use staging or adapt work platforms to help. If unavoidable, reduce laying rate or consider a half-size block. Arrange block stacks and spot boards at a comfortable position. Handle blocks close to the body when lifting into position. Arrange block stacks with clear access and small enough to avoid over-reaching. Make reasonable checks to ensure workers are trained to use lifting equipment and handling aids safely. Keep stored blocks dry to avoid weight gain from rain. **Handling road kerbs - f**ollow the hierarchy of control measures; Elimination - eliminate manual lifting of kerbs at the design stage, (e.g. use alternative construction methods that do not involve manual handling or eliminate the need for the kerb). Total mechanisation - ensure kerbs are handled and laid mechanically (e.g. using vacuum devices/mechanical grabs etc.). Partial mechanisation - ensure that the maximum amount of the kerb handling process is undertaken mechanically (e.g. using mechanical solutions to get the kerb near its final position, off-loading using a hoist etc.). Using smaller/lighter kerbs or handling aids will further reduce the risks from any residual manual handling. Manual handling - in rare cases where it is not possible to use any of the above solutions, short stretches of kerb may be laid manually. Where this is necessary workers should be trained in good handling techniques. The use of lighter weight kerbs, or devices which allow two people to share the lift, will further reduce the risk of injury.
Use of hazardous substances, particularly where there is a need for health monitoring CoSHH policy	The following hierarchy of control should be applied when assessing risk to minimise or eliminate the harm created by a hazard; 1. Elimination - remove the hazard completely change the process so no substances are needed. 2. Substitution - replace with something less hazardous, e.g., if using bleach, can it be replaced with a low hazard cleaning preparation, at least for a proportion of the tasks undertaken. 3. Engineering controls - physical barriers or containment extraction or improved ventilation would all be regarded as engineering controls. 4. Administrative controls - safety procedures, instructions, supervision and enforcement. 5. PPE gloves, respirators, protective eyewear, coveralls, aprons, etc. A CoSHH assessment library for common substances supplied by Lovell is stored on our intranet. If any additional assessments are required, discuss this with the regional H, S & E team. Subcontractors are to supply suitable and sufficient CoSHH assessments to identify exposure and control measures they will be adopting when providing and/or using substances hazardous to health. These are to be reviewed for suitability using the RAMS review process. Note: an MSDS does not constitute a CoSHH assessment and must not be accepted on its own.

	Where a CoSHH assessment identifies the necessity to issue respiratory protective equipment (RPE), wearers of close fitting RPE must be appropriately face fit tested to ensure that RPE is of the correct size and type. Where appropriate, health surveillance is to be provided to employees. This is to be carried out by the occupational health provider appointed by Lovell. Subcontractors must make worker health surveillance records available on request. We must ensure we take the right precautions to reduce the risks of exposure to legionella. A competent person should carry out a risk assessment where necessary to identify whether water systems in use or needing to be worked upon are likely to create a risk from exposure to legionella. Ensure a good maintenance regime for any active hot or cold water systems on site, e.g., weekly flushing of infrequently used outlets.
Reducing noise Noise policy	The Noise Regulations define lower and upper exposure action values, levels of noise exposure which, if exceeded, require specific action. Estimated noise exposure needs to be compared with the action values to know what specific actions are required in addition to our general duty to reduce risks from noise.

	Lower exposure action value	Upper exposure action value
Daily or weekly personal noise exposure	80 dB(A)	85 dB(A)
Peak sound pressure	135 dB(C)	137 dB(C)

Where workers are likely to be exposed at or above the upper exposure action values, action must be taken to reduce noise exposure.
Even where noise exposures are below upper exposure action values, action to reduce the risks should be taken reducing exposure further.
Employers are responsible for assessing noise hazards and the likely exposure to their workers, this is Lovell's duty for Lovell and agency employees; subcontractors are responsible for their workforce.
Measures to eliminate or reduce noise risks and protect employees must be identified including;
• Using quieter equipment or a different, quieter process,
• Engineering/technical controls to reduce, at source, the noise produced by a machine or process,
• Using screens, barriers, enclosures, or absorbent materials to reduce noise on its path to exposed people;
• Limiting the time people spend in noisy areas.
Where noise control measures require actions from workers to be effective (e.g., making proper use of noise enclosures or following approved low noise working methods), workers must be provided with appropriate information, instruction, training, and competent supervision.
Work areas with noise levels exceeding 85 dB(A) must be designated as hearing protection zones and clearly marked with appropriate signage. The designated area may be larger than initially expected, so noise monitoring should be conducted by a qualified individual to ensure accuracy.
Noise control measures must be monitored for effectiveness and improved as necessary.
Health surveillance (hearing checks) are required for workers at risk of noise at work.
Subcontractors must make records available on request.
Think CUFF when assessing the suitability of hearing protection
C - Condition - Is the hearing protection in a good state of repair?
U - Use - Are the workers using hearing protection when it is needed?
F - Fit the ear - Is the hearing protection fitted or worn properly?

	F - Fit for purpose - Has the hearing protection been correctly specified? Refer to our Tool and equipment noise level guide for detailed information on noise levels of commonly used equipment.
Reducing vibration Vibration policy Refer to the Use of vibrating tools risk assessment for further information	Exposure to vibration from hand held or hand guided power tools can cause irreversible painful and disabling conditions. Tools that minimise vibration exposure must be selected and maintained, ensuring they are suitable for the task and used properly. Tool selection should prioritise low or anti vibration alternatives, tool suitability, and reduced vibration designs. The HAVS magnitude of each tool is to be displayed or at least readily available. To keep vibration below the exposure limit value (ELV), limit daily tool use time. Use real use vibration values and exposure points or supplier categories to set maximum usage times. Aim to minimise exposure as much as possible, not just to meet the ELV. Employees at risk from vibration should receive information on HAV risks, health surveillance, and proper tool use, including training on vibration absorbing tools. Health surveillance is needed if exposure action values (EAV) are exceeded, including screenings, specialist referrals, medical advice, RIDDOR reporting, and effectiveness data. Subcontractors must make worker health surveillance records available on request. Subcontractors using vibratory tools and equipment must assess and manage health risks and monitor their workforce's exposure. They are required to provide records upon request. Examples include using handheld breakers for concrete demolition, masonry removal, or pile cropping, as well as wall chasing and drilling masonry or concrete with hammer drills. Refer to our Tool and equipment vibration guide for detailed information on vibration levels of commonly used equipment.
Exposure to UV radiation (from the Sun) CoSHH and PPE policies	UV INDEX 01 02 03 04 05 06 07 08 09 10 11 LOW MODERATE HIGH VERY HIGH EXTREME To protect health from excessive sun exposure, Lovell requires workers to adhere to the following measures: • Wear appropriate clothing to shield against harmful solar radiation. • Regularly apply sunscreen to any exposed skin. • When possible, coordinate with management to avoid outdoor work between 11 a.m. and 3 p.m., when UV radiation is strongest, even on cloudy days. • Stay hydrated by drinking plenty of water. • Regularly check skin for unusual moles or spots, and consult a doctor promptly if changes in shape, size, colour, itching, or bleeding are noticed The wearing of shorts on our construction projects is subject to risk assessment; considerations need to include specific task hazards that may result in cuts and scratches, grazes, splinters etc. where skin damage can lead to infection. Some trades will need to keep lower legs covered for other reasons, for example to prevent chemical burns from cement based materials during concrete pours. Regularly apply sunscreen to any exposed skin. NOTE: Some regions prohibit the wearing of shorts, and their rules supersede the above. Measures to manage heat include scheduling work during cooler periods, offering shaded rest areas, ensuring access to cool water, and educating workers on heat stress. There is currently no legal maximum temperature, but heat must be managed as a hazard. Heat stress occurs when the body cannot regulate its temperature, influenced by factors like work rate, humidity, and clothing. Symptoms range from concentration difficulties and muscle cramps to heat stroke, which can be fatal. Regularly assess work conditions and monitor workers for early signs of heat stress. Subcontractors are expected to cooperate with management to implement these guidelines effectively.

Contaminated land	Prior to construction and following demolition the contaminated areas have been remediated as per the remediation strategy.
Weil's Disease (Leptospirosis)	Maintain good housekeeping particularly around canteen areas ensuring food waste is put in the waste bins/skips provided on site. Where rodents have been observed, engage with relevant pest control contractor and instruct operatives not to touch them if encountered. Wash cuts and grazes immediately with soap and running water and cover all cuts and broken skin with waterproof plasters before and during work, and always before eating, drinking or smoking.
Discarded hypodermic needles and other sharps. Refer to the Needles and drug related waste risk assessment for further information	If discarded needles are discovered, they are not to be handled without appropriate arm's length tools. If possible, cover the needle(s) with something heavy such as a block or slab or something obvious, warn all in the area that needles have been discovered giving the location and inform them to avoid all contact. Inform site management as soon as possible giving location and amount. No part of the body should be placed 'blind' into any cavity/space - the area is to be exposed as much as possible and suitable lighting provided. If skin is accidentally punctured by a needle, encourage the wound to bleed - wash the wound with running water, dry and cover it with a plaster, and attend the nearest Accident and Emergency Hospital as soon as possible.

6. GAS SAFETY PLAN

1. Scope of works;
There is a new gas main to be installed on site, heating to be provided by air source heat pump. The POC is from the existing network.

2. Appliances/equipment potentially affected by works - *tick all that apply*			
New installation (new build project) ☐ - Go to 3. Gas contractor			
Boilers ☐	Fires ☐	Cookers ☐	Hobs ☐
Flues ☐	Vents/Air bricks ☐	Window vents ☐	Chimneys ☐
Other ☐ Please state:			

3. Gas contractor:	Logical Gas and Plumbing

4. Gas contractors Gas Safe Registration No.:	

4. Name of Gas contractor supervisor: *Supervisor must be named*	

5. Arrangements for controlling significant risks
"[Detail controls and method to be followed.]"

Suitable arrangements for support and protection of gas equipment must be detailed above, including preventing ingress of foreign materials where appropriate.

Guidance.

Anyone who works on gas must be competent to do so. The level and range of competence should match the full extent of work done but needs only to be sufficient for and relevant to that work. Employers of gas fitting operatives are required to ensure that their employees have the required competence for the work undertaken; in addition to ensuring they are properly experienced and trained. This involves ongoing monitoring of performance standards, as necessary.

Before a significant alteration is made to premises where a gas appliance or equipment is installed, e.g. installation or removal of windows, air bricks, extractor fan units, re-roofing, external cladding work etc., any implications for gas appliance/fitting safety need to be properly addressed - seek the advice of a competent gas engineer.

In some cases, the effects of particular work for gas safety may be obvious. For example, where a chimney is being reduced in height or capped, its effectiveness in removing flue gases may be drastically affected. Before such work is started, it needs to be established whether, or not, the chimney is active and, if so, allowance made for this in the way the work is carried out. This may include planning for appliances to be disconnected before work commences, preventing debris falling or being thrown down the chimney, and ensuring appliances are tested for safety after the work has been completed. Disconnection/testing of appliances must only be carried out by a Gas Safe-registered engineer. Similar consideration needs to be given to any proposed alterations which might affect operation of a flue system, e.g. fitting a flue liner or terminal.

In other cases, the effects of the work may not be so obvious. For example, when fitting double glazing or cavity wall insulation, providing a temporary roof covering over a building, the removal of fixed permanent ventilation, such as air bricks, and replacement with closable ventilation louvres (in contravention of standards) or blockage of vents by insulation material, can lead to danger from reduced ventilation/incomplete combustion. Equally, fitting extractor fans can lead to the pull on flues being overcome and flue products being sucked back into premises. Moreover, the enclosure of an existing flue terminal within a new extension or conservatory (again in contravention of standards) can lead to flue gases becoming entrapped. All alterations must be properly planned.

In accordance with regulation 9 of the Gas Safety (Installation and Use) Regulations 1998, a person who allows gas to flow into any premises for the first time should ensure an appropriately sited emergency control is in place. Where there is a gas meter, the meter control may serve as the emergency control as long as the conditions (as follows) are met. Each individual premises (e.g. each house or flat) using a supply of gas should be provided with an emergency control, whether or not that premises contains a gas meter. The emergency control should be situated as near as is reasonably practicable to the point where the pipe supplying gas enters the premises. It should be readily accessible to all consumers, i.e. gas users, in the premises concerned (e.g. not located in a basement or cellar); therefore, a valve located in a meter-room which is normally locked, and accessible only to a landlord, gas supplier, gas transporter and/or emergency services, for example, cannot act as an ‘emergency control’.
In the case of LPG, this regulation only applies where the gas is supplied from a storage tank or tanks, or from two or more cylinders connected by an automatic changeover device. In other cases, the vapour valve on each cylinder also functions as a shut-off control and no additional provision is necessary. For further information refer to ‘Safety in the installation and use of gas systems and appliances L56’

7. THE HEALTH AND SAFETY FILE

Each contractor and supplier will be requested to supply information relating to materials supplied and or works packages completed.

Information will be requested at the earliest possible opportunity as it becomes increasingly more difficult to obtain information from contractors or suppliers who have left site or have completed delivery of materials.

The information will be collected and passed to the Principal Designer and the main file as soon as it is available and will not be left towards the end of the contract period.

Health and safety file format

Check the Pre-construction Information (PCI) to ensure that the clients requested format is detailed in this section – if none provided, use the format below

Section	Content
A	A brief description of the work carried out.
B	Any hazards that have not been eliminated through the design and construction processes, and how they have been addressed (e.g., surveys or other information concerning asbestos or contaminated land)
C	Key structural principles (e.g., bracing, sources of substantial stored energy - including pre or post-tensioned members) and safe working loads for floors and roofs.
D	Hazardous materials used (e.g., lead paint; pesticides; special coatings)
E	Information regarding the removal or dismantling of installed plant and equipment (e.g. any special arrangement for lifting such equipment)
F	Health and safety information about equipment provided for cleaning or maintaining the structure
G	The nature, location and markings of significant services, including underground cables; gas supply equipment; firefighting services etc.
H	Information and as-built drawings of the building, its plant and equipment (e.g., the means of safe access to and from service voids and fire doors)

There should be enough detail to allow the likely risks to be identified and addressed by those carrying out the work. However, the level of detail should be proportionate to the risks. The file should **not** include things that will be of no help when planning future construction work such as pre-construction information, the construction phase plan, contractual documents, safety method statements etc. Information must be in a convenient form, clear, concise and easily understandable

8. Environment

Site management are responsible for ensuring all necessary environmental control measures identified within this plan are implemented and monitored.
Pre-start meetings with our supply chain will ensure these control measures are communicated.
Site induction will include environmental controls in place and necessary behaviours or actions required.
Our supply chain are required to comply with this PMP in its entirety. Site inductions, toolbox talks, training and task briefings will be given to all site personnel with relevant information from the PMP.
This PMP will be provided to subcontractors, along with the contract specific environmental details, where their works package can have a potential detrimental impact on the environment.
Subcontractors will be required to develop their own environmental plans specific to work packages where appropriate and to comply with the content and direction of this and other applicable supporting documentation.

Communication
Environmental information will be delivered in the following way:

- Agenda item in project progress meetings
- Inductions, topic-specific training, tool box talks
- Information on notice boards
- Supervisor briefings
- Lovell intranet

Additionally, within the contract, information will be communicated through:
Health, safety and environment meetings
Supply chain meetings
Other meetings e.g. design team meeting
Where contact is made with any regulatory authorities, the health, safety and environment team will be informed, and records will be entered onto Project Plus
Complaints and compliments will also be recorded on Project Plus and resolved particularly when from regulators, the public and customers.

Monitoring
Site management will undertake weekly recorded inspections to ensure relevant environmental control measures are appropriate, and controls are being complied with.
Site environmental compliance will also be monitored regularly by our health, safety and environment team.
The inspection report will be discussed with site management and any recommendations will be actioned as necessary.

Emergency Preparedness and Response
Control measures to prevent and control environmental incidents and emergencies on sites are referenced in the register of environmental effects and detailed in site emergency plans.
Generally, pollution prevention will be achieved by adequate training, by the provision of containment measures such as drip trays, absorbent mats or materials, drain protection for preventing impact on sewers or watercourses and by complying with safe working methods.
Adequate and appropriately placed spill kits will be provided for rapid incident response when and where prevention fails.
Incidents and emergencies will be reported in accordance with Lovell's procedures.

Minor Incidents
A minor environmental incident is an occurrence which leads to, or has potential to lead to, minor harm to the environment.

Examples include:

Pollution	Spillage of chemicals or oil (<2 litres) to hardstand.
Nuisance (dust/noise etc.)	A minor environmental complaint received from a member of the public.
Waste segregation	Incorrect segregation of general and hazardous wastes on site.

Major Incident
A major environmental incident is a legal breach, an event or series of events, which leads to or has the potential to lead to significant harm to the environment.

Examples include;

Waste disposal	Disposal of waste materials, including giving or selling to an unlicensed carrier or site. Also includes poor description of waste, leading to poor "duty of care" control and inappropriate disposal. Where all the records of waste consignments are missed or incorrectly completed.
Nuisance (dust/noise etc.)	A complaint is received from a regulator relating to nuisance and is substantiated.
Enforcement action is served by a regulator	A notice is served by a regulator on a project. Notices include: • S60 notices (noise and vibration) • Enforcement notice (waste) • Prosecution (all of above)
System failure	When auditing shows that the management of our processes is systematically failing to maintain compliance.

Emergency Incident
An emergency is a situation that has moved beyond the control of Lovell and requires the assistance of external agencies to minimise the potential harm to the environment.

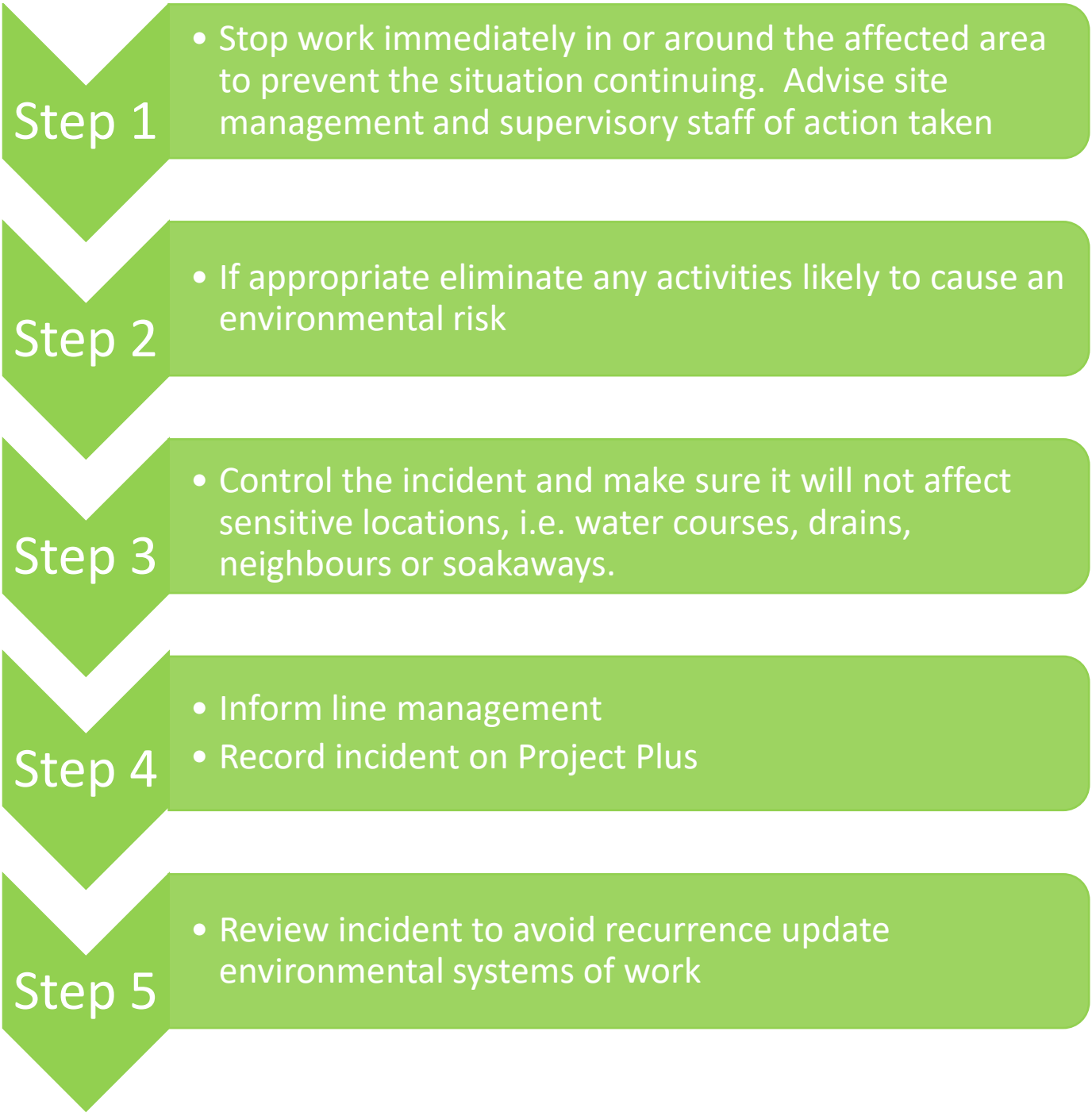
Spill Containment Provisions
The site will maintain suitable spillage containment at the following location(s) across the site:

At fuel bowser.

Incident Reporting
Where the incident is controllable and no intervention is required from any third party/statutory Environmental authority, then controls should be implemented, the incident cleaned up/resolved and recorded on Project Plus.
Where the incident cannot be managed using on-site resources or is considered difficult to control (e.g. cannot be cleaned up within one hour of occurring), line management, health, safety and environment department and the relevant Environmental authority must be informed.

Call the Environment Agency incident hotline on 0800 80 70 60 (0300 065 3000 for Natural Resources Wales) to report;
- damage or danger to the natural environment;
- pollution to water or land;
- poaching or illegal fishing;
- dead fish or fish gasping for air;
- main rivers blocked by a vehicle or fallen tree causing risk of flooding;
- flooding from any river, stream, canal, natural spring or the sea;
- illegal removals from watercourses;
- unusual changes in river flow;
- collapsed or badly damaged river or canal banks.

Minor incident



Major Incident (Emergency)

Step 1

- Act promptly and properly to minimise the potential impact spreading too far.
- Confirm the source and prevent further contamination.

Step 2

- Notify authorities as appropriate and receive advice.
- If required await assistance prior to implementation of remedial action.

Step3

- Use spill kits as necessary without putting people at risk.
- Apply additional controls as necessary to protect sensitive areas at risk of harm.

Step 4

- Notify management and health, safety and environmental team

Step 5

- Record incident on Project Plus
- Health, safety and environmental team to undertake investigation.

Records

Environmental records will include;

- Inspections
- Site visit records (by others)
- Internal and external audit reports
- Waste management records and plans
- Minutes of progress meetings
- Correspondence including complaints and regulatory units
- Incident and investigation reports
- Permits, licences and consents
- Environmental data e.g., recycled aggregates, sustainable timber, etc.

Carbon accounting

Requirements of the legal Carbon Reduction Commitment (CRC) necessitate the recording of energy consumption specifically gas and electricity consumption. Nonetheless, as a minimum the following fuel uses will be recorded (where appropriate to do so and where information is available and/or not recorded elsewhere):

- Electricity (direct purchase) kWh
- Electricity (customer supply) kWh
- Diesel consumption (generators) litre
- Diesel consumption (all other uses) litre
- Gas consumption kWh
- Other power sources if needed e.g., renewable.

Environmental operational controls; (delete or expand each section as appropriate ensuring information detailed is relevant to the project)
For further guidance, follow link to our Environment Policies

Site set up	When selecting and establishing site compounds, careful consideration will be given to site sensitivity, security, neighbouring properties, chemical storage and handling (including spill prevention), material storage needs, drainage, vehicle access (including employee commuting), potential nuisances, and planning constraints. Site compounds, storage, and construction areas will be fenced or have barriers to clearly define operational areas and separate them from other occupied work sites. Where appropriate, site plans will indicate the establishment of the site and the locations of environmental facilities such as fuel tanks, spill kits, and waste bins.
Archaeology and Heritage	Contract documentation must be thoroughly reviewed to identify the presence or location of archaeological sites, protected heritage, and buildings. Designers must be engaged to integrate known archaeological features into the project design, ensuring that these features are preserved or properly managed. All necessary licenses or permissions must be obtained before commencing any work on or around archaeological sites, protected heritage, or buildings. A watching brief or qualified specialist must be employed to monitor and record works conducted on or around known archaeological sites or heritage locations. Locations containing archaeological or heritage significance must be adequately fenced off or otherwise protected to prevent accidental damage. Robust communication procedures must be established for reporting unknown finds. These procedures must include immediate reporting to the local archaeological officer or relevant Local Authority, with all discoveries thoroughly documented.
Contaminated Land	A preliminary or desktop investigation of the site and its previous uses must be conducted to identify potential risks from contamination. A thorough site investigation must be carried out to determine the type and extent of any suspected contamination. The testing company and laboratory responsible for testing and analysing contamination must be suitably competent. The proposed remediation strategy must be agreed upon by the local planning authority and the relevant environmental agency, where applicable. The site induction must include details of contamination and the procedures for working in areas of known contamination. Procedures must be in place to ensure work is stopped, and appropriate reporting occurs if contamination is accidentally discovered or disturbed. Areas of contamination must be fenced off to prevent vehicles and machinery from spreading contamination across the site. Relevant environmental permits must be in place for the treatment and remediation of contamination. Suitable controls must be in place for managing contaminated water, such as discharge consents to foul sewers or tanker. Contaminated materials that need to be stockpiled must be covered to prevent run-off and wind-blown contamination. Contaminated materials must be stored on hard-stand areas to prevent contamination of the ground and groundwater below. Stockpiles must be positioned away from drainage systems or watercourses. Suitable wheel-washing facilities must be provided to clean contaminated vehicles before they leave the site. Vehicles removing contaminated materials must be covered with sheets before leaving the site.
Ecology	Contractual and client documentation must be reviewed to identify all sensitive areas containing wildlife. All relevant ecological risks must be included in the construction environmental management plan, along with their mitigation measures. Licenses must be obtained from Natural England or the relevant conservation body before moving protected species or disrupting their habitats, such as bats, badgers, and lizards. Specific biosecurity plans must be developed and implemented if native species are identified on the site.

	Areas containing wildlife must be suitably protected from the impact of construction work. Trees must be suitably protected to avoid damage during construction activities including keeping materials off the root area. Vegetation removal works must be scheduled to avoid breeding and nesting periods. Permission from the Local Authority must be obtained before removing hedges or trees that are subject to a tree preservation order. Approval must be obtained from the relevant environment agency to manage or remove invasive plants, such as Japanese knotweed and giant hogweed. Approval from the relevant environment agency is required for the treatment or management of plants adjacent to a watercourse. Treatment operatives must hold the appropriate qualifications and certificates of competency for the use of pesticides.
Energy Management	**ENERGY AND TRANSPORT** Energy objectives and targets must be established for the project. An energy monitoring process must be implemented to track and report energy consumption and carbon emissions, including those from business travel and transport. Discussions with energy suppliers must be conducted to ensure electrical supplies are connected as early as possible to avoid reliance on generators. Temporary accommodation units must be equipped with practical energy saving devices, such as low energy (LED) lighting, passive infrared sensors, timer switches, and thermostats for heating and hot water. The site induction must cover key energy efficiency issues, including maintaining plant and switching off equipment when not in use. Signs must be in place to remind site personnel to switch off equipment when it is not required. Site office equipment must be set up to print efficiently (e.g., double sided) and to a central location rather than using individual printers. The site must consider incorporating renewable energy sources to contribute to powering site accommodation. A logistics/transport plan must be in place that considers efficient transport arrangements, such as using consolidation centres or just Intime delivery. Quality checks on installed fabric insulation must be completed. The building must meet its target air - tightness level. All renewable energy systems (e.g., biomass, PV) must be fully commissioned, tested, and documented to ensure eligibility for FITs or RHI tariffs. All building services, meters, and control systems must be fully commissioned and tested. A plan for post occupancy monitoring and seasonal commissioning must be in place. Local sensitive areas, such as schools and residential zones, must be identified. The site must consider green travel arrangements to reduce staff travel, such as using rail and water transport where practical. Suitable parking arrangements for private cars and plant must be defined. Permission must be obtained from the Local Authority for any road closures or erection of hoarding on the public highway. Local pedestrian diversion routes must be agreed upon with the Local Authority. Delivery routes for construction traffic must be in accordance with any planning condition or agreement with the Local Authority. Suppliers must be informed of any delivery restrictions and routes. Entrance and exit gates must be located on main roads rather than side roads. Deliveries must be scheduled to avoid traffic disruption and queuing outside the site. Delivery vehicles must be switched off during loading and unloading unless operating equipment such as a Hiab is required.

	Designated vehicle routes on site must be clearly defined. Deliveries must be organised to minimise excessive use of reversing sirens. Use of eco-friendly site cabins must be considered. Designers must specify the use of low carbon concrete where applicable. The possibility of sourcing materials from local suppliers must be considered. **RESOURCE EFFICIENCY AND MATERIAL MANAGEMENT** The site must consider alternative techniques for efficient resource use, such as offsite manufacture, modular design, manufacture to fit design, and design for disassembly. The design must account for the reuse of reprocessed demolition materials, the use of recycled aggregate, or excavated soil and materials, as part of the site waste management plan. Procedures must be in place to identify and order the correct type and quantity of materials. Procedures must ensure that main materials are sourced responsibly (e.g., sustainable timber) and that records are maintained for traceability. Deliveries must be inspected to prevent damage during unloading, ensure delivery to the correct area of the site, and verify correct specification and quantity. Stockpiles and material storage areas must be located away from traffic routes to prevent accidental damage. Materials must be stored in a manner that prevents repetitive handling. Materials must be stored with appropriate security measures to prevent loss, theft, or vandalism. Stockpiled materials must be stored to prevent cross contamination with other materials or wastes. Stockpiled materials must be stored away from sensitive areas, drains, or watercourses. Materials must be handled with the correct equipment to prevent accidental damage. Hazardous/CoSHH materials must be stored, issued, and disposed of correctly.
Statutory Nuisance	Appropriate liaison or communication must take place with local stakeholders who may be affected by potential nuisances. Effective dust suppression techniques must be used to minimise air pollution from activities such as timber sawing, stone or block cutting, and crushing. Dust on site haul roads and material stockpiles must be adequately dampened down on dry, windy days. Haul roads must be located away from sensitive areas, such as rivers and ditches. Site vehicle speed limits must be controlled to reduce dust generation. Public roads must be regularly cleaned using a road sweeper or vacuum to remove dust. Vehicles that transport granular or dusty materials must have sheeted covers. All plant and vehicles must be in good working order and have up to date maintenance or service logs. Enclosed chutes and covered skips must be used for lowering dusty demolition or waste materials. Mortar and concrete must be mixed in enclosed areas to prevent dust emissions. Material stockpiles or spoil heaps must be stored away from sensitive areas, such as drains, rivers, and ditches. The works must be assessed to identify the potential noise and vibration impacts on local neighbours.

	The local environmental health officer and neighbours must be consulted and forewarned of any out of hours or major disruptive activities. If a Control of Pollution Act Section 61 consent is required, noise levels must be recorded to ensure compliance with permitted limits. Working methods must be reviewed to use equipment that reduces noise and vibration, where possible (e.g., pile jacking, chemical bursting). Working hours must be defined to restrict noisy operations to specific times of day. Noisy plant must be kept as far as possible from sensitive receptors. Deliveries must be planned to minimise disruption in the local area. Haul routes must be well maintained to prevent excessive vehicle noise and vibration. Noise screens must be used where required to reduce noise transmission. Noise screens and hoarding must be well maintained, with no holes or gaps. Lighting must be positioned to avoid causing a nuisance at night, and non - essential lighting must be switched off. The site must have a procedure in place for handling complaints and addressing issues.
Waste Management	A site waste management plan must be prepared, identifying waste types and quantities for the project. The waste management plan must be actively maintained and updated as the project progresses. A waste target and relevant objectives must be set for the project to minimise waste generation and maximise recycling efforts. Project waste requirements must be included in all contracts with trade contractors and suppliers to ensure compliance. Waste management requirements must be included in the site induction to ensure all personnel are aware of their responsibilities. Waste responsibilities must be clearly defined, specifying who is responsible for disposing of what materials and when. Designated areas must be established for segregating, reusing, and ultimate disposal of waste materials, these should be clearly signed for each waste stream and be safely accessible for pedestrians to deposit waste. Recycling facilities must be provided to segregate office and canteen wastes, including paper, cans, and plastics. Projects in Wales must be registered for hazardous waste with the NRW. Waste management permits, licenses, or exemptions must be in place for any onsite waste processing activities, such as crushing and soil treatment. The WRAP quality protocol must be followed for the production of aggregates from waste. The CL:AIRE Code of Practice must be adhered to for the treatment and use of contaminated soils, including the appointment of a qualified person and the development of a materials management plan (MMP) Hazardous wastes (e.g., oil, fuel, paints) must be collected and stored separately from general wastes. The burning of rubbish onsite is prohibited unless a permit or license has been obtained. Only registered waste carriers must be used to remove waste from the site, and regular checks must be conducted to ensure compliance. Waste must be disposed of at licensed sites appropriate for the type of waste being disposed of. Road sweeper waste must be disposed of at authorised sites. Whenever possible, sweepers should travel to a licensed site for unloading. Avoid emptying sweepers into or near drains, surface water, or groundwater to prevent pollution, and do not empty waste directly onto bare ground. The arisings compartment of the sweeper should be washed out only in areas with controlled drainage, like a public sewer or containment unit. With the right licence or permit, sweeper waste can be emptied onto an impermeable surface with controlled drainage.

	To deposit waste on land, a licence or permit is required. Waste transfer documents must include all required information, including six digit waste codes, the license number of the carrier, tip location, and a declaration regarding the waste hierarchy. Waste transfer documents must be retained for the appropriate durations: two years for non-hazardous waste and three years for hazardous waste.
Water management	All watercourses and drainage systems on site must be identified. All works in, above, or near watercourses must be agreed upon with the relevant Flood Defence Authority (Local Authority or regulatory body for statutory main rivers). All discharges to streams, ditches, and drainage systems must be consented to by the relevant environment agency. All abstractions from rivers, ponds, lakes, or water mains must be consented to by the relevant environment agency. Site personnel must be inducted and trained in dealing with wastewater on site. Procedures must be in place to monitor water quality and ensure discharges meet required standards. Water discharges must be properly treated using methods such as settlement tanks or lagoons. Designated areas for washing out concrete lorries must be established away from watercourses and drains. Washout areas must be contained, feature an impermeable ground layer, and be designed for easy periodic cleaning. Undertake concrete or mortar batching or mixing well away from watercourses, gullies and drains. Watercourses and drainage systems must be protected from runoff and silty water caused by our works. This must also include existing systems around our projects. Implement and maintain appropriate measures to prevent silt entering any watercourse or drain; for example, use and regularly check condition and performance of gulley bags (or similar). Regularly check watercourses are not being affected by dewatering operations or rainwater runoff. All fuel tanks must be effectively bunded to at least 110% of their capacity (or 25% of total capacity for drums). Oil and diesel tanks and chemicals must be located as far as possible from drains and watercourses. Oil and diesel tanks must be separated from the ground by an impermeable layer. All oil and diesel tanks and chemicals must be marked with the type of contents, volume, and appropriate hazard warning signs. Steps must be taken to prevent ground contamination or pollution from fuels, oils, chemicals, paints, etc. Storage areas must be contained, feature an impermeable ground layer, and be designed for easy periodic cleaning. Site personnel must be made aware of spillage response procedures through inductions and toolbox talks. Appropriate spill kits must be available, and personnel must be trained to manage accidental spillages to drains or watercourses. Proactive measures to reduce water consumption, such as grey water recycling and water saving devices (e.g., waterless urinals), must be implemented. Water consumption must be monitored, recorded, and communicated to site personnel to promote water minimisation.

ASPECTS AND IMPACTS

Likelihood of Activity resulting in impact.	Severity of Subsequent Impact				
	Low (1)	Moderate (2)	Moderate (3)	High (4)	High (5)
Negligible (1)	1	2	3	3	5
Unlikely (2)	2	4	6	8	10
Unlikely (3)	3	6	9	12	15
Likely (4)	4	8	12	16	20
Likely (5)	5	10	15	20	25
Certain (6)	6	12	18	24	30

LOW 1 - 5 MODERATE 6 - 15 HIGH 16 - 30

Definitions:

Activity: generic definition relating to works being completed and medium that may be impacted

Aspect: element of an activity that can interact with the environment

Impact: any change to the environment, whether adverse or beneficial, wholly or partially resulting from an aspect

Likelihood: the chance or probability of an event occurring. Negligible - rare, occurs less than 0.1% of the time/case through to Certain – almost inevitable, 99.9% chance of occurrence

Severity: the impact that an event might have on the environment. Low - minor in inconsequential impact with no or short-term duration through to High - major impact or destruction to the environment with potential long-term consequence.

Significance: the product of likelihood and severity according to the above table.

Guidance

Likelihood of an environmental impact occurring

Likelihood	Description	L Score
Certain	Occurs repeatedly / event 'only to be expected'	6
Likely	'No surprise' / will occur several times	5
Likely	Could occur sometimes	4
Unlikely	Unlikely, though conceivable	3
Unlikely	So unlikely that probability is close to zero	2
Negligible	Not going to occur	1

Environmental consequences of an impact occurring

Consequence	Description of environmental impact	C Score
High	Major damage on & off site, national reputation damage, prosecution inevitable	5
High	Considerable environmental damage, prosecution and national reputation damage likely	4
Moderate	Moderate impact, contamination or damage recoverable, local reputation damage, prosecution possible	3
Moderate	Slight impact, small scale event contained on site, possible local media interest, prosecution unlikely	2
Low	No measurable environmental consequence, no reputation damage, zero likelihood of prosecution	1

Risk rating categories

Risk Rating	Action to be taken
High (16-30)	Work can only continue if control measures reduce the risk rating to an acceptable level
Moderate (6-15)	Introduce control measures to reduce risk as low as reasonably practicable
Low (1-5)	Risk broadly acceptable, but situation needs to be monitored for changes and action to reduce risk

Activity	Aspect	Impact	Impact Significance (IS)			Control and Mitigation	Residual IS
			Likelihood	Severity	Significance		
Likelihood **1** - Negligible, **2-3** - Unlikely, **4-5** - Likely, **6** - Certain		Severity **1-2** - Low, **2-3** - Moderate, **4-5** - High			Significance **1-5** - Low, **6-15** - Moderate, **16-30** - High		
Works associated with office operations	Operation of air-conditioning and refrigerant units containing ozone depleting substances	Escape of gases and impact associated with ozone layer and climate change.	-	-	-		-
Works affecting **water** resources	Abstraction of surface or groundwater	Deterioration in water resource quantity and quality	-	-	-		-
	Dewatering of surface or groundwater	Deterioration in water resource quantity and quality	-	-	-		-
	Impoundment of watercourses	Deterioration in water resource quantity and quality	-	-	-		-
	Discharge of effluent	Deterioration in water resource quality	-	-	-		-
	Discharge of site drainage	Deterioration in water resource quality	6	3	6	Site drainage installed as per drawings	3
	Discharge of foul drainage	Deterioration in water resource quality	6	3	6	Foul drainage installed as per drawings	3
	Physical (temp and perm) works to watercourses and rivers	Deterioration in water resource quality	-	-	-		-
	Physical (temp and perm) works to watercourses and rivers	Change in flow regime	-	-	-		-
	Physical (temp and perm) works to watercourses and rivers	Loss of Biodiversity	-	-	-		-
	Physical (temp and perm) works to flood defence works	Deterioration in water resource quantity and quality	-	-	-		-
	Physical (temp and perm) works to estuaries	Deterioration in water resource quantity and quality	-	-	-		-
	Spillages of hazardous substances	Deterioration in water resource quantity and quality	3	4	7	Suitable storage arrangements. Spill Kits, emergency preparedness	3
	Use and storage of construction hazardous substances including oils/ diesels and petroleum	Deterioration in water resource quality	6	4	8	Diesel Storage& Use procedures. Refuelling arrangements – location of spill kits.	3
	Use and storage of process commissioning hazardous substances	Deterioration in water resource quality	-	-	-		-
	Concrete washout	Deterioration in water resource quality	6	3	6	Position of concrete washout to be away from sewers/ gullies.	3

Activity	Aspect	Impact	Impact Significance (IS)			Control and Mitigation	Residual IS
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Likelihood **1** - Negligible, **2-3** - Unlikely, **4-5** - Likely, **6** - Certain		Severity **1-2** - Low, **2-3** - Moderate, **4-5** - High			Significance **1-5** - Low, **6-15** - Moderate, **16-30** - High		
	Use of potable water	Deterioration in water resource quality	6	2	2	Potable water installations will be chlorinated and tested prior to use.	1
Works affecting ecological habitat and species	Works affecting ecological important habitat	Loss of biodiversity	-	-	-		-
	Works removing ecological important habitat	Loss of biodiversity	-	-	-		-
	Works affecting ecological protected species	Loss of biodiversity	6	3	2	Bat boxes to be provided on dwellings, care to be taken if remedial works are required when bats may be roosting.	2
	Works removing ecological protected species	Loss of biodiversity	-	-	-		-
	Works affecting invasive plants	Land contamination by non-native species	-	-	-		-
	Works removing invasive plants	Land contamination by non-native species	-	-	-		-
Works affecting historic (e.g. listed) or archaeological important sites and structures	Direct impact	Loss of historic/archaeological value	-	-	-		-
	Near area	Loss of historic/archaeological value Subsidence vibration	-	-	-		-
	Adjacent to area	Encroachment	-	-	-		-
Working on and disturbance of contaminated land	Physical disturbance	Potential spread of contaminated land and pollution	6	5	12	Hot spots have been remediated as per remediation strategy	6
	Disposal	Potential spread of contaminated land and pollution	6	5	11	Disposal and remediation has been untaken as per the remediation strategy by groundworker in control of site for enabling works	5
General construction	Mud on road	Nuisance to local population	6	2	6	Early road installation reduces risk of	3

Activity	Aspect	Impact	Impact Significance (IS)			Control and Mitigation	Residual IS
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activities that may lead to Nuisance						mud on wheels. Wheel wash facilities to be made available during muck shift activities. Regular road brush visiting site.	
	Atmospheric emissions	Nuisance to local population	6	3	6	Idling time minimised via management controls. Plant maintenance schedule. Early connection to mains electric reduces generator use (and subsequent emissions).	2
	Construction dust	Nuisance to local population	6	3	9	Early road installation reduces dust. Regular road brush visits. Damping down during dry spells, on tool extraction and suppression measures applied.	4
	Batching dust and silo emissions	Nuisance to local population	-	-	-		-
	Process atmospheric emissions	Nuisance to local population	-	-	-		-
	Noise emissions	Nuisance to local population	6	3	6	Site operating hours prescribed for noisy activities. Mobile plant operating time restrictions applied. Ongoing consultations with neighbours to update on foreseeable noisy activities	2
	Light emissions	Nuisance to local population	6	3	3	PIR lighting to compound installed in compound, street lighting away from from existing residents.	2
	Vibration	Nuisance to local population	6	3	2	No Piling works taking place however, vibration likely when forming roads and running machinery. Vibration monitoring will take place if deemed necessary.	1
	Odour emissions	Nuisance to local population	-	-	-		-
	Road congestion	Nuisance to local population	5	3	5	Site delivering safely instructions issued to supply chain. Delivery route planned and delivery times prohibited during rush hours. One way system into site will reduce risk of congestion.	3
	Other public rights of way	Loss of amenity value Disruption	6	3	3	Public right of way is on the development currently closed to the requirements of the permit.	2
	Visual amenity	Loss of amenity value	6	2	2	Artwork provided to site hoarding. Visual impact enhanced using company branding etc. External areas regularly checked and tidied.	1

Activity	Aspect	Impact	Impact Significance (IS)			Control and Mitigation	Residual IS
			Likelihood	Severity	Significance		
Likelihood **1** - Negligible, **2-3** - Unlikely, **4-5** - Likely, **6** - Certain		Severity **1-2** - Low, **2-3** - Moderate, **4-5** - High			Significance **1-5** - Low, **6-15** - Moderate, **16-30** - High		
	Unsociable working hours	Nuisance to local population	3	2	2	Operating times in accordance with local authority. No Sunday working permitted.	1
Works requiring the consumption of energy and/or fossil fuels	Energy consumption/carbon management - Construction works	Direct: cost Indirect: atmospheric emissions Resource depletion	6	2	3	Reducing idling times of machines, resource efficiency, use of off site production (Smart roof)	2
	Energy consumption/carbon management - Site accommodation	Direct: cost Indirect: atmospheric emissions Resource depletion	6	2	3	Use Hybrid generator initially, mains power as soon as possible, Eco-Cabins in place.	2
	Energy consumption/carbon management - Transport and logistics	Direct: cost Indirect: atmospheric emissions Resource depletion	6	2	3	Efficient call off processes, effective storage of materials.	2
	Energy consumption/carbon management - Material selection (embodied energy)	Direct: cost Indirect: atmospheric emissions Resource depletion	6	2	3	Material selection in accordance with SAP assessment.	2
	Energy consumption / carbon management – generation of on-site power	Direct: cost Indirect: atmospheric emissions Resource depletion	6	2	3	Generators will be required to provide temporary lighting and for some power tools. Mostly battery-operated tools. Generators to be switched off when not required.	2
	Delivery and handling (transfer) of fuels (liquid or gas)	Direct pollution through spills, etc. Waste of resource and cost	6	5	10	Diesel tanks to be stored away from SWD's. Refuelling procedures to be followed. Dedicated small tools refuelling area to be established. Generators to be located on top of spill nappies. Spill kits to be located at all diesel storage tanks.	5
Works leading to the generation of waste	Material storage and damage	Direct: cost Indirect: reduced sustainability	5	3	5	Appropriate material storage areas to be established. Delivery to site just in time where appropriate, designing out high waste materials.	4
	Excavated materials	Contamination Nuisance Pollution Legal compliance	6	5	11	Full compliance with CL:AIRE DoWCoP as early as possible	5
	Creation of litter	Nuisance	6	2	2	Bins to be provided with segregated recycling areas. Good housekeeping practices adopted and monitored.	1

Activity	Aspect	Impact	Impact Significance (IS)			Control and Mitigation	Residual IS
			Likelihood	Severity	Significance		
Likelihood **1** - Negligible, **2-3** - Unlikely, **4-5** - Likely, **6** - Certain		Severity **1-2** - Low, **2-3** - Moderate, **4-5** - High			Significance **1-5** - Low, **6-15** - Moderate, **16-30** - High		
	Waste disposal (duty of care) Construction waste Sewage M&E decommissioning waste, etc.	Contamination Nuisance Pollution Legal compliance	6	5	9	Waste management procedures applied and monitored by site team. Designated skips provided for waste streams. Waste Contractor approved; Waste Carriers licence checked. WTN provided for all uplifts.	4
	Surplus excavation/aggregate disposal	Increased cost Reduced sustainability	5	4	7	Aggregate surplus to be reused on site for foundations to storage areas etc. All surplus materials to be considered for re-use on site prior to removal.	4
	Packaging waste	Increased cost of disposal Depletion of resources	6	2	2	Waste streams segregated, supply chain reducing packaging sent.	1
Works in sensitive location or where abnormal operating conditions arise e.g. emergency response	Abnormal operating conditions e.g. pumping, filtration, water treatment, etc.	Pollution of environment Legal sanction	6	5	11	Over pumping required in initial phase of works, silt buster was utilised as well as hay bales to prevent silt ingress into water course.	5
	Unplanned event (Incidents e.g. spill, fire, etc.)	Pollution of environment Legal sanction	3	2	13	Unplanned events are practiced for i.e Fire evacuation, spill control etc.	5

LOVELL safetyalways

ENVIRONMENTAL CONSENTS AND PRE-NOTIFICATION CHECKLIST

Consent name	Description of the works requiring approval	Approx timescale to obtain consent	Enforcement agency			Required	Department. responsible for application	Date applied	Consent received/comments
			England	Wales	Scotland				
Water resources									
Permit to discharge water to a watercourse	Effluent discharges of 5 to 20 cubic meters per day to a point source, i.e. pipe, outfall or soak-away, that enters directly or indirectly controlled waters. Any discharges exceeding 100 cubic meters per day will need to apply for a bespoke permit. Unless within 200m of a watercourse, then any discharges exceeding 50 cubic metres per day will need to apply for a bespoke permit.	EA - approx. four months SEPA: Registration - one month License - approx. four months	EA	NRW	SEPA	Yes ☐ No ☑			
Consent to discharge waste water to a Sewer	Consent or approval for discharge of effluent to sewer.	Two months	Water Company	Water Company	Water Company	Yes ☐ No ☑			
S165 consent for temporary discharge from a pipe less than 229mm	Temporary consent to discharge to surface water from a pipe less than 229mm (9”) or when the EA request a formal application. Application via water company	EA - Seven working days SEPA - Seven working days	EA	NRW	SEPA	Yes ☐ No ☑			
S166 consent for temporary discharge from a pipe larger than 229mm	Temporary consent to discharge to surface water from a pipe greater than 229mm (9”) or when the EA request a formal application.	EA Seven - working days SEPA - Seven working days	EA	NRW	SEPA	Yes ☐ No ☑			
Abstraction licence	Abstraction of water from a controlled water resource Note: some dewatering activities will require an abstraction licence. If you plan to abstract more than 20 cubic metres a day from a watercourse or underground water reserve, you will likely need a license. There are exemptions – dewatering of underground strata and abstractions of surface waters to prevent interference with building or engineering works where the abstraction lasts less than 6 consecutive months, subject to restrictions.	EA: four - six months SEPA: Registration - one month License - approx. four months	EA	NRW	SEPA	Yes ☐ No ☑			
Notification of removal of water from excavations	Removal of water from the ground or surface water to assist construction or the extraction of aggregates and minerals	N/A	EA	NRW	SEPA	Yes ☐ No ☑			
Works in proximity of a watercourse / land drainage / flood risk activity permit	Any temporary or permanent physical works in, adjacent or within 9m, under, or over a watercourse. Standard rules exemptions or bespoke permit.	LA (for ordinary watercourses): EA (for main rivers): two months IDB (where applicable): two months SEPA: registration - one month Licence approx. four months	LA / EA / IDB	LA / NRW	SEPA	Yes ☐ No ☑			

Consent name	Description of the works requiring approval	Approx timescale to obtain consent	Enforcement agency			Required	Department. responsible for application	Date applied	Consent received/comments
			England	Wales	Scotland				
Consent to use pesticide in close proximity to a watercourse	Any application of a pesticide (including herbicides, fungicides, insecticides, molluscicides, rodenticides, growth regulators and masonry and timber preservatives) within ten metres of a watercourse, including canal, ditch, river or estuary.	Two months	EA	NRW	SEPA	Yes ☐ No ☑			
Consent to affect bed of an estuary or sea (FEPA consent, in Wales you will also require a Coastal Protection Act consent (CPA))	Any works that may deposit material onto the bed of an estuary or the sea, including cofferdams, erection of jetties, outfall structures	Four - 12 months	MMO	Marine Consents Unit: (MCU) – Welsh Assembly	Marine Scotland Licensing Operations Team – Scottish Executive	Yes ☐ No ☑			
River works licence (within River Thames)	Under Section 66 of the Port of London Act, a river works licence is required for any works in the River Thames, riverward of the mean high water mark and regardless of ownership of the river bed, including any works under the river or overhanging the river.	Three months	Port of London Authority	-	-	Yes ☐ No ☑			
Dredging licence (within River Thames)	Before any dredging work is undertaken on the tidal Thames it is a statutory requirement that a licence for such works is granted under Section 73 of the Port of London Act 1968 (as amended).	Three months	Port of London Authority	-	-	Yes ☐ No ☑			
River works licence (within the Medway Port)	Any works which are to be carried out within the port limit must have a river works licence to ensure that all relevant consultations have been carried out and that there are no adverse effects on the safety of navigation within the port.	Three months	Peel Ports Medway	-	-	Yes ☐ No ☑			
Dredging licence	Before any dredging work is undertaken within the port of Medway and dredging licence must be approved.	Three months	Peel Ports Medway	-	-	Yes ☐ No ☑			
Installation of water fitting	Installation of new water supply e.g. batcher to be consented by water company.	One month	Water Company	Water Company	Water Company	Yes ☐ No ☑			
Discharge of hazardous substances and non-hazardous pollutants dangerous substance / groundwater regulations	Disposal / discharge of effluent containing hazardous substances or non-hazardous pollutants to ground or to surface water which is not covered by a Consent to Discharge.	Three months	EA	NRW	SEPA	Yes ☐ No ☑			
Groundwater Source Protection Zone (SPZ).	When working within a Groundwater Source Protection Zone (SPZ), you should contact your local regulator to discuss the work being undertaken. The SPZ is an area designated around a groundwater source, the maximum extent of which is the catchments area for the source and within which the Regulator seeks to limit the processes and activities that can occur within that area.	-	EA	NRW	SEPA	Yes ☐ No ☑			
Water Protection	General construction works are exempt but any fixed	Four months	EA	NRW	NA	Yes ☐			

Consent name	Description of the works requiring approval	Approx timescale to obtain consent	Enforcement agency			Required	Department. responsible for application	Date applied	Consent received/comments
			England	Wales	Scotland				
Zones (WPZ) Consent	premises e.g. depots in a WPZ where chemicals are stored will require a consent You must get consent if you store or use: • 200 litres of more of any controlled substance • 50 litres or more of any controlled substance if stored in a single container Controlled substances include fuel and oil, artificial fertilizer, and toxic, harmful or corrosive substances.					No ☑			
Piling work within a GWPZ approval	Any piling or penetrative foundation works that are scheduled to take place within a groundwater source protection zone must first be approved by the Environment Agency. A piling risk assessment must be undertaken including contaminated land tests – these can take four weeks to complete.	25 days	EA	NRW	SEPA	Yes ☐ No ☑			
CAR License (Complex License)	Management of surface water run-off from a construction site, including access tracks, which: - Is more than 4 hectares - Is in excess of 5km or - Includes an area of more than 1 hectare or length of more than 500m on ground with a slope in excess of 25°	Four months	N/A	N/A	SEPA	Yes ☐ No ☑			
Dust									
Prescribed processes	Use of mobile concrete crushers and screens - operator should have a licence from the planning authority local to its headquarters. Where Lovell own and operate concrete batching plant away from site the batching process may be a prescribed process requiring consent.	Three months 21 days for mobilisation authorisation	Planning Authority	Planning Authority	SEPA / Planning Authority	Yes ☐ No ☑			
Noise									
S61 consent (noise and vibration)	S61 consent is only necessary if a planning or development order or the client requires the contractor to enter into the S61 process.	Two months to develop 28 days determination	Planning Authority	Planning Authority	Planning Authority	Yes ☐ No ☑			
CRC (energy efficiency scheme) (formerly carbon reduction commitment)									
CRC energy efficiency scheme	Any organisation with at least one half hourly electricity meter settled on the half hourly market must register with CRC. Any organisation which uses less than 6,000Mwh must make an informed disclosure. CRC compliance is Lovell Group responsibility. Joint ventures must individually assess whether they qualify and must register for CRC energy efficiency scheme with reference to 'A guide to qualification and organisational structure'.	Registration not consent	EA	EA	EA	Yes ☐ No ☑			
Energy Savings Opportunities	Qualifying organisations to undertake energy audits and identify energy savings.	Registration not consent	EA	EA	EA	Yes ☐ No ☑			

Consent name	Description of the works requiring approval	Approx timescale to obtain consent	Enforcement agency			Required	Department. responsible for application	Date applied	Consent received/comments
			England	Wales	Scotland				
Scheme (ESOS)	ESOS compliance is Lovell Group responsibility.								
Ozone depleting substances									
F-Gas and ODS regulations qualified person	A qualified person needs to; carry out leak checking, recovery of fluorinated greenhouse gases, install, maintain and service any refrigeration equipment, air conditioning units, equipment containing fluorinated greenhouse gas based solvents, fire protection system, fire extinguisher or H.V switch gear containing more that 3kg of fluorinated greenhouse gas. An individual must be qualified for the relevant activity e.g. H.V switch gear will require a individual holding the H.V switch gear qualification. Qualifications include five day CITB/City and Guild.	Contractor to organise. Lovell to check qualifications.	EA	NRW	SEPA	Yes ☐ No ☑			
Waste Management									
Environmental Permitting Regulations 2009 (England and Wales) Waste Management Licence 1994 (Scotland)	An environmental permit must be gained for a location where waste material requires disposal, storage or treatment on site or where the off site location does not have permitted licences. Any waste management licences in place before 6 April 2008 automatically became Environmental Permits. The Environmental Permitting Regulations do not apply in Scotland and a Waste Management Licence must still be obtained.	Four months	EA	NRW	SEPA (WML)	Yes ☐ No ☑			
Waste Exemptions	Environment Permitting Regulations (England and Wales) 2010	Online system in England and Wales. 21 days (Scotland)	EA	NRW	SEPA	Yes ☐ No ☐			
Hazardous Waste Registration	The Hazardous Waste Regulations require any premises in Wales or Scotland that produce or hold hazardous waste in quantities of greater than 500kg to annually register. Note: this requirement in England was removed in April 2016.	Immediate (by phone and/or online)	-	NRW	Not applicable *(Use / purchase Special Waste Consignment Notes from SEPA)*	Yes ☐ No ☑			
Ecology									
Control / Removal of Invasive Species	Submission of Invasive Species management plan to EA / SEPA		EA	NRW	SEPA	Yes ☐ No ☑			
Licence to effect or translocation of protected species or habitats	Where protected species has been identified, a licence may be necessary to undertake mitigation or works in the area.	25 – 60 days	DEFRA English Nature	Welsh Assembly CCW	Scottish Executive SNH	Yes ☐ No ☑			
Consent to work in a Site of Special Scientific Interest (SSSI) Special Areas of	Where works will be undertaken in a protected habitat.	Four - six months	Natural England	CCW (CCGW)	SNH or regulatory Authority	Yes ☐ No ☑			

Consent name	Description of the works requiring approval	Approx timescale to obtain consent	Enforcement agency			Required	Department. responsible for application	Date applied	Consent received/comments
			England	Wales	Scotland				
Conservation, Special Protection Areas, RAMSAR (wetland areas)									
Consent to work in a Site of Special Scientific Interest that is also a Special Area of Conservation, Special Protection Areas or RAMSAR (wetlands)	Where works would take place in or could affect the integrity of the protected site / or its species then an appropriate assessment may be required.	Four - six months	LPA / DEFRA Natural England	LPA / DEFRA CCW (CCGW)	LPA / DEFRA SNH	Yes ☐ No ☑			
Felling licenses	Where more than 5m3 of timber is to be felled per quarter and no detailed planning permission is in place or other exemption applies.	Ten weeks	Forestry Commission	Forestry Commission	Forestry Commission	Yes ☐ No ☑			
Archaeology and built heritage									
Listed Building Consent / Conservation Area Consent	Works affecting a listed building / conservation areas including installation of noise insulation and remedial works on structure(s).	One - two months	Planning Authority Historic England	Planning Authority Welsh Assembly	Planning Authority Scottish Executive	Yes ☐ No ☑			
Scheduled Ancient Monuments	Works potentially affecting a scheduled ancient monument must be consented by English Heritage.	Three months	Historic England	Historic Wales	Historic Environment Scotland	Yes ☐ No ☑			
Works affecting an area of archaeological importance	Where works affect an area where there is evidence and or potential for archaeological remains.	Six weeks	Planning Authority	Planning Authority	Planning Authority	Yes ☐ No ☑			
Licence for removing human remains (archaeology)	Where human remains need removing.	One week	Home Office	Home Office	Home Office (Historic Scotland)	Yes ☐ No ☑			
Licence which will affect a burial ground	Where works will affect a burial ground.	Three months	Home Office (Church of England)	Home Office	Home Office	Yes ☐ No ☑			
Planning Permission / Development Order / Act conditions									
Planning Permission onto a classified road		12-16 weeks	Planning Authority	Planning Authority	Planning Authority	Yes ☐ No ☑			
Planning conditions	Conditions may require certain controls and agreements to be in place and implemented prior to and during the works including demolition / dismantling.	Eight weeks	Planning Authority	Planning Authority	Planning Authority	Yes ☑ No ☐	Technical	N/A	All pre-occupation conditions now discharged.
Development Consent Order		Four - 12 months	Infrastructure Planning Committee	Infrastructure Planning Committee	N/A	Yes ☐ No ☑			
EIA Screening/ Scoping	Scoping opinion for EA, as per EIA regulations.	Six weeks (screen) Six weeks (scope)	Planning Authority /	Planning Authority /	Planning Authority /	Yes ☐ No ☑			

Consent name	Description of the works requiring approval	Approx timescale to obtain consent	Enforcement agency			Required	Department. responsible for application	Date applied	Consent received/comments
			England	Wales	Scotland				
			MMO	MMO	Scottish Executive / MMO				
Town and Country Planning (Control of Advertisements) (England) Regulations 2007	Restrictions on site signage on hoardings, when in a conservation area.		Planning Authority	-	-	Yes ☐ No ☑			
Town and Country Planning (Section 62A Applications)	When development is within ten metres of railway land (including sidings etc.) there is a requirement to notify the railway infrastructure owner.					Yes ☐ No ☑			
EIA and Environmental Statement		Six - 12 months	Planning Authority / DEFRA	Planning Authority / DEFRA	Planning Authority / DEFRA	Yes ☐ No ☑			
Wayleaves / Easements	For example, where new overhead lines (OHL), cables and pipelines will cross third party land.	Two - Six months	Landowner	Landowner	Landowner	Yes ☐ No ☑			
Land Purchase / leasing	Where additional land is required permanently or temporarily for the works.	Six - 12 months	Landowner	Landowner	Landowner	Yes ☐ No ☑			
Lease conditions	Conditions may require certain controls and agreements to be in place and implemented prior to and during the works.	Four weeks	Landlord	Landlord	Landlord	Yes ☐ No ☑			
Port Authority consultation	Port Authorities may impose certain controls and require certain agreements to be in place and implemented prior to and during the works.	Four weeks	Port Authority	Port Authority	Port Authority	Yes ☐ No ☑			
Public Rights of Way, Roads									
Closure and Diversion of Public Rights of Way and Roads	Temporary / permanent closures or diversions of public rights of way and roads require consent and notification of alterations prior to works commencing.	One - Two months	Planning Authority	Planning Authority	Planning Authority	Yes ☐ No ☑			
Closure and Diversion of Trunk Roads of Motorways	Temporary or permanent closures or diversions of trunk roads and motorways require consent and notification of alterations prior to works commencing.	One - two months	Highways England	Welsh Assembly	Scottish Executive	Yes ☐ No ☑			
Radioactive Substances									
Licence for the use and storage of radioactive sources	Where on site laboratories or other areas use radioactive sources for measurement etc.	Four - five months	EA	NRW	SEPA	Yes ☐ No ☑			
Other									

Consent name	Description of the works requiring approval	Approx timescale to obtain consent	Enforcement agency			Required	Department. responsible for application	Date applied	Consent received/comments
			England	Wales	Scotland				
CEEQUAL (Civil Engineering Environmental Quality Assessment and Award) Scheme	Where projects are required to complete CEEQUAL assessments.	Project duration	CEEQUAL	CEEQUAL	CEEQUAL	Yes ☐ No ☑			
BREEAM (Building Research Establishment Environmental Assessment Method)	Where projects are required to complete BREEAM assessments.	Project duration	BRE	BRE	BRE	Yes ☐ No ☑			

9. QUALITY

Quality
Specifications and technical information for the project will be assessed by the Building Control Authority.
All substructures will be constructed as designed by a structural engineer.

Objectives
The development will be constructed in accordance with the approved register of drawings and document to a quality which accords with good building practice, standards laid down by the NHBC or Zurich, and the requirements of the CDM Regulations. The register of documents and drawings will be checked upon issue. The scheme will be built in accordance with CDM Regulations, LIMS requirements, specific requirements of this PMP and approved specifications.

Procedures
Company procedures are clearly set out in the Construction section of LIMS and will be implemented in the building of this project.
Works will be carried out in accordance with approved drawings. Work will be initiated by instructing contractors to carry out works in accordance with programme, LIMS, orders, drawings and specifications issued.
Approved drawings will be the uploaded to Project Plus. A drawing register is automatically populated by Project Plus to monitor the issue of all technical information from office to site and to external parties.

Inspection and testing
New build works shall be carried out in accordance with NHBC standards, or other where specified. The inspection and testing regime will generally be in accordance with nationally agreed NHBC inspection and hold points, and site management will carry out stage checks in accordance with LIMS. Site checks shall be carried out in advance of any NHBC/third party inspection.
Where items require rectification, these shall be carried out immediately as part of the site operation.
Other inspection and test plans shall be prepared as required for: -

Screed, mortar and concrete - (ready mixed to be sourced and test certificates to be obtained from supplier/contractor)
Special requirements as identified in the specification.
Activities agreed at the contract commencement meeting.
Activities identified during the construction stage.

Site management will implement stage checks and material call off/delivery schedules in accordance with LIMS which will be monitored by the Operations and Contracts Manager. Consideration has been given to the quantity and method of delivery and the following restrictions have been noted (i.e. size of delivery vehicle, frequency and requirement of part loads on bulk orders).
The Contracts and site management will maintain the build programme, stage checks and material call off delivery schedules.

Refurbishment
Inspection and test plans shall be prepared as required for: -
The contract requirements as identified in the specification.
Activities agreed at the contract commencement meeting.
Activities identified during the construction stage.
If no specific tests are required by the client then this is to be documented.

Method statements, inspection and test plans, check lists and record sheets shall be prepared for those items requiring them. Where possible a standard format shall be followed on each project. Each stage of operation requiring checking shall be separately identified. Where activities are carried out by a contractor they shall be responsible for the preparation of the method statements, checklists and carrying out the testing and inspection with agreed points where the site management carried out a stage check. Where items require rectification, these shall be carried out immediately as part of the site operation. Failure to meet the requirements of the inspection and test plan shall be dealt with under the terms of the contract of employment (i.e. direct or subcontract).

Meetings
Regular contractor coordination meetings, chaired by the Contracts Manager, and attended by relevant contractors will be held.
The date for the first meeting will be agreed at the monthly job review.
Internal job review meetings chaired by the Contracts Manager/Site Manager and attended by Surveyor will be held monthly following initial handover from estimating team.

Design coordination and progression meetings with all relevant parties and specialists as required, to fully develop the design.

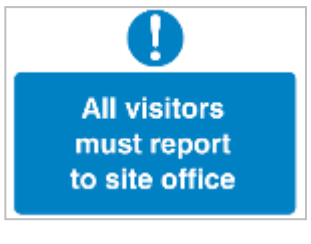
Handover procedures
Properties are to be brought to completion by site management before being offered to the Client's representative. For sales plots, an inspection is to be carried out jointly by the site management sales representative and all outstanding items recorded. All plots are to be inspected jointly by Lovell and the Client's representative/purchaser and outstanding items recorded.

Following the inspection and completion of any works arising, the property is available for handover, and is evidenced by the signing of a handover certificate, by the Client's representative/purchaser.
Meter readings will be taken and a handover pack containing all the relevant details appropriate to the property will be handed to the Client's Representative.

Maintenance
While still on site, site management will ensure day-to-day defects are dealt with as they are reported. Following completion of the site, the day-to-day maintenance will be carried out by Lovell Customer Care department, who should be contacted by the Client. All relevant information will be passed to Customer Care department to enable this procedure to take place.
Defects will be the responsibility of the Customer Care Department. These are to be dealt with as laid down within LIMS, NHBC Buildmark and requirements of contract documents. On completion of the project the Contracts Manager will ensure handover is recorded on Coins with the Customer Care co-ordinator and update the inspection log to ensure defects liability periods are recorded.
On completion of any items raised by the representative/tenant, confirmation, by signature, that these works have been carried out will be required.

Roads and sewers
Site management will ensure that roads and sewers for adoption and upgrading are completed in accordance with details and specification and placed on maintenance by the local adopting authority. The Contracts Manager will be responsible for ensuring that adoption takes place at the end of the maintenance period, where applicable.

SITE RULES



- All site arrivals and departures are to be recorded.
- All site employees will attend a site specific induction and are required to confirm they understand the requirements of risk assessments and associated method statements provided by their company.
- Any unsafe act or condition observed or encountered is to be reported to site management.
- Safety helmet, safety footwear with toe and midsole protection, upper body hi-vis and task suitable gloves* are mandatory. * Gloves may only be omitted if a specific risk assessment determines that wearing them would create or increase risk for certain tasks, such as operating rotating or moving machinery or using serrated blades.
- All other personal protective equipment must be worn as determined by task specific risk assessment.
- Where CoSHH assessment identifies use of tight fitting respiratory protective equipment (RPE), wearers must be clean shaven and appropriately face fit tested to ensure the RPE is of the correct size and type.
- Site hours are from 7.30am to 18.00pm Mon/Fri and 8.30am to 13.30pm Sat. Working outside of these hours is not permitted unless by prior agreement.
- All accidents, incidents and learning events, no matter how minor must be reported to Lovell site management.
- Smoking and vaping is only permitted in areas designated by site management.
- Everyone must be considerate of others, especially the public. Refrain from using foul or lewd language, as well as any aggressive or insulting behaviour.
- All people entering the site are to be made aware of emergency procedures, first aid arrangements, escape routes and the site assembly point.
- All access and emergency routes must be kept free from obstruction at all times.
- All site employees must co-operate in keeping the site tidy and clear away debris, waste, tools, and materials at the end of each work shift. This includes the site welfare facilities.
- No site employee should interfere with, damage, or misuse any safety sign or equipment, including fire safety devices, provided for site safety
- Only trained, competent, and authorised personnel are permitted to remove or alter any scaffold structure or work platform, as directed by site management.
- Consumption or possession of alcohol or illegal drugs on site is strictly prohibited. No person is to work on this site having consumed alcohol or illegal drugs. Those suspected of being under the influence of alcohol or illegal drugs will be invited to undergo specific testing. This site also operates a random testing regime.
- Where there is a risk of serious or imminent danger or wild animals are discovered on site, work activities must stop immediately and be reported to site management - work must not continue until instructed to do so.
- Battery operated or 110v tools and equipment are to be used. Any repairs of servicing must be carried out by qualified electricians only makeshift repairs are not permitted. Only use battery chargers, devices, and batteries from reputable manufacturers and do not mix between different manufacturers. Batteries should only be charged in designated areas.
- Halogen lighting is not permitted on site; alternatives are to be used such as protected fluorescent lighting or LED.
- Permits to work are required for all hot works, breaking ground and confined space entry. Suitable, serviced fire extinguishers must be available in the work area whilst carrying out hot works.

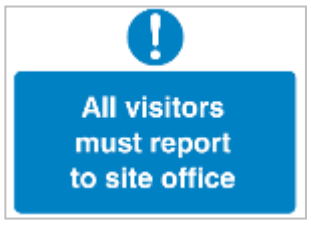
PAVES
PEDESTRIANS AND VEHICLES EFFECTIVELY SEGREGATED

SITE HEALTH AND SAFETY STARTS HERE

SITE RULES

PAVES
PEDESTRIANS AND VEHICLES EFFECTIVELY SEGREGATED

- Unsafe and inappropriate behaviour may result in dismissal from site.
- The wearing of earphones is not permitted on site. Radios and mobile phones may be used at site management's discretion. Mobile phones are not to be used whilst carrying out work or driving activities.
- Plant operators must hold a recognised certificate of training (CPCS, NPORS, IPAF etc). These are to be produced at induction and on request. Mobile phone use during plant operation is forbidden.
- It is strictly forbidden to ride on any plant as a passenger.
- Operators of dumpers must not remain on the machine whilst it is being loaded and must wear the seat belt whilst in motion. This includes cabbed dumpers
- All designated PAVES routes are to be followed at all times.
- Reversing should be avoided whenever possible. If reversing is unavoidable, all visibility aids must be used, and a responsible person should assist as needed.
- All footpath and roads, both on and off the site, shall be maintained in a condition which is satisfactory for foot and vehicular traffic.



- Vehicles must be parked considerately and not obstruct public footpaths
- No site deliveries are to be made during periods of peak pedestrian and vehicular traffic to local schools. All suppliers are to be formally notified of this.
- Site employees are to report any defects to plant or equipment to their manager immediately; this includes any fire safety equipment.
- Manual handling operations are to use mechanical aids whenever possible. Risks to health are to be properly assessed.
- All materials are to be stored in agreed areas where they will not obstruct site access. Materials should not be stored in any public area.
- Should any asbestos containing materials (ACM) be discovered or suspected, works must stop and the incident reported to Lovell site management.
- Creation of airborne dusts is to be prevented where practical by substituting materials, using different processes and off site manufacturing.
- If prevention isn't possible, use on-tool extraction or water to control dust, depending on the process and tools. Wear suitable respiratory protective equipment (RPE). Those using tight-fitting RPE must be clean-shaven and properly face-fit tested.
- Any step ladders or ladders intended for use must be justified by risk assessment to ensure other access equipment has been considered. Step ladders must only be used for short duration, low risk works, and operatives must maintain 3 points of contact. Domestic/non-professional grade equipment is not permitted. Larger materials and tools are not to be carried up ladders.
- Plant and equipment must be fitted with appropriate silencers that are properly used and maintained. Plant must not be left idling unnecessarily.
- Burning of waste and other materials is not permitted on site at any time.
- Waste materials to be placed into the relevant container provided - use off cuts where possible.
- Consideration must be given to the environment e.g. air, ground and water pollution - all observations are to be reported to site management.

SITE HEALTH AND SAFETY STARTS HERE

APPENDIX 7

Gas Protection Membrane Specification

GROUND GAS PROTECTION
GP®1 TECHNICAL DATA SHEET

JUTA | TITANTECH®

GP®1

GP®1 proprietary gas resistant damp proof membrane (DPM) is a multi-layer, low density polyethylene membrane, reinforced with a polypropylene reinforcing grid with an integral aluminium foil. GP®1 is specifically designed and manufactured to perform as a methane, carbon dioxide, radon, ground gas, air & moisture protection system.

Thickness	0.6 mm
Width	Various m
Length	Various m
Weight	370 g/m²

TITANTECH®
For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Handling
Roll weights can be in excess of 20 kg and hence appropriate care and equipment is required for unloading and handling.

Storage
Rolls of GP®1 should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged, but should be protected from exposure to UV.

Installation
GP®1 should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015.

Certifications

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 20/5705

Please Scan

CE UK CA UK NI

Rev 2024

GROUND GAS PROTECTION
GP®1 TECHNICAL DATA SHEET

GP®1

Feature	Characteristics	Test Method	GP®1
Physical Properties	Thickness	EN 1849-2	0.6 mm
	Thickness - between Scrim	BS EN ISO 9863-1:2016	0.4 mm
	Width	EN 1849-2	Various m
	Length	EN 1849-2	Various m
	Weight	EN 1849-2	370 g/m^2
Hydraulic Press	Water Column	EN 20811	> 300
	Resistance to Water Penetration	EN 13967, EN 1928	Pass
	Water Tightness	EN 11296, EN 1367, EN 1928	Pass
Mechanical Properties	Resistance to Static Load	EN 12730-B	20 kg
	Tensile Strength (MD)	EN 12311-1	600 N/50mm
	Tensile Strength (CMD)	EN 12311-1	480 N/50mm
	Tensile Elongation (MD)	EN 12310-1	20%
	Tensile Elongation (CMD)	EN 12310-1	20%
	Puncture Resistance	EN 12236	1.25 kN
	Resistance to Tearing (Nail Shank) MD	EN 12310-1	330 N
	Resistance to Tearing (Nail Shank) CMD	EN 12310-1	400 N
Durability and Chemical Resistance	Transmission Rate of Volatile Liquids - Diesel	ISO 6179:2010 (B)	0.246 g/m^2/h
	Transmission Rate of Volatile Liquids - Xylene	ISO 6179:2010 (B)	0.571 g/m^2/h
	Transmission Rate of Volatile Liquids - Toluene	ISO 6179:2010 (B)	0.583 g/m^2/h
	Transmission Rate of Volatile Liquids - Petrol	ISO 6179:2010 (B)	0.135 g/m^2/h
Gas Permeability	Methane Permeability	BS EN ISO 15105-1	< 0.09 ml/m^2/day/atm
	Carbon Dioxide Permeability	BS EN ISO 15105-1	< 0.09 ml/m^2/day/atm
	Radon Permeability	K124/02/95	8.0 x 10^{-15} m^2/s
	Hydrogen Sulphide Permeability	BS EN ISO 15105-1	< 0.1 ml/m^2/day/atm
Compliance and Certification	CE Mark - EN13967:2012 (A1 2017)		
	NHBC Standards Compliant		
	Conforms to BS 8485:2015 + A1 2019		
	BBA Certified - Certificate No. 20/5728		

JUTA UK

Please contact JUTA UK Directly for more information on GP®1

Jointing and Sealing

It is recommended GP®1 be heat welded where possible, with welding carried out by competent personnel with suitable qualifications in accordance with best practice, and guidance contained within BS 8485:2015.

Accessory Products

- GP®1 Starter Band
- GP® Tape
- GP® Self Adhesive Membrane
- GP® Primer
- GP® Top Hats and Preformed Corners
- GP® Protection Fleece
- GP® Void Vent (24/40mm)

GROUND GAS PROTECTION
GP®1 SAM
TECHNICAL DATA SHEET

JUTA | TITANTECH®

GP®1 SAM

GP®1 SAM, gas protection self adhesive membrane, is a bituminous gas proof and water proof sheet, composed of self-adhesive SBS polymer modified bitumen incorporating GP®1 with an upper surface finish of black reinforced LDPE, and a lower surface finish of siliconized release film. GP®1 SAM is used for the gas/ waterproofing of underground structures where harmful ground gasses are anticipated, and as a self adhesive accessory to GP®1.

Thickness	1.2 mm
Width	0.9 m or 0.3 m
Length	20 m
Weight	1100 g/m²

TITANTECH®
For developers of brownfield and contaminated sites the TITANTECH® family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Handling
Roll weights can be in excess of 20 kg (approx 33 kg/roll) and hence appropriate care and equipment is required for unloading and handling. This product is non-toxic nor flammable.

Storage
Rolls of GP®1 SAM should be stored on in a cool, dry place, and be protected from exposure to rain, sun, heat and cold temperatures prior to installation. Exposure to sunlight for extended period of time could cause difficulty with removal of the release film.

Certifications

BBA APPROVAL INSPECTION CERTIFICATION CERTIFICATE 22/6076

Please Scan

CE UK CA UK NI

Rev 2024

GROUND GAS PROTECTION
GP®1 SAM
TECHNICAL DATA SHEET

GP®1 SAM

Feature	Characteristics	Test Method	GP®1 SAM
Physical Properties	Thickness	EN 1849-2	1.2 mm
	Width	EN 1849-2	0.9 or 0.3 m
	Length	EN 1849-2	20 m
	Weight	EN 1849-2	1100 g/m^2
Hydraulic Press	Water Tightness	EN 1928	Pass
	Water Vapour Transmission	EN 1931	0.013 g/m^2/day
Mechanical Properties	Tensile Strength (MD/CMD)	EN 12311-2 (A)	500 N/50mm
	Elongation (MD/CMD)	EN 12311-2 (A)	> 12 %
	Resistance to Static Load	EN 12370	20 kg
	Joint Strength	EN 12317-2	> 30 N
	Durability and Water Tightness (Ageing and Chemicals) 60 kPa	EN 1847	Pass
	Resistance to Nail Tear (MD/CMD)	EN 12310-1	> 300 N
	Resistance to Fire	EN 13501	F Euro Class
Gas Permeability	Methane Permeability	EN ISO 15105-1	< 0.68 ml/m^2/day/atm
	Carbon Dioxide Permeability	EN ISO 15105-1	< 2.81 ml/m^2/day/atm
	Radon Permeability	K124/02/95	8.0 x 10^{-15} m^2/S
Compliance and Certification	CE Mark - EN13967:2012 + A1:2017 Type (A/T)		
	BS 8485:2015 Compliant (Methane and Carbon Dioxide Barrier)		

JUTA UK

Please contact JUTA UK Directly for more information on GP®1 SAM

Installation

GP®1 SAM should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015, and/or BS 8102:2009.

It is recommended that GP®1 SAM is not applied in temperatures below 10°C, in colder weather the material can be warmed slightly to aid adhesion.

Accessory Products

- GP® Primer
- GP® Protection Board
- GP® Protection Fleece

APPENDIX 8

Current Gas Protection Verification Reports

GEOSHIELD

Verification Certificate

Date: 28 February 2025

Keytec Installation Services

Plot 1
Greenside Mill Skelmanthorpe
Saville Road
Skelmanthorpe
Huddersfield
HD8 9ED

The documentation in this handover package shows that the installation of the Gas Membrane and ancillaries was installed to specification.

Verified in accordance with BS 8485:2015+A1:2019 and CIRIA 735.

All areas were verified, and remediation issues corrected.

Paul Colbeck
Director of Site Services

GEOSHIELD

Verification Certificate

Date: 28 February 2025

Keytec Installation Services

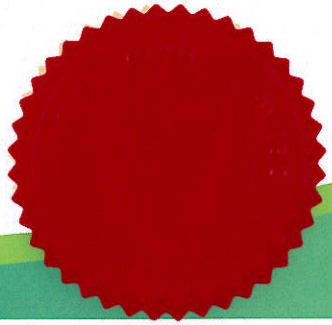
Plot 2
Greenside Mill Skelmanthorpe
Saville Road
Skelmanthorpe
Huddersfield
HD8 9ED

The documentation in this handover package shows that the installation of the Gas Membrane and ancillaries was installed to specification.

Verified in accordance with BS 8485:2015+A1:2019 and CIRIA 735.

All areas were verified, and remediation issues corrected.

Paul Colbeck
Director of Site Services



GEOSHIELD

Verification Certificate

Date: 28 February 2025

Keytec Installation Services

Plot 3
Greenside Mill Skelmanthorpe
Saville Road
Skelmanthorpe
Huddersfield
HD8 9ED

The documentation in this handover package shows that the installation of the Gas Membrane and ancillaries was installed to specification.

Verified in accordance with BS 8485:2015+A1:2019 and CIRIA 735.

All areas were verified, and remediation issues corrected.

Paul Colbeck
Director of Site Services

GEOSHIELD

Verification Certificate

Date: 28 February 2025

Keytec Installation Services

Plot 4
Greenside Mill Skelmanthorpe
Saville Road
Skelmanthorpe
Huddersfield
HD8 9ED

The documentation in this handover package shows that the installation of the Gas Membrane and ancillaries was installed to specification.

Verified in accordance with BS 8485:2015+A1:2019 and CIRIA 735.

All areas were verified, and remediation issues corrected.

Paul Colbeck
Director of Site Services

GEOSHIELD

Verification Certificate

Date: 28 February 2025

Keytec Installation Services

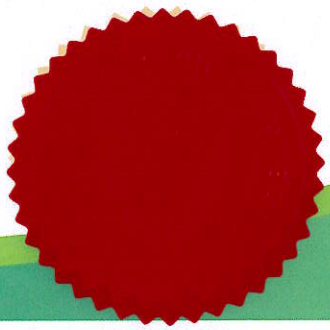
Plot 5
Greenside Mill Skelmanthorpe
Saville Road
Skelmanthorpe
Huddersfield
HD8 9ED

The documentation in this handover package shows that the installation of the Gas Membrane and ancillaries was installed to specification.

Verified in accordance with BS 8485:2015+A1:2019 and CIRIA 735.

All areas were verified, and remediation issues corrected.

Paul Colbeck
Director of Site Services



GEOSHIELD

Verification Certificate

Date: 28 February 2025

Keytec Installation Services

Plot 6
Greenside Mill Skelmanthorpe
Saville Road
Skelmanthorpe
Huddersfield
HD8 9ED

The documentation in this handover package shows that the installation of the Gas Membrane and ancillaries was installed to specification.

Verified in accordance with BS 8485:2015+A1:2019 and CIRIA 735.

All areas were verified, and remediation issues corrected.

Paul Colbeck
Director of Site Services

GEOSHIELD

Verification Certificate

Date: 28 February 2025

Keytec Installation Services

Plot 8
Greenside Mill Skelmanthorpe
Saville Road
Skelmanthorpe
Huddersfield
HD8 9ED

The documentation in this handover package shows that the installation of the Gas Membrane and ancillaries was installed to specification.

Verified in accordance with BS 8485:2015+A1:2019 and CIRIA 735.

All areas were verified, and remediation issues corrected.

Paul Colbeck
Director of Site Services

GEOSHIELD

Verification Certificate

Date: 28 February 2025

Keytec Installation Services

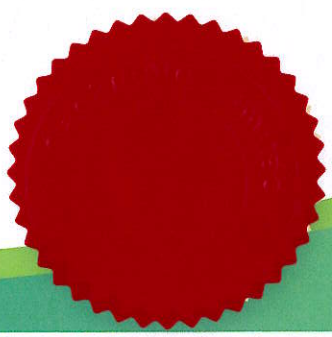
Plot 9
Greenside Mill Skelmanthorpe
Saville Road
Skelmanthorpe
Huddersfield
HD8 9ED

The documentation in this handover package shows that the installation of the Gas Membrane and ancillaries was installed to specification.

Verified in accordance with BS 8485:2015+A1:2019 and CIRIA 735.

All areas were verified, and remediation issues corrected.

Paul Colbeck
Director of Site Services



GeoShield Verification Report 2

PROJECT REFERENCE: GEO104864

PROJECT: Greenside Mill, Skelmanthorpe

PROJECT ADDRESS: Saville Road,

Skelmanthorpe, Huddersfield

HD8 9ED

SPECIFICATION: Verified in accordance with CIRIA 735.

Design in accordance with BS8485 2015 + 2019 for Methane and Carbon Dioxide.

Substrate prepared in accordance with manufacturer's instructions.

JUTA GP1 Gas Membrane

JUTA GP SAM

GeoShield Verification Report

NAME OF SURVEYOR: Niall Hogan

VERIFICATION COMPANY: GeoShield Limited

Icon Business Centre

4100 Park Approach

Thorpe Park

Leeds

CONTACT NUMBER: 07423 116951

EMAIL ADDRESS: nhogan@geoshield.co.uk

ORDER NUMBER: To be confirmed

PER VISIT: YES: ✔ NO: ☐ PROJECT: YES: ✔ NO: ☐

GeoShield Verification Report

CLIENT DETAILS

CLIENT CONTACT:	Dean Smith-Martin
CONTACTS ROLE:	
MOBILE PHONE:	
EMAIL ADDRESS:	

CLIENT CONTACT:	
CONTACTS ROLE:	
MOBILE PHONE:	
EMAIL ADDRESS	
NOTES:	

GeoShield Verification Report

APPLICATOR'S DETAILS

APPLICATOR NAME:	Bob Finnerty
COMPANY:	Keytec Installation Services
APPLICATOR TEL:	C/O Dean Martin-Smith on 07974 517075
APPLICATOR EMAIL:	

APPLICATOR NAME:	
COMPANY:	Keytec Installation Services
APPLICATOR TEL:	
APPLICATOR EMAIL:	

NOTES: At least one member of each team group will have a NVQ Level 2

qualification in the gas membrane installation.

GeoShield Verification Report

AREA SURVEYED:

Plots 2, 3 & 4 - Full Line Out

SITE CONDITIONS:

WEATHER:

Overcast

TEMPERATURE:

5ºc

RELATIVE HUMIDITY:

N/A

MEMBRANE TEMPERATURE:

N/A

TIME: 13:00 - 14:00

DATE: 17.02.2025

REPORT NUMBER: 002

ACCOMPANIED BY:

Bob Finnerty - Keytec Installation Services

GeoShield Verification Report

Verification Layout

The photograph above shows a plan layout of the site. The area highlighted in blue shows Plots 2, 3 & 4 where the verification inspection took place on site today.

GeoShield Verification Report

OVERVIEW

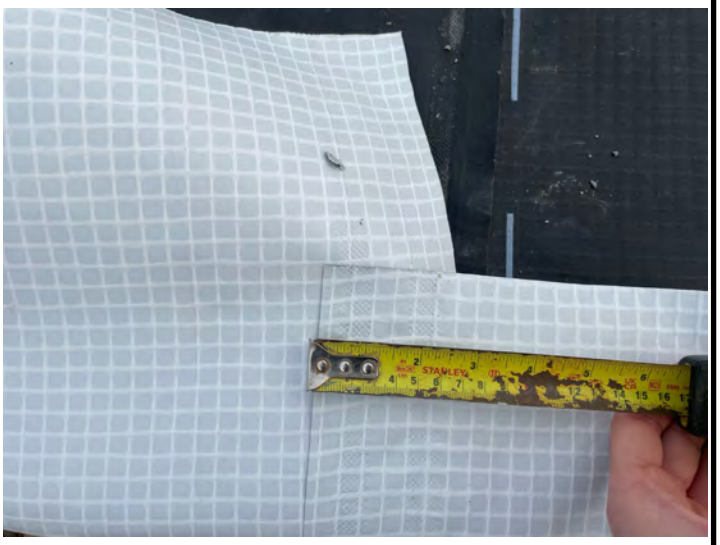
The photograph above displays an overview of Plots 2, 3 & 4 where today's verification inspection took place on site.

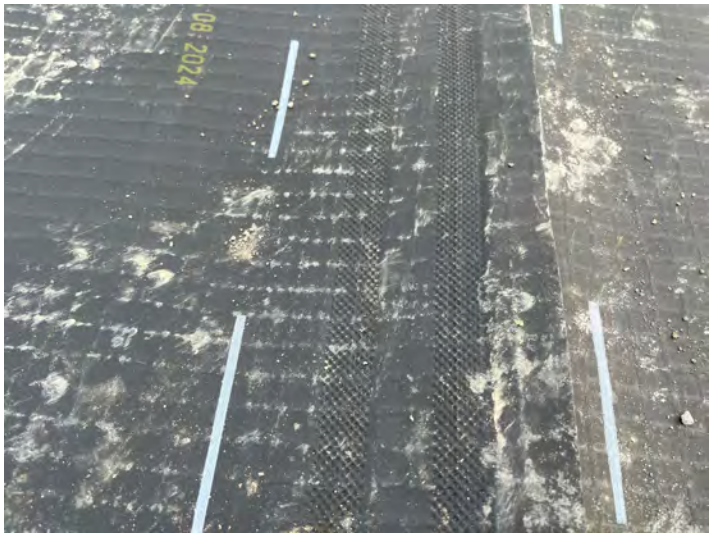
GeoShield Verification Report

VERIFICATION ITEM ONE

LOCATION/GRID LINE: Plots 2, 3 & 4 - Full Line Out

Installation of JUTA GP1 Gas Barrier





NOTES:

A complete line out of the JUTA GP1 Gas Barrier has been installed across the footprint of Plots 2, 3 & 4. The JUTA GP1 Gas Barrier has been installed across the entirety of the plots, including all internal party walls and over the external cavity to the outer leaf brickwork.

NOTES:

The majority of lap joints between the adjacent sheets of JUTA GP1 Gas Barrier have been overlapped a minimum of 100mm, conforming to manufacturer's specifications, however some overlaps were less than 100mm but these still passed the testing procedures conducted.

GeoShield Verification Report

VERIFICATION ITEM ONE

All overlaps have been welded using a twinny welder, creating a continuous gas resistant seal throughout the plots. Thorough visual inspections, supported by mechanical point stress testing conducted upon all lap joints identified one miswelded lap joint.
Tested and verified in accordance with CIRIA 735.

VERIFICATION ITEM ONE

REMEDIATIONS:

Faults Identified & Remediated - Lap Joints

NOTES:

As mentioned, one miswelded overlap was identified during the testing procedures conducted upon the lap joints. The fault was highlighted for ease of identification and remediated on site in the presence of GeoShield. The dedicated applicators from Keytec

NOTES:

Installation Services opted to remediate the fault by applying a patch of JUTA GP SAM over the affected area, with heat and rolled pressure applied to ensure a secure bond was achieved. No further faults were identified during the re-testing of the remedial works.

GeoShield Verification Report

VERIFICATION ITEM TWO

LOCATION/GRID LINE: Plots 2, 3 & 4 - Full Line Out

Pipe Penetrations

NOTES:

Throughout the complete line out installation of the JUTA GP1 Gas Barrier to the referenced plots, there were a number of pipe penetrations that have been sealed in accordance with manufacturer's specifications and design guidelines. This has been achieved using JUTA GP SAM, which is a gas resistant self adhesive

NOTES:

membrane. The installers have first cut the JUTA GP1 Gas Barrier tight around the base of each pipe penetration to minimise voided areas. Next, patches of JUTA GP SAM are placed intricately in a top hat formation around the pipe penetration and onto the JUTA GP1 Gas Barrier, as shown in the photographs above. Heat and rolled

GeoShield Verification Report

VERIFICATION ITEM TWO

pressure is applied to activate the bitumen backing, creating a secure bond between the pipe penetration and the JUTA GP1 Gas Barrier. All pipe penetrations throughout the referenced plots were subjected to thorough mechanical point stress testing where a probe was run along all edges of the JUTA GP SAM detailing. No faults were identified. Tested and verified in accordance with CIRIA 735.

GeoShield Verification Report

VERIFICATION ITEM THREE

LOCATION/GRID LINE: Plots 2, 3 & 4 - Full Line Out

Corner & Threshold Detailing

NOTES:

A number of corners and thresholds throughout the referenced plots have also been sealed correctly using JUTA GP SAM. Where the JUTA GP1 Gas Barrier has been folded to minimise voided areas and gaps across the footprint of the plots, each corner junction has been welded using a hot air tool to activate the bitumen

NOTES:

backing of the membrane, creating a reinforced gas resistant seal. Firm rolled pressure is applied with a silicone roller to aid in the adhesion, ensuring the JUTA GP1 Gas Barrier has fully bonded. Some corners have been reinforced with additional strips of JUTA GP1 Gas Barrier.

GeoShield Verification Report

VERIFICATION ITEM THREE

As with the pipe penetrations, a probe was run along all seams of the JUTA GP1 Gas Barrier within the corner detailing to validate that a gas tight seal had been achieved throughout. No faults or defects were identified.
Tested and verified in accordance with CIRIA 735.

ADDITIONAL PHOTOGRAPHS

An air brick installed around the perimeter of the plots.

The JUTA GP1 Gas Barrier crosses the internal cavity of the plots.

GeoShield Verification Sticker applied to confirm sign off of the plots.

A mechanical point stress test being conducted upon a patch repair within a threshold.

GeoShield Verification Report

GAS MEMBRANE TESTING

VISUAL /PICK & PROBE:	✔	SMOKE TEST:	
AIR LANCING:		DILECTIC:	
DESTRUCTIVE:		OTHER:	
INERT GAS TEST:		SPECIFY:	

Testing checklist attached: YES ✔ NO

Gridline/Plot Sign off

Gridline/Plot Sign off	Plots 1, 5, 6, 8 & 9 inclusive	✔
Gridline/Plot Sign off	Plots 2, 3 & 4 - Full Line Out	✔
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		
Gridline/Plot Sign off		

GEOSHIELD Verification Report

REMEDIATION LOG

Date	Nr	Remediation Description	Y/N
26/09/2024	001	There were no issues identified throughout the verification visit.	✔
17/02/2025	002	One miswelded lap joint was identified, this was remediated.	✔

GeoShield Verification Report

VERIFICATION SUMMARY

This was the second visit to the site where verification was required for the complete line out installation of the JUTA GP1 Gas Barrier to Plots 2, 3 & 4, carried out by Keytec Installation Services.

All overlaps between the adjacent sheets of JUTA GP1 Gas Barrier have been twinny welded, creating continuous welded joints throughout.

All pipe penetrations have been successfully sealed using JUTA GP SAM.

All corners have been reinforced with strips of JUTA GP1 Gas Barrier welded onto the existing membrane.

Thorough visual inspections, supported by mechanical point stress testing were conducted throughout the inspection today. One miswelded lap joint was identified, which was successfully remediated on site in the presence of GeoShield.

This was passed and verified in accordance with CIRIA 735 and installed to BS8485:2015+2019.

GEOSHIELD SIGNATURE:

DATE: 17-Feb-2025

APPENDIX 9

Additional Contamination Testing during Construction - MDJA

Michael D Joyce Associates LLP
Geotechnical and Geoenvironmental Consultants

Your ref:

Our ref: ADJ/DJM/11466

Date: 8th April 2025

Mr. M. Killip
Lovell Partnerships Limited
Unit 3 Turnberry Park
Gildersome
Leeds
LS27 7LE

By Email Only

Dear Matt

Greenside Mills, Skelmanthorpe
Risk Assessment and Validation Report No. 4458

Michael D Joyce Associates LLP was commissioned by Lovell Partnerships Limited to carry out additional testing and reporting to address concerns regarding remediation on the above named site.

Kirklees Council raised uncertainty regarding the groundworks to date and possible cross-contamination as follows;

> *The site was identified as potentially contaminated by Environmental Health (our reference 139/17). An intrusive investigation conducted by Sirius Group has confirmed contamination. On 17th April 2024, during a meeting with Sirius Group regarding the discharge of condition applications (2022/93965 & 2023/93622), Environmental Health raised concerns about demolition and clearance activities carried out by third-party contractors in the Summer of 2023.*
>
> *In April 2024, Environmental Health was informed of significant alterations to the site's topography, compared to that described in the Sirius reports reviewed to date. There is potential mixing and disturbing of materials due to uncontrolled stockpiling and material management of demolition wastes, which could present risks and introduce new sources of contamination. Several soil stockpiles were identified across different areas of the site. This included black-stained soils stockpiled in an area to the east of the site. We question whether this black-stained soil is from the pond which was identified in the pond in, flagged by Sirius Group and Environmental Health as needing additional ground investigation work.*
>
> *For Environmental Health to recommend the discharge of contaminated land conditions, we must be satisfied, at all the relevant stages, that satisfactory reports have been submitted to demonstrate that the development is suitable for use. We acknowledge a verification report received in support of the current application, despite pre-commencement conditions not being discharged for this site. We will not consider a validation report until a suitable Phase 2 and where necessary a suitable remediation strategy has been received and approved. The site must be fully characterised in its current state.*

Contin....

Under the National Planning Policy Framework, it is the developer's responsibility to confirm that the site is safe and suitable for its intended use. Moving forward, in the first instance, we expect a detailed risk assessment and thorough investigation of the site in its current condition to confirm there is no risk to the end-users. Any reports must be authored by a competent person and adhere to legislation and good practice guidance. This information must be submitted to the Local Planning Authority for approval in writing. The Planning Officer will reconsult Environmental Health when new reports are authored.

At this stage our recommendation was therefore to carry out surface sampling across the site (excluding the remediated pond) now that the site has been reduced to anticipated final level.

The sampling locations were specifically chosen from the rear gardens of plots that are accessible at present, namely Plots 1, 3, 7, 8, 17, 20, 23, 24, 28, 38 and three samples of Public Open Space (POS). All were from the near surface. As such, these areas constitute the greatest risk to future residents. These are shown on figure 1.

The western part of the site is presently inaccessible due to spoil and materials being stockpiled, and also concrete hardstanding which has yet to be removed. Further testing is proposed for this area in due course.

Reporting

The purpose of this documentation is to provide transparent reasoning as to why the remediation was required, a methodology about how it was to be undertaken and proof that the specified works have been undertaken so as 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. The report should be carried out by Michael D Joyce Associates LLP.

Where hardstanding is proposed, the link between the potential contaminants in the soil and the end users will no longer exist. As such, no special precautions are necessary.

General Rational

The inspection and sampling was under the direction a Chartered Engineer. The recovered soil samples were screened on site for any visual or olfactory evidence of contamination including the presence of VOCs. Samples were selected on the basis of those which were most likely to be contaminated and those which gave the most appropriate indication of the remediation of any contaminants. The samples were stored in both glass and plastic containers and kept in cooled conditions. Testing was carried out by Envirolab Limited to UKAS accredited procedures in accordance with MCERTS performance standards.

The aim of this was to make a preliminarily assessment of the level of any contamination on the site in order to determine if there was any remaining risk in respect of both human health and the environment.

Standard Appendix B attached to this report discusses the methodology for the assessment of contamination and should be read in conjunction with the comments overleaf.

The Contaminated Land Report (CLR) series of documents have been produced by the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency, to provide regulators with "relevant, appropriate, authoritative and scientifically based information and advice on the assessment of risk from contamination in soils".

Contin....

The Environment Agency has issued a number of Soil Guideline Values (SGVs) which, whilst non-binding, may be used as guidance in the assessment of land and in setting remediation targets. They should only be applied to human health assessments.

The SGVs have been derived using the Contaminated Land Exposure Assessment Model (CLEA) and are based on assumptions relating to soil conditions, pollutant type and behaviour, land use patterns and the availability of receptors. SGVs are also subject to statistical assessment. The CLR documentation requires that the results of laboratory testing are subject to statistical analysis to remove uncertainty over a so-called 'averaging area'.

To date selective SGVs have been issued for the following land-uses as follows;

- Residential with and without plant uptake (SGVres)
- Allotments
- Commercial/Industrial (SGVcomm)

DEFRA previously issued "Outcome of the Way Forward Exercise on Soil Guideline Values". This document was intended to provide guidance to determine if there is a Significant Possibility of Significant Harm (SPOSH) i.e. whether land meets the legal trigger of being contaminated land.

In the context of Part 2A, a risk assessor using an SGV would conclude the following (DEFRA, 2008).

- At a representative average soil concentration at or below an SGV, it is very unlikely that there will be a *significant possibility of significant harm (SPOSH)*.

- At a representative average soil concentration above an SGV, there *might* be a *significant possibility of significant harm* with the significance linked to the margin of exceedance, the duration and frequency of exposure, and other site-specific factors that the enforcing authority may wish to take into account. Further investigation and/or detailed evaluation will usually be required.

It should be stressed that where there is any uncertainty as to whether or not there is a SPOSH, it was the policy of this practice to adopt a conservative approach, particularly in the adoption of clean cover systems.

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

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

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

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

Contin....

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

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

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

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

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

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

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

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

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

The guidance clarifies how generic assessment criteria (including the currently available SGVs/GACs) should and should not be used. It states that:

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

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

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

(a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.

(b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.

(c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risks to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.

(d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.

(e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.

The way in which the new four category system is intended to operate and the place of the C4SLs within that system, was explained in detail in the Impact Assessment which accompanied the Statutory Guidance. Please note that although the detail of the Impact Assessment is included here to provide clarity on the job expected of C4SLs, the Statutory Guidance, itself, sets out the regime that needs to be delivered under Part 2A.

The C4SLs are intended as "*relevant technical tools*" (in relation to Paragraph 4.2.1(c)) provides to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

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

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

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> *"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soils that, unless stated otherwise, are tolerable or pose a minimal risk to human health".*

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

Contin...

In 2014 CL:AIRE (Contaminated Land: Application in Real Environments) published "*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*". In it a series of C4SLs were proposed as follows;

Results

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

In 2014 CL:AIRE (Contaminated Land: Application in Real Environments) published "*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*". In it a series of C4SLs were proposed as follows;

The Sirius Remediation Strategy provides threshold concentrations for Total Petroleum Hydrocarbons (TPH). However, no hydrocarbon odours were encountered during the sampling, and as such Polyaromatic Hydrocarbon (PAH) testing was considered more relevant. The threshold values chosen for these are those of the LQM/CIEH with a 1% Soil Organic Matter content.

Contin....

Table 1: Results of Topsoil and Subsoil Testing

Analyte	Concentration Range (mg/kg)	Maximum Permitted Concentrations for Gardens (mg/kg)
Arsenic (total)	<1 - 18	37
Cadmium (total)	<0.5 - 1.0	11
Chromium (total)	18 - 78	910
Copper (total)	19 - 75	910
Lead (total)	14 - 101	200
Mercury (total)	<0.17	40
Nickel (total)	15 - 24	130
Selenium (total)	<1	250
Zinc (total)	56 - 145	450
Phenols (total)	<0.2	110
Naphthalene	<0.03 - 0.23	2.3
Acenaphthylene	<0.01 - 0.16	170
Acenaphthene	<0.01 - 0.22	210
Fluorene	<0.01 - 0.31	170
Phenanthrene	<0.03 - 1.95	95
Anthracene	<0.02 - 0.61	2400
Fluoranthene	<0.08 - 4.67	280
Pyrene	<0.07 - 4.26	620
Benzo (a) anthracene	<0.04 - 2.49	7.2
Chrysene	<0.06 - 3.14	15
Benzo (b) fluoranthene	<0.05 - 3.34	2.6
Benzo (k) fluoranthene	<0.07 - 1.30	77
Benzo (a) pyrene	<0.04 – 3.17	5.0
Indeno (1,2,3 cd) pyrene	<0.03 – 3.81	27
Dibenz (a,h) anthracene	<0.04 – 0.91	0.24
Benzo (g,h,I) perylene	<0.05 – 3.66	320
Asbestos	Identified	None

Contin....

Discussion of the Results

Metals

All the results for the metals fell within their Maximum Permitted Concentrations (thresholds) for a residential end-use (with home-grown vegetables).

Polyaromatic Hydrocarbons (PAH)

One result for Benzo (b) fluoranthene marginally exceeded the threshold for garden areas. It recorded 3.34 mg/kg. However, the sample (POS2) was of future Public Open Space, and fell within the threshold for Residential POS of 7.1 mg/kg.

Two results for Dibenz (a,h) anthracene marginally exceeded the threshold for a residential end-use. However, these were also from POS. Only one result exceeded the threshold for Residential POS of 0.57 mg/kg, recording 0.91 mg/kg.

Asbestos

Loose Asbestos fibres of Chrysotile were recorded in three of the samples. The asbestos contents as a percentage of the sample as a whole were therefore determined. These recorded <0.001%, 0.002% and 0.026%.

In addition, one of the samples contained insulation board. The asbestos content comprised Chrysotile and Amosite and represented 0.001% of the total mass.

Contaminant Risk Assessment

None of the results recorded excess metal concentrations, and only one sample exceeded its threshold for a Residential POS.

In respect of the asbestos, reference is made to the HSE publication "Asbestos: The Analytes' Guide", published in 2001. It states;

The extent of airborne fibres released from soils and Made Ground will depend on several factors including the:

- *Nature of the asbestos material (e.g. bound or unbound or a combination);*
- *Percentage of asbestos in soil (w/w);*
- *Type of soil and the nature of any disturbance (e.g. mechanical excavation);*
- *Condition of the soil (e.g. moisture content).*

Air monitoring has shown that airborne fibre concentrations rarely exceed the LOQ and are unlikely to exceed the control limit unless the works is disturbing relatively high percentages (>1%) of unbound asbestos in dry soil. Where there is mostly bound asbestos in soils, below a mass concentration of 0.1% w/w, airborne fibre concentrations are unlikely to exceed the LOQ for personal sampling. When the soil is damp or wet, airborne emissions of asbestos will be suppressed and wind dilution and dispersion of any emissions will also reduce worker and bystander exposures.

Contin....

There is significant evidence indicating that most worker fibre exposure from soil remediation and removal work will be below the LOQ (i.e. <0.010 f/ml) when carried out under controlled conditions (i.e. wetting) and using mechanical equipment. This sampling information will be useful for many risk assessments and confirms the need for continued control. This does not mean that soil remediation activities will always give rise to low exposure. More energetic processes (e.g. crushing, power screening and grading of demolition waste and made land/soil) may give rise to elevated fibre levels, especially if dry. There may also be situations where direct handling of dry ACM's may occur (e.g. conveyor belt screening, picking out debris or picking up material) which may give rise to measurable personal exposures when handling significant quantities. Where significant fine unbound asbestos fibres are present, action should be taken to control any work-related release to air by keeping the soil damp.

Based on the latest HSE guidance, it is reasonable to assume that the recorded levels of asbestos are acceptable in respect of groundworkers. In accordance with the principles of As Low as Reasonably Practicable (ALARP), and soils being excavated should be kept damp and dust generation on the site kept to a minimum with spraying.

Nevertheless, the recommendations made in the Remediation Strategy continue to apply, namely;

For the Control of Asbestos Regulations 2012 (CAR), the overall purpose of the survey and site assessment is to protect workers from the asbestos hazard. The site survey data should be used to identify asbestos hotspots and the surrounding areas which have lower amounts of asbestos (i.e. spread from the hotspot). This can be in the form of approximate contours of the amount of asbestos found and/or colour coded as a red, amber or green zone. These zoned areas are used to communicate the appropriate management and control procedures that should be used by workers on the site to reduce their exposure to airborne asbestos to As Low as Reasonably Practicable (ALARP).

Where necessary, excavation, movement stockpiling and placement of asbestos-contaminated soils/aggregates should be undertaken in accordance with a site-specific method statement and the Control of Asbestos Regulations 2012.

An exclusion zone should be set out at the location of the impacted soils to be excavated, with access restricted for all site personnel except those specifically undertaking the works.

Where any visible fragments of ACM are identified, a hand-picking exercise should be undertaken during earthworks, where practicable, using Category B non-licensed asbestos work qualified personnel. All identified visible ACM's should be carefully picked, double bagged and placed into a lockable skip for subsequent off-site disposal.

Following the above, picking, any remaining soils containing residual asbestos (i.e. no visible ACM's and asbestos soil matrix concentration of <0.1% may be carefully excavated and placed outside the footprint of proposed roads and drainage infrastructure at an appropriate depth to allow for the placement of hard surfacing or clan cover soils as necessary. These works should be supervised by Category B trained personnel, with the location and depths of placed impacted soils being accurately surveyed/recorded and marked on a constraints plan.

Any excavated soils containing visible ACM's, and/or asbestos fibres in concentrations >0.1%that are excavated must be removed from site as hazardous waste.

During all operations, the risk of dust release should be continuously assessed, and appropriate mitigation measures put in place. This is typically a bowser with hose attachment to wet down working areas and suppress dust, although other alternative techniques will be considered as necessary. Potential dust emissions from stockpiled soils should be mitigated by the application of water or stabilising agents and/or by covering with tarpaulin sheeting or other appropriate cover material.

Excavated 'residual' soils should be carefully placed within the deposition area and carefully compacted to minimise the risk of dust emissions.

All site personnel undertaking the remedial works should be suitably trained for the task being undertaken and should wear the appropriate personal protective equipment/respiratory protective equipment (PPE/RPE), taking into account the weather conditions at the time of the works. Advice should be sought from a qualified and experienced asbestos surveyor/analyst if necessary. PPE/RPE may include:

- *Cat 3 Type 5 coveralls.*
- *RPE (typically Sundstrom ½ mask fitted with P3 filter or equivalent).*
- *Boots that are easily cleanable.*
- *Disposable gloves.*

Personal decontamination should be carried out in accordance with, and as applicable to, the HSE's Asbestos Essentials EM8 document. All disposable PPE/RPE should be treated as contaminated waste and disposed of appropriately.

The excavation and handling of asbestos-contaminated soils on the site may comprise non-licensed work. If this applies, the Health and Safety Executive (HSE) should be notified. Reference should be made to the CL:AIRE CAR-SOIL guidance to determine whether the work is notifiable.

Residential End-Users

The Sirius Remediation Strategy requires that for garden areas, where asbestos impacted Made Ground is present within 1m of finished ground levels (as is the case here), an additional 150mm granular hard-dig layer or geotextile separator is provided below the 600mm topsoil and sub-soil clean cover.

As there is no clear pattern as to the spread of asbestos across the plots and POS areas tested, it is recommended that the above precautions are provided to the garden areas (both front and back).

In conclusion, the existing Remediation Strategy continues to be adopted.

Waste Soils

The Waste Classification Technical Guidance WM3, states that waste containing asbestos should be classified as "hazardous" where;

- Soil or waste is hazardous if there are free and dispersed fibres that represent ≥0.1% of the waste as a whole.
- Or if identifiable fragments of asbestos are present and the concentrations of asbestos with those fragments is greater than 0.1%.

It is therefore recommended that the existing and future stockpiles are tested to determine if any identifiable fragments of Asbestos Containing Materials (ACM's) are present. It is very unlikely that the concentrations of free fibres will exceed 0.1% of the waste as a whole.

Contin....

To minimise future costs, it is recommended that Made Ground is stockpiled separately from clean excavated soils, as the latter are very unlikely to be contaminated by ACM's.

Yours sincerely

A D Joyce

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Partners: Anthony D Joyce BSc MSc ARSM CEng CGeol CEnv MICE FGS SiLC
Lucie A M Joyce BSc (Hons) Edward L H Joyce BSc (Hons)

Greenside Mills, Skelmanthorpe

Sampling Locations

Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

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Scale: NTS

Figure: 1

envirolab
Hattersley Science & Technology Park
Stockport Road, Hattersley, SK14 3QU

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 25/03242
Issue Number: 1 **Date:** 04 April, 2025

Client:
Michael D Joyce Associates LLP
Charnock Court
6 South Parade
Wakefield
WF1 1LR

Project Manager: Mr Anthony Joyce
Project Name: Greenside Mills, Skelmanthorpe
Project Ref: N/A
Order No: N/A
Date Samples Received: 27/03/25
Date Instructions Received: 28/03/25
Date Analysis Completed: 04/04/25

Approved by:

Richard Wong
Client Manager

Envirolab Job Number: 25/03242

Client Project Name: Greenside Mills, Skelmanthorpe

Client Project Ref: N/A

Lab Sample ID	25/03242/1	25/03242/2	25/03242/3	25/03242/4	25/03242/5	25/03242/6	25/03242/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Plot 1	Plot 3	Plot 7	Plot 8	Plot 17	Plot 20	Plot 23			
Depth to Top	0.05	0.05	0.05	0.05	0.05	0.05	0.05			
Depth To Bottom										
Date Sampled	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	5A	5A	6A	6A	6A	5A	6A			
% Stones >10mm$_A$	<0.1	28.8	7.9	<0.1	2.2	4.9	<0.1	% w/w	0.1	A-T-044
Phenol$_A$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	0.2	A-T-050s
Organic Matter$_D^{M\#}$	3.45	1.86	2.44	2.33	6.10	2.62	6.79	% w/w	0.14	A-T-032s
Arsenic$_D^{M\#}$	3	5	4	7	18	8	7	mg/kg	1	A-T-024s
Cadmium$_D^{M\#}$	<0.5	<0.5	<0.5	1.0	0.6	0.6	<0.5	mg/kg	0.5	A-T-024s
Copper$_D^{M\#}$	35	30	26	75	65	24	29	mg/kg	1	A-T-024s
Chromium$_D^{M\#}$	18	78	25	47	73	29	29	mg/kg	1	A-T-024s
Lead$_D^{M\#}$	36	31	29	50	79	41	40	mg/kg	1	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	mg/kg	0.17	A-T-024s
Nickel$_D^{M\#}$	24	20	19	29	21	21	20	mg/kg	1	A-T-024s
Selenium$_D^{M\#}$	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-024s
Zinc$_D^{M\#}$	79	56	75	136	81	79	74	mg/kg	1	A-T-024s

Envirolab Job Number: 25/03242

Client Project Name: Greenside Mills, Skelmanthorpe

Client Project Ref: N/A

Lab Sample ID	25/03242/1	25/03242/2	25/03242/3	25/03242/4	25/03242/5	25/03242/6	25/03242/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Plot 1	Plot 3	Plot 7	Plot 8	Plot 17	Plot 20	Plot 23			
Depth to Top	0.05	0.05	0.05	0.05	0.05	0.05	0.05			
Depth To Bottom										
Date Sampled	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	5A	5A	6A	6A	6A	5A	6A			
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{D}^{\#}$	Chrysotile & Amosite	NAD	NAD	Chrysotile	NAD	NAD	Chrysotile			A-T-045
Asbestos Matrix (visual)$_{D}$	-	-	-	-	-	-	-			A-T-045
Asbestos Matrix (microscope)$_{D}$	Insulation	-	-	Loose Fibres	-	-	Loose Fibres			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_{D}$	N/A	N/A	N/A	N/A	N/A	N/A	N/A			A-T-045
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing)$_{D}$	0.001	-	-	0.026	-	-	<0.001	% w/w	0.001	A-T-054

Envirolab Job Number: 25/03242

Client Project Name: Greenside Mills, Skelmanthorpe

Client Project Ref: N/A

Lab Sample ID	25/03242/1	25/03242/2	25/03242/3	25/03242/4	25/03242/5	25/03242/6	25/03242/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Plot 1	Plot 3	Plot 7	Plot 8	Plot 17	Plot 20	Plot 23			
Depth to Top	0.05	0.05	0.05	0.05	0.05	0.05	0.05			
Depth To Bottom										
Date Sampled	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25			
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL			
Sample Matrix Code	5A	5A	6A	6A	6A	5A	6A			
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.06	<0.01	<0.01	0.06	<0.01	<0.01	0.02	mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	0.05	<0.01	<0.01	0.05	0.02	<0.01	0.01	mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	0.28	0.03	<0.02	0.24	0.04	0.07	0.09	mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	1.19	0.15	<0.04	0.72	0.17	0.11	0.33	mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	1.06	0.15	<0.04	0.69	0.16	0.10	0.27	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	1.13	0.15	<0.05	0.70	0.19	0.10	0.33	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.59	0.08	<0.05	0.38	0.10	<0.05	0.15	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.47	<0.07	<0.07	0.30	<0.07	<0.07	0.15	mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	1.21	0.18	<0.06	0.79	0.21	0.12	0.38	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.15	<0.04	<0.04	0.09	<0.04	<0.04	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	2.48	0.32	<0.08	1.62	0.22	0.22	0.69	mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	0.05	<0.01	<0.01	0.07	<0.01	<0.01	0.04	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.63	0.08	<0.03	0.38	0.10	0.06	0.15	mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	0.06	<0.03	<0.03	0.08	<0.03	<0.03	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	0.69	0.16	0.10	0.72	0.13	0.09	0.41	mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	2.25	0.28	<0.07	1.38	0.19	0.18	0.65	mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	12.3	1.58	0.10	8.27	1.53	1.05	3.67	mg/kg	0.01	A-T-019s

Envirolab Job Number: 25/03242

Client Project Name: Greenside Mills, Skelmanthorpe

Client Project Ref: N/A

Lab Sample ID	25/03242/8	25/03242/9	25/03242/10	25/03242/11	25/03242/12	25/03242/13		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Plot 24	Plot 28	Pos. 1	Pos. 2	Pos. 3	Plot 39				
Depth to Top	0.05	0.05	0.05	0.05	0.05	0.05				
Depth To Bottom										
Date Sampled	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25				
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL				
Sample Matrix Code	6A	6A	6AE	6A	6AE	6AE				
% Stones >10mm$_A$	6.6	<0.1	1.6	5.1	9.5	38.1		% w/w	0.1	A-T-044
Phenol$_A$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		mg/kg	0.2	A-T-050s
Organic Matter$_D^{M\#}$	4.83	0.55	5.54	8.64	6.72	3.99		% w/w	0.14	A-T-032s
Arsenic$_D^{M\#}$	6	<1	7	7	8	6		mg/kg	1	A-T-024s
Cadmium$_D^{M\#}$	<0.5	<0.5	0.6	0.8	0.6	<0.5		mg/kg	0.5	A-T-024s
Copper$_D^{M\#}$	24	19	59	74	62	28		mg/kg	1	A-T-024s
Chromium$_D^{M\#}$	20	19	44	50	45	38		mg/kg	1	A-T-024s
Lead$_D^{M\#}$	32	14	82	101	76	37		mg/kg	1	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17		mg/kg	0.17	A-T-024s
Nickel$_D^{M\#}$	20	21	22	23	22	15		mg/kg	1	A-T-024s
Selenium$_D^{M\#}$	<1	<1	<1	<1	<1	<1		mg/kg	1	A-T-024s
Zinc$_D^{M\#}$	75	58	119	145	115	69		mg/kg	1	A-T-024s

Envirolab Job Number: 25/03242

Client Project Name: Greenside Mills, Skelmanthorpe

Client Project Ref: N/A

Lab Sample ID	25/03242/8	25/03242/9	25/03242/10	25/03242/11	25/03242/12	25/03242/13		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Plot 24	Plot 28	Pos. 1	Pos. 2	Pos. 3	Plot 39				
Depth to Top	0.05	0.05	0.05	0.05	0.05	0.05				
Depth To Bottom										
Date Sampled	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25				
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL				
Sample Matrix Code	6A	6A	6AE	6A	6AE	6AE				
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{D}^{\#}$	NAD	NAD	Chrysotile	NAD	NAD	NAD				A-T-045
Asbestos Matrix (visual)$_{D}$	-	-	-	-	-	-				A-T-045
Asbestos Matrix (microscope)$_{D}$	-	-	Loose Fibres	-	-	-				A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_{D}$	N/A	N/A	N/A	N/A	N/A	N/A				A-T-045
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing)$_{D}$	-	-	0.002	-	-	-		% w/w	0.001	A-T-054

Envirolab Job Number: 25/03242

Client Project Name: Greenside Mills, Skelmanthorpe

Client Project Ref: N/A

Lab Sample ID	25/03242/8	25/03242/9	25/03242/10	25/03242/11	25/03242/12	25/03242/13		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Plot 24	Plot 28	Pos. 1	Pos. 2	Pos. 3	Plot 39				
Depth to Top	0.05	0.05	0.05	0.05	0.05	0.05				
Depth To Bottom										
Date Sampled	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25	26-Mar-25				
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL				
Sample Matrix Code	6A	6A	6AE	6A	6AE	6AE				
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.01	<0.01	0.17	0.22	0.13	0.18		mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	0.16	0.12	<0.10	0.04		mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	0.03	<0.02	0.49	0.61	0.41	0.47		mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.17	<0.04	1.75	2.49	1.25	0.65		mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.16	<0.04	2.23	3.17	1.41	0.51		mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.18	<0.05	2.48	3.34	1.38	0.53		mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.07	<0.05	1.48	3.66	1.18	0.26		mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	1.02	1.30	<0.70	0.22		mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	0.19	<0.06	2.10	3.14	1.44	0.67		mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	0.36	0.91	<0.40	0.07		mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	0.29	<0.08	3.74	4.67	2.42	1.78		mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	0.01	<0.01	0.23	0.31	0.16	0.16		mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.08	<0.03	1.45	3.81	1.19	0.26		mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	<0.03	0.23	<0.30	<0.30	0.04		mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	0.15	<0.03	1.51	1.95	1.37	1.25		mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	0.26	<0.07	3.22	4.26	2.06	1.45		mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	1.60	<0.08	22.6	34	14.4	8.54		mg/kg	0.01	A-T-019s

Report Notes

General

•This report shall not be reproduced, except in full, without written approval from Envirolab.
•The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client and can affect the validity of results.
•The results reported herein relate only to the material supplied to the laboratory.
•The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
•Analytical results reflect the quality of the sample at the time of analysis only.
•Opinions and Interpretations expressed are outside our scope of accreditation.
•A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
•If a sample is outside of the calibration range or affected by interferences then it may need diluting. This will result in the limit of detection (LOD) being raised.
•Subcontracted Analysis: Please see the appended report for any deviations, current LODs and accreditation status of the test.

Key

Superscript "#"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "D" on Asbestos	Analysis performed on a dried aliquot of sample provided.
Subscript "^"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

Asbestos

Identification: Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis
"Trace Asbestos Identified" will be reported if there is not enough present to verify the type.
Quantification: Generally a 2 stage process including visual identification, hand picking and weighing, and fibre counting. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres). "TRACE" will be reported as a quantification result.
PLEASE INFORM THE LABORATORY IF YOU WOULD LIKE THE STAGE 3 SEDIMENTATION PROCESS CARRIED OUT. Note this will be subcontracted.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs
Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.					

Soil Chemical Analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:
For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:
EPH CWG results have humics mathematically subtracted through instrument calculation.
Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:
Results greater than 12900µS/cm @ 25^0C / 11550µS/cm @ 20^0C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Michael D Joyce Associates LLP, Charnock Court, 6 South Parade, Wakefield, WF1 1LR

Project: Greenside Mills, Skelmanthorpe

Clients Project No: N/A

Project No: 25/03242

Date Received: 28/03/2025 (am)

Cool Box Temperatures (°C): 15.3

NO DEVIATIONS IDENTIFIED with respect to sampling dates or containers received.

Note: If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3 (for water samples 5 ± 3°C), ISO 18400-105:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	25/03242/1	25/03242/2	25/03242/3	25/03242/4	25/03242/5	25/03242/6	25/03242/7	25/03242/8	25/03242/9	25/03242/10	25/03242/11	25/03242/12
Client Sample No												
Client Sample ID/Depth	Plot 1 0.05m	Plot 3 0.05m	Plot 7 0.05m	Plot 8 0.05m	Plot 17 0.05m	Plot 20 0.05m	Plot 23 0.05m	Plot 24 0.05m	Plot 28 0.05m	Pos. 1 0.05m	Pos. 2 0.05m	Pos. 3 0.05m
Date Sampled	26/03/25	26/03/25	26/03/25	26/03/25	26/03/25	26/03/25	26/03/25	26/03/25	26/03/25	26/03/25	26/03/25	26/03/25
A-T-019s	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	04/04/2025	02/04/2025	02/04/2025	03/04/2025	03/04/2025
A-T-024s	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025
A-T-032s	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025
A-T-044	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025	02/04/2025
A-T-045	31/03/2025	31/03/2025	31/03/2025	31/03/2025	31/03/2025	31/03/2025	31/03/2025	31/03/2025	31/03/2025	31/03/2025	31/03/2025	31/03/2025
A-T-050s	01/04/2025	01/04/2025	01/04/2025	01/04/2025	01/04/2025	01/04/2025	01/04/2025	01/04/2025	01/04/2025	01/04/2025	01/04/2025	01/04/2025
A-T-054	03/04/2025			03/04/2025			03/04/2025			03/04/2025		

Lab Sample ID	25/03242/13
Client Sample No	
Client Sample ID/Depth	Plot 39 0.05m
Date Sampled	26/03/25
A-T-019s	02/04/2025
A-T-024s	02/04/2025
A-T-032s	02/04/2025
A-T-044	02/04/2025
A-T-045	31/03/2025
A-T-050s	01/04/2025
A-T-054	

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

STANDARD APPENDIX B

NOTES ON CONTAMINATION INVESTIGATION PROCEDURE (June 2021)

mdja

1. **GENERAL.** The desk study and/or intrusive ground investigation is typically carried out in accordance with the Environment Agency's "Land Contamination Risk Management (LCRM) documents and the requirements of BS5930: 2015 and BS10175: 2011+A1: 2020. In relation to contamination the desk study is referred to as the preliminary investigation in BS10175 and the intrusive ground investigation is referred to as the Exploratory Investigation. This appendix briefly describes the nature of the work carried out and explains the standards against which contamination data has been assessed. The nature of any contamination investigation is such that only a small percentage of the ground, and therefore potential contamination, is sampled. Consequently variations in both ground conditions and contaminant levels can occur between any two sampling positions. The contamination investigation is designed to minimise such risks, but they cannot be eliminated.

2. **REVIEW OF CONTAMINATION ISSUES –** The National Planning Policy Framework (NPPF) and Part 2A of the Environmental Protection Act 1990 create a new regime for the identification and remediation of contaminated land. It introduced a definition of contaminated land described in Section 78A(2) of the Act of:

"any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or

(b) significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused:

Both Part 2A and the planning regime embrace the "suitable for use" approach. In the context of Part IIA, action is necessary only where there are unacceptable risks to health or to the environment, taking into account the current use of the land and its environmental setting.

For humans, significant harm is defined as "death, disease, serious injury ". Specifically, disease is taken to mean an unhealthy condition of the body or part of it. "Significant possibility of significant harm" is described as health effects arising from the intake of a contaminant or other direct bodily contact with the contaminant where the intake or exposure is unacceptable. The assessment should also take into account the total intake from all sources, the relative contribution of the pollutant linkage in question, and the duration of intake or exposure. The various statutory definitions are given overleaf.

The presence of unnatural substances does not automatically constitute a risk unless there is a link or pathway between the contamination (the hazard) and the receptor (the target) be it humans, the environment or property. Therefore the assessment needs to determine whether a hazard is present and whether the necessary pathway exists the so-called "pollution linkage" or "conceptual site model".

The effect of any hazard on a site depends primarily on the site use and groundwater conditions since these determine who and what may be at risk and the routes by which they may be exposed to the hazard. Site uses can include allotments, domestic gardens on residential developments, amenity and recreational areas, public open space and industrial and commercial buildings. On any site, the potential contaminants have to be identified together with the potential receptors. The pathway for that contaminant to reach its target has then to be considered.

3. **PRELIMINARY INVESTIGATION.** The preliminary Phase I Geoenvironmental Assessment (desk study) report normally considers the following key sections:

Introduction	
The Site	Contaminated Land
Site History	Radon
Geology and Mining	Geoenvironmental Risk Assessment
Hydrogeology	Geotechnical Assessment
Groundsure Geo-Insight and Enviro-Insight	Ground Investigation (Recommendations)

The report will summarise the findings and also relate our opinions to the potential for a site to be geoenvironmentally impaired, at levels likely to warrant mitigation or further consideration appropriate to the current or future use. Findings are based on information obtained and described during the desk study and site inspection without intrusive ground investigation. It is possible that further information exists. The absence of indicators of impairment does not mean that such impairment does not exist. Additional investigation including intrusive methods can reduce the risks but cannot eliminate them and may not be cost effective. We can advise on the additional research opportunities, their cost and their possible impact on mitigating risk. Recommendations are normally given based on the redevelopment proposals for the site.

Type of Receptor	Description of harm that is to be regarded as significant harm	Conditions For There Being A Significant Possibility Of Significant Harm
1. Human beings	Death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. For these purposes, disease is to be taken to mean an unhealthy condition of the body or a part of it and can include, for example, cancer, liver dysfunction or extensive skin ailments. Mental dysfunction is included only insofar as it is attributable to the effects of a pollutant on the body of the person concerned.	If the amount of the pollutant in the pollutant linkage represents an unacceptable intake or direct bodily contact, assessed on the basis of relevant information on the toxicological properties of that pollutant. Such an assessment should take into account: • the likely total intake of, or exposure to, the substance or substances which form the pollutant, from all sources including that from the pollutant linkage in question; • the relative contribution of the pollutant linkage in question to the likely aggregate intake of, or exposure to, the relevant substance or substances; and • the duration of intake or exposure resulting from the pollutant linkage in question. The question of whether an intake or exposure is unacceptable is independent of the number of people who might experience or be affected by that intake or exposure. Toxicological properties should be taken to include carcinogenic, mutagenic, teratogenic, pathogenic, endocrine-disrupting and other similar properties.
2. All other human health effects (particularly by way of explosion or fire)		If the probability, or frequency, of significant harm of that description is unacceptable. The pollutant linkage might cause "significant harm which" • would be irreversible or incapable of being treated; • would affect a substantial number of people; • would result from a single incident such as a fire or an explosion; or • would be likely to result from a short-term (lees than 24-hour) exposure to the pollutant.
3. Any ecological system, or living organism forming part of such a system, within a location which is protected.	For any protected location: • harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or • harm which affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location.	If either: • significant harm of that description is more likely than not to result from the pollutant linkage; or • there is a reasonable possibility of significant harm of that description being caused, and if that harm were to occur, it would result in such a degree of damage to features of special interest at the location in question that they would be beyond any practicable possibility of restoration.
4. Property in the form of: • crops, including timber; • produce grown domestically, or on allotments, for consumption; • livestock; • other owned or domesticated animals; • wild animals which are the subject of shooting or fishing rights.	For crops, a substantial diminution in yield or other substantial loss in the value resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage.	If significant harm of that description is more likely than not to result from the pollutant linkage in question.
5. Property in the form of buildings.	Structural failure, substantial damage or substantial interference with any right of occupation.	If significant harm of that description is more likely than not to result from the pollutant linkage in question during the expected economic life of the building.
6. Controlled waters.		

4. **INTRUSIVE INVESTIGATION.** BS10175 describes this as an exploratory investigation. Intrusive ground investigation is described in Standard Appendix A. During the investigation representative or indicative samples are obtained for testing by an accredited laboratory. The aim is to determine (with a degree of confidence appropriate to the objectives), the presence, concentration and distribution of contaminants in respect of those points investigated. The extent of any necessary intrusive investigation will depend on the size of the site and any hazards, either known or suspected.

5. **ASSESSMENT OF CONTAMINATION.** The assessment of contaminated land under the terms of Part II A of the Environmental Protection Act 1990 is based upon pollution linkage (source - pathway - receptor model) and the principles of the Environment Agency's "Contamination Land Risk Management" documentation.

DEFRA previously issued "Outcome of the Way Forward Exercise on Soil Guideline Values". This document was intended to provide guidance to determine if there is a Significant Possibility of Significant Harm (SPOSH) i.e. whether land meets the legal trigger of being contaminated land.

In the context of Part 2A, a risk assessor using an SGV would conclude the following (DEFRA, 2008).

- At a representative average soil concentration at or below an SGV, it is very unlikely that there will be a *significant possibility of significant harm (SPOSH)*.

- At a representative average soil concentration above an SGV, there *might* be a *significant possibility of significant harm* with the significance linked to the margin of exceedance, the duration and frequency of exposure, and other site-specific factors that the enforcing authority may wish to take into account. Further investigation and/or detailed evaluation will usually be required.

It should be stressed that where there is any uncertainty as to whether or not there is a SPOSH, it was the policy of this practice to adopt a conservative approach, particularly in the adoption of clean cover systems.

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

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

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

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

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

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

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

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

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

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

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

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

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

The guidance clarifies how generic assessment criteria (including the currently available SGVs/GACs) should and should not be used. It states that:

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

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

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

(a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.

(b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.

(c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risks to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.

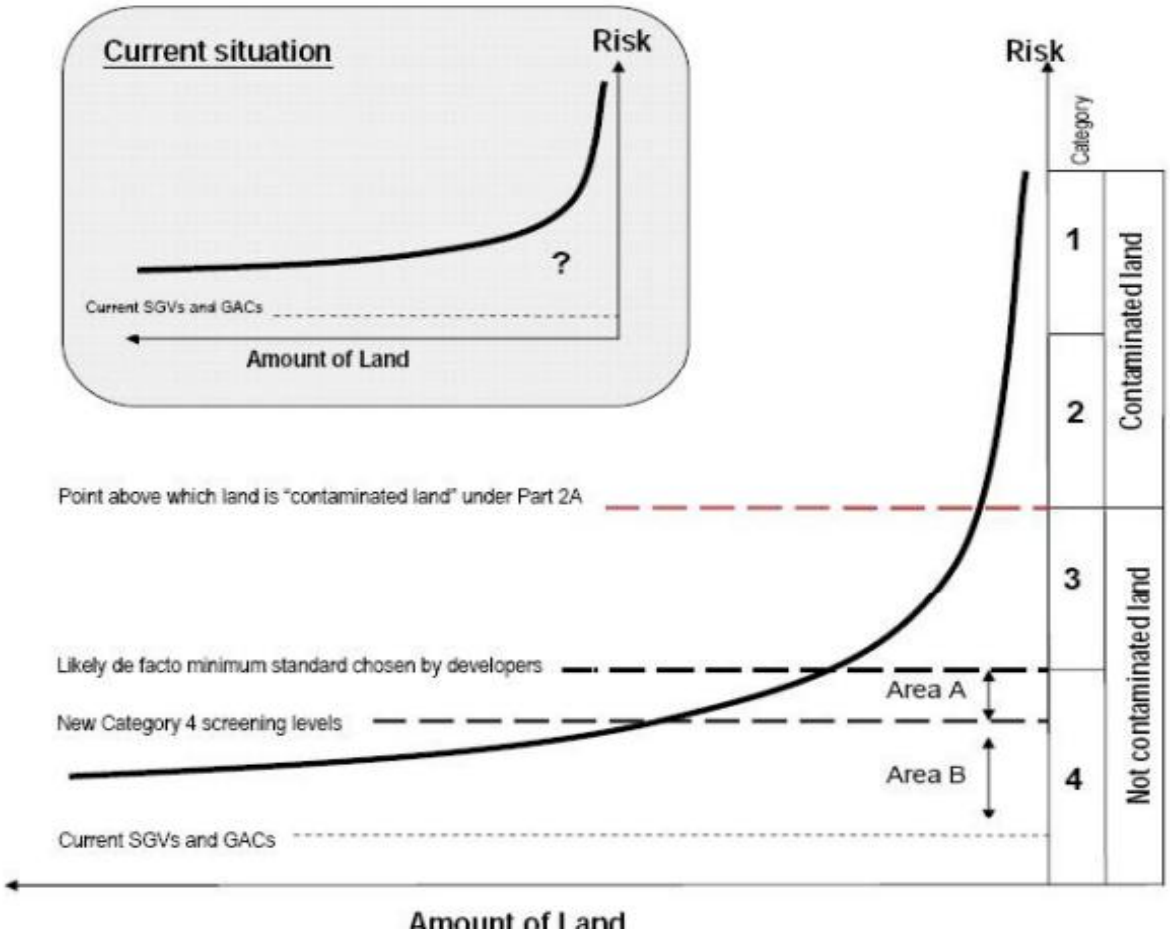
(d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.

(e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.

The way in which the new four category system is intended to operate and the place of the C4SLs within that system, was explained in detail in the Impact Assessment which accompanied the Statutory Guidance. Please note that although the detail of the Impact Assessment is included here to provide clarity on the job expected of C4SLs, the Statutory Guidance, itself, sets out the regime that needs to be delivered under Part 2A.

Paragraph 47 of the Impact Assessment describes the diagram in detail. Of particular relevance to this project is the description of the overall diagram (sub-paragraph a), description of category 4 (sub-paragraphs c (part iv) and h) and the description of how the monetised benefits of the new system will be realised (sub-paragraph h). These sub-paragraphs are reproduced below.

Diagram showing the new Category 1-4 system (compared to current situation)



The diagram above seeks to illustrate, in a simplified manner, broadly what the changes to the statutory guidance on significant possibility of significant harm to human health are intended to achieve. To explain:

(a) The curved line and axes illustrate the spectrum of risk presented by land contamination. The idea is to show that a very large amount of land is low risk, and only a small amount of land would pose sufficient risk to be contaminated land in the legal sense. The axes and lines in the diagrams are not to scale, and they have been compressed for the purposes of illustration (in reality the risks on Category 1 land would probably be orders of magnitude above Category 4 risks, and vastly more land would be in Category 4 compared to the other Categories).

(b) The smaller diagram summarizes the current situation. In the area below the SGV/GACs there is near certainty that land is not contaminated land, however, above the line there is increasing uncertainty. As explained above, currently remediation usually occurs to just below the SGV/GAC level because they are perceived as offering the only cast-iron guarantee of when land is definitely not contaminated land. Sometimes consultants are employed to justify remediating to levels above the SGV/GACs, however the further they go away from the SGV/GACs the more legal risk they and their clients are exposed to.

(c) The new statutory guidance will end the current situation, and it would not be legally possible e.g. for individual regulators to ignore the changes being made. For example, as explained above, the new statutory guidance will specifically say:

(i) that Part 2A cannot be used to force remediation to below a point where it ceases to be contaminated land in the legal sense i.e. the Category 2/3 border in terms of the diagram), although responsible parties can choose to go further;

(ii) that SGV/GACs cannot be used as one size fits all remediation thresholds under either Part 2A of the planning system;

(iii) that normal background levels of contamination are not caught by Part 2A; and

(iv) that SGV/GACs are well into Category 4, sometimes by only a few times and sometimes by orders of magnitude. These changes and others also provide the legal backing for the development e.g. of Category 4 screening levels, as discussed below.

(d) The new Category 1-4 system divides the spectrum of risk posed by contaminated land into four different categories, and the statutory guidance will explain how to decide when land falls into each Category. This is more sophisticated than the current statutory guidance, which in effect has only two categories (contaminated land or not) and does not explain how to decide which category land falls into. The new Category 1-4 system

reflects what assessors find when they investigate real sites i.e. some are clearly contaminated land (Category 1) ; some clearly are not (Category 4) and some are less-straightforward and need some level of detailed assessment before a decision can be taken as to whether or not they are contaminated land (Categories 2 and 3).

(e) In the case of Category 2 and 3 sites, the regulator will have flexibility to take decisions within the parameters set by the new Guidance. There would be less flexibility for Category 2 and 3 sites that clearly pose either a high or low risk. However, the regulator will have considerable flexibility for sites closer to the Category 2/3 border to judge which side of the border a site would fall (e.g. taking account of their understanding of the risks, uncertainties and the interests of the local community). These are often complex decisions which need to be taken case-by-case given the many factors involved.

(f) In the case of Categories 1 and 4 the regulator will have far less flexibility. For example, if a regulator claimed that a site matching the Category 1 description was not contaminated land, or that a site matching the Category 4 description was contaminated land, they would be acting directly against the statutory guidance which the Act requires that they follow, and decisions could be challenged (e.g. in a law court) with a high chance that the challenge would be successful. Among other things, the intention of doing this is to create far more legal certainty around when land is definitely not contaminated land in the legal sense. With the specific wording of the new statutory guidance, and the supporting tools such as the new Category 4 screening levels, it would be very difficult for a regulator e.g. to threaten landowners with the Part 2A regime, and if they tried to determine land as contaminated land they would be operating in direct opposition to the statutory guidance.

(g) In the many consultation meetings held in developing the Category 1-4 system, all the developers, landowners and consultants we spoke to were strongly of the view that they would want the ensure their land is safely within Category 4 (even though in theory they could remediate to a level within Category 3 and still satisfy Part 2A and planning rules). They would do this for various reasons, including the fact that the flexibility granted to regulators in Categories 2 and 3 means that the further into Category 3 a site gets, the greater the risk that the regulator might decide it is in Category 2. Also they would want to be in Category 4 for reasons of marketability, future proofing etc. So developers and others would have a strong incentive to seek the regulatory certainty of being safely within Category 4. Thus, as far as development taking place under the planning system is concerned, Category 3 would, in effect, normally be a buffer which provides added reassurance that development falling within Category 4 will not be caught by the Part 2A regime.

(h) The new statutory guidance will bring about a situation where the current SGV/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land. Above the C4SLs, in Area A on the diagram, there will be much stronger legal backing for experts to use their judgement to make sensible and precautionary decisions on when land should be considered to be towards the top end of Category 4, without fear that land may be caught as contaminated land. This recognizes that the generic C4SLs will not be able to describe the Category 3/4 border itself because they are generic and would therefore have to err on the side of caution whilst a detailed site specific assessment would be able to push further by looking at specific circumstances relating to a specific site.

(i) The very large majority of the monetized benefits of the changes to the regime discussed in this Impact Assessment manifest themselves in Category 4, and in particular in Areas A and B on the diagram. The main effects of moving to the new system would include Low risk land falling within Area B (pre-development) on the diagram would no longer have to be remediated because it would fall below the new C4SLs. Similarly land which is in Area A pre-development would no longer need to be remediated if justified by a detailed site-specific assessment. For these sites the cost of remediation would be removed altogether. The cost of remediating land which is initially in Categories 3, 2 or 1 would fall because it would be remediated to the new C4SL levels (or somewhere within Area A if there has been a detailed assessment) rather than the SGV/GAC level. This will have the overall effect of reducing the cost of remediation, with the effect varying according to specific site circumstances, the type of remediation etc. Generally the cost of remediation would fall for many affected brownfield land sites. This would have the general effect of making such land more economically viable for development. It would also mean that some land that is not currently economically viable to develop becomes reduce pressure to develop Greenfield land in some cases. The C4SLs will also speed up regulatory decisions on the reuse of brownfield land by providing a simple remediation standard.

The C4SLs are intended as "*relevant technical tools*" (in relation to Paragraph 4.2.1(c)) provides to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

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

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

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> *"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soils that, unless stated otherwise, are tolerable or pose a minimal risk to human health".*

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

CL:AIRE (Contaminated Land: Application in Real Environments) has published "*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*". In it a series of C4SLs were proposed as follows;

Analyte	Residential (with home grown produce) (mg/kg)	Residential (without home grown produce) (mg/kg)	Allotments (mg/kg)	Commercial (mg/kg)	POS (mg/kg)
Arsenic	37	40	49	640	79
Benzene	0.87	3.3	0.18	98	140
Benzo(a)Pyrene	5	5.3	5.7	77	10
Cadmium	22	150	3.9	410	880
Chromium (vi)	21	21	170	49	21
Lead	200	310	80	2300	630

Where C4SL's are not available, Generic Assessment Criteria have been used as follows;

Generic Assessment Criteria for Human Health Risk Assessment Comparison
METALS/CYANIDE

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and based on 6% soil organic matter (SOM)
Values are expressed in mg/kg

	S4UL						C4SL						EA SGV			EIC/AGS/CL:AIRE or *ATRISKSOIL		
	Residential with homegrown produce	Residential without homegrown produce	Allotment	Commercial	POSresi	POSpark	Residential with homegrown produce	Residential without homegrown produce	Allotment	Commercial	POSresi	POSpark	Residential	Allotment	Commercial	Residential without consumption of homegrown produce	Allotment	Commercial
Antimony[1]																550	ND	7500
Arsenic (6% SOM)	37	40	43	640	79	170	37	40	49	640	79	170	32	43	640			
Barium[1]																1300	ND	22000
Beryllium (6% SOM)	1.7	1.7	35	12	2.2	63												
Boron (6% SOM)	290	11000	45	240000	21000	46000												
Cadmium (6% SOM)	11	85	1.9	190	120	560	22	150	3.9	410	220	880	10	1.8	230			
Chromium (III) (6% SOM)	910	910	18000	8600	1500	33000												
Chromium (VI) (6% SOM)	6	6	1.8	33	7.7	220	21	21	170	49	21	250						
Copper (6% SOM)	2400	7100	520	68000	12000	44000												
Cyanide (AtriskSoil)																34*	34*	34*
Lead (6% SOM)							200	310	80	2300	630	1300						
Nickel (6%SOM)	130	180	53	980	230	800												
Mercury (Elemental) (6% SOM)	1.2	1.2	21	58	16	30							1.0	26	26			
Mercury (Inorganic) (6% SOM)	40	56	19	1100	120	240							170	80	3600			
Mercury (Methyl) (6% SOM)	11	15	6	320	40	68							11	8	410			
Molybdbenum[1]																670	ND	17000
Selenium (6% SOM)	250	430	88	12000	1100	1800							350	120	13000			
Vanadium (6% SOM)	410	1200	91	9000	2000	5000												
Zinc (6% SOM)	3700	40000	620	730000	81000	170000												

Additional notes for EIC/AGS/CL:AIRE GAC

1 Due to the limitations in time and scope of the EIC/AGS/CL:AIRE project, plant uptake factors were not derived for metals and therefore the metals GAC have only been produced for residential without consumption of homegrown produce and commercial land-uses. Note that the derived GAC are not dependent on SOM.

PETROLEUM HYDROCARBONS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM).
SGVs based on 6% SOM, at a lower SOM the SGV may not be sufficiently protective.
Generic assessment criteria for Petroleum Hydrocarbons will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 10

	S4UL						C4SL						EA SGV			EIC/AGS/CL:AIRE			
Compound	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential**	**Allotment**	**Commercial**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Aliphatic EC 5-6 (1% SOM)	42	42	730	3200 (340)	570000 (304)	95000 (304)													
Aliphatic EC 5-6 (2.5% SOM)	78	78	1700	5900 (558)	590000	130000 (558)													
Aliphatic EC 5-6 (6% SOM)	160	160	3900	12000 (1150)	600000	18000 (1550)													
Aliphatic EC>6-8 (1% SOM)	100	100	2300	7800 (144)	600000	150000 (144)													
Aliphatic EC>6-8 (2.5% SOM)	230	230	5600	17000 (322)	610000	220000 (322)													
Aliphatic EC>6-8 (6% SOM)	530	530	13000	40000 (736)	620000	320000 (736)													
Aliphatic EC>8-10 (1% SOM)	27	27	320	2000 (78)	13000	14000 (78)													
Aliphatic EC>8-10 (2.5% SOM)	65	65	770	4800 (190)	13000	18000 (190)													
Aliphatic EC>8-10 (6% SOM)	150	150	1700	11000 (451)	13000	21000 (451)													
Aliphatic EC>10-12 (1% SOM)	130 (48)	130 (48)	2200	9700 (48)	13000	21000 (48)													
Aliphatic EC>10-12 (2.5% SOM)	330 (118)	330 (118)	4400	23000 (118)	13000	23000 (118)													
Aliphatic EC>10-12 (6%SOM)	760 (283)	770 (283)	7300	47000 (283)	13000	24000 (283)													
Aliphatic EC>12-16 (1% SOM)	1100 (24)	1100 (24)	11000	59000 (24)	13000	25000 (24)													
Aliphatic EC>12-16 (2.5% SOM)	2400 (59)	2400 (59)	13000	82000 (59)	13000	25000 (59)													
Aliphatic EC>12-16 (6% SOM)	4300 (142)	4300 (142)	13000	90000 (142)	13000	26000 (142)													
Aliphatic EC>16-35 (1% SOM)	65000 (8.48)	65000 (8.48)	260000	1600000	250000	450000													
Aliphatic EC>16-35 (2.5% SOM)	92000 (21)	92000 (21)	270000	1700000	250000	480000													
Aliphatic EC>16-35 (6% SOM)	110000	110000	270000	1800000	250000	490000													
Aliphatic EC>35-44 (1% SOM)	65000 (8.48)	65000 (8.48)	260000	1600000	250000	450000													
Aliphatic EC>35-44 (2.5% SOM)	92000 (21)	92000 (21)	270000	1700000	250000	480000													
Aliphatic EC>35-44 (6% SOM)	110000	110000	270000	1800000	250000	490000													
Aromatic EC 5-7 (1% SOM)	70	370	13	26000 (1220)	56000	76000 (1220)													
Aromatic EC 5-7 (2.5% SOM)	140	690	27	46000 (2260)	56000	84000 (2260)													
Aromatic EC 5-7 (6% SOM)	300	1400	57	86000 (4710)	56000	92000 (4710)													
Aromatic EC>7-8 (1% SOM)	130	860	22	56000 (869)	56000	87000 (869)													
Aromatic EC>7-8 (2.5% SOM)	290	1800	51	110000 (1920)	56000	95000 (1920)													
Aromatic EC>7-8 (6% SOM)	660	3900	120	180000 (4360)	56000	100000 (4360)													
Aromatic EC>8-10 (1% SOM)	34	47	8.6	3500 (613)	5000	7200 (613)													
Aromatic EC>8-10 (2.5% SOM)	83	110	21	8100 (1500)	5000	8500 (1500)													
Aromatic EC>8-10 (6% SOM)	190	270	51	17000 (3580)	5000	9300 (3580)													
Aromatic EC>10-12 (1% SOM)	74	250	13	16000 (364)	5000	9200 (364)													
Aromatic EC>10-12 (2.5% SOM)	180	590	31	28000 (899)	5000	9700 (899)													
Aromatic EC>10-12 (6% SOM)	380	1200	74	34000 (2150)	5000	10000													
Aromatic EC>12-16 (1% SOM)	140	1800	23	36000 (169)	5100	10000													
Aromatic EC>12-16 (2.5% SOM)	330	2300 (419)	57	37000	5100	10000													
Aromatic EC>12-16 (6% SOM)	660	2500	130	38000	5000	10000													
Aromatic EC>16-21 (1% SOM)	260	1900	46	28000	3800	7600													
Aromatic EC>16-21 (2.5% SOM)	540	1900	110	28000	3800	7700													
Aromatic EC>16-21 (6% SOM)	930	1900	260	28000	3800	7800													
Aromatic EC>21-35 (1% SOM)	1100	1900	370	28000	3800	7800													
Aromatic EC>21-35 (2.5% SOM)	1500	1900	820	28000	3800	7800													
Aromatic EC>21-35 (6% SOM)	1700	1900	1600	28000	3800	7900													
Aromatic EC>35-44 (1% SOM)	1100	1900	370	28000	3800	7800													
Aromatic EC>35-44 (2.5% SOM)	1500	1900	820	28000	3800	7800													
Aromatic EC>35-44 (6% SOM)	1700	1900	1600	28000	3800	7900													
Aliphatic + Aromatic EC>44-70 (	1600	1900	1200	28000	3800	7800													
Aliphatic + Aromatic EC>44-70 (	1800	1900	2100	28000	3800	7800													
Aliphatic + Aromatic EC>44-70 (	1900	1900	3000	28000	3800	7800													

	S4UL						C4SL						EA SGV			EIC/AGS/CL:AIRE			
Compound	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential**	**Allotment**	**Commercial**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Benzene (1% SOM)	0.087	0.38	0.017	27	72	90													
Benzene (2.5% SOM)	0.17	0.7	0.034	47	72	100													
Benzene (6% SOM)	0.37	1.4	0.075	90	73	110	0.87	3.3	0.18	98	140	230	0.33	0.07	95				
Toluene (1% SOM)	130	880 (869)	22	56000 (869)	56000	87000 (869)													
Toluene (2.5% SOM)	290	1900	51	110000 (1920)	56000	95000 (1920)													
Toluene (6% SOM)	660	3900	120	180000 (4360)	56000	100000 (4360)							610	120	$4.4x10^3$				
Ethyl benzene (1% SOM)	47	83	16	5700 (518)	24000	17000 (518)													
Ethyl benzene (2.5% SOM)	110	190	39	13000 (1220)	24000	22000 (1220)													
Ethyl benzene (6% SOM)	260	440	91	27000 (2840)	25000	27000 (2840)							350	90	$2.8x10^3$				
o-xylene (1%SOM)	60	88	28	6600 (478)	41000	17000 (478)													
o-xylene (2.5% SOM)	140	210	67	15000 (1120)	42000	24000 (1120)													
o-xylene (6% SOM)	330	480	160	33000 (2620)	43000	33000 (2620)							250	160	$2.6x10^3$				
m-xylene (1% SOM)	59	82	31	6200 (625)	41000	17000 (625)													
m-xylene (2.5% SOM)	140	190	74	14000 (1470)	42000	24000 (1470)													
m-xylene (6% SOM)	320	450	170	31000 (3460)	43000	32000 (3469)							240	180	$3.5x10^3$				
p-xylene (1% SOM)	56	79	29	5900 (576)	41000	17000 (478)													
p-xylene (2.5% SOM)	130	180	69	14000 (1350)	42000	23000 (1350)													
p-xylene (6% SOM)	310	430	160	30000 (3170)	43000	31000 (3170)							230	160	$3.2x10^3$				
Methyl tert-butyl ether (1% SOM)																49	73	23	7900
Methyl tert-butyl ether (2.5% SOM)																84	120	44	13000
Methyl tert-butyl ether (6% SOM)																160	220	90	24000

Additional Notes for LQM/CIEH Generic Assessment Criteria

1 For residential land use the inhalation of vapours indoors exposure pathway is the most significant exposure pathway for the lighter end aliphatic and aromatic fractions (up to aliphatic EC>12-16 and aromatic EC>10-12). The ingestion of soil and indoor dust and consumption of homegrown produce exposure pathways are the most significant for the higher end fractions (aliphatics EC>16-35 and EC>35-44; aromatics EC>12-16, EC16-21, EC>21-35, EC>35-44 and EC44-70).

2 For the allotment land use the consumption of homegrown produce exposure pathway is the most significant for the aromatic and lighter end aliphatic fractions. The ingestion of soil and and indoor dust is the most significant exposure pathway for the higher end aliphatics EC>12-16, EC>16-35 and EC35-44.

3 For the commercial land use the indoor inhalation of vapour exposure pathway is a significant exposure pathway for the lighter end aliphatic and aromatic fractions (up to aliphatic EC>12-16 and aromatic EC>10-12.

4 Background exposure represents a significant proportion of the total exposure for all fractions expect aromatic fractions EC>5-7 and EC>7-8 in all land uses.

Notes for SGVs

1 Based on a sandy loam as defined in Environment Agency (2009b) and 6% SOM. At a lower SOM, SGVs may not be sufficient protective.
2 Generic assessment criteria will vary according to SOM for all land uses.
3 SGVs assume that free phase contamination is not present.
4 SGVs based on a sub-surface soil to indoor air correction air correction factor of 10.
5 SGV presented for Toluene Commercial based on the vapour saturation limit.
6 SGV presented for Ethylbenzene Allotment and Xylene Allotment - in applying the rules for non-soil background, the inhalation background ADE is limited to being no larger than the contribution of the inhalation soil ADE.
7 Exposure of all isomers of xylene should be considered together, because the HCV applied is based on intake of total xylene and not an individual isomer in isolation.

Notes for EIC/AGS/CL:AIRE Generic Assessment Criteria

1 GAC have been derived for 4 generic land uses; residential with consumption of homegrown produce, residential without consumption of homegrown produce, allotments and commercial land-use.

POLYAROMATIC HYDROCARBONS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria for Polycyclic Aromatic Hydrocarbons will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	LQM/CIEH						C4SL					
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**
Acenaphthene (1% SOM)	210	3000 (57)	34	84000 (57)	15000	29000						
Acenaphthene (2.5% SOM)	510	4700 (141)	85	97000 (141)	15000	30000						
Acenaphthene (6% SOM)	1100	6000 (336)	200	100000	15000	30000						
Acenaphthylene (1% SOM)	170	2900 (86.1)	28	83000 (86.1)	15000	29000						
Acenaphthylene (2.5% SOM)	420	4600 (212)	69	97000 (212)	15000	30000						
Acenaphthylene (6% SOM)	920	6000 (506)	160	100000	15000	30000						
Anthracene (1% SOM)	2400	31000 (1.17)	380	520000	74000	150000						
Anthracene (2.5% SOM)	5400	35000	950	540000	74000	150000						
Anthracene (6% SOM)	11000	37000	2200	540000	74000	150000						
Benz(a)anthracene (1% SOM)	7.2	11	2.9	170	29	49						
Benz(a)anthracene (2.5% SOM)	11	14	6.5	170	29	56						
Benz(a)anthracene (6% SOM)	13	15	13	180	29	62						
Benzo(a)pyrene (1% SOM)	2.2	3.2	0.97	35	5.7	11						
Benzo(a)pyrene (2.5% SOM)	2.7	3.2	2.0	35	5.7	12						
Benzo(a)pyrene (6% SOM)	3.0	3.2	3.5	36	5.7	13	5.0	5.3	5.7	77	10	21
Benzo(b)fluoranthene (1% SOM)	2.6	3.9	0.99	44	7.1	13						
Benzo(b)fluoranthene (2.5% SOI	3.3	4.0	2.1	44	7.2	15						
Benzo(b)fluoranthene (6% SOM)	3.7	4.0	3.9	45	7.2	16						
Benzo(ghi)perylene (1% SOM)	320	360	290	3900	640	1400						
Benzo(ghi)perylene (2.5% SOM)	340	360	470	4000	640	1500						
Benzo(ghi)perylene (6% SOM)	350	360	640	4000	640	1600						
Benzo(k)fluoranthene (1% SOM)	77	110	37	1200	190	370						
Benzo(k)fluoranthene (2.5% SOI	93	110	75	1200	190	410						
Benzo(k)fluoranthene (6% SOM)	100	110	130	1200	190	440						
Chrysene (1% SOM)	15	30	4.1	350	57	93						
Chrysene (2.5% SOM)	22	31	9.4	350	57	110						
Chrysene (6% SOM)	27	32	19	350	57	120						
Dibenzo(ah)anthracene (1% SOI	0.24	0.31	0.14	3.5	0.57	1.1						
Dibenzo(ah)anthracene (2.5% S	0.28	0.32	0.27	3.6	0.57	1.3						
Dibenzo(ah)anthracene (6% SOI	0.3	0.32	0.43	3.6	0.58	1.4						
Fluoranthene (1% SOM)	280	1500	52	23000	3100	6300						
Fluoranthene (2.5% SOM)	560	1600	130	23000	3100	6300						
Fluoranthene (6% SOM)	890	1600	290	23000	3100	6400						
Fluorene (1% SOM)	170	2800 (30.9)	27	63000 (30.9)	9900	20000						
Fluorene (2.5% SOM)	400	3800 (76.5)	67	68000	9900	20000						
Fluorene (6% SOM)	860	4500 (183)	160	71000	9900	20000						
Indeno(123cd)pyrene (1% SOM)	27	45	9.5	500	82	150						
Indeno(123cd)pyrene (2.5% SOI	36	46	21	510	82	170						
Indeno(123cd)pyrene (6% SOM)	41	46	39	510	82	180						
Naphthalene (1% SOM)	2.3	2.3	4.1	190 (76.4)	4900	1200 (76.4)						
Naphthalene (2.5% SOM)	5.6	5.6	10	460 (183)	4900	1900 (183)						
Naphthalene (6% SOM)	13	13	24	1100 (432)	4900	3000						
Phenanthrene (1% SOM)	95	1300 (36)	15	22000	3100	6200						
Phenanthrene (2.5% SOM)	220	1500	38	22000	3100	6200						
Phenanthrene (6% SOM)	440	1500	90	22000	3100	6300						
Pyrene (1% SOM)	620	3700	110	54000	7400	15000						
Pyrene (2.5% SOM)	1200	3800	270	54000	7400	15000						
Pyrene (6% SOM)	2000	3800	620	54000	7400	15000						
Coal Tar (BaP as surrogate marl	0.79	1.2	0.32	15	2.2	4.4						
Coal Tar (BaP as surrogate marl	0.98	1.2	0.67	15	2.2	4.7						
Coal Tar (BaP as surrogate marl	1.1	1.2	1.2	15	2.2	4.9						

CHLOROALCANES AND ALKANES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
1,1-Dichloroethane (1% SOM)							2.4	2.5	9.2	280
1,1-Dichloroethane (2.5% SOM)							3.9	4.1	17	450
1,1-Dichloroethane (6% SOM)							7.4	7.7	35	850
1,2-Dichloroethane (1% SOM)	0.0071	0.0092	0.0046	0.67	29	21				
1,2-Dichloroethane (2.5% SOM)	0.011	0.013	0.0083	0.97	29	24				
1,2-Dichloroethane (6% SOM)	0.019	0.023	0.016	1.7	29	28				
1,1,1-Trichloroethane (1% SOM)	8.8	9	48	660	140000	57000 (1425)				
1,1,1-Trichloroethane (2.5% SOI	18	18	110	1300	140000	76000 (2915)				
1,1,1-Trichloroethane (6% SOM)	39	40	240	3000	140000	100000 (6392)				
1,1,2-Trichloroethane (1% SOM)							0.6	0.88	0.28	94
1,1,2-Trichloroethane (2.5% SOM)							1.2	1.8	0.61	190
1,1,2-Trichloroethane (6% SOM)							2.7	3.9	1.4	400
1,1,1,2-Tetrachloroethane (1% S	1.2	1.5	0.79	110	1400	1500				
1,1,1,2-Tetrachloroethane (2.5%	2.8	3.5	1.9	250	1400	1800				
1,1,1,2-Tetrachloroethane (6% S	6.4	8.2	4.4	560	1400	2100				
1,1,2,2-Tetrachloroethane (1%SI	1.6	3.9	0.41	270	1400	1800				
1,1,2,2-Tetrachloroethane (2.5%	3.4	8.0	0.89	550	1400	2100				
1,1,2,2-Tetrachloroethane (6%SI	7.5	17	2.0	1100	1400	2300				
1,1-Dichloroethene (1% SOM)							0.23	0.23	2.8	26
1,1-Dichloroethene (2.5% SOM)							0.40	0.41	5.6	46
1,1-Dichloroethene (6% SOM)							0.82	0.82	12	92
Tetrachloroethene (1% SOM)	0.18	0.18	0.65	19	1400	810 (424)				
Tetrachloroethene (2.5% SOM)	0.39	0.40	1.5	42	1400	1100 (951)				
Tetrachloroethene (6% SOM)	0.9	0.92	3.6	95	1400	1500				
Tetrachloromethane (1% SOM)	0.026	0.026	0.45	2.9	890	190				
Tetrachloromethane (2.5% SOM	0.056	0.056	1.0	6.3	920	270				
Tetrachloromethane (6% SOM)	0.13	0.13	2.4	14	950	400				
Trichloroethene (1% SOM)	0.016	0.017	0.041	1.2	120	70				
Trichloroethene (2.5% SOM)	0.034	0.036	0.091	2.6	120	91				
Trichloroethene (6% SOM)	0.075	0.080	0.21	5.7	120	120				
Trichloromethane (1% SOM)	0.91	1.2	0.42	99	2500	2600				
Trichloromethane (2.5% SOM)	1.7	2.1	0.83	170	2500	2800				
Trichloromethane (6% SOM)	3.4	4.3	1.7	350	2500	3100				
Vinyl Chloride (1% SOM)	0.00064	0.00077	0.00055	0.059	3.5	4.8				
Vinyl Chloride (2.5% SOM)	0.00087	0.0010	0.0010	0.077	3.5	5.0				
Vinyl Chloride (6% SOM)	0.0014	0.0015	0.0018	0.12	3.5	5.4				
Chloroethane (1% SOM)							8.3	8.4	110	960
Chloroethane (2.5% SOM)							11	11	200	1300
Chloroethane (6% SOM)							18	18	380	2100
1,2-Dichloropropane (1% SOM)							0.024	0.024	0.62	3.3
1,2-Dichloropropane (2.5% SOM)							0.042	0.042	1.2	5.9
1,2-Dichloropropane (6% SOM)							0.084	0.085	2.6	12
2-Chloronaphthalene (1% SOM)							3.7	3.8	40	390
2-Chloronaphthalene (2.5% SOM)							9.2	9.3	98	960
2-Chloronaphthalene (6% SOM)							22	22	230	2200
Bromodichloromethane (1% SOM)							0.016	0.019	0.016	2.1
Bromodichloromethane (2.5% SOM)							0.030	0.034	0.032	3.7
Bromodichloromethane (6% SOM)							0.061	0.07	0.068	7.6
Chloromethane (1% SOM)							0.0083	0.0085	0.066	1
Chloromethane (2.5% SOM)							0.0098	0.0099	0.13	1.2
Chloromethane (6% SOM)							18	18	380	2100

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
cis -1,2 Dichloroethene (2.5% SOM)							0.19	0.20	0.50	24
cis -1,2 Dichloroethene (6% SOM)							0.37	0.39	1.0	47
trans -1,2 Dichloroethene (1% SOM)							0.19	0.19	0.93	22
trans -1,2 Dichloroethene (2.5% SOM)							0.34	0.35	1.9	40
trans -1,2 Dichloroethene (6% SOM)							0.70	0.71	4.0	81
Dichloromethane (1% SOM)							0.58	2.1	0.1	270
Dichloromethane (2.5% SOM)							0.98	2.8	0.19	360
Dichloromethane (6% SOM)							1.7	4.5	0.34	560
Hexachloroethane (1% SOM)							0.2	0.22	0.27	22
Hexachloroethane (2.5% SOM)							0.48	0.54	0.67	53
Hexachloroethane (6% SOM)							1.1	1.3	1.6	120

Notes for EIC/AGS/CL:AIRE Generic Assessment Criteria

1 GAC have been derived for 4 generic land uses; residential with consumption of homegrown produce, residential without consumption of homegrown produce, allotments and commercial land-use.

EXPLOSIVES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL					
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**
RDX (1% SOM)	120	13000	17	210000	210000	210000
RDX (2.5% SOM)	250	13000	38	210000	26000	49000 (18.7)
RDX (6% SOM)	540	13000	85.0	210000	27000	53000
HMX (1% SOM)	5.7	6700	0.86	110000	13000	23000 (0.35)
HMX (2.5% SOM)	13	6700	1.9	110000	13000	23000 (0.39)
HMX (6% SOM)	26	6700	3.9	110000	13000	24000 (0.48)

PESTICIDES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

Compound	S4UL Residential with home grown produce	Residential without home grown produce	Allotment	Commercial	POSresi	POSpark
Aldrin (1% SOM)	5.7	7.3	3.2	170	18	30
Aldrin (2.5% SOM)	6.6	7.4	6.1	170	18	31
Aldrin (6% SOM)	7.1	7.5	9.6	170	18	31
Dieldrin (1% SOM)	0.97	7	0.17	170	18	30
Dieldrin (2.5% SOM)	2	7.3	0.41	170	18	30
Dieldrin (6% SOM)	3.5	7.4	0.96	170	18	31
Atrazine (1% SOM)	3.3	610	0.5	9300	1200	2300
Atrazine (2.5% SOM)	7.6	620	1.2	9400	1200	2400
Atrazine (6% SOM)	17.4	620	2.7	9400	1200	2400
Dichlorovos (1% SOM)	0.032	6.4	0.0049	140	16	26
Dichlorovos (2.5% SOM)	0.066	6.5	0.010	140	16	26
Dichlorovos (6% SOM)	0.14	6.6	0.022	140	16	27
Alpha-Endosulfan (1% SOM)	7.4	160 (0.003)	1.2	5600 (0.003)	1200	2400
Alpha-Endosulfan (2.5% SOM)	18	280 (0.007)	2.9	7400 (0.007)	1200	2400
Alpha-Endosulfan (6% SOM)	41	410 (0.016)	6.8	8400 (0.016)	1200	2500
Beta-Endosulfan (1% SOM)	7	190 (0.00007)	1.1	6300 (0.00007)	1200	2400
Beta-Endosulfan (2.5% SOM)	17	320 (0.0002)	2.7	7800 (0.0002)	1200	2400
Beta-Endosulfan (6% SOM)	39	440 (0.0004)	6.4	8700	1200	2500
Alpha-Hexachlorocyclohexanes (	0.23	6.9	0.035	170	24	47
Alpha-Hexachlorocyclohexanes (	0.55	9.2	0.087	180	24	48
Alpha-Hexachlorocyclohexanes (	1.2	11	0.21	180	24	48
Beta-Hexachlorocyclohexanes (1	0.085	3.7	0.013	65	8.1	15
Beta-Hexachlorocyclohexanes (2	0.2	3.8	0.032	65	8.1	15
Beta-Hexachlorocyclohexanes (6	0.46	3.8	0.077	65	8.1	16
Gamma-Hexachlorocyclohexane	0.06	2.9	0.0092	67	8.2	14
Gamma-Hexachlorocyclohexane	0.14	3.3	0.023	69	8.2	15
Gamma-Hexachlorocyclohexane	0.33	3.5	0.054	70	8.2	15

CHLOROBENZENES & METHYLBENZENES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Chlorobenzene (1% SOM)	0.46	0.46	5.9	56	11000	1300 (675)				
Chlorobenzene (2.5% SOM)	1.0	1.0	14	130	13000	2000 (1520)				
Chlorobenzene (6% SOM)	2.4	2.4	32	290	14000	2900				
1,2-Dichlorobenzene (1% SOM)	23	24	94	2000 (571)	90000	24000 (571)				
1,2-Dichlorobenzene (2.5% SOM	55	57	230	4800 (1370)	95000	36000 (1370)				
1,2-Dichlorobenzene (6% SOM)	130	130	540	11000 (3240)	98000	51000 (3270)				
1,3-Dichlorobenzene (1% SOM)	0.40	0.44	0.25	30	300	390				
1,3-Dichlorobenzene (2.5% SOM	1.0	1.1	0.6	73	300	440				
1,3-Dichlorobenzene (6% SOM)	2.3	2.5	1.5	170	300	470				
1,4-Dichlorobenzene (1% SOM)	61	61	15	4400 (224)	17000	36000 (224)				
1,4-Dichlorobenzene (2.5% SOM	150	150	37	10000 (540)	17000	36000 (540)				
1,4-Dichlorobenzene (6% SOM)	350	350	88	25000 (1280)	17000	36000 (1280)				
1,2,3-Trichlorobenzene (1% SOI	1.5	1.5	4.7	102	1800	770 (134)				
1,2,3-Trichlorobenzene (2.5% S(	3.6	3.7	12	250	1800	110 (330)				
1,2,3-Trichlorobenzene (6% SOI	8.6	8.8	28	590	1800	1600 (789)				
1,2,4-Trichlorobenzene (1% SOI	2.6	2.6	55	220	15000	1700 (318)				
1,2,4-Trichlorobenzene (2.5% S(	6.4	6.4	140	530	17000	2600 (786)				
1,2,4-Trichlorobenzene (6% SOI	15	15	320	1300	19000	400 (1880)				
1,3,5-Trichlorobenzene (1% SOI	0.33	0.33	4.7	23	1700	380 (36.7)				
1,3,5-Trichlorobenzene (2.5% S(	0.81	0.81	12	55	1700	580 (90.8)				
1,3,5-Trichlorobenzene (6% SOI	1.9	1.9	28	130	1800	860 (217)				
1,2,3,4-Tetrachlorobenzene (1%	15	24	4.4	1700 (122)	830	1500 (122)				
1,2,3,4-Tetrachlorobenzene (2.5	36	56	11	3080 (304)	830	1600				
1,2,3,4-Tetrachlorobenzene (6%	78	120	26	4400 (728)	830	1600				
1,2,3,5-Tetrachlorobenzene (1%	0.66	0.75	0.38	49 (39.4)	78	110 (39)				
1,2,3,5-Tetrachlorobenzene (2.5	1.6	1.9	0.90	120 (98.1)	79	120				
1,2,3,5-Tetrachlorobenzene (6%	3.7	4.3	2.2	240 (235)	79	130				
1,2,4,5-Tetrachlorobenzene (1%	0.33	0.73	0.06	42 (19.7)	13	25				
1,2,4,5-Tetrachlorobenzene (2.5	0.77	1.7	0.16	72 (49.1)	13	26				
1,2,4,5-Tetrachlorobenzene (6%	1.6	3.5	0.37	96	13	26				
Pentachlorobenzene (1% SOM)	5.8	19	1.2	640 (43.0)	100	190				
Pentachlorobenzene (2.5% SOM	12	30	3.1	770 (107)	100	190				
Pentachlorobenzene (6% SOM)	22	38	7.0	830	100	190				
Hexachlorobenzene (1% SOM)	1.8 (0.20)	4.1 (0.20)	0.47	110 (0.20)	16	30				
Hexachlorobenzene (2.5% SOM)	3.3 (0.50)	5.7 (0.50)	1.1	120	16	30				
Hexachlorobenzene (6% SOM)	4.9	6.7 (1.2)	2.5	120	16	30				
1,2,4-Trimethylbenzene (1% SOM)							0.35	0.41	0.38	42
1,2,4-Trimethylbenzene (2.5% SOM)							0.85	0.99	0.93	99
1,2,4-Trimethylbenzene (6% SOM)							2	2.3	2.2	220
Isopropyl benzene (1% SOM)							11	12	32	1400
Isopropyl benzene (2.5% SOM)							27	28	79	3300
Isopropyl benzene (6% SOM)							64	67	190	7700
Propylbenzene (1% SOM)							34	40	34	4100
Propylbenzene (2.5% SOM)							82	97	83	9700
Propylbenzene (6% SOM)							190	230	200	21000
Styrene (1% SOM)							8.1	35	1.6	3300
Styrene (2.5% SOM)							19	78	3.7	6500
Styrene (6% SOM)							43	170	8.7	11000

PHENOLS AND CHLOROPHENOLS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	LQM/CIEH						EA SGV			EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential**	**Allotment**	**Commercial**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**otm**	**Commercial**
Phenol (1% SOM)	120	440 (460)	23	440 (26000)	440 (10000)	440 (7600)							
Phenol (2.5% SOM)	200	690	42	690 (30000)	690 (10000)	690 (8300)							
Phenol (6% SOM)	380	1200	83	1300 (34000)	1300 (10000)	1300 (9300)	420	280	3200 (38000)				
Chlorophenol (1% SOM)	0.87	94	0.13	3500	620	1100							
Chlorophenol (2.5% SOM)	2.0	150	0.30	4000	620	1100							
Chlorophenol (6% SOM)	4.5	210	0.70	4300	620	1100							
Pentachlorophenol (1% SOM)	0.22	27 (16.7)	0.03	400	60	110							
Pentachlorophenol (2.5% SOM)	0.52	29	0.08	400	60	120							
Pentachlorophenol (6% SOM)	1.2	31	0.19	400	60	120							
2,4-Dimethylphenol (1% SOM)										19	210	3	16000
2,4-Dimethylphenol (2.5% SOM)										43	410	7	24000
2,4-Dimethylphenol (6%SOM)										97	730	17	30000
Total Cresols (2-Methylphenol, 3-methylphenol, 4-methylphenol) (1%SOM)										80	3700	12	160000
Total Cresols (2-Methylphenol, 3-methylphenol, 4-methylphenol) (2.5%SOM)										180	5400	27	180000
Total Cresols (2-Methylphenol, 3-methylphenol, 4-methylphenol) (6%SOM)										400	6900	63	180000

PHTHALATES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	EIC/AGS/CL:AIRE			
Compound	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Bis (2-ethylhexyl) phthalate (1%	280	2700	47	85000
Bis (2-ethylhexyl) phthalate (2.5	610	2800	120	86000
Bis (2-ethylhexyl) phthalate (6%	1100	2800	280	86000
Butyl benzyl phthalate (1% SOM	1400	42000	220	940000
Butyl benzyl phthalate (2.5% SO	3300	44000	550	940000
Butyl benzyl phthalate (6% SOM	7200	44000	1300	950000
Diethyl Phthalate (1% SOM)	120	1800	19	1500000
Diethyl Phthalate (2.5% SOM)	260	3500	41	220000
Diethyl Phthalate (6% SOM)	570	6300	94	290000
Di-*n*-butyl phthalate (1% SOM)	13	450	2	15000
Di-*n*-butyl phthalate (2.5% SOM	31	450	5	15000
Di-*n*-butyl phthalate (6% SOM)	67	450	12	15000
Di-*n*-octyl phthalate (1% SOM)	2300	3400	940	89000
Di-*n*-octyl phthalate (2.5% SOM	2800	3400	2100	89000
Di-*n*-octyl phthalate (6% SOM)	3100	3400	3900	89000

OTHER ORGANICS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Carbon disulphide (1% SOM)	0.14	0.14	4.8	11	11000	1300				
Carbon disulphide (2.5% SOM)	0.29	0.29	10	22	11000	1900				
Carbon disulphide (6% SOM)	0.62	0.62	23	47	12000	2700				
Hexachloro-1,3-butadiene (1% S	0.29	0.32	0.25	31	25	48				
Hexachloro-1,3-butadiene (2.5%	0.70	0.78	0.61	66	25	50				
Hexachloro-1,3-butadiene (6% S	1.6	1.8	1.4	120	25	51				
Tributyl tin oxide (1% SOM)							0.25	1.4	0.042	130
Tributyl tin oxide (2.5% SOM)							0.59	3.1	0.1	180
Tributyl tin oxide (6% SOM)							1.3	5.7	0.24	200
Biphenyl (1% SOM)							66	220	14	18000
Biphenyl (2.5% SOM)							160	500	35	33000
Biphenyl (6% SOM)							360	980	83	48000
2,4-Dinitrotoluene (1% SOM)							1.5	170	0.22	3700
2,4-Dinitrotoluene (2.5% SOM)							3.2	170	0.49	3700
2,4-Dinitrotoluene (6% SOM)							7.2	170	1.1	3800
2,6-Dintrotoluene (1% SOM)							0.78	78	0.12	1900
2,6-Dintrotoluene (2.5% SOM)							1.7	84	0.27	1900
2,6-Dintrotoluene (6% SOM)							3.9	87	0.61	1900
Bromoform (1% SOM)							2.8	5.2	0.95	760
Bromoform (2.5% SOM)							5.9	11	2.1	1500
Bromoform (6% SOM)							13	23	4.6	3100

6. GEOENVIRONMENTAL RISK ASSESSMENT

6.1 **Potential Hazard Sources.** Ground contamination can occur through several causes, particularly from historical use of the site and is often linked to the processes of waste disposal, underground storage, open storage, process pipework, leaks, spillages, tanks, site filling and various other reasons. The contamination can either arise from site sources or be the result of migration from other sources off site.

6.2 **Potential Migratory Pathways.** The primary pathways are considered to be laterally or vertically downward through underlying strata or upward to the ground surface. Such pathways also provide the potential for contaminants to migrate towards local watercourses and groundwater.

6.3 **Potential Targets At Risk.** Potential environmental liabilities related to current legislation associated with contaminated land with regard to existing ownership and redevelopment are summarised.

The probability of a hazard, linked with its consequences, can be used to assess risk in accordance with the tables below for use in decision making.

Consequence of Pollution Linkage

Severe	Damage to human health. Substantial pollution of controlled waters. Significant change in ecosystem population. Irreparable damage to property.
Moderate	Non-permanent damage to human health. Minor pollution of controlled waters. Change in ecosystem. Damage to property.
Mild	Short term health effects. Slight pollution of controlled waters. Slight effect on ecosystem. Minor repairable damage to property.
Near Zero	No noticeable effect on human health. No significant pollution to controlled waters. No measurable effect on ecosystem densities. Non-structural cosmetic damage to property.

Decision Making

Probability of a hazard and an associated linkage	**Consequences of a pollution linkage (hazard-pathway-target)**			
	Severe	Moderate	Mild	Near Zero
High	High	High	Medium/low	Negligible
Medium	High	Medium	Low	Negligible
Low	High/medium	Medium/low	Low	Negligible
Unlikely	High/medium/low	Medium/low	Low	Negligible

Final overall risk is based on an assessment of probability of a hazard and its consequences. Risk categories are shown shaded in the table above and defined below.

Risk	**Description**
High	Site probably or certainly unsuitable for present use or environmental setting. Contamination probably or certainly present and likely to have an unacceptable impact on key targets. Urgent action needed.
Medium/ Moderate	Site may not be suitable for present use or environmental setting. Contamination may be present, and likely to have unacceptable impact on key targets. Action may be needed on the medium term.
Low	Site considered suitable for present use and environmental setting. Contamination may be present but unlikely to have unacceptable impacts on key targets. Action unlikely to be needed in present use.
Negligible	Site considered suitable for present use and environmental setting. Contamination may be present but unlikely to have unacceptable impacts on key targets. No action needed while site remains in present use.

The review of the information from the exploratory investigation may be such that a decision is made that there is no need for further investigation. Alternatively, it may be necessary to carry out a further main investigation.

The Environment Agency has set out guidance as to the classification of waste arising from construction sites in its document "The Definition of Waste" dated April 2006. This document outlines how waste is to be handled

The following activities are not regarded as a waste management activity requiring licencing.

1) Construction activities carried out for the purpose of producing a suitably engineered soil e.g. lime stabilisation, vibro-replacement and piling.

2) Uncontaminated materials produced on site (including excavated soils and materials from demolition) which can be reused without further treatment. Examples include site regrading and footing excavations.

   These must be done in accordance with the Planning Permission. Demolition material must be used in accordance with the quality protocols for the production of aggregates from inert waste, subject to appropriate testing and the lack of any harmful constituents. Uses include pipe bedding, backfill and sub-base.

3) Contaminated soils can be moved on-site providing they do not require treatment or containment. There should be no risk to the environment i.e. non-leachable and in accordance with Planning Permission. Relevant activities can include site regarding and use of materials below clean cover systems, capping, buildings and hardstanding.

Where contaminated materials have to be placed in an engineered cell to prevent pollution, then this would be classed as landfilling and require PPC permits. Any material taken off site is considered to be waste. However, this is under review. If material is waste, then there is a duty of care including ensuring material is transported by a registered carrier. The destination of material leaving the site should be regularly checked and Waste Transfer Notes kept.

Clean Cover Systems

According to the Environment Agency's Remediation Position Statements of May 2006, the placement of a cover system using "clean" material is not treatment of waste. Consequently, no licensing/permitting position statements are applicable to this type of remediation. If the cover system uses 'waste materials' in its construction, waste management licensing exemption paragraph 9A may be applicable to its installation. If the installation of the proposed cover system does not meet the criteria for registration of this exemption, the activity may be regulated through a waste management site license.

7. WASTE ACCEPTANCE CRITERIA (WAC)

The main objective of the Landfill Directive is to prevent or reduce as far as possible the negative effects of landfilling waste on the environment and on human health. It is intended to reduce the disposal of waste materials to landfills and to encourage more sustainable approaches to dealing with wastes. It bans the landfill of liquids and certain solid wastes, introduces requirements for the treatment of wastes prior to landfill and provides for the classification of landfills as sites for inert, hazardous or non-hazardous waste and prohibits co-disposal.

It sets out procedures for waste acceptance at landfills and the types of waste for each class of landfill as specified by Waste Acceptance Criteria (WAC). The WAC are predominantly lists of "limit values" for certain parameters obtained from standard leaching tests of wastes going to landfills. WAC are set out in the Landfill Directive itself. Full details can be found in the Environment Agency document "Waste Classification – Guidance on the classification and Assessment of Waste " Technical Guidance WM3 - 2015

8. MAIN REFERENCES

British Standards	BS3882: 2015 British Standard Specification for Topsoil BS5930: 2015+A1:2020 British Standard Code of Practice for Site Investigations BS8485: 2015 British Standard Code of Practice for the design and protective measures from methane and carbon dioxide ground gases for new buildings BS10175: 2011+A2:2017 British Standard Code of Practice for the Investigation of Potentially Contaminated Sites
BRE	Radon: Guidance on protective measures for new dwellings, BR211, 2015 Protective measures for housing on gas-contaminated land, BR414, 2015 Cover systems for land regeneration, 2004 Concrete in aggressive ground. Special Digest SD1, 3rd Edition, 2005 Soakaway Design (DG365)
CIEH	The LQM / CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd Edition)
CIRIA	Assessing risks posed by hazardous ground gases to buildings, CIRIA C665 Asbestos in Soil and Made Ground: a guide to understanding and managing risks, CIRIAC733, 2014 Good Practice on the testing and verification of protection systems for buildings against hazardous ground gases. C735:2014
CL:AIRE	Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, SP1010, 2013
DEFRA	Contaminated Land Report CLR 11, 2002 (7-10 withdrawn) R & D Publications TOX 1 – 12, 14, 16 – 25 R & D Publications SGV 1, 3, 4, 5, 7, 8, 9, 10, 15 and 16 (withdrawn) Improvements to Contaminated Land Guidance - "Outcome of the "Way Forward", 2008 Exercise on Soil Guideline Values. July 2008 Guidance on the Legal Definition of Contaminated Land. July 2008 Simplification of the Contaminated Land Regime Impact Assessment No: Defra 1133
DETR	Circular 02/2000. Contaminated Land, 2000 Guidelines for Environmental Risk Assessment and Management, 2000
Environment Agency	Guidance for the Safe Development of Housing on Land Affected by Contamination, 2000 Protective measures for housing on gas-contaminated land Remediation Position Statements, May 2006 Guidance and monitoring of landfill leachate, groundwater and surface water Human health toxicological assessment of contaminants in soil (Science Report SC050021/SR2) 2008 Updated technical background in the CLEA model (Science Report SC0520021/SR3) Waste Classification – Guidance on the classification and Assessment of Waste - Technical Guidance WM3 (2015) Contaminated Land Risk Management (2021)
HMSO	Part 2A of the Environmental Protection Act Part 2A Statutory Guidance – April 2012 Contaminated Land (England) Regulations 2006 The Contaminated Land (England) (Amendment) Regulations 2012 The Water Act 2003 (Commencement No. 11) Order 2012
Institution of Civil Engineers	Contaminated Land: Investigation, Assessment and Remediation, 2nd Edition
NHBC	Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present, 2007

This list is not intended to be exhaustive.

APPENDIX 10

Dust Suppression for Groundworkers

Caldwell Construction Limited Work Activity Risk Assessment

Client Name:	Lovell	**Development Name:**	Skelmanthorpe	**RA Ref:**	RA01ENV
Assessment Date:	January 2025	**Assessed By:**	H&S Department	**Assessment Review:**	After significant change or 12 months from the date of assessment.
Description of Work Activity:	Groundworks				

No.	Likelihood
1	Very Unlikely
2	Unlikely
3	Likely
4	Very Likely
5	Almost Certain

No.	Severity
1	Minimal
2	Minor
3	Moderate
4	Major
5	Severe

Risk Rating = (Likelihood x Severity)	
1-4	LOW RISK
5-10	MED RISK
10-25	HIGH RISK

RISK MATRIX						
LIKELIHOOD	5	M	M	H	H	H
	4	L	M	H	H	H
	3	L	M	M	H	H
	2	L	L	M	M	M
	1	L	L	L	M	M
		1	2	3	4	5
		SEVERITY				

Persons at Significant Risk Key:	**A = Task Operatives, B = Other Company Operatives, C = Other Site Personnel, D = Members of the Public**

Activity Ref:	Hazard / Work Activity	Persons at Significant Risk (see key above)	Hazards Identified	Risk Rating Before Control Measures:			Control Measures in Place	Residual Risk Rating After Control Measures		
				L	S	R		L	S	R
01	Remediation works	N/A	• Badgers	3	3	9	• If working within 30m of a badger set, you may require a license from the nature conservation body. • Seek expert advice before any work within 30m of a badger sett • Stop work immediately and inform safety team if a badger or badger sett is seen on site and fence off area.	1	3	3
02	Working in close proximity to watercourses	N/A	• Great Crested Newts	4	3	12	• Ensure an environmental survey of the site is carried out by a competent person	3	2	6

							• Stop work in the immediate area and inform Safety Team for instruction if GCN have been identified on site • Take photographs of GCN if possible • Seek expert advice from ecologist and do not touch or disturb their habitat • Erect a semi-permanent newt fence			
03	Remediation works	N/A	• Invasive plant species - Giant Hogweed, Himalayan Balsam, Japanese Knotweed	2	4	8	• Giant Hogweed - is a very aggressive plant with powerful odour, it can grow to 6m with leaves reaching 3m and has a reddish-purple hollow stem with spots and bristle like hairs. • Do Not touch as the sap can burn and blister the skin. Inform safety team if discovered. Seek medical advice if you come into contact with. • Do Not track through or move soil containing GH • Himalayan Balsam - Non-native plant with pink to purplish, or sometimes white flowers that can smell like peaches. The leaves have serrated edges with hollow stems and can grow to 4m in height. It grows mainly by watercourses but can grow along roads. • If identified stop work and inform the safety team, fence off area with a 7m boundary. Do Not touch or disturb seed pods. • Japanese Knotweed - It can grow to 3m in height with hollow bamboo like stems, grows in dense clumps with white to whitish- green flowers, Bark is green with brown to red/purple	2	2	4

							speckles, Alternate leaves, 7-15cm long and leathery. • Follow same controls as Himalayan Balsam			
04	Remediation works	N/A	• Nesting Birds	4	3	12	• It is illegal to intentionally or recklessly kill, injure, capture or even disturb a nesting bird • Nesting season is between 1st March - 31st August, however birds may nest earlier or later than the dates stated with some birds nesting all year if conditions are suitable so there are no fixed dates indicating when site work may be carried out. • Check that no nesting birds or active nests are present before carrying out site clearance or clearing scrubland, hedges or other potential nesting sites. • Stop all construction and work in the immediate area if nesting birds are present and inform safety team	2	1	2
05	Remediation works / Ground works	N/A	• Trees and Hedgerows	4	3	12	• Hedgerows are protected by law and permission should be sought from the local council before removing any part of one, also trees may be under a tree preservation order (TPO) and consent must also be gained before work can commence. • 1m from trunk is a prohibited zone. • Excavations of any kind must not be undertaken within this zone unless fully discussed with the local Authority Tree Officer. • 4x tree circumference. Excavations should be hand dug, where machinery	2	2	4

							is required permission must be sought from the safety team before work starts. • Do Not store or allow machinery under canopy of trees			
06	Sewer / Drainage / Ground works	N/A	• Rats	4	5	20	• Rats can carry Leptospirosis a form bacterial infection, also known as Weil's Disease. • The bacteria can enter through breaks in the skin or through the lining of the mouth and nose after contact with urine contaminated water. • First symptoms are flu-like – persistent headaches, and possible chills. Later symptoms can lead to vomiting, muscle pains and kidney failure. Ensure to cover all open wounds, and wash hands prior to eating or using the toilet. • Put all waste food in the correct receptacles and keep lid firmly closed.	1	5	5
07	Remediation Works	N/A	• Working on previously developed land	4	3	12	• Contaminants can be present in any form and found when not expected – Remain observant during digging works • Once identified, work should only be carried out in consultation with a contaminated land specialist who will produce a site-specific method statement to include all potential risks presented by the contamination. • If identified as contaminated ensure to follow the safe systems of work and don the required PPE. • Do Not smoke when working on made ground.	2	2	4

08	Excavation Works	N/A	• Pumping and Dewatering	5	3	15	• Discharge of water from excavations is trade effluent, and therefore requires a permit unless it meets the requirements of the Temporary Discharge of Water from Excavations. • Check with safety team prior to pumping whether any treatment systems are required before final discharge of pumped out water. • Typical systems include: settlement tanks, discharge over grassed areas, through silt socks or hay bales. • Check that the point of discharge is to the correct location e.g. the sewer, manhole or gulley. • Periodically check that treatment systems are working, and that water being finally discharged is clear of silt or solids that may give rise to pollution and is not causing damage to the bed or banks of any watercourse, ensure coupling and pipework is secure. • Notify safety team immediately if water is muddy, flooding occurs, or the pipework is faulty. • Notify safety team immediately if you see silty water entering a drain or watercourse and try to stop or divert the flow e.g. using a silt barrier	2	3	6
09	Ground Works	N/A	• Working near watercourses	4	4	16	• Ensure to report any spillages in to a watercourse and ensure you have a spill kit available at all times. • Do not store chemicals within 10 meters of a watercourse.	1	4	4

							• Do not refuel or undertake maintenance of plant or vehicles close to water. • Do not store waste next to any watercourse – segregate and store waste in a suitable area before disposing correctly. • Keep vehicles and plant away from riverbanks - Do not release silt through the operation of plant. • Make sure your activities disturb or damage protected species or their environment. • Take precautions if working near stagnant water, which can carry harmful micro-organisms. • Suspend work in rivers beds, culverts, storm drains and sewers when thunderstorms or heavy rain are active in the local area			
10	Building Works	N/A	• Cement and Concrete	4	3	12	• Identify all drains / gullies / watercourses at the planning stage and prior to commencing work. • Store bagged cement and concrete additives and undertake mixing at least 10m away from drains, gullies and watercourses. • Use designated areas for washout activities. • Protect bagged cement from moisture and where necessary proactively protect nearby drains against washout water running into them.	1	3	3

11	Re-fuelling / Portable generators / Stihl Saws	N/A	• Drip Trays	5	3	15	• Use drip trays under all compressors, generators, lighting-tower units, pumps, oil/fuel/chemical containers taken out onto site. • Ensure drip trays are on flat surfaces to prevent any spillages. • Check drip trays frequently: If you can't see the bottom the tray needs to be emptied. • Drip tray contents should be treated as contaminated water. • Know where your nearest spill kit is in case of a problem with a drip tray	1	3	6
12	Remediation Works / Ongoing Groundworks	N/A	• Silt	5	5	25	• Reduce or eliminate working in or near drainage channels. • Ensure any water discharged over ground doesn't enter drainage systems - it can lead to streams/watercourses. • Only remove vegetation from areas needed in the near future. • Seed or cover stockpiles of spoils. • Prevent water from entering excavations by using cut off ditches and filtration socks on pipes. • Use silt fences and hay bales at the toe of slopes to reduce silt transport. Collect run-off and allow silt to settle before disposal. • Carry out regular maintenance of silt-traps in drains and channels. • Check site drainage systems are working - discolouration could indicate silt pollution. • Notify safety team immediately if you see silty water entering a drain or	2	5	10

							watercourse and try to stop or divert the flow e.g. using a silt barrier. • Depending on the severity of the silt run off, consult environmental specialist to ascertain whether Floc Mats or a pipe reactor can be utilised. • The pipe reactor ensures suspended solids are bound together so they can be easily separated. The Floc mats are placed at the outlet to capture sediment and prevent it polluting the watercourse.			
13	Site Set Up	N/A	• Storage and use of fuels	4	5	20	• Store bulk diesel in bunded tanks. The bunds must be capable of storing at least 110% of the largest tank or 25% of the total storage capacity, whichever is greater. • Ensure to keep a spill kit near to fuel and oil storage areas. • Store fuels and oil more than 10m away from drains or surface watercourses. • For correct refuelling you must: Use trip trays underneath all static plant and refuelling operations. • Use automatic shut-off pistol grip delivery systems when refuelling from tanks and bowsers. • Use funnels when refuelling smaller items of plant and equipment. • Always replace lids on any containers and return them to the stores after use. • Keep tanks and bowers locked and secure after use	1	5	5

14	Cutting Activities / Arid Ground Conditions / Plant	N/A	• Dust	5	3	15	• Control deliveries to site to minimise queueing. • Ensure haul routes are located away from sensitive areas and reduce the width of the route - to reduce the area of dust produced. • Minimise drop heights into haulage vehicles and grab wagons. • Ensure materials likely to produce dust are covered to and from site. • Keep to site speed limits: slower vehicles produce less dust. • Use the wheel-wash for appropriate vehicles if one is provided on site – mud on surrounding roads dries to become dust. • Ensure cutting operations are adequately supressed / shielded or controlled. • Keep stockpiles of materials to a minimum and seal long standing stocks.	3	3	9
15	Cutting Activities / Plant	N/A	• Air Pollution	3	3	9	• Keep all vehicles and plant maintained and serviced - Ensure all vehicles comply with MOT emissions standards and report defective exhaust systems or black smoke to your Supervisor. • Make sure deliveries to site comply with delivery hours to minimise queuing & excessive exhaust fumes. • Minimise your own impacts by car sharing or using public transport to get to work. • No burning of materials on site	1	3	3
16	Plant & Machinery	N/A	• Noise and Vibration	5	4	20	• Restrict noisy activities to certain times of the day if possible.	2	4	8

							• Adhere to working hours; some sites are only consented to work at certain times. • Obtain permission from site management for work outside these hours. • Plan deliveries: Arrange routes and times to minimise nuisance to the local community. • Endeavour to keep noisy plant away from public areas. • Minimise drop heights into hoppers, lorries and other plant. • Use silenced generators and tower lights where necessary and close all engine covers. • Don't ignore complaints from the local community.			
17	Deliveries / Plant / Vehicles	N/A	• Site Traffic	5	4	20	• Make sure deliveries use the designated routes to and from site, avoiding 'no go' areas. • Ensure delivery drivers are aware of site delivery times and PPE requirements. • Ensure haul roads are well maintained and where necessary use wheel washes before leaving site to keep neighbouring roads clean. • Make sure all speed limits are observed. • Sheet vehicles carrying any material which could easily blow away before leaving site. • Ensure sufficient turning space for vehicles and plant therefore minimising reversing and the need for alarms.	1	4	4

							• Ensure segregated walkways are in place to demarcate traffic routes from pedestrian areas.			
18	Ongoing Works	N/A	• Waste Hierarchy	4	3	12	• Follow the Waste Hierarchy; it is preferable that you treat the waste as high up the hierarchy as possible and reasonably practicable, Reduce the amount of waste produced, Reuse materials for alternative purposes if suitable and until no longer fit for purpose. • Segregate materials on site into different waste. Recycle materials wherever possible. • Consider all options: energy recovery/ disposal should only be used if options further up the hierarchy cannot be used	1	3	3
19	Hazardous Waste	N/A	• Asbestos • Pesticides • Solvents • Chemicals e.g. brake fluid or print toner • Waste Oils • Batteries • Hazardous waste containers • Discarded electrical equipment (TVs/monitors/ fridges/freezers)	4	4	16	• It is our responsibility to ensure waste is correctly identified, stored and transported as it passes through the chain of production until final disposal • Segregate hazardous wastes (such as batteries, asbestos, waste oils) from non-hazardous wastes and disposing of them in a way which doesn't harm the environment. • Waste must be kept secure in the appropriate container and prevented from escaping • Complete a Consignment Note that accurately describes the waste in writing, including EWC Code, a written description and volume when the waste is moved off site	1	4	4

Dust minimum standards - GROUNDWORKER

Always to be implemented unless risk assessment can justify reasons for not doing so.

Respiratory protective equipment (RPE) with an APF of 20 (FFP3 or P3) **must always be worn** in addition to controls detailed below.

You must make sure that the RPE is:

- Suitable for the work – disposable masks or half masks can become uncomfortable to wear for long periods. Powered RPE helps minimise this. Consider it when people are working for more than an hour without a break;
- Compatible with other items of protective equipment;
- Fits the user - face fit testing is needed for tight-fitting masks;
- Worn correctly - anyone using tight-fitting masks also needs to be clean shaven. For those with facial hair, a loose fitting powered respirator is to be used.

Remember: RPE is the last line of protection, it cannot be relied upon as the only means of protection.

Extraction units must be M or H class only. The use of L class is not permitted. All equipment is to be properly used and regularly maintained.

TASK	ELIMINATE OR LIMIT DUST;	CONTROL THE DUST;
Cutting concrete kerbs, blocks and paving with a petrol cut off saw	• Limit the number of cuts during design/layout • Use lower energy equipment like block splitters • Get material cut off site and delivered	• Use a waterproof crayon to mark the line to be cut. Never score the line using the saw alone without water suppression. • Use water suppression - this means enough water supplied at the right levels for the whole time that the work is being done. Just wetting the material beforehand does not work • RPE as above
Chasing concrete and raking mortar	• Limit the need for chasing at the design/layout stage • Use a work method that limits/does not need chasing	• Select the most appropriate tool for the task • Use on tool extraction using an H or M class extraction unit • Use an appropriate hood for the tool where none manufactured as part of the power tool • Consider powered RPE for longer duration work • RPE as above
Removing small rubble, dust and debris	• Limit waste materials during design/planning • Consider where waste material is created and how frequently it needs removing • Use the correct dust controls to prevent making dust	• Damp down with water spray • Use a rake, shovel or rubber bladed squeegee to remove larger pieces into bucket or wheelbarrow • Keep damp and sweep smaller debris removing with a shovel • RPE as above
Using a hand-held breaker in enclosed spaces with limited ventilation	• Limit the amount of breaking during design/planning stage • Bursting, crushing, cutting, sawing or other techniques • Remote controlled demolition • Hydrodemolition	• Use on tool extraction using an H or M class extraction unit • Use an appropriate hood for the tool where none manufactured as part of the power tool • Consider powered RPE for longer duration work • RPE as above
Scabbling or grinding with hand-held tools	• Specify architectural finishes that do not need scabbling • Use (ultra) high-pressure water jetting • Use chemical retarders and pressure washing	• Use on tool extraction using an H or M class extraction unit • Use an appropriate hood for the tool where none manufactured as part of the power tool • Consider powered RPE for longer duration work • RPE as above

	• Cast in proprietary joint formers, e.g. mesh formwork	
Drilling with hand held rotary power tools	• Limit the number of holes during design/planning • Use direct fastening or screws	• Drill through a dust hood connected to an M or H class extraction unit or using cordless extraction attached to the drill (for smaller drill bits) or • Use on tool extraction using an H or M class extraction unit and hollow core drill bits if appropriate • RPE as page 1
General duties causing nuisance dusts	• Carefully plan the work, considering alternative methods where possible • Consider effects of wind on work programme • Position stockpiles considerately	• Use an air flow water atomiser 'cannon' to suppress airborne dusts • Cover or seed stockpiles for long term cover • Regularly wet sweep roads • Reduce site traffic speeds on haul roads • Reduce double handing by the convenient placement of materials in relation to construction process.

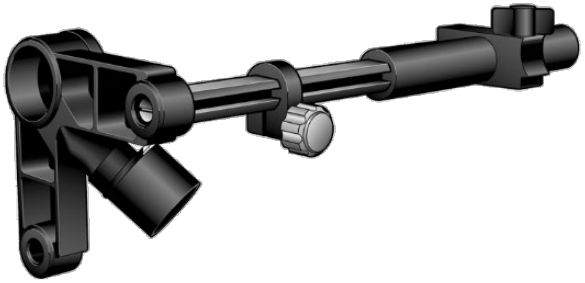
Examples of dust capturing hoods overleaf – most brands offer similar solutions and 35mm exhaust ports are compatible across most brands.

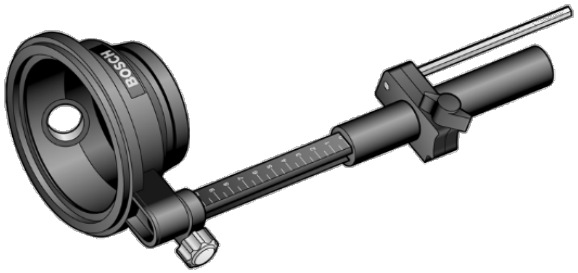
LOVELL

Dust minimum standards - GROUNDWORKER

Always to be implemented unless risk assessment can justify reasons for not doing so.

Drilling hoods (hollow masonry drill bits are also available)





Grinders (to suit various diameters)

Breaker shrouds

EXAMPLES ONLY

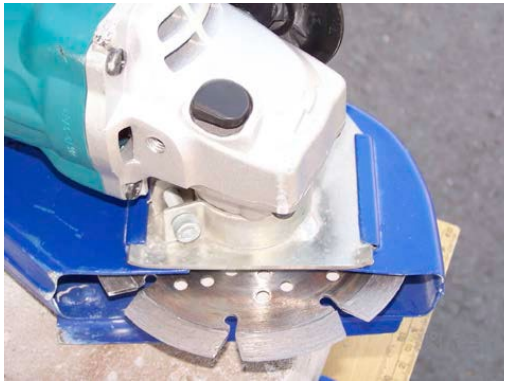
LOVELL

Dust minimum standards - GROUNDWORKER

Always to be implemented unless risk assessment can justify reasons for not doing so.

Hammer chisels

Mini grinder



Petrol cut off saw and water bottle kit

Water atomiser 'cannon'

EXAMPLES ONLY

Identified Contamination

Heavy metals and PAHs have been identified within Made Ground soils across the site. Localised asbestos fibres have also been identified within Made Ground soils in TP06, and within the stockpile and pond sediments in the east of the site.

Hydrocarbon odours and staining has been identified locally in the former AST and mill pond areas in TP218 and TP223, and within the locality of TP04/TP226. Any potential hydrocarbon sources were recommended to be identified, with appropriate remedial measures undertaken.

A significantly elevated concentration of naphthalene was recorded within a sample of pond sediment (obtained from the eastern most pond). It was recommended that additional testing of the pond sediment be undertaken as part of enabling works to confirm the characteristic naphthalene concentration of the soils. Subject to further assessment, consideration of the excavation and off-site removal of all impacted materials, or alternative remedial options to treat the impacted soils, such as biological or chemical remedial techniques, should be considered.

It was noted that the pond contains a substantial quantity of sediments which have been demonstrated to include elevated concentrations of heavy metals and PAHs. It has been strongly recommended that a suitable strategy for management of surface waters is developed for this area of the site to prevent harmful mobilisation and release of sediments into adjacent watercourses.

Whilst no evidence of hydrocarbon contamination has been noted within the surface water culvert sample, the presence of the black oily substance should be further

STANDARD APPENDIX A

NOTES ON SITE INVESTIGATION PROCEDURE (Dec 2023)

1. **GENERAL.** The ground investigation has been carried out in accordance with the requirements of BS5930: 2015 and A1: 2020 and BS10175: 2011+A1: 2017. By its very nature, any ground investigation only samples a small percentage of the ground. Consequently, changes in ground conditions and soil properties can occur between any two exploratory points, for example local features such as soft ground, pockets of contamination and faults. This is also true of the exploration of mineworkings and such features can extend beneath parts of the site not investigated. Unrecorded bell pits and shafts can also exist between exploratory points. The ground investigation is designed to minimise such risks but they cannot be eliminated.

2. **GROUND INVESTIGATION.**

2.1 **BOREHOLE AND TRIAL PIT RECORDS.** These illustrate the ground conditions only at the location of the particular borehole or trial pit. Correlation between boreholes is for guidance only and its accuracy cannot be guaranteed.

2.2 **SHELL AND AUGER BORING.** This technique uses a tripod winch and an essentially percussive action using a variety of tools. Disturbed and undisturbed samples can be taken. This is the most suitable method for soft ground investigation, enabling the maximum amount of information to be obtained. However, minor changes in lithology may be overlooked unless continuous undisturbed sampling is used.

2.3 **GROUNDWATER**. Groundwater levels vary seasonally and the details given on the borehole logs relate only to the dates and the conditions described in the borehole records. The rate of boring may not have allowed an equilibrium water level to be established and the use of casing may seal off certain seepages.

2.4 **SAMPLING.** Disturbed samples of soils are taken for identification and classification purposes. In cohesive soils 'undisturbed' samples 100mm in diameter are taken by open drive sampler for laboratory testing of strength, permeability and consolidation characteristics.

2.5 **STANDARD PENETRATION TESTS**. S.P.T tests are used in granular and cohesive materials and in soft or weathered rocks. Difficulties in obtaining true 'N' values mean they must only be used as a guide and not as an absolute value in foundation design.

2.6 **ROTARY DRILLING.** Two main types of rotary drilling are carried out in rock. Rock coring using diamond or tungsten carbide tipped core bits provides samples and information on rock types, fissuring and weathering. Openhole drilling only produces small particles for identification purposes and the information gained is therefore limited. The latter is, however, useful as a quick method for detecting major strata changes and for the location of coal seams and old workings. Water, air, foam or drilling muds may be used as the flushing medium in either case.

2.7 **PERMEABILITY TESTS.** These can be carried out in boreholes or trial pits and gives a good indication of in-situ permeability.

2.8 **TRIAL PITTING.** This enables soil conditions to be closely examined at any specific point and samples taken. It also gives useful information on the stability of excavations and ingress of water.

2.9 **WINDOW SAMPLING**. Window sampling consists of driving a series of 1m-long tubes into the ground using a dropping weight. On completion of each 1m run, the tube is withdrawn. The next tube is then inserted and the process repeated to provide a continuous profile of the ground. On each run the tube diameter is reduced in order to assist in its recovery.

2.10 **GAS MONITORING.** This is routinely carried out in trial pits or probe holes to check for elevated levels of methane and carbon dioxide or oxygen deficiency, particularly since risks can exist from natural gases, landfill sites and rising groundwater levels in mine workings below ground. Longer term monitoring is carried out with gas monitoring standpipes.

3. **SOIL DESCRIPTION.** Samples from borings or trial pits are described as specified in the standard procedure outlined in the British Standards. The description includes colour, consistency, structure, weathering, lithological type, inclusions and origin. All descriptions are based on visual and manual identification.

Fire Soils (Cohesive Soils)

The following field terms are used:

Soil Type	Description
Very soft	Exudes between fingers
Soft	Moulded by light finger pressure
Firm	Cannot be moulded by the fingers but can be rolled in hand to 3mm threads.
Stiff	Crumbles and breaks when rolled to 3mm threads but can be remoulded to a lump.
Very stiff	No longer moulded but crumbles under pressure. Can be indented with thumbs.

The following terms are used in accordance with the results of laboratory and field tests.

Description	Undrained Shear Strength Cu (kPa)
Extremely Low	<10
Very Low	10 - 20
Low	20 - 40
Medium	40 - 75
High	75 - 150
Very High	150 - 300

Fine soils can also be classified according to their sensitivity, which is the ratio between undisturbed and remoulded undrained shear strength.

Sensitivity	Ratio
Low	8
Medium	8 - 30
High	>30
Quick	>50

Granular Soils (Non-Cohesive)

The following descriptions are used for granular soils.

Description	Normalised Blow Count (N_1) 60
Very Loose	0 - 4
Loose	4 - 10
Medium	10 - 30
Dense	30 - 50
Very Dense	>50

4. **NATURAL OR IN-SITU MOISTURE CONTENT**. The natural or in-situ moisture content of a soil is defined as the weight of water contained in the pore space, expressed as a percentage of the dry weight of solid matter present in the soil. Soil properties are greatly affected by the moisture content and the test can help to give an indication of likely engineering behaviour.

5. **LIQUID AND PLASTIC LIMITS**. Two simple classification tests are known as the liquid and plastic limits. If a cohesive soil is remoulded with increasing amounts of water, a point will be reached at which it ceases to behave as a plastic material and becomes essentially a viscous fluid. The moisture content corresponding to this change is arbitrarily determined by the liquid limit test. 'Fat' clays, which have high contents of colloidal particles, have high liquid limits; 'lean' clays, having low colloidal particle contents have correspondingly low liquid limits. An increase in the organic content of a clay is reflected by an increase in the liquid and plastic limits.

   If a cohesive soil is allowed to dry progressively, a point is reached at which it ceases to behave as a plastic material, which can be moulded in the fingers, and it becomes friable. The moisture content of the soil at this point is known as the 'plastic limit' of the soil.

   The range of water content over which a cohesive soil behaves plastically, i.e. the range lying between the liquid and plastic limits, is defined as the plasticity index.

   A cohesive soil with a natural water content towards its liquid limit will, in general, be an extremely soft material whereas a cohesive soil with a natural water content below its plastic limit will tend to be a stiff material.

6. **PARTICLE-SIZE DISTRIBUTION.** A knowledge of particle-size distribution is used to classify soils and to indicate likely engineering behaviour. British Standards define soils in relation to their particle-size as shown below:-

Boulders	>200mm	Coarse Sand	2.0 to 0.63mm
Cobbles	200 to 63mm	Medium Sand	0.63 to 0.2mm
		Fine Sand	0.2 to 0.063mm
Coarse Gravel	63 to 20mm	Coarse Silt	0.063 to 0.02mm
Medium Gravel	20 to 6.3mm	Medium Silt	0.02 to 0.0063mm
Fine Gravel	6.3 to 2mm	Fine Silt	0.0063 to 0.002mm
		Clay	<0.002mm

7. **BULK DENSITY.** The bulk density of a material is the weight of that material per unit volume and includes the effects of voids whether filled with air or water. The 'dry density' of a soil is defined as the weight of solids contained in a unit volume of the soil.

8. **PERMEABILITY.** The permeability of a material is defined as the rate at which water flows through it per unit area of soil under unit hydraulic gradient.

9. **CONSOLIDATION CHARACTERISTICS.** When subjected to pressure, a soil tends to consolidate as the air or water in the pore space is forced out and the grains assume a denser state of packing. The decrease in volume per unit of pressure is defined as the 'compressibility' of the soil, and a measure of the rate at which consolidation proceeds is given by the 'coefficient of consolidation' of the soil. These two characteristics Mv and Cv are determined in the consolidation test and the results are used to determine settlement of structures or earthworks.

10. **STRENGTH CHARACTERISTICS.** The strength of geological materials is generally expressed as the maximum resistance that they offer to deformation or fracture by applied shear or compressive stress. The strength characteristics of geological materials depend to an important degree on their previous history and on the conditions under which they will be stressed in practice. Consequently, it is necessary to simulate in the laboratory tests the conditions under which the material will be stressed in the field.

In general, the only test carried out on hard rocks is the determination of their compressive strength but consideration must be given to fissuring, jointing and bedding planes.

The tests at present in use for soils and soft rocks fall into two main categories. Firstly, those in which the material is stressed under conditions of no moisture content change, and secondly those in which full opportunity is permitted for moisture content changes under the applied stresses. Tests in the first category are known as undrained (immediate or quick) tests, while those in the second category are known as drained (slow or equilibrium) tests. The tests are normally carried out in the triaxial compression apparatus but granular materials may be tested in the shear box apparatus.

The undrained triaxial test gives the apparent cohesion C_u and the angle of shearing resistance $\emptyset_u$. In dry sands, $C_u = 0$ and $\emptyset_u$ is equal to the angle of internal friction whereas with saturated non-fissured clays $\emptyset u$ tends to 0 and the apparent cohesion C_u is equal to one-half the unconfined compression strength qu. On site the vane test gives an approximate measure of shear strength.

For some stability problems use is made of a variant of the undrained triaxial test in which the specimen is allowed to consolidate fully under the hydrostatic pressure and is then tested to failure under conditions of no moisture content change. This is known as the consolidated undrained triaxial test. Pore water pressures may be measured during this test or a fully drained test may be carried out. In either case the effective shear strength parameters C' and $\emptyset'$ can be obtained which can be used to calculate shear strength at any given pore water pressure.

11. **COMPACTION.** The density at which any soil can be placed in an earth dam, embankment or road depends on its moisture content and on the amount of work which is used in compaction. The influence of these two factors can be studied in compaction tests, which can determine the maximum dry density (MDD) achievable at a certain optimum moisture content (OMC).

12. **CALIFORNIA BEARING RATIO TEST.** In flexible pavement design a knowledge of the bearing capacity of the subgrade is necessary to enable the thickness of pavement for any particular combination of traffic and site conditions to be determined. The quality of the subgrade can be assessed by means of the California Bearing Ratio Test or approximately by the MEXE cone penetrometer.

13. **ROCK DESCRIPTION.** This is based on;

(i) Strength

Term	**Field Identification**	**Unconfined Compressive Strength (MPa)**
Extremely Weak[a]	Indented by thumbnail.	Less than 1
Very Weak	Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife.	1 to 5
Weak	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer.	5 to 25
Medium Strong	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer.	25 to 50
Strong	Specimen required more than one blow of geological hammer to fracture it.	50 to 100
Very Strong	Specimen requires many blows of geological hammer to fracture it.	100 to 250
Extremely Strong	Specimen can only be chipped with geological hammer.	Greater than 250

[a] Some extremely weak rocks will behave as soils and should be described as soils.

(ii) Structure

Thickness Term	**Spacing Term**	**Thickness or spacing**
Very thickly	Extremely wide	>6m
Very thickly	Very wide	2m – 6m
Thickly	Wide	600mm – 2m
Medium	Medium	200mm – 600mm
Thinly	Close	60mm – 200mm
Very thinly	Very close	20mm – 60mm
Thickly laminated (Sedimentary)		
Narrowly (Metamorphic and Igneous	Extremely close	6mm – 20mm
Thinly laminated (Sedimentary)		
Very narrowly (Metamorphic and Igneous)	Extremely close	<6mm

(iii) Colour
(iv) Texture
(v) Grain size

Description	Predominate Grain Size (mm)
Conglomerate	>2
Coarse - grained	2 - 0.63
Medium - grained	0.63 - 0.20
Fine - grained	0.20 - 0.063
Siltstone	0.063 - 0.002
Mudstone	<0.002

(vi) Rock Name
(vii) Stability
(viii) Weathering

Term	Description	Grades
Fresh/unweathered	No visible sign of rock material weathering; perhaps slight discolouration on major discontinuity surfaces.	0
Slightly weathered	Slight discolouration indicates weathering of rock material and discontinuity surfaces.	1
Moderately weathered/Distinctly weathered	Less than half of the rock material is decomposed or disintegrated. Fresh or discoloured rock is present either as a continuous framework or as core stones.	2
Highly weathered/ Destructed	More than half of the rock material is decomposed or disintegrated. Fresh or discoloured rock is present either as a continuous framework or as core stones.	3
Completely weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still apparent.	4
Residual soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soils has not been significantly transported.	5

(ix) Discontinuities
(x) Weathered of Rock Mass

14. **CHEMICAL TESTS.** A knowledge of water soluble sulphate content and pH of soils and groundwater is important in determining the protection required for concrete or steel in contact with the ground. Other specialist tests may be carried out on sites suspected of being contaminated (see standard appendix B).

15. **REFERENCES**

BS5930: 2015+A1:2020 British Standard Code of Practice for Site Investigations
BS10175: 2011+A1:2017 British Standard Code of Practice for the Investigation of Potentially Contaminated Sites
BS EN ISO 14688-1: 2018 Geotechnical Investigation and Testing: Identification and Classification of Soil
BS EN ISO 14688-2: 2018 Geotechnical Investigation and Testing: Identification and Classification of Soil

STANDARD APPENDIX B

NOTES ON CONTAMINATION INVESTIGATION PROCEDURE (June 2021)

mdja

1. **GENERAL.** The desk study and/or intrusive ground investigation is typically carried out in accordance with the Environment Agency's "Land Contamination Risk Management (LCRM) documents and the requirements of BS5930: 2015 and BS10175: 2011+A1: 2020. In relation to contamination the desk study is referred to as the preliminary investigation in BS10175 and the intrusive ground investigation is referred to as the Exploratory Investigation. This appendix briefly describes the nature of the work carried out and explains the standards against which contamination data has been assessed. The nature of any contamination investigation is such that only a small percentage of the ground, and therefore potential contamination, is sampled. Consequently variations in both ground conditions and contaminant levels can occur between any two sampling positions. The contamination investigation is designed to minimise such risks, but they cannot be eliminated.

2. **REVIEW OF CONTAMINATION ISSUES –** The National Planning Policy Framework (NPPF) and Part 2A of the Environmental Protection Act 1990 create a new regime for the identification and remediation of contaminated land. It introduced a definition of contaminated land described in Section 78A(2) of the Act of:

"any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or

(b) significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused:

Both Part 2A and the planning regime embrace the "suitable for use" approach. In the context of Part IIA, action is necessary only where there are unacceptable risks to health or to the environment, taking into account the current use of the land and its environmental setting.

For humans, significant harm is defined as "death, disease, serious injury ". Specifically, disease is taken to mean an unhealthy condition of the body or part of it. "Significant possibility of significant harm" is described as health effects arising from the intake of a contaminant or other direct bodily contact with the contaminant where the intake or exposure is unacceptable. The assessment should also take into account the total intake from all sources, the relative contribution of the pollutant linkage in question, and the duration of intake or exposure. The various statutory definitions are given overleaf.

The presence of unnatural substances does not automatically constitute a risk unless there is a link or pathway between the contamination (the hazard) and the receptor (the target) be it humans, the environment or property. Therefore the assessment needs to determine whether a hazard is present and whether the necessary pathway exists the so-called "pollution linkage" or "conceptual site model".

The effect of any hazard on a site depends primarily on the site use and groundwater conditions since these determine who and what may be at risk and the routes by which they may be exposed to the hazard. Site uses can include allotments, domestic gardens on residential developments, amenity and recreational areas, public open space and industrial and commercial buildings. On any site, the potential contaminants have to be identified together with the potential receptors. The pathway for that contaminant to reach its target has then to be considered.

3. **PRELIMINARY INVESTIGATION.** The preliminary Phase I Geoenvironmental Assessment (desk study) report normally considers the following key sections:

Introduction	
The Site	Contaminated Land
Site History	Radon
Geology and Mining	Geoenvironmental Risk Assessment
Hydrogeology	Geotechnical Assessment
Groundsure Geo-Insight and Enviro-Insight	Ground Investigation (Recommendations)

The report will summarise the findings and also relate our opinions to the potential for a site to be geoenvironmentally impaired, at levels likely to warrant mitigation or further consideration appropriate to the current or future use. Findings are based on information obtained and described during the desk study and site inspection without intrusive ground investigation. It is possible that further information exists. The absence of indicators of impairment does not mean that such impairment does not exist. Additional investigation including intrusive methods can reduce the risks but cannot eliminate them and may not be cost effective. We can advise on the additional research opportunities, their cost and their possible impact on mitigating risk. Recommendations are normally given based on the redevelopment proposals for the site.

Type of Receptor	Description of harm that is to be regarded as significant harm	Conditions For There Being A Significant Possibility Of Significant Harm
1. Human beings	Death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. For these purposes, disease is to be taken to mean an unhealthy condition of the body or a part of it and can include, for example, cancer, liver dysfunction or extensive skin ailments. Mental dysfunction is included only insofar as it is attributable to the effects of a pollutant on the body of the person concerned.	If the amount of the pollutant in the pollutant linkage represents an unacceptable intake or direct bodily contact, assessed on the basis of relevant information on the toxicological properties of that pollutant. Such an assessment should take into account: • the likely total intake of, or exposure to, the substance or substances which form the pollutant, from all sources including that from the pollutant linkage in question; • the relative contribution of the pollutant linkage in question to the likely aggregate intake of, or exposure to, the relevant substance or substances; and • the duration of intake or exposure resulting from the pollutant linkage in question. The question of whether an intake or exposure is unacceptable is independent of the number of people who might experience or be affected by that intake or exposure. Toxicological properties should be taken to include carcinogenic, mutagenic, teratogenic, pathogenic, endocrine-disrupting and other similar properties.
2. All other human health effects (particularly by way of explosion or fire)		If the probability, or frequency, of significant harm of that description is unacceptable. The pollutant linkage might cause "significant harm which" • would be irreversible or incapable of being treated; • would affect a substantial number of people; • would result from a single incident such as a fire or an explosion; or • would be likely to result from a short-term (lees than 24-hour) exposure to the pollutant.
3. Any ecological system, or living organism forming part of such a system, within a location which is protected.	For any protected location: • harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or • harm which affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location.	If either: • significant harm of that description is more likely than not to result from the pollutant linkage; or • there is a reasonable possibility of significant harm of that description being caused, and if that harm were to occur, it would result in such a degree of damage to features of special interest at the location in question that they would be beyond any practicable possibility of restoration.
4. Property in the form of: • crops, including timber; • produce grown domestically, or on allotments, for consumption; • livestock; • other owned or domesticated animals; • wild animals which are the subject of shooting or fishing rights.	For crops, a substantial diminution in yield or other substantial loss in the value resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage.	If significant harm of that description is more likely than not to result from the pollutant linkage in question.
5. Property in the form of buildings.	Structural failure, substantial damage or substantial interference with any right of occupation.	If significant harm of that description is more likely than not to result from the pollutant linkage in question during the expected economic life of the building.
6. Controlled waters.		

4. **INTRUSIVE INVESTIGATION.** BS10175 describes this as an exploratory investigation. Intrusive ground investigation is described in Standard Appendix A. During the investigation representative or indicative samples are obtained for testing by an accredited laboratory. The aim is to determine (with a degree of confidence appropriate to the objectives), the presence, concentration and distribution of contaminants in respect of those points investigated. The extent of any necessary intrusive investigation will depend on the size of the site and any hazards, either known or suspected.

5. **ASSESSMENT OF CONTAMINATION.** The assessment of contaminated land under the terms of Part II A of the Environmental Protection Act 1990 is based upon pollution linkage (source - pathway - receptor model) and the principles of the Environment Agency's "Contamination Land Risk Management" documentation.

DEFRA previously issued "Outcome of the Way Forward Exercise on Soil Guideline Values". This document was intended to provide guidance to determine if there is a Significant Possibility of Significant Harm (SPOSH) i.e. whether land meets the legal trigger of being contaminated land.

In the context of Part 2A, a risk assessor using an SGV would conclude the following (DEFRA, 2008).

- At a representative average soil concentration at or below an SGV, it is very unlikely that there will be a *significant possibility of significant harm (SPOSH)*.

- At a representative average soil concentration above an SGV, there *might* be a *significant possibility of significant harm* with the significance linked to the margin of exceedance, the duration and frequency of exposure, and other site-specific factors that the enforcing authority may wish to take into account. Further investigation and/or detailed evaluation will usually be required.

It should be stressed that where there is any uncertainty as to whether or not there is a SPOSH, it was the policy of this practice to adopt a conservative approach, particularly in the adoption of clean cover systems.

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

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

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

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

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

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

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

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

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

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

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

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

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

The guidance clarifies how generic assessment criteria (including the currently available SGVs/GACs) should and should not be used. It states that:

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

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

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

(a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.

(b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.

(c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risks to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.

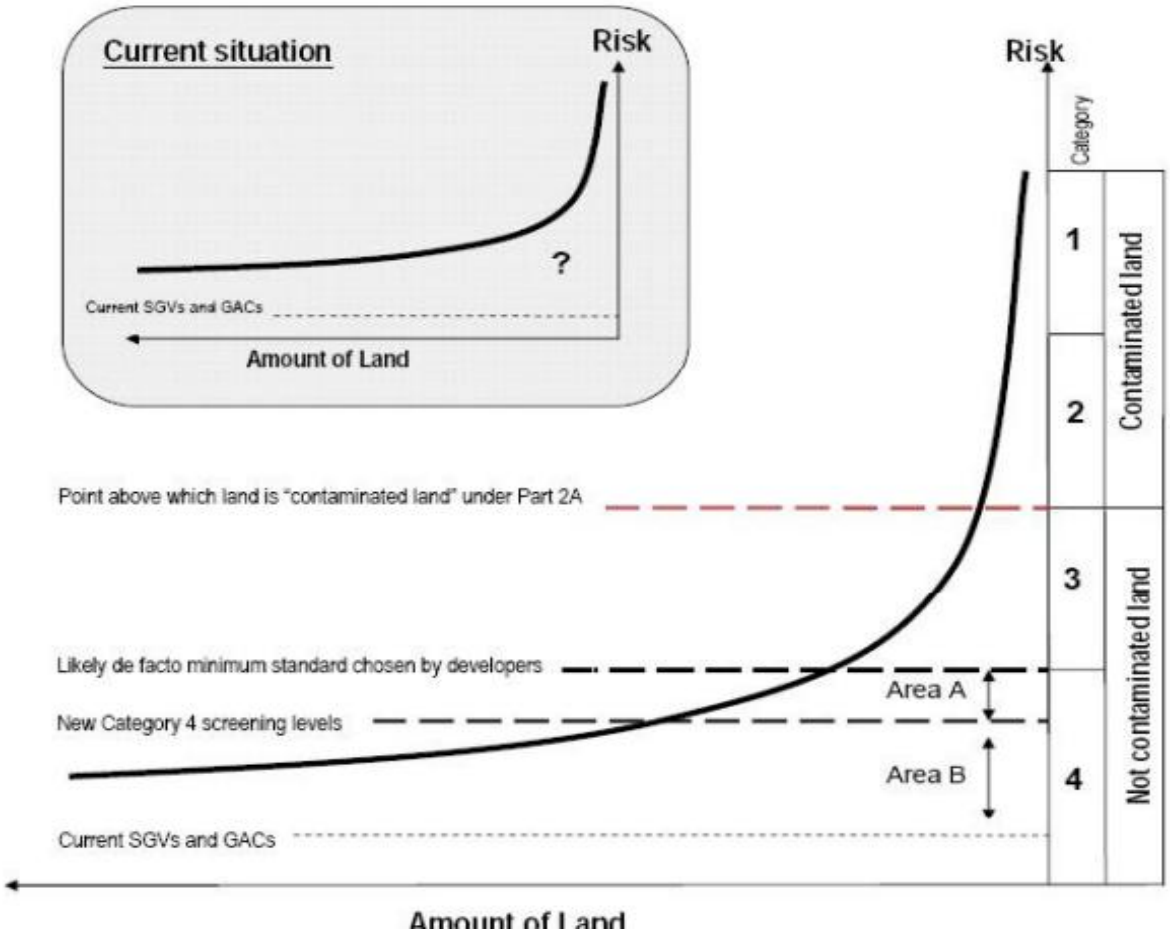
(d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.

(e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.

The way in which the new four category system is intended to operate and the place of the C4SLs within that system, was explained in detail in the Impact Assessment which accompanied the Statutory Guidance. Please note that although the detail of the Impact Assessment is included here to provide clarity on the job expected of C4SLs, the Statutory Guidance, itself, sets out the regime that needs to be delivered under Part 2A.

Paragraph 47 of the Impact Assessment describes the diagram in detail. Of particular relevance to this project is the description of the overall diagram (sub-paragraph a), description of category 4 (sub-paragraphs c (part iv) and h) and the description of how the monetised benefits of the new system will be realised (sub-paragraph h). These sub-paragraphs are reproduced below.

Diagram showing the new Category 1-4 system (compared to current situation)



The diagram above seeks to illustrate, in a simplified manner, broadly what the changes to the statutory guidance on significant possibility of significant harm to human health are intended to achieve. To explain:

(a) The curved line and axes illustrate the spectrum of risk presented by land contamination. The idea is to show that a very large amount of land is low risk, and only a small amount of land would pose sufficient risk to be contaminated land in the legal sense. The axes and lines in the diagrams are not to scale, and they have been compressed for the purposes of illustration (in reality the risks on Category 1 land would probably be orders of magnitude above Category 4 risks, and vastly more land would be in Category 4 compared to the other Categories).

(b) The smaller diagram summarizes the current situation. In the area below the SGV/GACs there is near certainty that land is not contaminated land, however, above the line there is increasing uncertainty. As explained above, currently remediation usually occurs to just below the SGV/GAC level because they are perceived as offering the only cast-iron guarantee of when land is definitely not contaminated land. Sometimes consultants are employed to justify remediating to levels above the SGV/GACs, however the further they go away from the SGV/GACs the more legal risk they and their clients are exposed to.

(c) The new statutory guidance will end the current situation, and it would not be legally possible e.g. for individual regulators to ignore the changes being made. For example, as explained above, the new statutory guidance will specifically say:

(i) that Part 2A cannot be used to force remediation to below a point where it ceases to be contaminated land in the legal sense i.e. the Category 2/3 border in terms of the diagram), although responsible parties can choose to go further;

(ii) that SGV/GACs cannot be used as one size fits all remediation thresholds under either Part 2A of the planning system;

(iii) that normal background levels of contamination are not caught by Part 2A; and

(iv) that SGV/GACs are well into Category 4, sometimes by only a few times and sometimes by orders of magnitude. These changes and others also provide the legal backing for the development e.g. of Category 4 screening levels, as discussed below.

(d) The new Category 1-4 system divides the spectrum of risk posed by contaminated land into four different categories, and the statutory guidance will explain how to decide when land falls into each Category. This is more sophisticated than the current statutory guidance, which in effect has only two categories (contaminated land or not) and does not explain how to decide which category land falls into. The new Category 1-4 system

reflects what assessors find when they investigate real sites i.e. some are clearly contaminated land (Category 1) ; some clearly are not (Category 4) and some are less-straightforward and need some level of detailed assessment before a decision can be taken as to whether or not they are contaminated land (Categories 2 and 3).

(e) In the case of Category 2 and 3 sites, the regulator will have flexibility to take decisions within the parameters set by the new Guidance. There would be less flexibility for Category 2 and 3 sites that clearly pose either a high or low risk. However, the regulator will have considerable flexibility for sites closer to the Category 2/3 border to judge which side of the border a site would fall (e.g. taking account of their understanding of the risks, uncertainties and the interests of the local community). These are often complex decisions which need to be taken case-by-case given the many factors involved.

(f) In the case of Categories 1 and 4 the regulator will have far less flexibility. For example, if a regulator claimed that a site matching the Category 1 description was not contaminated land, or that a site matching the Category 4 description was contaminated land, they would be acting directly against the statutory guidance which the Act requires that they follow, and decisions could be challenged (e.g. in a law court) with a high chance that the challenge would be successful. Among other things, the intention of doing this is to create far more legal certainty around when land is definitely not contaminated land in the legal sense. With the specific wording of the new statutory guidance, and the supporting tools such as the new Category 4 screening levels, it would be very difficult for a regulator e.g. to threaten landowners with the Part 2A regime, and if they tried to determine land as contaminated land they would be operating in direct opposition to the statutory guidance.

(g) In the many consultation meetings held in developing the Category 1-4 system, all the developers, landowners and consultants we spoke to were strongly of the view that they would want the ensure their land is safely within Category 4 (even though in theory they could remediate to a level within Category 3 and still satisfy Part 2A and planning rules). They would do this for various reasons, including the fact that the flexibility granted to regulators in Categories 2 and 3 means that the further into Category 3 a site gets, the greater the risk that the regulator might decide it is in Category 2. Also they would want to be in Category 4 for reasons of marketability, future proofing etc. So developers and others would have a strong incentive to seek the regulatory certainty of being safely within Category 4. Thus, as far as development taking place under the planning system is concerned, Category 3 would, in effect, normally be a buffer which provides added reassurance that development falling within Category 4 will not be caught by the Part 2A regime.

(h) The new statutory guidance will bring about a situation where the current SGV/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land. Above the C4SLs, in Area A on the diagram, there will be much stronger legal backing for experts to use their judgement to make sensible and precautionary decisions on when land should be considered to be towards the top end of Category 4, without fear that land may be caught as contaminated land. This recognizes that the generic C4SLs will not be able to describe the Category 3/4 border itself because they are generic and would therefore have to err on the side of caution whilst a detailed site specific assessment would be able to push further by looking at specific circumstances relating to a specific site.

(i) The very large majority of the monetized benefits of the changes to the regime discussed in this Impact Assessment manifest themselves in Category 4, and in particular in Areas A and B on the diagram. The main effects of moving to the new system would include Low risk land falling within Area B (pre-development) on the diagram would no longer have to be remediated because it would fall below the new C4SLs. Similarly land which is in Area A pre-development would no longer need to be remediated if justified by a detailed site-specific assessment. For these sites the cost of remediation would be removed altogether. The cost of remediating land which is initially in Categories 3, 2 or 1 would fall because it would be remediated to the new C4SL levels (or somewhere within Area A if there has been a detailed assessment) rather than the SGV/GAC level. This will have the overall effect of reducing the cost of remediation, with the effect varying according to specific site circumstances, the type of remediation etc. Generally the cost of remediation would fall for many affected brownfield land sites. This would have the general effect of making such land more economically viable for development. It would also mean that some land that is not currently economically viable to develop becomes reduce pressure to develop Greenfield land in some cases. The C4SLs will also speed up regulatory decisions on the reuse of brownfield land by providing a simple remediation standard.

The C4SLs are intended as "*relevant technical tools*" (in relation to Paragraph 4.2.1(c)) provides to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

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

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

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> *"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soils that, unless stated otherwise, are tolerable or pose a minimal risk to human health".*

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

CL:AIRE (Contaminated Land: Application in Real Environments) has published "*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*". In it a series of C4SLs were proposed as follows;

Analyte	Residential (with home grown produce) (mg/kg)	Residential (without home grown produce) (mg/kg)	Allotments (mg/kg)	Commercial (mg/kg)	POS (mg/kg)
Arsenic	37	40	49	640	79
Benzene	0.87	3.3	0.18	98	140
Benzo(a)Pyrene	5	5.3	5.7	77	10
Cadmium	22	150	3.9	410	880
Chromium (vi)	21	21	170	49	21
Lead	200	310	80	2300	630

Where C4SL's are not available, Generic Assessment Criteria have been used as follows;

Generic Assessment Criteria for Human Health Risk Assessment Comparison
METALS/CYANIDE

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and based on 6% soil organic matter (SOM)
Values are expressed in mg/kg

	S4UL						C4SL						EA SGV			EIC/AGS/CL:AIRE or *ATRISKSOIL		
	Residential with homegrown produce	Residential without homegrown produce	Allotment	Commercial	POSresi	POSpark	Residential with homegrown produce	Residential without homegrown produce	Allotment	Commercial	POSresi	POSpark	Residential	Allotment	Commercial	Residential without consumption of homegrown produce	Allotment	Commercial
Antimony[1]																550	ND	7500
Arsenic (6% SOM)	37	40	43	640	79	170	37	40	49	640	79	170	32	43	640			
Barium[1]																1300	ND	22000
Beryllium (6% SOM)	1.7	1.7	35	12	2.2	63												
Boron (6% SOM)	290	11000	45	240000	21000	46000												
Cadmium (6% SOM)	11	85	1.9	190	120	560	22	150	3.9	410	220	880	10	1.8	230			
Chromium (III) (6% SOM)	910	910	18000	8600	1500	33000												
Chromium (VI) (6% SOM)	6	6	1.8	33	7.7	220	21	21	170	49	21	250						
Copper (6% SOM)	2400	7100	520	68000	12000	44000												
Cyanide (AtriskSoil)																34*	34*	34*
Lead (6% SOM)							200	310	80	2300	630	1300						
Nickel (6%SOM)	130	180	53	980	230	800												
Mercury (Elemental) (6% SOM)	1.2	1.2	21	58	16	30							1.0	26	26			
Mercury (Inorganic) (6% SOM)	40	56	19	1100	120	240							170	80	3600			
Mercury (Methyl) (6% SOM)	11	15	6	320	40	68							11	8	410			
Molybdbenum[1]																670	ND	17000
Selenium (6% SOM)	250	430	88	12000	1100	1800							350	120	13000			
Vanadium (6% SOM)	410	1200	91	9000	2000	5000												
Zinc (6% SOM)	3700	40000	620	730000	81000	170000												

Additional notes for EIC/AGS/CL:AIRE GAC

1 Due to the limitations in time and scope of the EIC/AGS/CL:AIRE project, plant uptake factors were not derived for metals and therefore the metals GAC have only been produced for residential without consumption of homegrown produce and commercial land-uses. Note that the derived GAC are not dependent on SOM.

PETROLEUM HYDROCARBONS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM).
SGVs based on 6% SOM, at a lower SOM the SGV may not be sufficiently protective.
Generic assessment criteria for Petroleum Hydrocarbons will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 10

	S4UL						C4SL						EA SGV			EIC/AGS/CL:AIRE			
Compound	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential**	**Allotment**	**Commercial**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Aliphatic EC 5-6 (1% SOM)	42	42	730	3200 (340)	570000 (304)	95000 (304)													
Aliphatic EC 5-6 (2.5% SOM)	78	78	1700	5900 (558)	590000	130000 (558)													
Aliphatic EC 5-6 (6% SOM)	160	160	3900	12000 (1150)	600000	18000 (1550)													
Aliphatic EC>6-8 (1% SOM)	100	100	2300	7800 (144)	600000	150000 (144)													
Aliphatic EC>6-8 (2.5% SOM)	230	230	5600	17000 (322)	610000	220000 (322)													
Aliphatic EC>6-8 (6% SOM)	530	530	13000	40000 (736)	620000	320000 (736)													
Aliphatic EC>8-10 (1% SOM)	27	27	320	2000 (78)	13000	14000 (78)													
Aliphatic EC>8-10 (2.5% SOM)	65	65	770	4800 (190)	13000	18000 (190)													
Aliphatic EC>8-10 (6% SOM)	150	150	1700	11000 (451)	13000	21000 (451)													
Aliphatic EC>10-12 (1% SOM)	130 (48)	130 (48)	2200	9700 (48)	13000	21000 (48)													
Aliphatic EC>10-12 (2.5% SOM)	330 (118)	330 (118)	4400	23000 (118)	13000	23000 (118)													
Aliphatic EC>10-12 (6%SOM)	760 (283)	770 (283)	7300	47000 (283)	13000	24000 (283)													
Aliphatic EC>12-16 (1% SOM)	1100 (24)	1100 (24)	11000	59000 (24)	13000	25000 (24)													
Aliphatic EC>12-16 (2.5% SOM)	2400 (59)	2400 (59)	13000	82000 (59)	13000	25000 (59)													
Aliphatic EC>12-16 (6% SOM)	4300 (142)	4300 (142)	13000	90000 (142)	13000	26000 (142)													
Aliphatic EC>16-35 (1% SOM)	65000 (8.48)	65000 (8.48)	260000	1600000	250000	450000													
Aliphatic EC>16-35 (2.5% SOM)	92000 (21)	92000 (21)	270000	1700000	250000	480000													
Aliphatic EC>16-35 (6% SOM)	110000	110000	270000	1800000	250000	490000													
Aliphatic EC>35-44 (1% SOM)	65000 (8.48)	65000 (8.48)	260000	1600000	250000	450000													
Aliphatic EC>35-44 (2.5% SOM)	92000 (21)	92000 (21)	270000	1700000	250000	480000													
Aliphatic EC>35-44 (6% SOM)	110000	110000	270000	1800000	250000	490000													
Aromatic EC 5-7 (1% SOM)	70	370	13	26000 (1220)	56000	76000 (1220)													
Aromatic EC 5-7 (2.5% SOM)	140	690	27	46000 (2260)	56000	84000 (2260)													
Aromatic EC 5-7 (6% SOM)	300	1400	57	86000 (4710)	56000	92000 (4710)													
Aromatic EC>7-8 (1% SOM)	130	860	22	56000 (869)	56000	87000 (869)													
Aromatic EC>7-8 (2.5% SOM)	290	1800	51	110000 (1920)	56000	95000 (1920)													
Aromatic EC>7-8 (6% SOM)	660	3900	120	180000 (4360)	56000	100000 (4360)													
Aromatic EC>8-10 (1% SOM)	34	47	8.6	3500 (613)	5000	7200 (613)													
Aromatic EC>8-10 (2.5% SOM)	83	110	21	8100 (1500)	5000	8500 (1500)													
Aromatic EC>8-10 (6% SOM)	190	270	51	17000 (3580)	5000	9300 (3580)													
Aromatic EC>10-12 (1% SOM)	74	250	13	16000 (364)	5000	9200 (364)													
Aromatic EC>10-12 (2.5% SOM)	180	590	31	28000 (899)	5000	9700 (899)													
Aromatic EC>10-12 (6% SOM)	380	1200	74	34000 (2150)	5000	10000													
Aromatic EC>12-16 (1% SOM)	140	1800	23	36000 (169)	5100	10000													
Aromatic EC>12-16 (2.5% SOM)	330	2300 (419)	57	37000	5100	10000													
Aromatic EC>12-16 (6% SOM)	660	2500	130	38000	5000	10000													
Aromatic EC>16-21 (1% SOM)	260	1900	46	28000	3800	7600													
Aromatic EC>16-21 (2.5% SOM)	540	1900	110	28000	3800	7700													
Aromatic EC>16-21 (6% SOM)	930	1900	260	28000	3800	7800													
Aromatic EC>21-35 (1% SOM)	1100	1900	370	28000	3800	7800													
Aromatic EC>21-35 (2.5% SOM)	1500	1900	820	28000	3800	7800													
Aromatic EC>21-35 (6% SOM)	1700	1900	1600	28000	3800	7900													
Aromatic EC>35-44 (1% SOM)	1100	1900	370	28000	3800	7800													
Aromatic EC>35-44 (2.5% SOM)	1500	1900	820	28000	3800	7800													
Aromatic EC>35-44 (6% SOM)	1700	1900	1600	28000	3800	7900													
Aliphatic + Aromatic EC>44-70 (	1600	1900	1200	28000	3800	7800													
Aliphatic + Aromatic EC>44-70 (	1800	1900	2100	28000	3800	7800													
Aliphatic + Aromatic EC>44-70 (	1900	1900	3000	28000	3800	7800													

	S4UL						C4SL						EA SGV			EIC/AGS/CL:AIRE			
Compound	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential**	**Allotment**	**Commercial**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Benzene (1% SOM)	0.087	0.38	0.017	27	72	90													
Benzene (2.5% SOM)	0.17	0.7	0.034	47	72	100													
Benzene (6% SOM)	0.37	1.4	0.075	90	73	110	0.87	3.3	0.18	98	140	230	0.33	0.07	95				
Toluene (1% SOM)	130	880 (869)	22	56000 (869)	56000	87000 (869)													
Toluene (2.5% SOM)	290	1900	51	110000 (1920)	56000	95000 (1920)													
Toluene (6% SOM)	660	3900	120	180000 (4360)	56000	100000 (4360)							610	120	$4.4x10^3$				
Ethyl benzene (1% SOM)	47	83	16	5700 (518)	24000	17000 (518)													
Ethyl benzene (2.5% SOM)	110	190	39	13000 (1220)	24000	22000 (1220)													
Ethyl benzene (6% SOM)	260	440	91	27000 (2840)	25000	27000 (2840)							350	90	$2.8x10^3$				
o-xylene (1%SOM)	60	88	28	6600 (478)	41000	17000 (478)													
o-xylene (2.5% SOM)	140	210	67	15000 (1120)	42000	24000 (1120)													
o-xylene (6% SOM)	330	480	160	33000 (2620)	43000	33000 (2620)							250	160	$2.6x10^3$				
m-xylene (1% SOM)	59	82	31	6200 (625)	41000	17000 (625)													
m-xylene (2.5% SOM)	140	190	74	14000 (1470)	42000	24000 (1470)													
m-xylene (6% SOM)	320	450	170	31000 (3460)	43000	32000 (3469)							240	180	$3.5x10^3$				
p-xylene (1% SOM)	56	79	29	5900 (576)	41000	17000 (478)													
p-xylene (2.5% SOM)	130	180	69	14000 (1350)	42000	23000 (1350)													
p-xylene (6% SOM)	310	430	160	30000 (3170)	43000	31000 (3170)							230	160	$3.2x10^3$				
Methyl tert-butyl ether (1% SOM)																49	73	23	7900
Methyl tert-butyl ether (2.5% SOM)																84	120	44	13000
Methyl tert-butyl ether (6% SOM)																160	220	90	24000

Additional Notes for LQM/CIEH Generic Assessment Criteria

1 For residential land use the inhalation of vapours indoors exposure pathway is the most significant exposure pathway for the lighter end aliphatic and aromatic fractions (up to aliphatic EC>12-16 and aromatic EC>10-12). The ingestion of soil and indoor dust and consumption of homegrown produce exposure pathways are the most significant for the higher end fractions (aliphatics EC>16-35 and EC>35-44; aromatics EC>12-16, EC16-21, EC>21-35, EC>35-44 and EC44-70).

2 For the allotment land use the consumption of homegrown produce exposure pathway is the most significant for the aromatic and lighter end aliphatic fractions. The ingestion of soil and and indoor dust is the most significant exposure pathway for the higher end aliphatics EC>12-16, EC>16-35 and EC35-44.

3 For the commercial land use the indoor inhalation of vapour exposure pathway is a significant exposure pathway for the lighter end aliphatic and aromatic fractions (up to aliphatic EC>12-16 and aromatic EC>10-12.

4 Background exposure represents a significant proportion of the total exposure for all fractions expect aromatic fractions EC>5-7 and EC>7-8 in all land uses.

Notes for SGVs

1 Based on a sandy loam as defined in Environment Agency (2009b) and 6% SOM. At a lower SOM, SGVs may not be sufficient protective.
2 Generic assessment criteria will vary according to SOM for all land uses.
3 SGVs assume that free phase contamination is not present.
4 SGVs based on a sub-surface soil to indoor air correction air correction factor of 10.
5 SGV presented for Toluene Commercial based on the vapour saturation limit.
6 SGV presented for Ethylbenzene Allotment and Xylene Allotment - in applying the rules for non-soil background, the inhalation background ADE is limited to being no larger than the contribution of the inhalation soil ADE.
7 Exposure of all isomers of xylene should be considered together, because the HCV applied is based on intake of total xylene and not an individual isomer in isolation.

Notes for EIC/AGS/CL:AIRE Generic Assessment Criteria

1 GAC have been derived for 4 generic land uses; residential with consumption of homegrown produce, residential without consumption of homegrown produce, allotments and commercial land-use.

POLYAROMATIC HYDROCARBONS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria for Polycyclic Aromatic Hydrocarbons will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	LQM/CIEH						C4SL					
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**
Acenaphthene (1% SOM)	210	3000 (57)	34	84000 (57)	15000	29000						
Acenaphthene (2.5% SOM)	510	4700 (141)	85	97000 (141)	15000	30000						
Acenaphthene (6% SOM)	1100	6000 (336)	200	100000	15000	30000						
Acenaphthylene (1% SOM)	170	2900 (86.1)	28	83000 (86.1)	15000	29000						
Acenaphthylene (2.5% SOM)	420	4600 (212)	69	97000 (212)	15000	30000						
Acenaphthylene (6% SOM)	920	6000 (506)	160	100000	15000	30000						
Anthracene (1% SOM)	2400	31000 (1.17)	380	520000	74000	150000						
Anthracene (2.5% SOM)	5400	35000	950	540000	74000	150000						
Anthracene (6% SOM)	11000	37000	2200	540000	74000	150000						
Benz(a)anthracene (1% SOM)	7.2	11	2.9	170	29	49						
Benz(a)anthracene (2.5% SOM)	11	14	6.5	170	29	56						
Benz(a)anthracene (6% SOM)	13	15	13	180	29	62						
Benzo(a)pyrene (1% SOM)	2.2	3.2	0.97	35	5.7	11						
Benzo(a)pyrene (2.5% SOM)	2.7	3.2	2.0	35	5.7	12						
Benzo(a)pyrene (6% SOM)	3.0	3.2	3.5	36	5.7	13	5.0	5.3	5.7	77	10	21
Benzo(b)fluoranthene (1% SOM)	2.6	3.9	0.99	44	7.1	13						
Benzo(b)fluoranthene (2.5% SOI	3.3	4.0	2.1	44	7.2	15						
Benzo(b)fluoranthene (6% SOM)	3.7	4.0	3.9	45	7.2	16						
Benzo(ghi)perylene (1% SOM)	320	360	290	3900	640	1400						
Benzo(ghi)perylene (2.5% SOM)	340	360	470	4000	640	1500						
Benzo(ghi)perylene (6% SOM)	350	360	640	4000	640	1600						
Benzo(k)fluoranthene (1% SOM)	77	110	37	1200	190	370						
Benzo(k)fluoranthene (2.5% SOI	93	110	75	1200	190	410						
Benzo(k)fluoranthene (6% SOM)	100	110	130	1200	190	440						
Chrysene (1% SOM)	15	30	4.1	350	57	93						
Chrysene (2.5% SOM)	22	31	9.4	350	57	110						
Chrysene (6% SOM)	27	32	19	350	57	120						
Dibenzo(ah)anthracene (1% SOI	0.24	0.31	0.14	3.5	0.57	1.1						
Dibenzo(ah)anthracene (2.5% S	0.28	0.32	0.27	3.6	0.57	1.3						
Dibenzo(ah)anthracene (6% SOI	0.3	0.32	0.43	3.6	0.58	1.4						
Fluoranthene (1% SOM)	280	1500	52	23000	3100	6300						
Fluoranthene (2.5% SOM)	560	1600	130	23000	3100	6300						
Fluoranthene (6% SOM)	890	1600	290	23000	3100	6400						
Fluorene (1% SOM)	170	2800 (30.9)	27	63000 (30.9)	9900	20000						
Fluorene (2.5% SOM)	400	3800 (76.5)	67	68000	9900	20000						
Fluorene (6% SOM)	860	4500 (183)	160	71000	9900	20000						
Indeno(123cd)pyrene (1% SOM)	27	45	9.5	500	82	150						
Indeno(123cd)pyrene (2.5% SOI	36	46	21	510	82	170						
Indeno(123cd)pyrene (6% SOM)	41	46	39	510	82	180						
Naphthalene (1% SOM)	2.3	2.3	4.1	190 (76.4)	4900	1200 (76.4)						
Naphthalene (2.5% SOM)	5.6	5.6	10	460 (183)	4900	1900 (183)						
Naphthalene (6% SOM)	13	13	24	1100 (432)	4900	3000						
Phenanthrene (1% SOM)	95	1300 (36)	15	22000	3100	6200						
Phenanthrene (2.5% SOM)	220	1500	38	22000	3100	6200						
Phenanthrene (6% SOM)	440	1500	90	22000	3100	6300						
Pyrene (1% SOM)	620	3700	110	54000	7400	15000						
Pyrene (2.5% SOM)	1200	3800	270	54000	7400	15000						
Pyrene (6% SOM)	2000	3800	620	54000	7400	15000						
Coal Tar (BaP as surrogate marl	0.79	1.2	0.32	15	2.2	4.4						
Coal Tar (BaP as surrogate marl	0.98	1.2	0.67	15	2.2	4.7						
Coal Tar (BaP as surrogate marl	1.1	1.2	1.2	15	2.2	4.9						

CHLOROALCANES AND ALKANES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
1,1-Dichloroethane (1% SOM)							2.4	2.5	9.2	280
1,1-Dichloroethane (2.5% SOM)							3.9	4.1	17	450
1,1-Dichloroethane (6% SOM)							7.4	7.7	35	850
1,2-Dichloroethane (1% SOM)	0.0071	0.0092	0.0046	0.67	29	21				
1,2-Dichloroethane (2.5% SOM)	0.011	0.013	0.0083	0.97	29	24				
1,2-Dichloroethane (6% SOM)	0.019	0.023	0.016	1.7	29	28				
1,1,1-Trichloroethane (1% SOM)	8.8	9	48	660	140000	57000 (1425)				
1,1,1-Trichloroethane (2.5% SOI	18	18	110	1300	140000	76000 (2915)				
1,1,1-Trichloroethane (6% SOM)	39	40	240	3000	140000	100000 (6392)				
1,1,2-Trichloroethane (1% SOM)							0.6	0.88	0.28	94
1,1,2-Trichloroethane (2.5% SOM)							1.2	1.8	0.61	190
1,1,2-Trichloroethane (6% SOM)							2.7	3.9	1.4	400
1,1,1,2-Tetrachloroethane (1% S	1.2	1.5	0.79	110	1400	1500				
1,1,1,2-Tetrachloroethane (2.5%	2.8	3.5	1.9	250	1400	1800				
1,1,1,2-Tetrachloroethane (6% S	6.4	8.2	4.4	560	1400	2100				
1,1,2,2-Tetrachloroethane (1%SI	1.6	3.9	0.41	270	1400	1800				
1,1,2,2-Tetrachloroethane (2.5%	3.4	8.0	0.89	550	1400	2100				
1,1,2,2-Tetrachloroethane (6%SI	7.5	17	2.0	1100	1400	2300				
1,1-Dichloroethene (1% SOM)							0.23	0.23	2.8	26
1,1-Dichloroethene (2.5% SOM)							0.40	0.41	5.6	46
1,1-Dichloroethene (6% SOM)							0.82	0.82	12	92
Tetrachloroethene (1% SOM)	0.18	0.18	0.65	19	1400	810 (424)				
Tetrachloroethene (2.5% SOM)	0.39	0.40	1.5	42	1400	1100 (951)				
Tetrachloroethene (6% SOM)	0.9	0.92	3.6	95	1400	1500				
Tetrachloromethane (1% SOM)	0.026	0.026	0.45	2.9	890	190				
Tetrachloromethane (2.5% SOM	0.056	0.056	1.0	6.3	920	270				
Tetrachloromethane (6% SOM)	0.13	0.13	2.4	14	950	400				
Trichloroethene (1% SOM)	0.016	0.017	0.041	1.2	120	70				
Trichloroethene (2.5% SOM)	0.034	0.036	0.091	2.6	120	91				
Trichloroethene (6% SOM)	0.075	0.080	0.21	5.7	120	120				
Trichloromethane (1% SOM)	0.91	1.2	0.42	99	2500	2600				
Trichloromethane (2.5% SOM)	1.7	2.1	0.83	170	2500	2800				
Trichloromethane (6% SOM)	3.4	4.3	1.7	350	2500	3100				
Vinyl Chloride (1% SOM)	0.00064	0.00077	0.00055	0.059	3.5	4.8				
Vinyl Chloride (2.5% SOM)	0.00087	0.0010	0.0010	0.077	3.5	5.0				
Vinyl Chloride (6% SOM)	0.0014	0.0015	0.0018	0.12	3.5	5.4				
Chloroethane (1% SOM)							8.3	8.4	110	960
Chloroethane (2.5% SOM)							11	11	200	1300
Chloroethane (6% SOM)							18	18	380	2100
1,2-Dichloropropane (1% SOM)							0.024	0.024	0.62	3.3
1,2-Dichloropropane (2.5% SOM)							0.042	0.042	1.2	5.9
1,2-Dichloropropane (6% SOM)							0.084	0.085	2.6	12
2-Chloronaphthalene (1% SOM)							3.7	3.8	40	390
2-Chloronaphthalene (2.5% SOM)							9.2	9.3	98	960
2-Chloronaphthalene (6% SOM)							22	22	230	2200
Bromodichloromethane (1% SOM)							0.016	0.019	0.016	2.1
Bromodichloromethane (2.5% SOM)							0.030	0.034	0.032	3.7
Bromodichloromethane (6% SOM)							0.061	0.07	0.068	7.6
Chloromethane (1% SOM)							0.0083	0.0085	0.066	1
Chloromethane (2.5% SOM)							0.0098	0.0099	0.13	1.2
Chloromethane (6% SOM)							18	18	380	2100

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
cis -1,2 Dichloroethene (2.5% SOM)							0.19	0.20	0.50	24
cis -1,2 Dichloroethene (6% SOM)							0.37	0.39	1.0	47
trans -1,2 Dichloroethene (1% SOM)							0.19	0.19	0.93	22
trans -1,2 Dichloroethene (2.5% SOM)							0.34	0.35	1.9	40
trans -1,2 Dichloroethene (6% SOM)							0.70	0.71	4.0	81
Dichloromethane (1% SOM)							0.58	2.1	0.1	270
Dichloromethane (2.5% SOM)							0.98	2.8	0.19	360
Dichloromethane (6% SOM)							1.7	4.5	0.34	560
Hexachloroethane (1% SOM)							0.2	0.22	0.27	22
Hexachloroethane (2.5% SOM)							0.48	0.54	0.67	53
Hexachloroethane (6% SOM)							1.1	1.3	1.6	120

Notes for EIC/AGS/CL:AIRE Generic Assessment Criteria

1 GAC have been derived for 4 generic land uses; residential with consumption of homegrown produce, residential without consumption of homegrown produce, allotments and commercial land-use.

EXPLOSIVES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL					
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**
RDX (1% SOM)	120	13000	17	210000	210000	210000
RDX (2.5% SOM)	250	13000	38	210000	26000	49000 (18.7)
RDX (6% SOM)	540	13000	85.0	210000	27000	53000
HMX (1% SOM)	5.7	6700	0.86	110000	13000	23000 (0.35)
HMX (2.5% SOM)	13	6700	1.9	110000	13000	23000 (0.39)
HMX (6% SOM)	26	6700	3.9	110000	13000	24000 (0.48)

PESTICIDES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

Compound	S4UL Residential with home grown produce	Residential without home grown produce	Allotment	Commercial	POSresi	POSpark
Aldrin (1% SOM)	5.7	7.3	3.2	170	18	30
Aldrin (2.5% SOM)	6.6	7.4	6.1	170	18	31
Aldrin (6% SOM)	7.1	7.5	9.6	170	18	31
Dieldrin (1% SOM)	0.97	7	0.17	170	18	30
Dieldrin (2.5% SOM)	2	7.3	0.41	170	18	30
Dieldrin (6% SOM)	3.5	7.4	0.96	170	18	31
Atrazine (1% SOM)	3.3	610	0.5	9300	1200	2300
Atrazine (2.5% SOM)	7.6	620	1.2	9400	1200	2400
Atrazine (6% SOM)	17.4	620	2.7	9400	1200	2400
Dichlorovos (1% SOM)	0.032	6.4	0.0049	140	16	26
Dichlorovos (2.5% SOM)	0.066	6.5	0.010	140	16	26
Dichlorovos (6% SOM)	0.14	6.6	0.022	140	16	27
Alpha-Endosulfan (1% SOM)	7.4	160 (0.003)	1.2	5600 (0.003)	1200	2400
Alpha-Endosulfan (2.5% SOM)	18	280 (0.007)	2.9	7400 (0.007)	1200	2400
Alpha-Endosulfan (6% SOM)	41	410 (0.016)	6.8	8400 (0.016)	1200	2500
Beta-Endosulfan (1% SOM)	7	190 (0.00007)	1.1	6300 (0.00007)	1200	2400
Beta-Endosulfan (2.5% SOM)	17	320 (0.0002)	2.7	7800 (0.0002)	1200	2400
Beta-Endosulfan (6% SOM)	39	440 (0.0004)	6.4	8700	1200	2500
Alpha-Hexachlorocyclohexanes (	0.23	6.9	0.035	170	24	47
Alpha-Hexachlorocyclohexanes (	0.55	9.2	0.087	180	24	48
Alpha-Hexachlorocyclohexanes (	1.2	11	0.21	180	24	48
Beta-Hexachlorocyclohexanes (1	0.085	3.7	0.013	65	8.1	15
Beta-Hexachlorocyclohexanes (2	0.2	3.8	0.032	65	8.1	15
Beta-Hexachlorocyclohexanes (6	0.46	3.8	0.077	65	8.1	16
Gamma-Hexachlorocyclohexane	0.06	2.9	0.0092	67	8.2	14
Gamma-Hexachlorocyclohexane	0.14	3.3	0.023	69	8.2	15
Gamma-Hexachlorocyclohexane	0.33	3.5	0.054	70	8.2	15

CHLOROBENZENES & METHYLBENZENES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with homegrown produce**	**Residential without homegrown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Chlorobenzene (1% SOM)	0.46	0.46	5.9	56	11000	1300 (675)				
Chlorobenzene (2.5% SOM)	1.0	1.0	14	130	13000	2000 (1520)				
Chlorobenzene (6% SOM)	2.4	2.4	32	290	14000	2900				
1,2-Dichlorobenzene (1% SOM)	23	24	94	2000 (571)	90000	24000 (571)				
1,2-Dichlorobenzene (2.5% SOM	55	57	230	4800 (1370)	95000	36000 (1370)				
1,2-Dichlorobenzene (6% SOM)	130	130	540	11000 (3240)	98000	51000 (3270)				
1,3-Dichlorobenzene (1% SOM)	0.40	0.44	0.25	30	300	390				
1,3-Dichlorobenzene (2.5% SOM	1.0	1.1	0.6	73	300	440				
1,3-Dichlorobenzene (6% SOM)	2.3	2.5	1.5	170	300	470				
1,4-Dichlorobenzene (1% SOM)	61	61	15	4400 (224)	17000	36000 (224)				
1,4-Dichlorobenzene (2.5% SOM	150	150	37	10000 (540)	17000	36000 (540)				
1,4-Dichlorobenzene (6% SOM)	350	350	88	25000 (1280)	17000	36000 (1280)				
1,2,3-Trichlorobenzene (1% SOI	1.5	1.5	4.7	102	1800	770 (134)				
1,2,3-Trichlorobenzene (2.5% S(	3.6	3.7	12	250	1800	110 (330)				
1,2,3-Trichlorobenzene (6% SOI	8.6	8.8	28	590	1800	1600 (789)				
1,2,4-Trichlorobenzene (1% SOI	2.6	2.6	55	220	15000	1700 (318)				
1,2,4-Trichlorobenzene (2.5% S(	6.4	6.4	140	530	17000	2600 (786)				
1,2,4-Trichlorobenzene (6% SOI	15	15	320	1300	19000	400 (1880)				
1,3,5-Trichlorobenzene (1% SOI	0.33	0.33	4.7	23	1700	380 (36.7)				
1,3,5-Trichlorobenzene (2.5% S(	0.81	0.81	12	55	1700	580 (90.8)				
1,3,5-Trichlorobenzene (6% SOI	1.9	1.9	28	130	1800	860 (217)				
1,2,3,4-Tetrachlorobenzene (1%	15	24	4.4	1700 (122)	830	1500 (122)				
1,2,3,4-Tetrachlorobenzene (2.5	36	56	11	3080 (304)	830	1600				
1,2,3,4-Tetrachlorobenzene (6%	78	120	26	4400 (728)	830	1600				
1,2,3,5-Tetrachlorobenzene (1%	0.66	0.75	0.38	49 (39.4)	78	110 (39)				
1,2,3,5-Tetrachlorobenzene (2.5	1.6	1.9	0.90	120 (98.1)	79	120				
1,2,3,5-Tetrachlorobenzene (6%	3.7	4.3	2.2	240 (235)	79	130				
1,2,4,5-Tetrachlorobenzene (1%	0.33	0.73	0.06	42 (19.7)	13	25				
1,2,4,5-Tetrachlorobenzene (2.5	0.77	1.7	0.16	72 (49.1)	13	26				
1,2,4,5-Tetrachlorobenzene (6%	1.6	3.5	0.37	96	13	26				
Pentachlorobenzene (1% SOM)	5.8	19	1.2	640 (43.0)	100	190				
Pentachlorobenzene (2.5% SOM	12	30	3.1	770 (107)	100	190				
Pentachlorobenzene (6% SOM)	22	38	7.0	830	100	190				
Hexachlorobenzene (1% SOM)	1.8 (0.20)	4.1 (0.20)	0.47	110 (0.20)	16	30				
Hexachlorobenzene (2.5% SOM)	3.3 (0.50)	5.7 (0.50)	1.1	120	16	30				
Hexachlorobenzene (6% SOM)	4.9	6.7 (1.2)	2.5	120	16	30				
1,2,4-Trimethylbenzene (1% SOM)							0.35	0.41	0.38	42
1,2,4-Trimethylbenzene (2.5% SOM)							0.85	0.99	0.93	99
1,2,4-Trimethylbenzene (6% SOM)							2	2.3	2.2	220
Isopropyl benzene (1% SOM)							11	12	32	1400
Isopropyl benzene (2.5% SOM)							27	28	79	3300
Isopropyl benzene (6% SOM)							64	67	190	7700
Propylbenzene (1% SOM)							34	40	34	4100
Propylbenzene (2.5% SOM)							82	97	83	9700
Propylbenzene (6% SOM)							190	230	200	21000
Styrene (1% SOM)							8.1	35	1.6	3300
Styrene (2.5% SOM)							19	78	3.7	6500
Styrene (6% SOM)							43	170	8.7	11000

PHENOLS AND CHLOROPHENOLS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	LQM/CIEH						EA SGV			EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential**	**Allotment**	**Commercial**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**otm**	**Commercial**
Phenol (1% SOM)	120	440 (460)	23	440 (26000)	440 (10000)	440 (7600)							
Phenol (2.5% SOM)	200	690	42	690 (30000)	690 (10000)	690 (8300)							
Phenol (6% SOM)	380	1200	83	1300 (34000)	1300 (10000)	1300 (9300)	420	280	3200 (38000)				
Chlorophenol (1% SOM)	0.87	94	0.13	3500	620	1100							
Chlorophenol (2.5% SOM)	2.0	150	0.30	4000	620	1100							
Chlorophenol (6% SOM)	4.5	210	0.70	4300	620	1100							
Pentachlorophenol (1% SOM)	0.22	27 (16.7)	0.03	400	60	110							
Pentachlorophenol (2.5% SOM)	0.52	29	0.08	400	60	120							
Pentachlorophenol (6% SOM)	1.2	31	0.19	400	60	120							
2,4-Dimethylphenol (1% SOM)										19	210	3	16000
2,4-Dimethylphenol (2.5% SOM)										43	410	7	24000
2,4-Dimethylphenol (6%SOM)										97	730	17	30000
Total Cresols (2-Methylphenol, 3-methylphenol, 4-methylphenol) (1%SOM)										80	3700	12	160000
Total Cresols (2-Methylphenol, 3-methylphenol, 4-methylphenol) (2.5%SOM)										180	5400	27	180000
Total Cresols (2-Methylphenol, 3-methylphenol, 4-methylphenol) (6%SOM)										400	6900	63	180000

PHTHALATES

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	EIC/AGS/CL:AIRE			
Compound	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Bis (2-ethylhexyl) phthalate (1%	280	2700	47	85000
Bis (2-ethylhexyl) phthalate (2.5	610	2800	120	86000
Bis (2-ethylhexyl) phthalate (6%	1100	2800	280	86000
Butyl benzyl phthalate (1% SOM	1400	42000	220	940000
Butyl benzyl phthalate (2.5% SO	3300	44000	550	940000
Butyl benzyl phthalate (6% SOM	7200	44000	1300	950000
Diethyl Phthalate (1% SOM)	120	1800	19	1500000
Diethyl Phthalate (2.5% SOM)	260	3500	41	220000
Diethyl Phthalate (6% SOM)	570	6300	94	290000
Di-*n*-butyl phthalate (1% SOM)	13	450	2	15000
Di-*n*-butyl phthalate (2.5% SOM	31	450	5	15000
Di-*n*-butyl phthalate (6% SOM)	67	450	12	15000
Di-*n*-octyl phthalate (1% SOM)	2300	3400	940	89000
Di-*n*-octyl phthalate (2.5% SOM	2800	3400	2100	89000
Di-*n*-octyl phthalate (6% SOM)	3100	3400	3900	89000

OTHER ORGANICS

Based on sandy loam soil as defined in SR3 (Environment Agency, 2009) and 1%, 2.5% and 6% soil organic matter (SOM)
Generic assessment criteria will vary according to SOM for all land values
Values are expressed in mg/kg
GACs assume that free phase contamination is not present
GACs are based on sub-surface soil to indoor air correction factor of 1

	S4UL						EIC/AGS/CL:AIRE			
Compound	**Residential with home grown produce**	**Residential without home grown produce**	**Allotment**	**Commercial**	**POSresi**	**POSpark**	**Residential with consumption of homegrown produce**	**Residential without consumption of homegrown produce**	**Allotment**	**Commercial**
Carbon disulphide (1% SOM)	0.14	0.14	4.8	11	11000	1300				
Carbon disulphide (2.5% SOM)	0.29	0.29	10	22	11000	1900				
Carbon disulphide (6% SOM)	0.62	0.62	23	47	12000	2700				
Hexachloro-1,3-butadiene (1% S	0.29	0.32	0.25	31	25	48				
Hexachloro-1,3-butadiene (2.5%	0.70	0.78	0.61	66	25	50				
Hexachloro-1,3-butadiene (6% S	1.6	1.8	1.4	120	25	51				
Tributyl tin oxide (1% SOM)							0.25	1.4	0.042	130
Tributyl tin oxide (2.5% SOM)							0.59	3.1	0.1	180
Tributyl tin oxide (6% SOM)							1.3	5.7	0.24	200
Biphenyl (1% SOM)							66	220	14	18000
Biphenyl (2.5% SOM)							160	500	35	33000
Biphenyl (6% SOM)							360	980	83	48000
2,4-Dinitrotoluene (1% SOM)							1.5	170	0.22	3700
2,4-Dinitrotoluene (2.5% SOM)							3.2	170	0.49	3700
2,4-Dinitrotoluene (6% SOM)							7.2	170	1.1	3800
2,6-Dintrotoluene (1% SOM)							0.78	78	0.12	1900
2,6-Dintrotoluene (2.5% SOM)							1.7	84	0.27	1900
2,6-Dintrotoluene (6% SOM)							3.9	87	0.61	1900
Bromoform (1% SOM)							2.8	5.2	0.95	760
Bromoform (2.5% SOM)							5.9	11	2.1	1500
Bromoform (6% SOM)							13	23	4.6	3100

6. GEOENVIRONMENTAL RISK ASSESSMENT

6.1 **Potential Hazard Sources.** Ground contamination can occur through several causes, particularly from historical use of the site and is often linked to the processes of waste disposal, underground storage, open storage, process pipework, leaks, spillages, tanks, site filling and various other reasons. The contamination can either arise from site sources or be the result of migration from other sources off site.

6.2 **Potential Migratory Pathways.** The primary pathways are considered to be laterally or vertically downward through underlying strata or upward to the ground surface. Such pathways also provide the potential for contaminants to migrate towards local watercourses and groundwater.

6.3 **Potential Targets At Risk.** Potential environmental liabilities related to current legislation associated with contaminated land with regard to existing ownership and redevelopment are summarised.

The probability of a hazard, linked with its consequences, can be used to assess risk in accordance with the tables below for use in decision making.

Consequence of Pollution Linkage

Severe	Damage to human health. Substantial pollution of controlled waters. Significant change in ecosystem population. Irreparable damage to property.
Moderate	Non-permanent damage to human health. Minor pollution of controlled waters. Change in ecosystem. Damage to property.
Mild	Short term health effects. Slight pollution of controlled waters. Slight effect on ecosystem. Minor repairable damage to property.
Near Zero	No noticeable effect on human health. No significant pollution to controlled waters. No measurable effect on ecosystem densities. Non-structural cosmetic damage to property.

Decision Making

Probability of a hazard and an associated linkage	**Consequences of a pollution linkage (hazard-pathway-target)**			
	Severe	Moderate	Mild	Near Zero
High	High	High	Medium/low	Negligible
Medium	High	Medium	Low	Negligible
Low	High/medium	Medium/low	Low	Negligible
Unlikely	High/medium/low	Medium/low	Low	Negligible

Final overall risk is based on an assessment of probability of a hazard and its consequences. Risk categories are shown shaded in the table above and defined below.

Risk	**Description**
High	Site probably or certainly unsuitable for present use or environmental setting. Contamination probably or certainly present and likely to have an unacceptable impact on key targets. Urgent action needed.
Medium/ Moderate	Site may not be suitable for present use or environmental setting. Contamination may be present, and likely to have unacceptable impact on key targets. Action may be needed on the medium term.
Low	Site considered suitable for present use and environmental setting. Contamination may be present but unlikely to have unacceptable impacts on key targets. Action unlikely to be needed in present use.
Negligible	Site considered suitable for present use and environmental setting. Contamination may be present but unlikely to have unacceptable impacts on key targets. No action needed while site remains in present use.

The review of the information from the exploratory investigation may be such that a decision is made that there is no need for further investigation. Alternatively, it may be necessary to carry out a further main investigation.

The Environment Agency has set out guidance as to the classification of waste arising from construction sites in its document "The Definition of Waste" dated April 2006. This document outlines how waste is to be handled

The following activities are not regarded as a waste management activity requiring licencing.

1) Construction activities carried out for the purpose of producing a suitably engineered soil e.g. lime stabilisation, vibro-replacement and piling.

2) Uncontaminated materials produced on site (including excavated soils and materials from demolition) which can be reused without further treatment. Examples include site regrading and footing excavations.

   These must be done in accordance with the Planning Permission. Demolition material must be used in accordance with the quality protocols for the production of aggregates from inert waste, subject to appropriate testing and the lack of any harmful constituents. Uses include pipe bedding, backfill and sub-base.

3) Contaminated soils can be moved on-site providing they do not require treatment or containment. There should be no risk to the environment i.e. non-leachable and in accordance with Planning Permission. Relevant activities can include site regarding and use of materials below clean cover systems, capping, buildings and hardstanding.

Where contaminated materials have to be placed in an engineered cell to prevent pollution, then this would be classed as landfilling and require PPC permits. Any material taken off site is considered to be waste. However, this is under review. If material is waste, then there is a duty of care including ensuring material is transported by a registered carrier. The destination of material leaving the site should be regularly checked and Waste Transfer Notes kept.

Clean Cover Systems

According to the Environment Agency's Remediation Position Statements of May 2006, the placement of a cover system using "clean" material is not treatment of waste. Consequently, no licensing/permitting position statements are applicable to this type of remediation. If the cover system uses 'waste materials' in its construction, waste management licensing exemption paragraph 9A may be applicable to its installation. If the installation of the proposed cover system does not meet the criteria for registration of this exemption, the activity may be regulated through a waste management site license.

7. WASTE ACCEPTANCE CRITERIA (WAC)

The main objective of the Landfill Directive is to prevent or reduce as far as possible the negative effects of landfilling waste on the environment and on human health. It is intended to reduce the disposal of waste materials to landfills and to encourage more sustainable approaches to dealing with wastes. It bans the landfill of liquids and certain solid wastes, introduces requirements for the treatment of wastes prior to landfill and provides for the classification of landfills as sites for inert, hazardous or non-hazardous waste and prohibits co-disposal.

It sets out procedures for waste acceptance at landfills and the types of waste for each class of landfill as specified by Waste Acceptance Criteria (WAC). The WAC are predominantly lists of "limit values" for certain parameters obtained from standard leaching tests of wastes going to landfills. WAC are set out in the Landfill Directive itself. Full details can be found in the Environment Agency document "Waste Classification – Guidance on the classification and Assessment of Waste " Technical Guidance WM3 - 2015

8. MAIN REFERENCES

British Standards	BS3882: 2015 British Standard Specification for Topsoil BS5930: 2015+A1:2020 British Standard Code of Practice for Site Investigations BS8485: 2015 British Standard Code of Practice for the design and protective measures from methane and carbon dioxide ground gases for new buildings BS10175: 2011+A2:2017 British Standard Code of Practice for the Investigation of Potentially Contaminated Sites
BRE	Radon: Guidance on protective measures for new dwellings, BR211, 2015 Protective measures for housing on gas-contaminated land, BR414, 2015 Cover systems for land regeneration, 2004 Concrete in aggressive ground. Special Digest SD1, 3rd Edition, 2005 Soakaway Design (DG365)
CIEH	The LQM / CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd Edition)
CIRIA	Assessing risks posed by hazardous ground gases to buildings, CIRIA C665 Asbestos in Soil and Made Ground: a guide to understanding and managing risks, CIRIAC733, 2014 Good Practice on the testing and verification of protection systems for buildings against hazardous ground gases. C735:2014
CL:AIRE	Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, SP1010, 2013
DEFRA	Contaminated Land Report CLR 11, 2002 (7-10 withdrawn) R & D Publications TOX 1 – 12, 14, 16 – 25 R & D Publications SGV 1, 3, 4, 5, 7, 8, 9, 10, 15 and 16 (withdrawn) Improvements to Contaminated Land Guidance - "Outcome of the "Way Forward", 2008 Exercise on Soil Guideline Values. July 2008 Guidance on the Legal Definition of Contaminated Land. July 2008 Simplification of the Contaminated Land Regime Impact Assessment No: Defra 1133
DETR	Circular 02/2000. Contaminated Land, 2000 Guidelines for Environmental Risk Assessment and Management, 2000
Environment Agency	Guidance for the Safe Development of Housing on Land Affected by Contamination, 2000 Protective measures for housing on gas-contaminated land Remediation Position Statements, May 2006 Guidance and monitoring of landfill leachate, groundwater and surface water Human health toxicological assessment of contaminants in soil (Science Report SC050021/SR2) 2008 Updated technical background in the CLEA model (Science Report SC0520021/SR3) Waste Classification – Guidance on the classification and Assessment of Waste - Technical Guidance WM3 (2015) Contaminated Land Risk Management (2021)
HMSO	Part 2A of the Environmental Protection Act Part 2A Statutory Guidance – April 2012 Contaminated Land (England) Regulations 2006 The Contaminated Land (England) (Amendment) Regulations 2012 The Water Act 2003 (Commencement No. 11) Order 2012
Institution of Civil Engineers	Contaminated Land: Investigation, Assessment and Remediation, 2nd Edition
NHBC	Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present, 2007

This list is not intended to be exhaustive.