OBSIDIAN ENVIRONMENTAL
Geotechnical, Environmental, & Waste Management Consultants

Report Ref: **OE/1702/1057/R3**	Date: **February 2024**
Project **22a & 22b, Alexander Road, Frampton Cotteril, South Glouc. BS36 2PZ** **Preliminary Phase II Geoenvironmental Assessment Report**	
Client: **White Horse Homes Limited**	

ISO 9001 QUALITY MANAGEMENT
ISO 14001 ENVIRONMENTAL MANAGEMENT
ISO 45001 HEALTH & SAFETY MANAGEMENT

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22a & 22b, Alexander Road, Frampton Cotteril, South Glouc. BS36 2PZ **Preliminary Phase II Geoenvironmental Assessment Report**

Issue Number	Status	Description of Amendments
Rev0	**Final**	N/A

Report prepared by:	
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EXECUTIVE SUMMARY

SITE INFORMATION & SETTING	
Report Purpose	This report Phase II Geoenvironmental Assessment, and the previous Phase I Report has been completed by Obsidian Environmental Ltd
Client	This report has been provided for White Horse Homes Limited, 67 Cleeve Hill, Downend, Bristol, BS16 6EU.
Site Name & Location	22a & 22b, Alexander Road, Frampton Cotteril, South Gloucestershire, BS36 2PZ.
Proposed Development	The proposed residential development is for six two-storey detached houses.

PHASE I SUMMARY REVIEW	
Third Parties – Coal Authorities-Groundsure	In 2023 a Coal Authority Report and Coal Mining Risk Assessment was completed. Groundsure information was reviewed in January 2024.
Historical setting of the site	The site was undeveloped remaining a field between the 1870s up until the early 2000s. There was significant mining activity detailed on the Groundsure historical maps for outside the site up until the early 1990s. There does not appear to be any significant risk of off-site contamination migrating to the site.
Coal Authority	It was advised that there was a risk of unrecorded shallow mining beneath the site in the Coal Authority Report. An application for a Permit to undertake intrusive drilling at the site, and Permit 27136 was issued for three open rotary boreholes to circa 30.0m bgl.

PHASE II GEOENVIRONMENTAL ASSESSMENT PHASE I AREA	
PHASE II GROUND INVESTIGATION	
Obsidian Ground Investigation	Five Window Sample holes (WS1 to WS5 inclusive) were drilled across the site; with three boreholes WS1, WS3 & WS4) installed with ground gas and groundwater monitoring points. SPTs were completed at various depths within each borehole. Three rotary open holes were drilled to intercept shallow mining conditions if present on the site between 22.0 and 32.0m bgl.
Ground Conditions Encountered	At the entrance to the site there is tarmac surfacing up to the first static caravan. There is a small area of lawn/topsoil at the rear of the second static caravan in the southern area of the site. Between such finishes there is general rock fill. Beneath the three finishes there is a clay type fill to maximum depths of 0.3 to 1.0m bgl. This is underlain by a Natural CLAY, soft to firm with depth to 3.0m bgl. There is within the CLAY two discrete coal seams at 0.5 to 0.6 and 0.85 to 0.9m bgl. The CLAY rests upon a weathered MUDSTONE, where SPT met refusal with resultant N values of 50+. The MUDSTONE bedrock was proven to 22.0m (RBH1) and 32.0m bgl at RBH2 and RBH3.
Groundwater Encountered	Groundwater was not found in any of the Window Sample or rotary boreholes during the drilling works. Groundwater was measured in all three monitoring locations on the initial ground gas monitoring event in January 2024 between 0.75 and 1.25m bgl.
Ground Gas Installations	Three of the Window Sample boreholes (WS1, WS3 and WS4) were installed with ground gas and groundwater monitoring points. Ground gas monitoring – a minimum of four rounds is proposed, with at least one measurement on a falling pressure when Atmospheric Pressure (AP) is at or below 1000mbars. The results of the ground gas measurements and assessment will be issued as an addendum to this Phase II report. The initial round of gas measurements was taken when Atmospheric Pressure was at 1030mbars. Maximum value of methane of 0%, with CO2 at 1.2%, with associated low flows.

PHASE III GEO-ENVIRONMENTAL ASSESSMENT & CONCLUSIONS	
Conclusions of Contamination Assessment Generic Risk Assessment	***Assessment of Results – Heavy Metals –*** There are elevated heavy metal results above the maximum allowable levels for Residential – with plant uptake. The elevated heavy metals were detailed as Cadmium at WS1A and WS5A within the Made Ground. Similarly, Copper at WS1A, and Lead at WS1A and WS5A ***Assessment of results - Speciated Petroleum Hydrocarbons (TPH)*** – The results do not detail any elevated speciated TPH results above the maximum allowable levels for Residential – with plant uptake. ***Assessment of results – Speciated Polycyclic Aromatic Hydrocarbons (PAH) -*** There were no elevated speciated PAH in any of the samples. ***Asbestos screen*** – All samples were tested for the presence of Asbestos fibres, but none were found..
Guidance on Ground Gas Protection	From a single round (R1) of the ground gas measurements at the site methane and carbon dioxide are very low, with low flows, when atmospheric pressure was above 1000mbars. However, atmospheric pressure on the day of the measurements was influenced by a high pressure event (1030mb). Radon gas is reported between 1% and 5% to 12% across the site.
Proposed Mitigation Measures	Based on the results from the initial round of ground gas monitoring, radon gas and ground gas mitigation measures should be assumed pending the completion of all of the gas monitoring events for the new structures at the site.

PHASE II GEOTECHNICAL CONCLUSIONS	
Obstructions	There were no obstructions noted during the Phase II cable percussive borings and/or rotary drilling works.
Groundworks & Earthworks	Excavations to 3.0m depth should be suitable with conventional soil excavating machinery. Spoil resulting from excavations in the Made Ground and natural CLAYS and GRAVELS will not generally be suitable for reuse as structural fill and is likely to have to be relocated/recovered or disposed off-site at a suitable licensed landfill. It is unlikely that shallow excavations will encounter groundwater, possibly only that found as perched waters on top of the Natural CLAY beneath the Made Ground..
Mine Workings	Former mine workings were found present beneath the site but not in close proximity to the surface. This was established from rotary open hole drilling to between 22.0 to 32.0m across the site – in compliance with the Permit issued by the Coal Authority. Additional drill and grouting are not required at the site.
Foundations	All foundations should be built directly off the weathered/MUDSTONE bedrock by the use of trench fill due to the variable depth of soft stratum – 1.6 to 3.0m bgl.
Ground Floor Slabs	All ground floor slabs should be supported on suitable reinforced concrete ground beams spanning between brickwork built off deep trench fill foundations. A void should be constructed directly beneath the floor slab as part of the required ground gas and Radon Gas membrane requirements.
SUDS - Soakaways	In-situ percolation tests were completed at the site due by a third party and hence, is not reported.
Buried Concrete	There does not appear to be any special requirements for concrete below ground (foundations etc.) within onsite soils – as per an assessment to BRE Special Digest 1. The soils across the site, including the existing Made Ground, have a Design Sulphate Class of AS1 and an ACEC class of DC-1 as outlined in *BRE Special Digest 1:2005.*
Waste Management	Any excavated Made Ground soils removed from the site from the designated Hot Spots, may be considered as Hazardous and should possibly be relocated within a licensed landfill. Copies of all Duty of Care Consignment Notes should be collated within the Site File in accordance with the CDM Regulations 2015.
Invasive Species	Invasive species such as Japanese Knotweed (JKW) and other invasive weeds were not noted during a site inspection during the Phase I and II Assessment Works.
Influence of Trees – Desiccation of Clays	There were no semi-mature or mature trees on the current site prior to the proposed site clearance.
Final Conceptual Model	There do not appear to be significant risk to the proposed development, particularly after the proposed Remediation Strategy is completed.

REMEDIAL STRATEGY	
Remedial Strategy	Detailed below is a list of the main requirements within the proposed Remedial Strategy: RS.1 At locations WS1 and WS5 treat as hot spots – excavate to a minimum of 1.0m bgl within the Made Ground at the two known locations (Hot Spots – WS1 and WS5) at a diameter of 2.0m and relocation off site at a licensed recovery facility. Backfill with clean

	imported crushed material. Samples should be taken at the sides and base of the excavations for verification chemical testing. RS.2 Excavate and remove all tarmac materials separately and relocate to a recycling facility for recovery and reuse. RS.3 Remove all rockfill currently across areas, as required for the construction works at the site for reuse as hardcore materials on or off site. R.4 Import clean topsoil and subsoils to rear gardens to make up for the loss of the original rock fill. R.5 A record of all excavated materials removed off site and all imported materials imported to the site in respect to on-site ground works should be kept and controlled by suitable Duty of Care tickets.

FUTURE CONSIDERATIONS	
Uncertainties & Limitations	Obsidian Environmental Ltd (Obsidian) has prepared this report in accordance with the instruction from White Horse Homes Limited). Obsidian shall not be responsible for any use of this report or its contents for any other purpose other than that for which it was prepared and provided.
Recommendations	R.1 The proposed Remedial Strategy, detailed in Section 9.0 should be adopted. R.2 This report should be issued to the South Gloucestershire Planning Authority to allow the Discharge of all relevant Planning Conditions.
Further Works	Ground gas assessment to be completed as an addendum report to be issued at a later date. Verification and Validation reports will be required as part of the proposed Remedial Strategy; to allow full discharge of the associated geoenvironmental planning Conditions.

1.0 INTRODUCTION

1.1 Instruction

Obsidian Environmental Ltd (The Foundry Business Centre, Marcus Street, Birkenhead, Wirral, CH41 1EU) was commissioned by White Horse Homes Ltd (67, Cleeve Hill, Downend, Bristol, BS16 6EU.) to undertake a Phase II Geoenvironmental Assessment on a site known as 22a & 22b Alexander Road, Frampton Cotteril, South Gloucestershire, BS36 2PZ.

1.2 Scope of Works

The objectives of the investigation were to determine the sub-surface conditions in respect of:

- Foundations for proposed structures.
- Design guidance for access road and car park construction.
- Foundations for boundary retaining walls.
- Contamination assessment to consider potential significant pollutant linkages arising from the historic site use
- Gas monitoring to consider risk of gas migration from landfills in the adjacent area.
- Radon Gas
- Invasive species
- Shallow coal mining investigation/assessment

1.3 Limitations

All information, comments and opinions given in this report are based on the ground conditions encountered during the site work and on the results of laboratory and field tests performed during the investigation. However, subsoils are inherently variable and hidden from view such that no investigation can be exhaustive to the extent that all soil conditions are revealed. Conditions may therefore be present beneath the site that were not apparent in the data reviewed as part of this assessment. In particular, it should be noted that groundwater levels vary due to seasonal and other effects and may at times differ to those measured during the investigation.

Similarly, this assessment has been based to a large extent on third party data acquired from Landmark and the Local Authority. This data has been taken at face value and has not been subjected to any third party validation.

2.0 PHASE 1 REVIEW

2.1 Introduction

A Phase I Geoenvironmental Assessment of the site at Alexander Road prior to the commencement of the intrusive site investigation works was completed as detailed below:

Phase I Geoenvironmental Assessment Report – completed by Obsidian Environmental Ltd - Ref: OE/1702/1057/R3, dated January 2024.

The main aspects established during the Desk Study are summarised in Sections 2.2 to 2.5 below.

2.2 Site Location and Description

The site is located near to the centre of the village of Frampton Cotteril at approximate National Grid Reference 367732E, 181374N. A site location plan is presented as Figure OE/1702/1057/R1/F01. It is regular in shape (rectangular) and covers an area of approximately 0.11ha. The site slopes circa 0.5m, falling from south to the north of the site.

The site is surfaced with initially tarmac surfacing, but predominantly rock fill – Mot Type 1 sub-base, with a small area of lawn at the southern area of the site. It is the location for two static caravans (Nos. 22a & 22b) – both occupied during intrusive site investigations (December 2023 and January 2024). There were several vehicles (cars, vans, and trailers) parked on the site. The site is bounded to the north and east by immediately adjacent residential development. To the west is Aleander Road, and to the south by a public footpath. Beyond both the road and footpath is further residential development.

2.3 Geology

Superficial Geology defined as Alluvium – clay, silt, sand, and gravel.

Bedrock geology at 1:10,000 scale. The main mass of rocks beneath superficial deposits are defined as the Farrington Member And Barren Red Member (undifferentiated) – MUDSTONE - Westphalian D Sub-age. At 23.0m from the site bedrock is defined as SANDSTONE.

2.4 Hydrology and Hydrogeology

There are no surface water features in close proximity to the site. Hence the potential risk to offsite surface water receptors is deemed to be low.

Guidance from the Environment Agency indicates that the Bedrock aquifer is designated as 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. As such the site sensitivity is regarded as medium. Summary Classification: Secondary bedrock aquifer - Medium Vulnerability, Combined classification: Productive Bedrock Aquifer, No Superficial Aquifer. This designation may locally result in low sensitivity due to the potential presence of former coal mining and related activities below the site.

2.5 Site History

Historical maps of the site area (1870`s to 2023) have been obtained via Groundsure. The site was shown as an open field between 1882 to circa 2000 until recent times. It is now occupied by two static caravans and several vehicles. The surrounding areas to the site were noted to be for coal mining related works, shafts, coal pits, and lime kilns. Residential development was expanding from the 1870s, with Alexander Road first noted on the1965 map. All details of coal mining activities were removed from the maps by the 1992 map.

3,0 SITE INVESTIGATION

3.0 General

An intrusive site investigation, using window sampler techniques and rotary open hole boreholes (shallow mining assessment), were completed at the site. In-situ SPT testing was conducted within the window sampling boreholes. A plan showing the exploratory hole locations is presented as OE/1702/1057/R3/F01 – see Figures.

3.1 Window Sampling

Five window samples, designated WS1 to WS5 inclusive, were advanced to depths between 1.6m and 3.0m below ground level (bgl) using a tracked Terrier Drilling rig on 19 December 2023 – see Appendix A – Site Investigation Photofile.

The window samples retrieved continuous soil samples from the hole which were logged by an onsite engineer. In addition, Standard Penetration Tests (SPT) were taken at regular intervals to provide an indication of the strength profile of the underlying strata. Representative samples were taken for geotechnical and chemical analysis.

On completion, two of the boreholes were backfilled with drilling arisings/cement bentonite grout. On completion, the remaining three boreholes (WS1, WS3 and WS4), were fitted with gas and groundwater monitoring standpipes. The standpipes comprised 50mm diameter UPVC riser pipe with screw connectors. The lower part is slotted to allow the free ingress of water and gas. The annulus between the riser pipe and the borehole wall was filled with pea gravel. The remaining annulus was filled with a cement bentonite grout and a lockable stopcock cover was installed at ground level.

Detailed log sheets of the window sample boreholes and a plot of SPT 'N' values with depth are collated within Appendix B.

3.2 Rotary open hole drilling

Three boreholes were drilled, under Permit No. 27136 (copy attached in Appendix A), issued by the Coal Authority on 07 August 2023, in accordance with the recommendations of the Planning Permission and Coal Authority Report. Three holes were required to be drilled to investigate if the site was underlain with any unrecorded shallow voids/worked coal seams.

Three rotary open hole boreholes, designated RBH1, RBH2 and RBH3, were advanced to depths of between 22m and 32m bgl using a Beretta rotary drilling rig. The rotary open hole boreholes were advanced into the bedrock between 11 and 12 January 2024.

On completion, the holes were backfilled with drilling arisings/cement bentonite grout.

Detailed log sheets of the rotary percussive boreholes are included in Appendix C.

3.3 Sample Collection and Testing Schedules

Environmental sample collection was conducted in accordance with Obsidian Environmental Standard Operating Procedures and BS EN ISO 22475-1:2006.

All soil samples were collected using either clean stainless steel utensils or clean disposable gloves and placed directly into clean containers provided by the laboratory. Samples obtained during the investigation were subjected to a range of geotechnical and geochemical and physical testing at appropriate UKAS accredited laboratories.

Samples were submitted for geotechnical laboratory testing to characterise the engineering properties of the soil. The following testing was scheduled:

- Classification tests (Atterberg Limits)

Testing was conducted in accordance with the procedures outlined in BS EN ISO 14688-1:2002, 14688-2:2004 and 14689-1:2003. Geotechnical laboratory test data is presented in Appendix D.

Soil samples were sent for chemical analysis to Envirolab laboratories (Greater Manchester)to be analysed for:

- General indicator suite comprising arsenic, boron (water soluble), cadmium, copper, chromium, lead, mercury, nickel, selenium, zinc, total cyanide, free cyanide, phenols, , total sulphur, sulphide, total sulphur, thiocyanate.
- Speciated Total Petroleum Hydrocarbons (TPH by GRO/EPH includes BTEX/MTBE).
- Speciated Poly Cyclic Aromatic Hydrocarbons (PAH)
- pH, acid soluble sulphate, soluble sulphate, and total sulphur content in accordance with BRE 1 Special Digest on concrete in aggressive ground conditions.
- Mineral Oil.
- Asbestos screen

The chemical laboratory test results are presented in Appendix E.

4.0 GROUND CONDITIONS

4.1 General

The following table (Table 4.1) provides a summary of the strata encountered within the Window Sample boreholes and the depth to the base of each stratum in metres as encountered.

Table 4.1 – Typical Strata,

Depth (m)	Typical Strata
0.0 to 0.3/1.0	Made Ground
0.3/1.0 to 1.6/3.0	Natural soft CLAY
0.5/0.6 & 0.85/0.9	Coal Deposits
1.6/3.0 to 3.9	Weathered MUDSTONE
1.6/3.9 to 32.0	Weak MUDSTONE bedrock

Groundwater was not encountered during the investigation.

4.2 Strata Encountered

Made Ground
The northern area of the site has a surfacing of tarmac and crushed rock fill (MOT Type I sub-base), with the central area covered in MOT Type I sub-base. There is a strip of lawn (turf and topsoil) at the southern area of the site. The Made Ground (MG) extends between 0.3 and 1.0m bgl. Below the rock fill where the MG is greater than 0.3m is general clay fill with fragments of brick and concrete.

Natural soft & soft to firm CLAY
Beneath the MG is a Natural stratum of orange, soft to firm, slightly silty, slightly gravelly CLAY.

Coal Deposits
Within window sample borehole WS2, between 0.5 and 0.6m bgl, and WS4 at 0.85 and 0.9m bgl are intact Coal deposit.

Weathered MUDSTONE
Below the CLAY the window sample drill refused at a competent weathered MUDSTONE. Borehole Logs are presented in Appendix A. The results of the SPTs are marked on the logs.

MUDSTONE bedrock
Below the CLAY, weathered/MUDSTONE bedrock with interbedded SANDSTONE was intercepted to the depths of the bore holes – between 22.0 bgl (RBH1) and 32.0m bgl (RBH2 and RBH3).

Groundwater
Groundwater was not found in any of the Window Sample boreholes on the day of the drilling works. Groundwater was measured in all three monitoring locations on the initial ground gas monitoring event in January 2024 between 0.75 and 1.25m bgl. There were no reported water strikes recorded during the open hole rotary drilling works.

4.3 Shallow Mining Drilling

Detailed below in Table 4.2 is a summary of the findings of the rotary drilling works, completed in accordance with the agreed Coal Mining Risk Assessment and Methodology, Ref OE/1702/1057/R1, dated June 2023. Following the submission of this document and an on-line application for a drilling permit - Permit 27136 - was granted - as detailed above. The positions of the completed window sample and rotary boreholes are detailed on Figure OE/1702/1057/R3/F01. A copy of the rotary borehole logs for RBH1, RBH2 and RBH3 are collated within Appendix C.

Table 4.2 – Summary of open hole rotary drilling works

Location	Depth of Stratum encountered (m bgl)	Description of Statum
RBH1	0.0 to 1.7 1.7 to 16.0 16.0 to 16.6 16.6 to 17.1 17.1 to 22.0	Fill – Made Ground MUDSTONE/SANDSTONE Bands Void Backfill – Made Ground MUDSTONE/SANDSTONE Bands – end of borehole
RBH2	0.0 to 0.7 0.7 to 2.6 2.6 to 19.8 19.8 to 20.2 20.2 to 32.0	Fill – Made Ground Natural CLAY MUDSTONE/SANDSTONE Bands Coal seam - unworked MUDSTONE/SANDSTONE Bands – end of borehole
RBH	1.0 to 1.7 1.7 to 2.4 2.4 to 2.7 2.7 to 20.0 20.0 to 20.5 20.5 to 32.0	Fill – Made Ground Natural CLAY Coal seam - unworked MUDSTONE/SANDSTONE Bands Coal seam - unworked MUDSTONE/SANDSTONE Bands – end of borehole

Comments

Location RBH1 – The Made Ground and Superficial deposits were circa 1.7m deep. There was then 14.3m of intact MUDSTONE/SANDSTONE interbedded bands. There was then a void – presumed worked coal of 0.6m and thence a further 0.5 m of backfilled void assumed also to be the same worked coal seam. The drillers considered that some or all of the void could have occurred during the drill passing through the worked seam – within backfilled material. At 22.0m bgl the drill bit became intermittently stuck (30.0 minutes), preventing further progress and it was agreed to abandon drilling at that location.

Location RBH2 – The Made Ground and Superficial deposits were circa 2.6m bgl. Below this was 17.2m of intact MUDSTONE with SANDSTONE interbedded bands before an unworked coal seam was intercepted at 19.8m bgl – 0.4m thick. As the borehole was progressed, it went back into intact MUDSTONE with SANDSTONE interbedded bands to 32.0m bgl – termination of borehole. It should be noted that the drill bit, during retrieval, at circa 12.0m bgl, became stuck in the borehole, taking four hours to retrieve it.

Location RBH3 - The Made Ground and Superficial deposits were circa 2.4m bgl. Below this was a discrete unworked coal seam (2.4 to 2.7m bgl). Below this, was 17.3m of intact MUDSTONE with SANDSTONE interbedded bands. At 20.0 to 20.5m was a second unworked coal seam. It then went back into intact MUDSTONE with SANDSTONE interbedded bands - 20.5 and 32.0m bgl – end of borehole.

In accordance with *Ciria Report C758D (London 2019) – Abandoned Mine Workings Manual,* calculations have been completed to assess the depth of intact rock with respect to the ratio t – see Table 4.3 below:

Table 54.3 – Calculated Ratios of intact rock below the Superficial deposits

Location	Rock levels (x)	*t - Calculated Ratios* x/10
RBH1	1.7 to 16.0m bgl	t = 14.3/10 = 1.43
RBH2	2.6 to 32.0	t = 29.4/10 = 2.94
RBH3	2.7 to 32.0m bgl	t = 29.3/10 = 2.93

Note: x = depth of intact bedrock

Hence, at all locations the ratio t was greater than the minimum requirement of 1.0, (between 1.43 and 2.93). It is therefore, considered, based on the results of the rotary drilling works and the above assessment of values for t, that further intrusive site investigation and/or grouting of voids is not required at the site. The development is for traditional ground/first floor houses.

5.0 GEOTECHNICAL ASSESSMENT

5.1 Introduction

It is understood that the proposed development comprises five detached two-storey dwellings.

5.2 Earthworks

Any areas of particularly poor quality, i.e. wet, soft, loose materials/soils etc, should be removed from beneath all proposed building and hardstanding areas, and the deficit made good with suitable compacted granular fill to an engineering specification. Excavations to 3.0m depth should be suitable with conventional soil excavating machinery.

Spoil resulting from excavations in the Made Ground and Natural CLAYs will not generally be suitable for reuse as structural fill and is likely to have to be disposed of at a suitable licensed landfill.

It is possible that shallow excavations will encounter groundwater – ponding on top of the CLAY stratum. Should this happen excavations can be kept dry by pumping from a conveniently located sump to a nearby foul sewer. If this is required, a temporary discharge licence will be required from the water authority.
Temporary excavations in the Made Ground may not stand unsupported in the short term at gradients of 1 in 2 and therefore may require shoring. Excavations below approximately 1m depth will require sheeting and shoring for personnel to enter safely.

5.3 Foundation Preliminary Design

Taking account of the strata revealed by this investigation it is considered that strip foundations are adopted for the proposed development. It should be noted that, based on the window sample boreholes, that foundations should be located below the CLAY stratum and bear directly onto the weathered/MUDSTONE bedrock. The foundations founding depth will deepen from west to east – circa 2.0 to 3.0m bgl and hence, deep trench fill should be considered.

A sample of the Natural CLAY stratum, where the proposed foundations will be located within. An Atterburg test was completed on the sample to assess the shrinkage/swell inherent characteristics. The CLAY sample has a Plasticity Index of 20, and a moisture content of 30% which is naturally high. It was classed as a brown/grey slightly silty, slightly gravelly CLAY – noted as CL. This defines the CLAY as a low plasticity Clay with low potential for shrinking and swell following possible seasonal significant changes in moisture content.

5.4 Foor Slabs

The use of suspended floor slabs is recommended due to probable depth of the foundations – see Section 5.4 above.

The formation should be inspected and approved; any ‘soft’ spots should be excavated and replaced with suitably compacted engineering fill. The formation, under the footprint of the proposed dwelling, should be proof rolled prior to construction of the floor slab.

Radon Gas level, based on the environmental database(see the Phase I Geoenvironmental Assessment – Ref: OE/1702/1057/R2, dated January 2024 and based on Groundsure data showed that <1% and between 5% to 10% of homes in the site vicinity were above the action level. Therefore, basic radon protection measures should be used in the construction of new dwellings. The level current ground gas levels reported Section 6.4 – Ground Gas levels, and future monitoring levels when Atmospheric Pressure is at or below 1000mbars should also be considered.

5.5 Roads and Pavements

For pavements, parking, and hardstanding areas, based on the site current investigations, a general design CBR of 2% can be assumed. Further testing conducted when formation level has been reached may increase the design CBR. Incorporation of a geogrid at the base of the capping would reduce the required thickness of construction and therefore reduce the volume of imported engineering fill.

The formation will degrade on exposure to wet weather and therefore it should be covered as soon as possible following exposure with a minimum150mm of compact granular fill.

5.6 Retaining Walls

It is understood that retaining walls are not required to facilitate the development..

5.7 Drainage

Soakage testing has not been conducted as part of this investigation. A third party has assessed the site for the potential to adopt a SUDs methodology to accommodate the storm drainage works at the site.

5.8 BRE Sulphate Analyses

Samples were tested for sulphate suites as outlined in *BRE Special Digest 1, Concrete in Aggressive Ground:2005*, during the site investigation works carried out by Obsidian Environmental Ltd.

The Natural soils (CLAY) at the site, have a Design Sulphate Class of AC1 and an ACEC class of DC1 as outlined in *BRE Special Digest 1:2005.* A copy of the results is collated with the chemical testing results – Appendix E.

5.9 Influence of Trees on new development

At the southern end of the site there is a hedgerow. The are no significant trees (semi-mature or mature) at that location. At the eastern boundary, off-site are one or two small trees. The geotechnical testing of the Natural CLAY soil has classed them as low risk of shrink/swelling characteristics.

6 CONTAMINATION ASSESSMENT

6.1 Analytical Results – Soils

6.1.1 Heavy Metals - The measured concentrations of contaminants have been used to assess the degree of potential soil contamination, when reviewed against the most sensitive end use, based on current guidance – ***Residential with plant uptake.*** The Human Health Risk Assessment Criteria adopted are collated within Appendix F.

The following table (Table 6.1) details the results for metals compared against the LQM/CIEH/S4ULs Human Health Risk Assessment. (NATHANIAL, C.P, M^{C}CAFFREY, C. ASHMORE, M. CHENG, Y. GILLETT, A. HOOKER, and P. OGDEN, R.C., 2015. Generic Assessment Criteria for Human Health Risk Assessment. Land Quality Press. Nottingham. (ISBN 0-9547474-3-7) where available and Category 4 Screening Values and widely adopted SGV values (Soil Guideline Values) have been used for the assessment. A copy of the Chemical Assessment Criteria (soils) used in this report have been collated within Appendix F, with the Chemical Testing results collated within Appendix E.

Where individual chemical determinants were found to be elevated when reviewed against current maximum allowable levels they are denoted in red/bold.

Table 6.1 – Results of the heavy metals found within soils (based on 1% SOM)

Compound	SGV or GAC (Residential) mg/kg	WS1 A (0.3m bgl)	WS2 A (0.3m bgl)	WS2 B 1.3m bgl)	WS3 A (0.4m bgl)	WS4 A (0.6m bgl)	WS5 A (0.7m bgl)
Arsenic	37	21	20	16	14	21	17
Barium	1400	419	267	50	47	271	365
Beryllium	1.7	1.1	1.0	0.7	0.6	1.0	0.6
Boron (ws)	290	<1.0	1.3	<1.0	<1.0	<1.0	1.2
Cadmium	1	**1.2**	0.8	<0.5	<0.5	0.6	**2.2**
Chromium	130	20	17	24	22	18	20
Copper	111	**313**	40	24	22	37	60
Lead	200	**727**	176	11	10	68	**253**
Mercury		0.29	<0.17	<0.17	<0.17	<0.17	<0.17
Molybdenum		2	2	<1	<1	2	1
Nickel	50	27	26	15	14	26	20
Selenium	35	<1	<1	<1	<1	<1	<1
Vanadium	210	24	22	24	22	23	28
Zinc	330	314	141	61	58	115	316

Assessment of results – Heavy Metals
As can be seen in Table 6.1 above the results record several heavy metal results above the maximum allowable levels for Residential – with plant uptake. The elevated heavy metals were detailed as Cadmium at WS1A and WS5A within the Made Ground. Similarly, Copper at WS1A, and Lead at WS1A and WS5A.

6.1.2 Speciated Total Petroleum Hydrocarbons
The measured concentrations of contaminants have been used to assess the degree of potential soil contamination, when reviewed against current guidance – ***Residential with plant uptake.***

The following table (Table 6.2) shows the results for speciated TPH compared either against the LQM/CIEH/S4ULs Human Health Risk Assessment. (NATHANIAL, C.P, M^{C}CAFFREY, C. ASHMORE, M. CHENG, Y. GILLETT, A. HOOKER, and P. OGDEN, R.C., 2015. Generic Assessment Criteria for Human Health Risk Assessment. Land Quality Press. Nottingham. (ISBN 0-9547474-3-7) where available and Category 4 Screening Values and widely adopted SGV values have been used for the assessment.

The results have been tabulated within Table 6.2 below:

Table 6.2 - Results of the speciated Petroleum Hydrocarbons (TPH) in soils (based on 1% SOM)

Compound	GAC (Residential) mg/kg	WS1A (0.3m bgl)	WS2A (0.3m bgl)	WS2B 1.3m bgl)	WS3A (0.4m bgl)	WS4A (0.6m bgl)	WS5A (0.7m bgl)
Aliphatic							
EC 5-6	42	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01
EC> 6-8	100	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01
EC> 8-10	27	4	8	<1	1	4	<1
EC> 10-12	130	4	8	<1	1	4	2
EC> 12-16	1,100	5	14	<1	2	6	34
EC> 16-21	65,000	5	13	<1	2	5	108
EC> 21-35	65,000	21	17	<1	9	15	54
Total Aliphatic		41	59	<1	19	33	211
Aromatic	70						
EC 5-7(benzene)	130	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01
EC> 7-8 (toluene)	34	<0.05	<0.05	<0.01	0.02	<0.01	<0.01
EC>8-10	74	2	3	<1	2	2	<1
EC<10-12	140	4	6	<1	2	4	1
EC<12-16	260	14	23	<1	6	15	17
EC<16-21	1,100	23	32	<1	8	22	43
EC<21-35	1,100	58	49	<1	21	49	16
Total Aromatics		106	114	<1	41	95	80
Total Aliphatic & Aromatic		147	173	<1	60	129	290

Assessment of results.
As can be seen in Table 6.2 above the results do not detail any elevated speciated TPH results above the maximum allowable levels for Residential – with plant uptake.

6.1.3 Polycyclic Aromatic Hydrocarbons (16 US EPA Speciated PAH) *based on 1% SOM.*

The measured concentrations of contaminants have been used to assess the degree of potential soil contamination, when reviewed against current guidance – ***Residential without plant uptake.***

The following table (Table 6.3) shows the results for speciated PAH compared either against the LQM/CIEH/S4ULs Human Health Risk Assessment. (NATHANIAL, C.P, M^{C}CAFFREY, C. ASHMORE, M. CHENG, Y. GILLETT, A. HOOKER, and P. OGDEN, R.C., 2015. Generic Assessment Criteria for Human Health Risk Assessment. Land Quality Press. Nottingham. (ISBN 0-9547474-3-7) where available and Category 4 Screening Values and widely adopted SGV values have been used for the assessment.

Table 6.3 - Results for speciated PAH in soils

Compound	GAC (Residential – with plant uptake) mg/kg	WS1A (0.3m bgl)	WS2 A (0.3m bgl)	WS2 B 1.3m bgl)	WS3 A (0.4m bgl)	WS4 A (0.6m bgl)	WS5 A (0.7m bgl)
Acenaphthene	210	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	170	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	2400	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)anthracene	7.2	0.06	<0.04	<0.04	<0.04	<0.04	<0.04
Benzo(a)pyrene	1.5	<0.04	<0.04	<0.04	<0.04	<0.04	0.08
Benzo(b)fluoranthene	2.6	0.1	<0.05	<0.05	<0.05	<0.05	0.1
Benzo(ghi)perylene	320	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	77	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Chrysene	15	0.1	<0.06	<0.06	<0.06	<0.06	0.09
Dibenzo(ah)anthracene	0.24	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoranthene	280	0.16	<0.08	<0.08	<0.08	<0.08	<0.08
Fluorene	170	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indenol(123-ed) pyrene	27	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Naphthalene	2.3	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Phenanthrene	95	0.1	<0.07	<0.07	<0.07	<0.07	0.11
Pyrene	620	O.14	<0.07	<0.07	<0.07	<0.07	0.13
Total PAH	0.66	<0.08	<0.08	<0.08	<0.08	<0.08	0.7

Assessment of results - Speciated Polycyclic Aromatic Hydrocarbons (PAH) – As can be seen there are elevated speciated PAH in any of the samples.

Other chemical testing results

pH – WS1 to WS4 incl. – 7.32 to 8.2mg/kg (neutral pH – 7.0 to 9.0mg/kg – Hence acceptable. WS5 – pH = 11.27mg/kg – highly alkaline.
Sulphate - <0.01g/l – at limit of detection.
Sulphide - <5mg/kg - at limit of detection.
Sulphur – WS1 to WS4 incl. – 63 to 769mg/kg. WS5 – 2000mg/kg
Cyanide (free) - <1mg/kg = at the limit of detection.
Cyanide (total) – WS1 to WS4 incl. <1mg/kg = at the limit of detection. At WS5 - =2mg/kg
Phenols - <2mg/kg
Total Organic Carbon0.28 to 12.6%w/w.
Mineral oil – WS1 to WS4 incl. - <30 to 40mg/kg. At WS5 = 1130mg/kg.
Asbestos screen – Fibres not detected.

6.2 Ground Gas Monitoring Results

At the issue of this Phase II Report, only one round of ground gas monitoring results was available, taken on the 11 January 2024. The monitoring results are presented as Appendix G.

The following assessment follows the recommendations on the current available guidance:

- ***CIRIA C665: 2007 – Assessing risks posed by hazardous gases to buildings***
- ***BS 8485: 2015 – CoP Design of protection measuring methane & CO2 new build***

In addition, CIRIA published the following:

- ***Good Practice for Risk Assessment for Coal Mine Emissions, issued in October 2021***

The above Good Practice Guidance has been reviewed as part of this Assessment.

The results of the Ground Gas Monitoring Results and evaluation of resultant Gas Screening Values (GSVs) have been collated within Appendix G. Tabulated below (Table 6.4) are the measurements taken from the first round of monitoring at Window Sample Borehole WS1, WS3 and WS4 on 11 January 2023:

Table 6.4 – Summary of Results of Gas Monitoring Rounds 1 to 4 inclusive

Gases	Units	WS1	WS3	WS4
Maximum Methane (CH4) %	%	0.0	0.0	0.0
Maximum Carbon Dioxide (CO2 %	%	1.9	0.2	0.0
Maximum Carbon Monoxide (CO) %	%	0.0	0.0	0.0
Minimum Oxygen (O2) %	%	18.1	19.8	18.9
Ballance %	%	80.4	80.0	80.1
Peak Flow	l/hour	0.1	-0.1	0.0
Steady Flow	l/hour	0.0	-0.1	-0.1
Atmospheric Pressure range mbars	mbars	1030	1030	1030
Groundwater Level depth	m bgl	1.25	0.75	0.95
Temperature	Degrees centigrade	3°	3°	3°
Weather		Sunny	Sunny	Sunny

In order to establish Gas Screening Values (GSVs) from the measurements taken the following standard formulae was adopted:

GSV = Highest Methane or Carbon Dioxide (%) X Peak Flow Value (l/hr)

Further ground gas monitoring results will be presented within an Addendum Report (Ref; OE/1702/1057/R4, on completion of the measurement - total three rounds, when one event will be at or below 1000mb.

6.3 Knotweed/Invasive Species

Japanese Knotweed (JKW) was not seen on the site during the Site Reconnaissance in December 2023 and during the site investigation works in January 2024. Other invasive weeds were also not identified at such times.

6.4 Waste Management

The previous recent site use has been for the location of two static caravans. In addition, it has been the storage area of several vehicles and trailers and associated equipment for the mobile food retail business. There are several calor gas bottle – used at the static caravans and for the mobile trailers.

It is advised that when the original owners and operators of the site fully vacate it, both static caravans, all vehicles and trailers, all extraneous equipment will be completely removed leaving the site immediately available for the construction of the proposed six new houses.

Consequently, there will be no waste management issues on the site prior to construction.

7.0 FINAL CONCEPTUAL MODEL

7.1 Introduction

A Preliminary Conceptual Model was constructed as part of the Phase I Geoenvironmental Assessment for the site (Report Ref: OE/1702/1057/R2, dated January 2024).

The site characterisation attempts to identify potential previous and existing site sources of contamination. The conceptual model links the identified sources likely to cause significant possibility of significant harm via pathways to identified critical receptors. The conceptual model is therefore based on a number of identified source-pathway-receptor scenarios. For land to be classified as contaminated a significant pollutant linkage will need to be identified which will include each component of the conceptual model. The absence or removal of a source or interception of a pathway will 'break' the pollutant linkage.

7.2 Conceptual Model

The conceptual model is characterised by identification of the following:

- On-site sources, which may impact on-site receptors via plausible pathways.
- On-site source, which may impact off-site receptors via plausible pathways.
- Off-site sources, which may impact on-site receptors via plausible pathways.

The change of land use will require assessment of the new site development layout within the context of introducing new exposure pathways. The planning regime will require assessment of the site to ensure the new development will not be classed as contaminated land under the definition provided by the Part 2A of the Environment Act 1990 as defined in the Environment Protection Act 1995.

The Contaminated Land Legislative Background is presented in Appendix J.

The Final Conceptual model is presented in Table 7.1 overleaf. The table considers the source, pathway, and receptors at the site. based on the findings of the Phase I and II Assessments.

Table 7.1 Conceptual Model – Risk Assessment

Item	Sources	Potential Contaminates	Potential Risks	Pathways	Receptors	Linkage, without Mitigation	Likelihood of Significant Pollutant Linkage	Mitigation
1	Leaks/spills from parking of vehicles at the site - hydrocarbons	Residual diesel, petrol fuels, lubricants, and oils.	Migration onto the site through soils beneath tarmac surfacing – front gardens to new properties.	Through Made Ground and existing drains.	Groundworkers, Utility companies, & Landscape workers. Construction workers and Residents	Yes	Low	None required
2	Storage of engine oils & lubricants on site	Hydrocarbon contamination	Impact on MG and Natural soils beneath the site and local groundwater regime, and off site contamination through damaged drains.	Through Made Ground and existing drains.	Groundworkers, Utility companies, & Landscape workers. Construction workers and Residents	Yes	Low	None required
3	Ground Gas from Made Ground & Natural soil	Carbon monoxide Carbon dioxide, Methane, & depleted Oxygen.	Migration into new dwellings via the ground floor slab	Through ground floor slab and service entries.	Occupants of new dwellings	No	Medium	Gas membrane
4	Mine gas from shallow workings	Carbon monoxide Carbon dioxide, Methane, Hydrogen Sulphide & depleted Oxygen.	Migration into new dwellings via the ground floor slab	Through ground floor slab and service entries.	Occupants of new dwellings	No	Medium	Radon gas membrane
5	Radon Gas	Radon gas	Migration into new dwellings via the ground floor slab	Through ground floor slab and service entries.	Occupants of new dwellings	No	Medium	Radon gas membrane
6	Leaks/spills from new car parking and hardstanding areas - hydrocarbons	Residual diesel, petrol fuels, lubricants, and oils.	Percolation of contaminates through soil and leaching of contaminates to groundwater	Directly through permeable Natural soils.	Groundworkers, Utility companies, & Landscape workers. Construction workers Residents and the general Public	Yes	Low	Good housekeeping by construction and resident vehicles

8.0 REMEDIATION STRATEGY

8.1 Introduction

An intrusive site investigation comprising five window sample boreholes, sampling, and testing of retrieved samples for chemical and geotechnical testing has been completed at the site. In addition, three open hole rotary boreholes have been drilled between 22.0 and 32.0m bgl. Detailed below, based on the results, a Summary of the finding has been presented together with a Remediation Strategy for the site.

8.2 Summary of Site Conditions

Made Ground was found to extends between 0.3 and 1.0m bgl. There is tarmac surfacing in the northern area, with rock fill over clay fill. Below the MG is a natural CLAY with two discrete coal seams intercepted and 0.5 to 0.6m bgl and 0.85 to 0.9m bgl.

The Made Ground at WS1 and WS5 has elevated heavy metals at 0.3 and 0.7m bgl respectively. WS5 has a very alkaline pH, together with a high Sulphur deposit. All other results have been below maximum allowable levels for a final end use of Residential – with plant up take.

There are no significant voids/back filled worked coal seams near the immediate surface requiring additional drilling and grouting.

The most appropriate foundations, based on the Superficial geology found at the site is traditional deep trench fill.

Suspended floor slabs should be constructed.

Ground gas/radon gas membrane should be accommodated at the ground floor slab level.

It is not anticipated that there will be any residual waste management issues associated with the site following the advised complete site clearance advised to be completed by the former site owners when they vacate the site.

There do not appear to be any invasive species issues with the site.

8.3 Remediation Strategy

Following the general site clearance advised the following is proposed:

RS.1 At locations WS1 and WS5 treat as hot spots – excavate to a minimum depth of the Made Ground at the two known locations of 1.0m – after the ground gas monitoring is complete – at a diameter of 2.0m, and relocation off site to a licensed recovery facility. Backfill with clean imported crushed material. Samples should be taken at the sides and base of the excavations for verification chemical testing.

RS.2 Excavate and remove all tarmac materials separately and relocate to a recycling facility for recovery and reuse.

RS.3 Remove all rockfill currently across areas of the site for reuse as hardcore materials on or off site as required.

R.4 Import clean topsoil and subsoils to rear gardens to make up for the loss of the original rock fill.

R.5 A record of all excavated materials removed off site and all imported materials imported to the site in respect to on-site ground works should be kept and controlled by suitable Duty of Care tickets.

9.0 CONCLUSIONS & RECOMMENDATIONS

9.1 Introduction

Detailed below are the Conclusions and Recommendations derived from the intrusive site investigations as detailed above.

9.2 Conclusions

C.1 The site is not underlain by any unrecorded shallow mining that will require any additional drilling and grouting to allow construction of the proposed six dwellings.

C.2 The site has a variable veneer of Made Ground (MG) of tarmac, rock, and clay fill between 0.3 and 1.0m in depth. One area at the southern area of the site is completed as turf/topsoil. The MG at the locations WS1 and WS5 has elevated heavy metals above the maximum allowable levels for an end use of Residential – with plant uptake.

C.3 The Superficial deposits are predominantly soft to firm Natural slightly silty, slightly gravelly CLAYS, between 1.6 and 2.0m depth. There are two discrete unworked coal seams at 0.5 to 0.6m bgl and 0.85 to 0.9m bgl.

C.4 The Superficial deposits overly initially weathered then intact weak Mudstone bedrock.

C.5 Strip footings, with deep trench fill, to bear directly onto the stiff weathered MUDSTONE, appears the most appropriate foundation based on the intrusive site investigation.

C.6 A sample of the Natural CLAY stratum, where the proposed foundations will be located within. An Atterburg test was completed to assess the shrinkage/swell inherent characteristics. The CLAY sample had a Plasticity Index of 20, and a moisture content of 30%. It was classed as a brown/grey slightly silty, slightly gravelly CLAY – noted as CL. This defines the CLAY as a low plasticity Clay with low potential for shrinking and swell with significant changes in moisture content.

C.7 Suspended ground floor slab, with a minimum 0.3m void appears the most appropriate option based on the intrusive site investigation, and ground gas and Radon Gas levels at the site.

C.8 There is no requirement for specialist concrete in aggressive ground, as per the BRE Specialist Digest 1 and the results of the chemical testing to the required suite.

9.3 Recommendations

R.1 The proposed Remedial Strategy, detailed in Section 9.0 should be adopted.

R.2 This report should be issued to the South Gloucestershire Planning Authority to allow the Discharge of all relevant Planning Conditions.

10.0 REFERENCES

10.1 Introduction

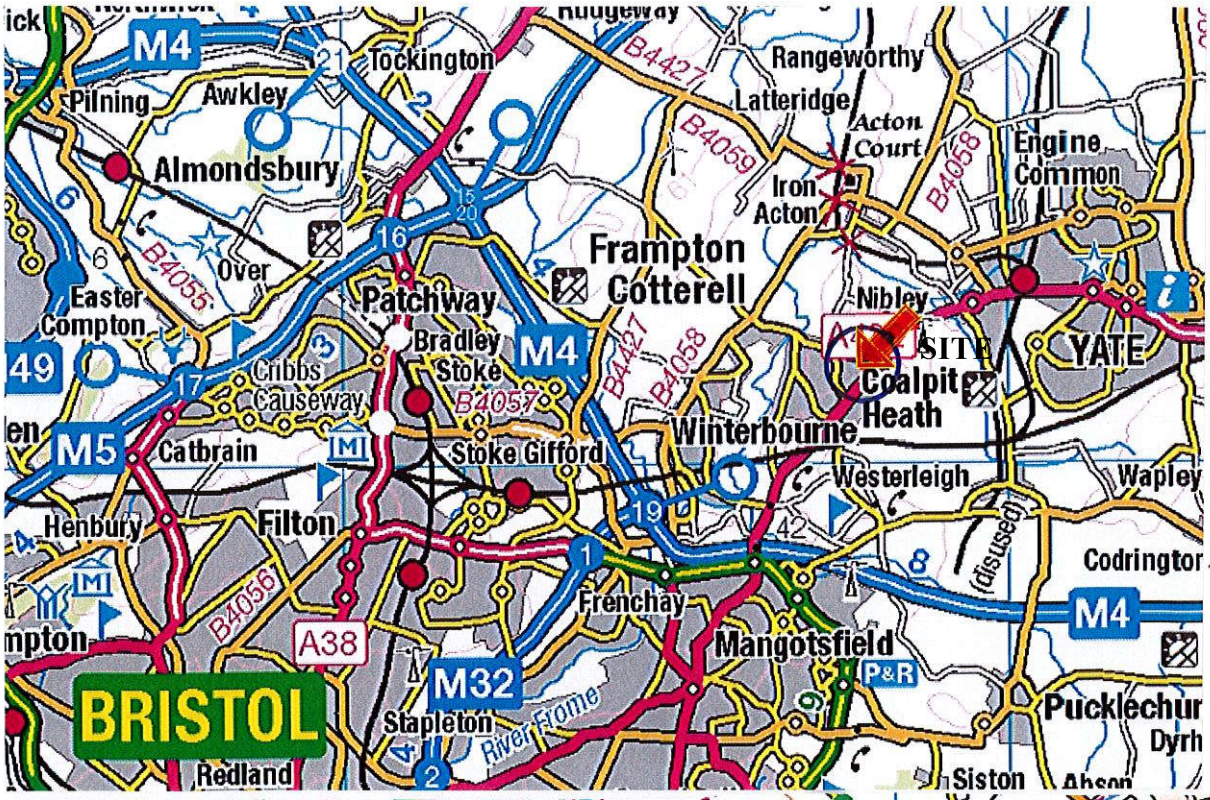
Detailed below are a list of reference documents (British Standards etc.) used within this Phase II Geoenvironmental Assessment:

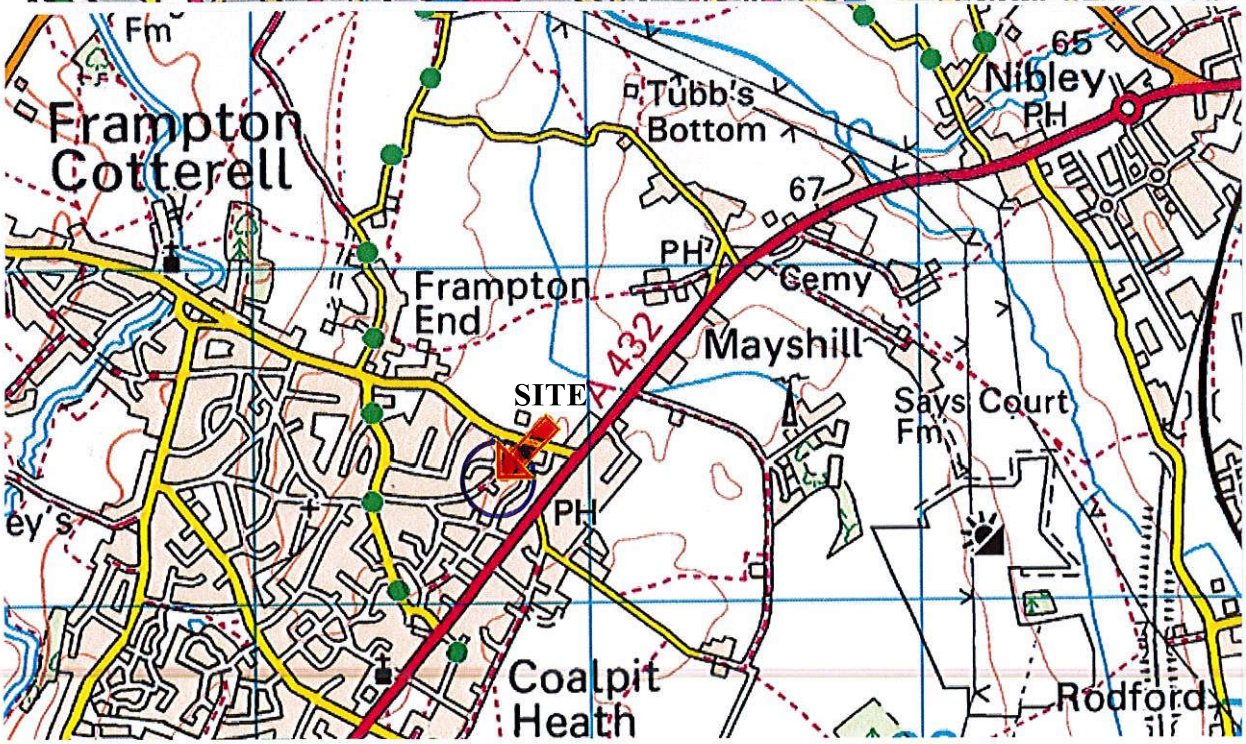
10.2 References

- Buildings Research Establishment, 2005. BRE Special Digest 1:2005 *Concrete in aggressive ground*. Watford. BRE Press
- Buildings Research Establishment, 2007. BRE 211: 2004 Radon: *Guidance on protective measures for new buildings*. Watford. IHS BRE Press.
- British Standards Institution, 2001. BS 10175:2011 + A2: 2017 *Investigation of potentially contaminated sites – Code of practice*
- British Standards Institution, 2004. BS EN 14688-2:2004. *Geotechnical investigation and testing – Identification and classification of soil: Part 2 principles for a classification*. London. BSI.
- Construction Industry Research & Information Association. 2007. CIRIA C665:2007 *Assessing risks posed by hazardous ground gases to buildings*.
- BS ISO 18400-102: 2017 – Soil Quality – Sampling
- BS 5930: 2015 + A1 2020 – Code of practice for ground investigation.
- BS 10175: 2011 + A2 2017 – CoP – Investigation of potentially contaminated land
- National House Building Council, 2010. NHBC Standards Part 4.0: *Foundations*. UK. NHBC
- The LQM/CIEH S4ULs for Human Health Risk Assessment.

FIGURES

OE/1702/956/R1/F01	**-**	**Site Location Plan**
OE/1702/956/R1/F02	**-**	**Topographical Survey**
OE/1702/956/R1/F03	**-**	**Site Layout Plan**
OE/1702/956/R1/F04	**-**	**Site Development Plan of Development Area**
OE/1702/956/R3/F01	**-**	**Site Investigation Location Plan**





OBSIDIAN ENVIRONMENTAL

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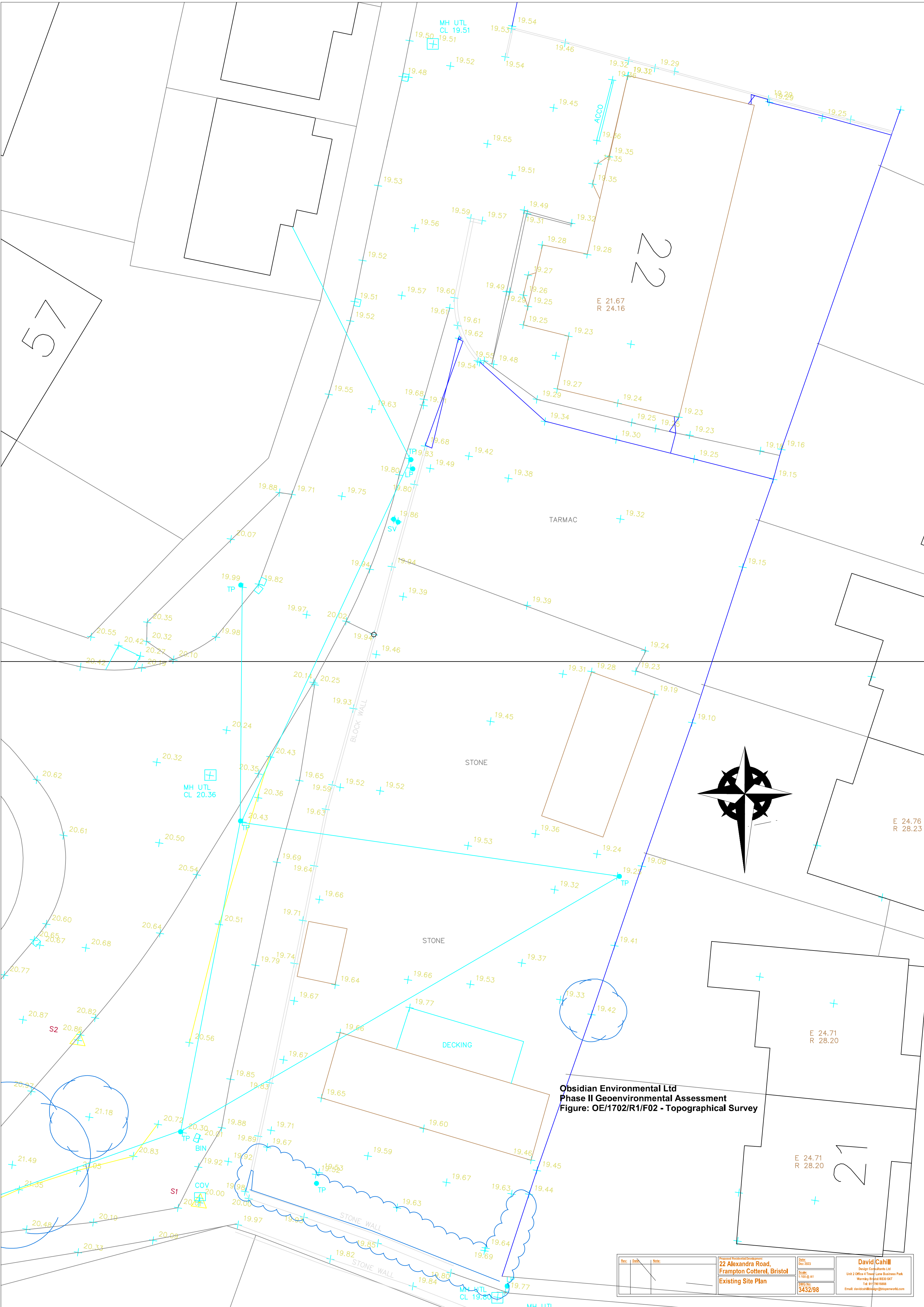
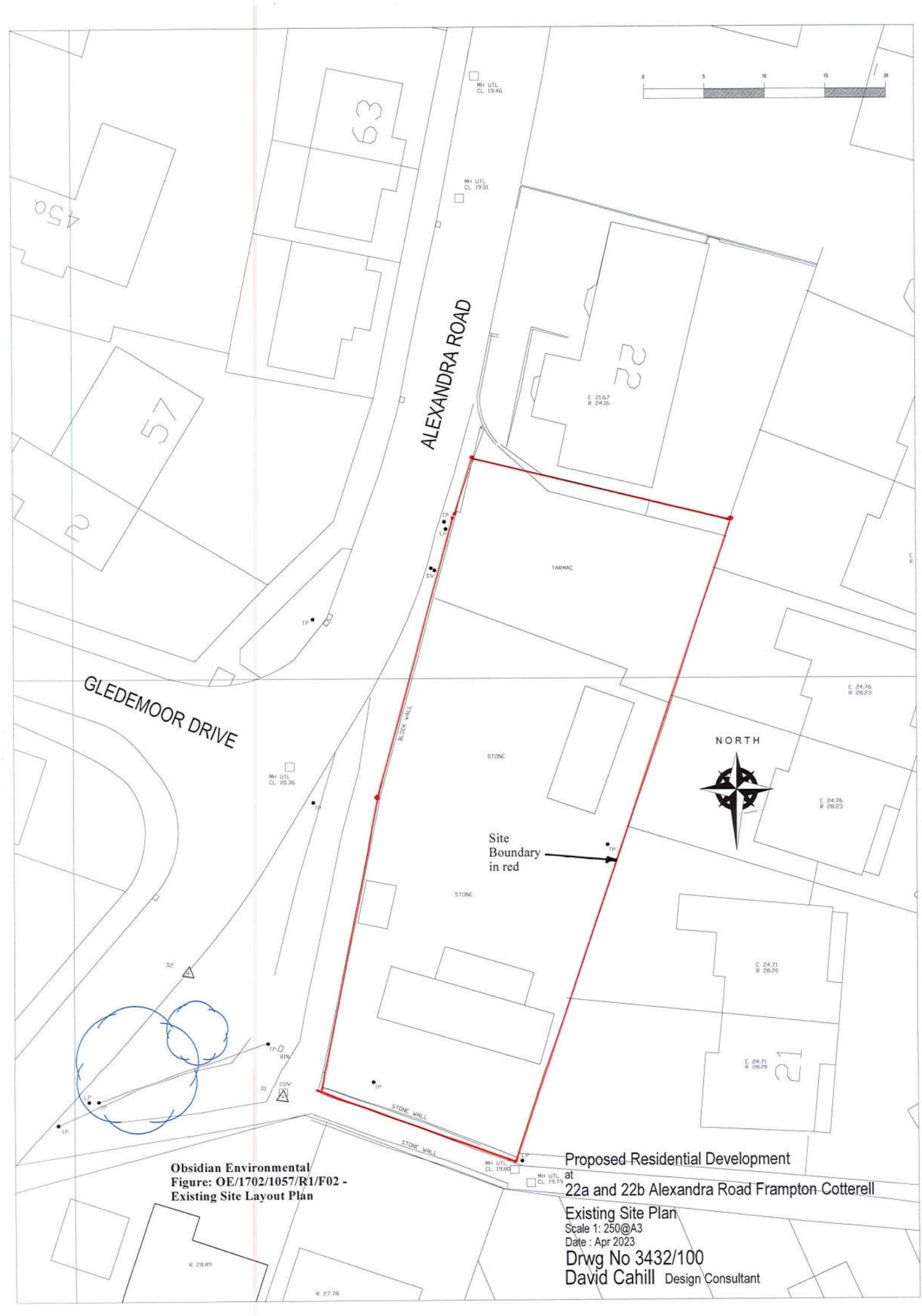
Project: Land at 22 Alexander Road, Frampton, BS36 2PZ	Drawn: LS	Scale Not to Scale
	Checked: LS	Date 28/06/2023
Title: Site Location Plan	Client:	White Horse Homes
	Drawing No.	OE/1792/1057/R1/F01



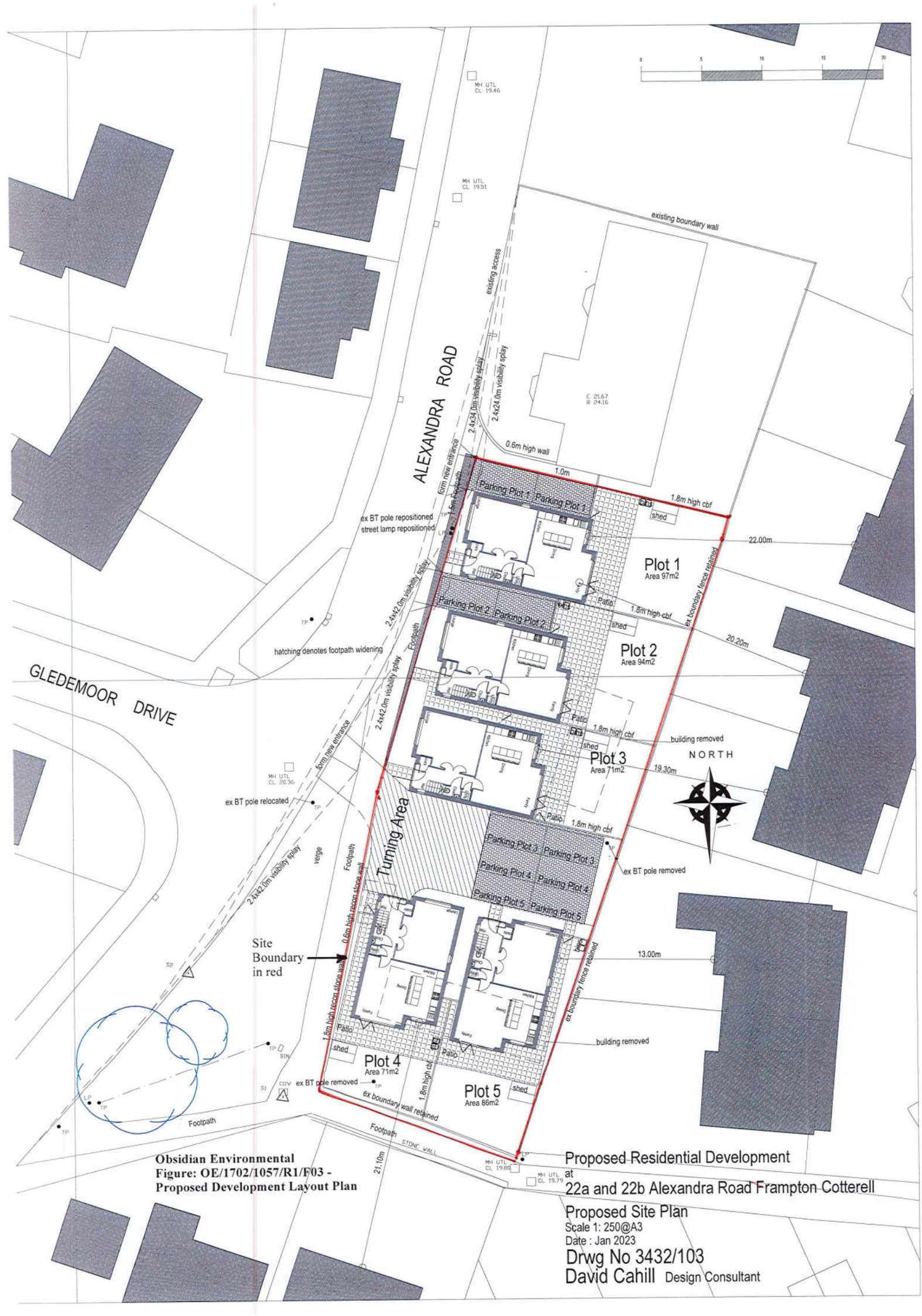
Obsidian Environmental Ltd
Phase II Geoenvironmental Assessment
Figure: OE/1702/R1/F02 - Topographical Survey



Obsidian Environmental
Figure: OE/1702/1057/R1/F02 - Existing Site Layout Plan

Proposed Residential Development
at
22a and 22b Alexandra Road Frampton Cotterell

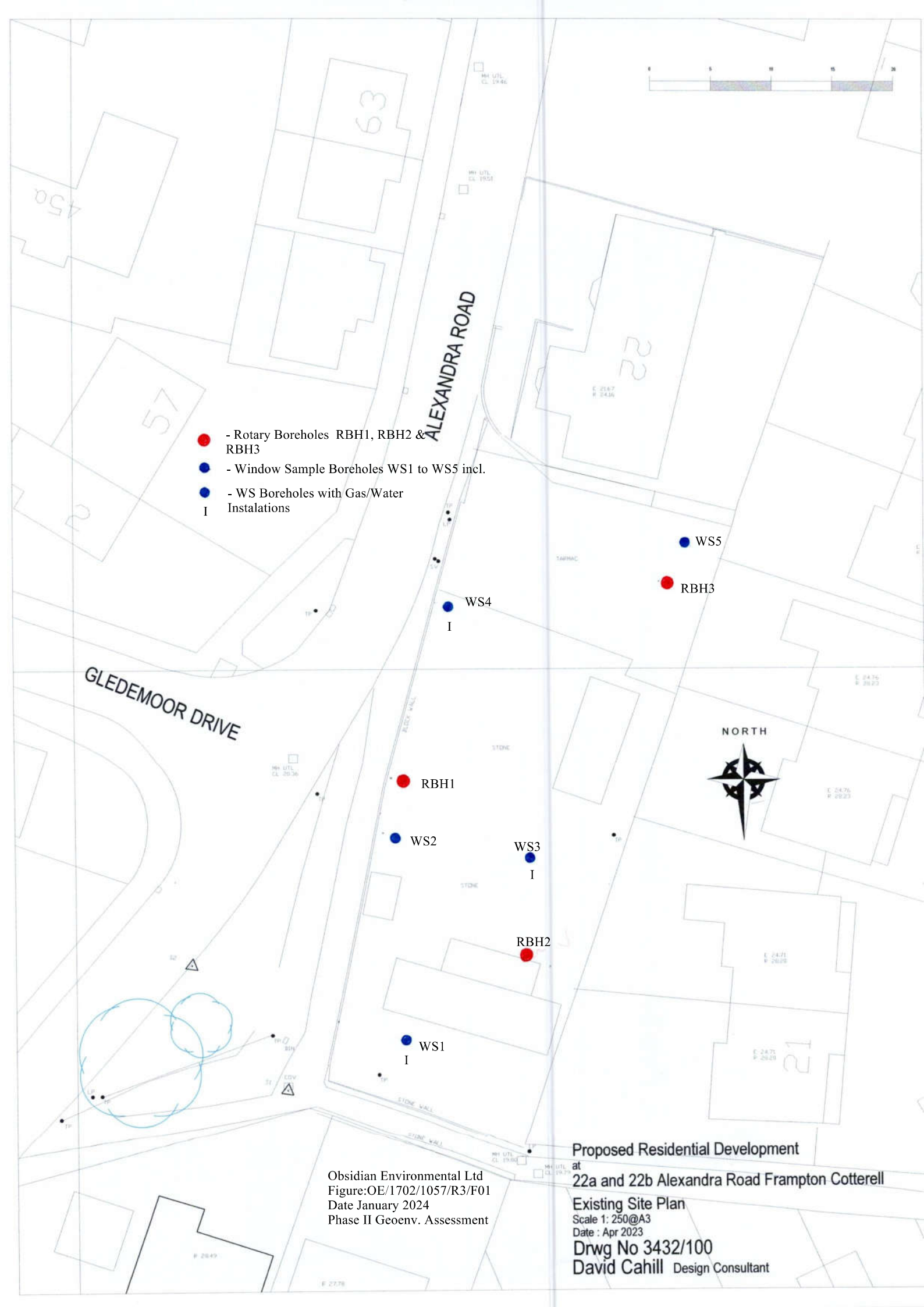
Existing Site Plan
Scale 1: 250@A3
Date : Apr 2023
Drwg No 3432/100
David Cahill Design Consultant



Obsidian Environmental
Figure: OE/1702/1057/R1/F03 -
Proposed Development Layout Plan

Proposed Residential Development
at
22a and 22b Alexandra Road Frampton Cotterell

Proposed Site Plan
Scale 1: 250@A3
Date : Jan 2023
Drwg No 3432/103
David Cahill Design Consultant


- Rotary Boreholes RBH1, RBH2 & RBH3
- Window Sample Boreholes WS1 to WS5 incl.
- WS Boreholes with Gas/Water Instalations
ALEXANDRA ROAD
GLEDEMOOR DRIVE
WS5
RBH3
WS4
RBH1
WS2
WS3
RBH2
WS1
NORTH
Obsidian Environmental Ltd
Figure:OE/1702/1057/R3/F01
Date January 2024
Phase II Geoenv. Assessment
Proposed Residential Development
at
22a and 22b Alexandra Road Frampton Cotterell
Existing Site Plan
Scale 1: 250@A3
Date : Apr 2023
Drwg No 3432/100
David Cahill Design Consultant

APPENDICES

APPENDIX A - Site Investigation Photofile

Photo OE/1702/1057/R3/P01 – Location and commencing surface at Window Sample WS1 – at the southwest corner of the site.

Photo OE/1702/1057/R3/P02 – Window Sample WS1 – Drilling cores 0.0 to 1.9m bgl.

Photo OE/1702/1057/R3/P03 – Window Sample WS1 – Drilling cores 0.0 to 0.19m bgl – turf/topsoil/rock fill.

Photo OE/1702/1057/R3/P04 – Window Sample WS1 – Drilling cores 0.19 to 0.7m bgl – Made Ground clayey fill.

Photo OE/1702/1057/R3/P05 – Window Sample WS1 – Drilling cores 0.7 to 1.0m bgl – Made Ground clayey fill.

Photo OE/1702/1057/R3/P06 – Window Sample WS1 – Drilling cores 1.0 to 1.3m bgl – Natural orange CLAY.

Photo OE/1702/1057/R3/FP07 – Window Sample WS1 – Drilling cores 1.3 to 1.7m bgl – Natural orange CLAY.

Photo OE/1702/1057/R3/P08 – Window Sample WS1 – Drilling cores 1.7 to 1.9m bgl – Natural orange CLAY.

Photo OE/1702/1057/R3/P09 – Window Sample WS1 – Drilling core at 1.9m bgl – Very stiff weathered Mudstone.

Photo OE/1702/1057/R3/P10 – Window Sample WS1 – Drilling core at 1.9m bgl – Very stiff weathered Mudstone.

Photo OE/1702/1057/R3/P11 – Location and commencing surface at Window Sample WS2 – at the western side of the site.

Photo OE/1702/1057/R3/P12 – Window Sample WS2 – Drilling cores 0.0 to 0.9m bgl – Made Ground.

Photo OE/1702/1057/R3/P13 – Window Sample WS2 – Drilling cores 1.0 to 1.6m bgl – Natural orange CLAY.

Photo OE/1702/1057/R3/P14 – Window Sample WS2 – Drilling cores 0.0 to 0.3m bgl – Made Ground – rock fill.

Photo OE/1702/1057/R3/15 – Window Sample WS2 – Drilling cores 0.3 to 0.6m bgl – Made Ground – soft clayey fill.

Photo OE/1702/1057/R3/P16 – Window Sample WS2 – Drilling cores 0.6 to 0.9m bgl – Made Ground – soft clayey fill.

Photo OE/1702/1057/R3/P17 – Window Sample WS2 – Drilling cores 0.9 to 1.6m bgl – Natural soft orange CLAY

Photo OE/1702/1057/R3/P18 – Window Sample WS2 – Drilling core at 1.6m bgl – Very stiff weathered Mudstone.

Photo OE/1702/1057/R3/P19 – Window Sample WS2 – Drilling core at 1.6m bgl – Very stiff weathered Mudstone.

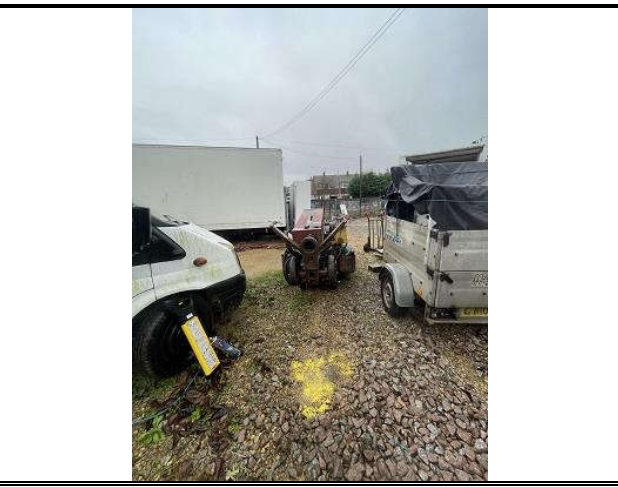


Photo OE/1702/1057/R3/P20 – Location and commencing surface at Window Sample WS3 – at the centre of the site.

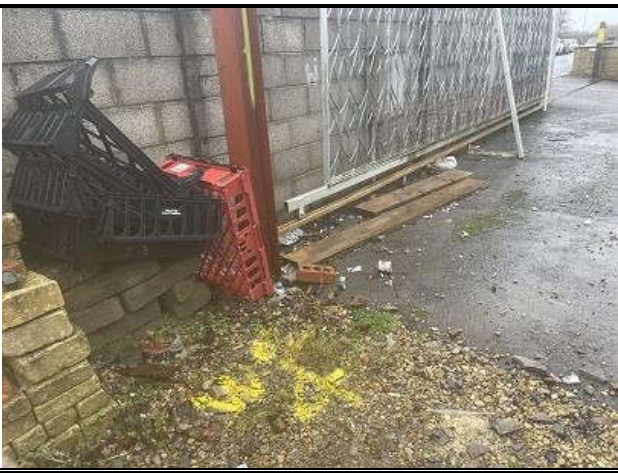


Photo OE/1702/1057/R3/P 21 – Location and commencing surface at Window Sample WS4 – at the northwest area of the site.

Photo OE/1702/1057/R3/P22 – Location and commencing surface at Window Sample WS5 – at the northeast corner of the site.

Photo OE/1702/1057/R3/P23 – Window Sample WS5 – Drilling cores at 0.0 to 3.0m bg – poor receoryl.

Photo OE/1702/1057/R3/P24 – Window Sample WS5 – Drilling cores 0.07 to 0.2m bgl – Made Ground – rock fill beneath tarmac surfacing.

Photo OE/1702/1057/R3/P25 – Window Sample WS5 – Drilling cores 0.2 to 0.3m bgl – Made Ground – Crushed Sandstone.

Photo OE/1702/1057/R3/P26 – Window Sample WS5 – Drilling cores 0.3 to 1.0m bgl – Made Ground – rock fill.

Photo OE/1702/1057/R3/P27 – Window Sample WS5 – Drilling cores 1.0 to 1.5m bgl – Made Ground – rock fill poor recovery.

Photo OE/1702/1057/R3/P28 – Window Sample WS5 – Drilling cores 2.2 to 2.3m bgl – Made Ground – rock fill poor recovery and coal seam.

Photo OE/1702/1057/R3/P29 – Window Sample WS5 – Drilling cores 2.3 to 2.6m bgl –Coal seam.

Photo OE/1702/1057/R3/P30 – Window Sample WS5 – Drilling cores 2.3 to 2.4m bgl –Coal seam.

Photo OE/1702/1057/R3/P31 – Window Sample WS5 – Drilling cores 2.7 to 2.9m bgl –Soft natural Clay.

Photo OE/1702/1057/R3/P32 – Window Sample WS5 – Drilling cores 2.9 to 3.0m bgl –Coal seam before encountering hard weathered Mudstone..

APPENDIX B - Window Sample Borehole Logs

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WINDOW SAMPLE LOG

Project: Phase II Geoenvironmental Assessment - 22 Alexander Road, Frampton Cotteril, BS36 2PZ				Bore Hole No: **WS1**
Job No: OE/1702/1057	Date: 19/12/2023	Ground Level m: 19.65m AOD	Coordinates E / N	
Contractor: South Wales Ground Testing Limted (Bridgend)				Sheet: 1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
	WS1/A			19.65		0.35	Made Ground (MG) - Grass/topsoil over rock fill - possibly MOT Type 1		Cover
							sub-base.		0.5m plain
						0.15	MG - Possible relic topsoil - discrete band.		pipe
						0.40	MG - Black/dark brown gravelly clay. Sample WS1/A at 0.3m bgl		
1.0				18.75		1.00	Natural soil - Soft, orange CLAY, becoming firm with depth. SPT at 1.0 to 1.45m bgl - 1, 2, 1, 2, 2 & 3 - N = 8		remainder slotted pipe
2.0				17.75		0.45	Weathered weak Mudstone - dense friable CLAY SPT at 1.9 to 1.35 - 10, 13, 27, 23/30 - N = 50		cap
3.0				17.30			End of Window Sample WS1 borehole at 2.35m		
4.0									
5.0									
6.0									
7.0									
8.0									
9.0									
10.0									

GENERAL REMARKS

No water strike. Ground gas, groundwater installation completed.

All dimensions in metres Scale 1:10	Client: White Horse Homes Limited	Method/ Plant used: Window sample rig	Logged by: LS

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WINDOW SAMPLE LOG

Project: Phase II Geoenvironmental Assessment - 22 Alexander Road, Frampton Cotteril, BS36 2PZ				Bore Hole No: **WS2**
Job No: OE/1702/1057	Date: 19/12/2023	Ground Level m: 19.8m AOD	Coordinates E / N	
Contractor: South Wales Ground Testing Limted (Bridgend)				Sheet: 1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
				19.80		0.10	Made Ground (MG) - Rockfill/gravel		
				19.70		0.40	MG - Mix of clay fill and relic topsoil - Sample WS2/A at 0.3m bgl		
				19.30		0.10	Natural strata - Coal deposit		
1.0			▼	19.20		1.00	Natural strata - Black stained becoming orange with depth soft CLAY Water strike at 0.9m bgl SPT at 1.0 to 1.45m bgl - 1, 1, 1, 2, 2 & 2 Sample WS2/B at 1.3m bgl		
2.0				18.20		0.45	Oranage grey weatheed Mudstone - Stiff CLAY SPT at 1.6 to 2.05m bgl - 10, 14, 29, 21/40 - N = 50		
				17.75		2.05	End of Window Sample borehole WS2 at 2.05m bgl		
3.0									
4.0									
5.0									
6.0									
7.0									
8.0									
9.0									
10.0									

GENERAL REMARKS

All dimensions in metres Scale 1:10	Client: White Horse Homes Limited	Method/ Plant used: Window sample rig	Logged by: LS

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WINDOW SAMPLE LOG

Project: Phase II Geoenvironmental Assessment - 22 Alexander Road, Frampton Cotteril, BS36 2PZ				Bore Hole No: **WS3**
Job No: OE/1702/1057	Date: 19/12/2023	Ground Level m: 19.4m AOD	Coordinates E / N	
Contractor: South Wales Ground Testing Limted (Bridgend)				Sheet: 1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
	WS3/A			19.40		0.40	Made Ground (MG) - Rock fill/gravel		Cover
				19.90		0.60	MG - Soft black relic topsoil - silty sandy clay Sample WS3/A at 0.4m bgl		0.5m plain pipe
1.0				18.40		0.90	Natural soil - Soft orange CLAY SPT at 1.0 to 1.45m - 1, 1, 2, 2, 1, & 2 - N = 7		remainder slotted pipe
2.0				17.50		0.45	At 1.9m bgl stiff brown/grey weathered Mudstone SPT at 1.9 to 2.35 - 6, 8, 10, 15 & 25/40 b;lows - N = 50.		Cap
				17.05			End of Window Sample borehole WS3 at 2.35m bgl		
3.0									
4.0									
5.0									
6.0									
7.0									
8.0									
9.0									
10.0									

GENERAL REMARKS

. Ground gas, groundwater installation completed.

All dimensions in metres Scale 1:10	Client: White Horse Homes Limited	Method/ Plant used: Window sample rig	Logged by: LS

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WINDOW SAMPLE LOG

Project: Phase II Geoenvironmental Assessment - 22 Alexander Road, Frampton Cotteril, BS36 2PZ				Bore Hole No: **WS4**
Job No: OE/1702/1057	Date: 19/12/2023	Ground Level m: 19.4m AOD	Coordinates E / N	
Contractor: South Wales Ground Testing Limted (Bridgend)				Sheet: 1 of 1

SAMPLES & TESTS			Water	STRATA					
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Geology	Instrument/ Backfill
	WS4/A			19.40		0.45	Made Ground (MG) - MOT Type 1 sub-base - rock fill.		
				18.95		0.35	MG - Soft grey gravelly clay Sampl WS4/A taken at 0.6m bgl		
1.0				18.55		0.05	Natural soil - Coal		
				18.50		0.70	Soft orange CLAY SPT at 1.0 to 1.45m bgl - 1, 0, 0, 1, 2 & 3 - N = 6 becoming firm at 1.45m bgl		
2.0				17.80		0.45	Stiff orange/grey orange/brown weathered Mudstone SPT at 1.6 to 2.05 - 7, 8, 10, 10, 18 & 12/10 blows - N = 50		
				17.35			End of Window Sample borehole WS4 at 2.05m bgl		
3.0									
4.0									
5.0									
6.0									
7.0									
8.0									
9.0									
10.0									

GENERAL REMARKS

No water strike.

All dimensions in metres Scale 1:10	Client: White Horse Homes Limited	Method/ Plant used: Window sample rig	Logged by: LS

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WINDOW SAMPLE LOG

Project: Phase II Geoenvironmental Assessment - 22 Alexander Road, Frampton Cotteril, BS36 2PZ				Bore Hole No: **WS5**
Job No: OE/1702/1057	Date: 19/12/2023	Ground Level m: 19.2m AOD	Coordinates E / N	
Contractor: South Wales Ground Testing Limted (Bridgend)				Sheet: 1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
				19.20			Made Ground (MG) - Tarmac (0.07 thickness) over MOT Type 1 Sub-base		Cover
							MG - Rock fill (0.125m thick)		0.5m plain pipe
							MGSandstone rock fill (0.1m thick)		
	WS5/A						MG - Gravelley clay - very little recovery. Sample WS5/A taken at 0.7 to 0.8m b		
1.0						2.10 total	SPT at 1.0 to 1.45m bgl - 3, 4, 1, 2, 1 & 2 - N = 6		remainder slotted pipe
2.0							SPT at 2.0 to 2.45m bgl - 3, 4, 4, 4, 4 & 3 - N = 15		
				17.10		0.40	Natural strata - Coal seam		
				16.70		0.10	Soft orange CLAY		
3.0							SPT at 3.0 to 3.45m bgl - 2, 5, 7, 10, 8 & 8 - N = 33		Cap
				16.20			Firm Orange/grey weathered Mudstone - very stiff CLAY		
						0.90	CPT at 3.45 to 3.9 - 8, 11, 13, 21 & 14/32 b;ows - N = 50		
4.0							hole collapsing hence CPS not SPTs		
				15.30			End of Window Sample borehole WS5 at 3.9m bgl		
5.0									
6.0									
7.0									
8.0									
9.0									
10.0									

GENERAL REMARKS

No water strike. Ground gas, groundwater installation completed.

All dimensions in metres Scale 1:10	Client: White Horse Homes Limited	Method/ Plant used: Window sample rig	Logged by: LS

APPENDIX C - Open Hole Rotary Drilling Logs

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BORE HOLE LOG

OBSIDIAN ENVIRONMENTAL

Project		Borehole No
22, Alexander Road, Frampton Cotteril, South Gloucestershire, BS36 2PZ		RBH1

Job No	Date	Ground Level m	Coordinates E / N
OE/1702/1057	11/01/2024	19.5m AOD	

Contractor: Apex Drilling Services

Sheet: 1 of 3

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
				19.50		1.70	Made Ground (MG) - Rock fill and dark brown clay		Last 1.0m bentonite & cement
1.0									Arisings
2.0							MUDSTONE with SANDSTONE bands		
3.0									
4.0									
5.0									
6.0									
7.0									
8.0									
9.0									
10.0				9.50			Rotary Borehole RBH1 continues to 22.0m bgl - Page 13of 3		

GENERAL REMARKS

No water strikes.

All dimensions in metres Scale 1:10	Client	Method/ Plant used	Logged by
	White Horse Homes Limited	Rotary Rig	LS

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BORE HOLE LOG

OBSIDIAN ENVIRONMENTAL

Project		Borehole No
22, Alexander Road, Frampton Cotteril, South Gloucestershire, BS36 2PZ		RBH1

Job No	Date	Ground Level m	Coordinates E / N
OE/1702/1057	11/01/2024	19.5m AOD	

Contractor: Apex Drilling Services

Sheet: 2 of 3

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
10.0				10.50			MUDSTONE with SANDSTONE bands		Arisings
11.0									
12.0									
13.0									
14.0						14.30			
15.0									
16.0									
				3.50		0.60	Void		
17.0				2.90		0.50	Backfill material - rockfill - mudstone		
				2.40			MUDSTONE with SANDSTONE bands Intact rock		
18.0									
						4.90			
19.0									
20.0				-0.50			Rotary Borehole RBH1 continues to 22.0m bgl - Page 3 of 3		

GENERAL REMARKS

No water strikes.

All dimensions in metres Scale 1:10	Client: White Horse Homes Limited	Method/ Plant used: Rotary Rig	Logged by: LS

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BORE HOLE LOG

OBSIDIAN ENVIRONMENTAL

Project		Borehole No
22, Alexander Road, Frampton Cotteril, South Gloucestershire, BS36 2PZ		RBH1

Job No	Date	Ground Level m	Coordinates E / N
OE/1702/1057	11/01/2024	19.5m AOD	

Contractor: Apex Drilling Services

Sheet: 3 of 3

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
				-0.50			MUDSTONE with SANDSTONE bands		Arisings
1.0						4.90			
2.0							MUDSTONE with SANDSTONE bands		
				-2.50			End of Rotary Borehole RBH1 at 22.0m bgl		
3.0									
4.0									
5.0									
6.0									
7.0									
8.0									
9.0									
10.0									

GENERAL REMARKS

No water strikes.

All dimensions in metres Scale 1:10	Client	Method/ Plant used	Logged by
	White Horse Homes Limited	Rotary Rig	LS

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BORE HOLE LOG

OBSIDIAN ENVIRONMENTAL

Project		Bore Hole No
22, Alexander Road, Frampton Cotteril, South Gloucestershire, BS36 2PZ		RBH2

Job No	Date	Ground Level m	Coordinates E / N
OE/1702/1057	11/01/2024	Site Datum 19.4m	

Contractor: Apex Drilling Services

Sheet: 1 of 4

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
				19.40		0.70	Made Ground (MG) - Rock fill		Last 1.0m bentonite cement mix
1.0						1.90	Natural soil - soft orange CLAY		
2.0									
3.0						17.20	MUDSTONE with SANDSTONE bands		
4.0									
5.0									
6.0									
7.0									
8.0									
9.0									
10.0				9.40			Rotary Borehole RBH2 continues to 32.0m bgl		

GENERAL REMARKS

No water strikes.

All dimensions in metres Scale 1:10	Client	Method/ Plant used	Logged by
	White Horse Homes Limited	Rotary Rig	LS

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BORE HOLE LOG

OBSIDIAN ENVIRONMENTAL

Project		Bore Hole No
22, Alexander Road, Frampton Cotteril, South Gloucestershire, BS36 2PZ		RBH2

Job No	Date	Ground Level m	Coordinates E / N
OE/1702/1057	11/01/2024	Site Datum 19.4m	

Contractor: Apex Drilling Services

Sheet: 2 of 4

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
10.0				9.40			MUDSTONE with SANDSTONE bands		Arisings
11.0									
12.0									
13.0									
14.0									
15.0									
16.0									
						17.20			
17.0									
18.0									
19.0									
							Rotary Borehole RBH2 continues to 32.0m bgl		
				-0.40			MUDSTONE with SANDSTONE bands		
20.0				-0.60		0.40	Coal		

GENERAL REMARKS

No water strikes.

All dimensions in metres Scale 1:10	Client	Method/ Plant used	Logged by
	White Horse Homes Limited	Rotary Rig	LS

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BORE HOLE LOG

OBSIDIAN ENVIRONMENTAL

Project		Bore Hole No
22, Alexander Road, Frampton Cotteril, South Gloucestershire, BS36 2PZ		RBH2

Job No	Date	Ground Level m	Coordinates E / N
OE/1702/1057	11/01/2024	Site Datum 19.4m	

Contractor: Apex Drilling Services

Sheet: 3 of 4

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
20.0				-0.60		0.40	Coal contd.		Arisings
				-0.80			MUDSTONE with SANDSTONE bands		
21.0									
22.0									
						11.80			
23.0									
24.0									
25.0									
26.0									
27.0									
28.0									
29.0									
30.0				-10.60			MUDSTONE with SANDSTONE bands Rotary Borehole RBH2 continues to 32.0m bgl		

GENERAL REMARKS

No water strikes.

All dimensions in metres Scale 1:10	Client White Horse Homes Limited	Method/ Plant used Rotary Rig	Logged by LS

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BORE HOLE LOG

OBSIDIAN ENVIRONMENTAL

Project		Bore Hole No
22, Alexander Road, Frampton Cotteril, South Gloucestershire, BS36 2PZ		RBH2

Job No	Date	Ground Level m	Coordinates E / N
OE/1702/1057	11/01/2024	Site Datum 19.4m	

Contractor: Apex Drilling Services

Sheet: 4 of 4

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
30.00				-10.60			MUDSTONE with SANDSTONE bands		Arisings
31.0						11.80			
32.0							MUDSTONE with SANDSTONE bands		
				-12.60			End of Rotary Borehole RBH2 at 32.0m bgl		
33.0									
34.0									
35.0									
36.0									
37.0									
38.0									
39.0									
40.0									

GENERAL REMARKS

No water strikes.

All dimensions in metres Scale 1:10	Client: White Horse Homes Limited	Method/ Plant used: Rotary Rig	Logged by: LS

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BORE HOLE LOG

OBSIDIAN ENVIRONMENTAL

Project		Bore Hole No
22, Alexander Road, Frampton Cotteril, South Gloucestershire, BS36 2PZ		RBH3
Job No: OE/1702/1057	Date: 12/01/2024	Ground Level m: Site Datum 19.25m; Coordinates E N
Contractor: Apex Drilling Services		Sheet: 1 of 4

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
				19.25		0.70	Made Ground (MG) - Tarmac over rock fill and clay		Last 1.0m bentonite & cement
1.0				18.55		1.70	Natural soil - soft orange CLAY		Arisings
2.0									
				16.85		0.30	Coal		
				16.55			MUDSTONE with SANDSTONE bands		
3.0									
4.0									
5.0						17.30			
6.0									
7.0									
8.0									
9.0									
10.0				9.25			MUDSTONE with SANDSTONE bands Rotary Borehole RBH3 continues to 32.0m bgl - sheet 4 of 4		

GENERAL REMARKS

No water strikes.

All dimensions in metres Scale 1:10	Client: White Horse Homes Limited	Method/ Plant used: Rotary Rig	Logged by: LS

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BORE HOLE LOG

OBSIDIAN ENVIRONMENTAL

Project		Bore Hole No
22, Alexander Road, Frampton Cotteril, South Gloucestershire, BS36 2PZ		RBH3
Job No: OE/1702/1057	Date: 12/01/2024	Ground Level m: Site Datum 19.25m; Coordinates E N
Contractor: Apex Drilling Services		Sheet: 2 of 4

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
10.0				9.25			MUDSTONE with SANDSTONE bands		Arisings
11.0									
12.0									
13.0									
14.0									
						17.30			
15.0									
16.0									
17.0									
18.0									
19.0									
20.0				-0.75			MUDSTONE with SANDSTONE bands Rotary Borehole RBH3 continues to 32.0m bgl - sheet 4 of 4		

GENERAL REMARKS

No water strikes.

All dimensions in metres Scale 1:10	Client: White Horse Homes Limited	Method/ Plant used: Rotary Rig	Logged by: LS

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BORE HOLE LOG

OBSIDIAN ENVIRONMENTAL

Project		Bore Hole No
22, Alexander Road, Frampton Cotteril, South Gloucestershire, BS36 2PZ		RBH3
Job No: OE/1702/1057	Date: 12/01/2024	Ground Level m: Site Datum 19.25m; Coordinates E N
Contractor: Apex Drilling Services		Sheet: 3 of 4

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
20.0				-0.75		0.50	Coal - unworked		Arisings
							MUDSTONE with SANDSTONE bands		
21.0									
22.0									
23.0									
24.0									
						11.50			
25.0									
26.0									
27.0									
28.0									
29.0									
30.0				-10.25			MUDSTONE with SANDSTONE bands Rotary Borehole RBH3 continues to 32.0m bgl - sheet 4 of 4		

GENERAL REMARKS

No water strikes.

All dimensions in metres Scale 1:10	Client: White Horse Homes Limited	Method/ Plant used: Rotary Rig	Logged by: LS

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BORE HOLE LOG

OBSIDIAN ENVIRONMENTAL

Project				Bore Hole No
22, Alexander Road, Frampton Cotteril, South Gloucestershire, BS36 2PZ				
Job No OE/1702/1057	Date 12/01/2024	Ground Level m Site Datum 19.25m	Coordinates E N	**RBH3**
Contractor Apex Drilling Services				Sheet 4 of 4

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
30.0				-10.50		11.50	MUDSTONE with SANDSTONE bands		Arisings
31.0									
32.0				-12.50			MUDSTONE with SANDSTONE bands End of Rotary Borehole RBH3 at 32.0m bgl		
33.0									
34.0									
35.0						17.30			
36.0									
37.0									
38.0									
39.0									
40.0				9.25					

GENERAL REMARKS

No water strikes.

All dimensions in metres Scale 1:10	Client White Horse Homes Limited	Method/ Plant used Rotary Rig	Logged by LS

APPENDIX D - Geotechnical Testing Results

IAN FARMER ASSOCIATES

Unit 4, Faraday Close, Pattinson North Industrial Estate, Washington, NE38 8QJ Tel: 0191 482 8500
washington@ianfarmer.co.uk www.ianfarmer.co.uk

Envirolab
Housesteads,
Off Stockport Road,
Hattersley,
SK14 3QU

F.A.O.

Final Test Report - 2281835 / 1

Site:	Obsidian Alexander Road
Job Number:	2281835
Originating Client:	Envirolab
Originating Reference:	23/12620
Date Sampled:	Not Given
Date Scheduled:	03/01/2024
Date Testing Started:	08/01/2024
Date Testing Finished:	11/01/2024

Previous Reports		Amendments	Date Issued

Amendments:

Authorised By: [redacted]

Tim Robinson
Quality Supervisor

Report Issue Date: 11/01/2024

IAN FARMER ASSOCIATES

Laboratory Test Report	2281835 / 1

Site: Obsidian Alexander Road **Job Number:** 2281835

Client: Envirolab **Page:** 2

Determination of Moisture Content, Liquid Limit and Plastic Limit and Derivation of Plasticity and Liquidity Index

Borehole / Trial Pit	Depth (m)	Sample	Natural Moisture Content %	Natural - Stones removed by hand Sieved - Washed on 425 µm sieve			Liquid Limit %	Plastic Limit %	Plasticity Index %	Liquidity Index	Class	Description / Remarks
				Natural / Sieved	Percentage Passing %	Moisture Content %						
WS2	1.30	D	32	Natural	100	32	49	19	30	0.43	CI	Brown/Grey slightly silty, slightly gravelly CLAY

Method of Preparation: BS 1377 : Part 1 : 1990 : Clause 7 Preparation of disturbed samples for testing
BS 1377 : Part 1 : 2016 : Clause 8.4.3 Preparation of samples for plasticity tests
BS 1377 : Part 2 : 1990 : Clause 4.2 Preparation of samples for plastic limit tests

Method of Test: BS 1377 : Part 2 : 1990 : Clause 3.2 Determination of moisture content
BS 1377 : Part 2 : 1990 : Clause 4.3 or 4.4 Determination of the liquid limit
BS 1377 : Part 2 : 1990 : Clause 5.3 Determination of the plastic limit and plasticity index

UKAS TESTING
1464

Results reported relate only to the samples tested.

Final Test Report - 2281835 / 1

Site:	Obsidian Alexander Road
Job Number:	2281835
Originating Client:	Envirolab

All opinions and interpretations contained within this report are outside of our Scope of Accreditation.

Samples will be retained for 28 days from date of issue of the final test report before being disposed of, unless we receive written instruction to the contrary.

Report End

Report Issue Date: 11/01/2024

APPENDIX E - Chemical Testing Results

envirolab
Hattersley Science & Technology Park
Stockport Road, Hattersley, SK14 3QU

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 23/12620
Issue Number: 1 **Date:** 11 January, 2024

Client:
Obsidian Environmental Ltd
The Foundry Business Centre
Marcus Street
Birkenhead
Wirral
UK
CH41 1EU

Project Manager: Leon Stanger
Project Name: Alexander Road Frampton Cotteril
Project Ref: OE/1702/1057
Order No: OE/1702/1057/LS/276
Date Samples Received: 20/12/23
Date Instructions Received: 20/12/23
Date Analysis Completed: 11/01/24

Approved by:

[redacted]

Sophie France
Client Manager

Envirolab Job Number: 23/12620

Client Project Name: Alexander Road Frampton Cotteril

Client Project Ref: OE/1702/1057

Lab Sample ID	23/12620/1	23/12620/2	23/12620/3	23/12620/4	23/12620/5	23/12620/6		Units	Limit of Detection	Method ref
Client Sample No	A	A	B	A	A	A				
Client Sample ID	WS1	WS2	WS2	WS3	WS4	WS5				
Depth to Top	0.30	0.30	1.30	0.40	0.60	0.7				
Depth To Bottom						0.8				
Date Sampled	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23				
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D				
Sample Matrix Code	3A	3	3	3	3	3				
% Stones >10mm$_A$	1.6	<0.1	<0.1	<0.1	<0.1	<0.1		% w/w	0.1	A-T-044
pH$_D$ M#	7.92	8.05	7.32	7.91	8.20	11.27		pH	0.01	A-T-031s
pH BRE$_D$ M#	-	-	7.32	-	-	-		pH	0.01	A-T-031s
Ammonium NH4 BRE (water sol 2:1)$_D$	-	-	<1.00	-	-	-		mg/l	1	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1)$_D$ M#	-	-	<7	-	-	-		mg/l	7	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1)$_D$	-	-	6.4	-	-	-		mg/l	0.4	A-T-026s
Sulphate (water sol 2:1)$_D$ M#	<0.01	<0.01	<0.01	<0.01	0.01	0.03		g/l	0.01	A-T-026s
Sulphate BRE (water sol 2:1)$_D$ M#	-	-	<10	-	-	-		mg/l	10	A-T-026s
Sulphate BRE (acid sol)$_D$ M#	-	-	<0.02	-	-	-		% w/w	0.02	A-T-028s
Sulphur (total)$_D$	769	757	67	63	725	2000		mg/kg	50	A-T-024s
Sulphur BRE (total)$_D$	-	-	<0.01	-	-	-		% w/w	0.01	A-T-024s
Magnesium BRE (water sol 2:1)$_D$	-	-	<1	-	-	-		mg/l	1	A-T-SOLMETS
Cyanide (free)$_A$ M#	<1	<1	<1	<1	<1	<1		mg/kg	1	A-T-042sFCN
Cyanide (total)$_A$ M#	<1	<1	<1	<1	<1	2		mg/kg	1	A-T-042sTCN
Thiocyanate$_A$	<5	<5	<5	<5	<5	<5		mg/kg	5	A-T-041s
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		mg/kg	0.2	A-T-050s
Sulphide$_A$	<5	<5	<5	<5	<5	<5		mg/kg	5	A-T-043-s
Total Organic Carbon$_D$ M#	11	12.4	0.28	6.79	12.6	6.76		% w/w	0.03	A-T-032s
Arsenic$_D$ M#	21	20	16	14	21	17		mg/kg	1	A-T-024s
Barium$_D$	419	267	50	47	271	365		mg/kg	1	A-T-024s
Beryllium$_D$	1.1	1.0	0.7	0.6	1.0	0.6		mg/kg	0.5	A-T-024s
Boron (water soluble)$_D$ M#	<1.0	1.3	<1.0	<1.0	<1.0	1.2		mg/kg	1	A-T-027s
Cadmium$_D$ M#	1.2	0.8	<0.5	<0.5	0.6	2.2		mg/kg	0.5	A-T-024s
Copper$_D$ M#	313	40	24	22	37	60		mg/kg	1	A-T-024s
Chromium$_D$ M#	20	17	24	22	18	20		mg/kg	1	A-T-024s
Lead$_D$ M#	727	176	11	10	68	253		mg/kg	1	A-T-024s
Mercury$_D$	0.20	<0.17	<0.17	<0.17	<0.17	<0.17		mg/kg	0.17	A-T-024s
Molybdenum$_D$ M#	2	2	<1	<1	2	1		mg/kg	1	A-T-024s
Nickel$_D$ M#	27	26	15	14	26	20		mg/kg	1	A-T-024s
Selenium$_D$ M#	<1	1	<1	<1	<1	<1		mg/kg	1	A-T-024s
Vanadium$_D$ M#	24	22	24	22	23	25		mg/kg	1	A-T-024s
Zinc$_D$ M#	314	141	61	58	115	316		mg/kg	5	A-T-024s
Mineral Oil (>C10-C40)$_A$	27	40	<10	<30	16	1130		mg/kg	10	A-T-007s

Envirolab Job Number: 23/12620

Client Project Name: Alexander Road Frampton Cotteril

Client Project Ref: OE/1702/1057

Lab Sample ID	23/12620/1	23/12620/2	23/12620/3	23/12620/4	23/12620/5	23/12620/6		Units	Limit of Detection	Method ref
Client Sample No	A	A	B	A	A	A				
Client Sample ID	WS1	WS2	WS2	WS3	WS4	WS5				
Depth to Top	0.30	0.30	1.30	0.40	0.60	0.7				
Depth To Bottom						0.8				
Date Sampled	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23				
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D				
Sample Matrix Code	3A	3	3	3	3	3				
(1.01) Item 1a Moisture Content of Soil (Oven Dried Method)$_A^\#$	-	-	ppended	-	-	-				Subcon IFA
(1.02) Item 2.4 4 Point Liquid & Plastic Limit by Cone Penetrometer$_A^\#$	-	-	Appended	-	-	-				Subcon IFA

Envirolab Job Number: 23/12620

Client Project Name: Alexander Road Frampton Cotteril

Client Project Ref: OE/1702/1057

Lab Sample ID	23/12620/1	23/12620/2	23/12620/3	23/12620/4	23/12620/5	23/12620/6		Units	Limit of Detection	Method ref
Client Sample No	A	A	B	A	A	A				
Client Sample ID	WS1	WS2	WS2	WS3	WS4	WS5				
Depth to Top	0.30	0.30	1.30	0.40	0.60	0.7				
Depth To Bottom						0.8				
Date Sampled	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23				
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D				
Sample Matrix Code	3A	3	3	3	3	3				
Asbestos in Soil (inc. matrix) ^										
Asbestos in soil$_D^{\#}$	NAD	NAD	NAD	NAD	NAD	NAD				A-T-045
Asbestos Matrix (visual)$_D$	-	-	-	-	-	-				A-T-045
Asbestos Matrix (microscope)$_D$	-	-	-	-	-	-				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

Envirolab Job Number: 23/12620

Client Project Name: Alexander Road Frampton Cotteril

Client Project Ref: OE/1702/1057

Lab Sample ID	23/12620/1	23/12620/2	23/12620/3	23/12620/4	23/12620/5	23/12620/6		Units	Limit of Detection	Method ref
Client Sample No	A	A	B	A	A	A				
Client Sample ID	WS1	WS2	WS2	WS3	WS4	WS5				
Depth to Top	0.30	0.30	1.30	0.40	0.60	0.7				
Depth To Bottom						0.8				
Date Sampled	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23				
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D				
Sample Matrix Code	3A	3	3	3	3	3				
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.06	<0.04	<0.04	<0.04	<0.04	0.05		mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	0.06		mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.10	<0.05	<0.05	<0.05	<0.05	0.10		mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07		mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	0.10	<0.06	<0.06	<0.06	<0.06	0.09		mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A$	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	0.16	<0.08	<0.08	<0.08	<0.08	0.11		mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	0.05		mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03		mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	0.10	<0.03	<0.03	<0.03	<0.03	0.11		mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	0.14	<0.07	<0.07	<0.07	<0.07	0.13		mg/kg	0.07	A-T-019s
Total PAH-16MS$_A$	0.66	<0.08	<0.08	<0.08	<0.08	0.70		mg/kg	0.01	A-T-019s

Envirolab Job Number: 23/12620

Client Project Name: Alexander Road Frampton Cotteril

Client Project Ref: OE/1702/1057

Lab Sample ID	23/12620/1	23/12620/2	23/12620/3	23/12620/4	23/12620/5	23/12620/6		Units	Limit of Detection	Method ref
Client Sample No	A	A	B	A	A	A				
Client Sample ID	WS1	WS2	WS2	WS3	WS4	WS5				
Depth to Top	0.30	0.30	1.30	0.40	0.60	0.7				
Depth To Bottom						0.8				
Date Sampled	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23	19-Dec-23				
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D				
Sample Matrix Code	3A	3	3	3	3	3				
TPH UKCWG with Clean Up										
Ali >C5-C6$_A$	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
Ali >C6-C8$_A$	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	4	8	<1	1	4	<1		mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	4	8	<1	1	4	2		mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	5	14	<1	2	6	34		mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	5	13	<1	2	5	108		mg/kg	1	A-T-055s
Ali >C21-C35$_A^{M\#}$	21	17	<1	9	15	54		mg/kg	1	A-T-055s
Ali >C35-C44$_A$	4	<1	<1	2	<1	13		mg/kg	1	A-T-055s
Total Aliphatics$_A$	41	59	<1	19	33	211		mg/kg	1	Calc-As Recd
Aro >C5-C7$_A^{\#}$	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.05	<0.05	<0.01	0.02	<0.01	<0.01		mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	2	3	<1	2	2	<1		mg/kg	1	A-T-055s
Aro >C10-C12$_A$	4	6	<1	2	4	1		mg/kg	1	A-T-055s
Aro >C12-C16$_A$	14	23	<1	6	15	17		mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	23	32	<1	8	22	43		mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	58	49	<1	21	49	16		mg/kg	1	A-T-055s
Aro >C35-C44$_A$	5	<1	<1	1	2	2		mg/kg	1	A-T-055s
Total Aromatics$_A$	106	114	<1	41	95	80		mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C44)$_A$	147	173	<1	60	129	290		mg/kg	1	Calc-As Recd
BTEX - Benzene$_A^{\#}$	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.05	<0.05	<0.01	0.02	<0.01	<0.01		mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s

Report Notes

General
This report shall not be reproduced, except in full, without written approval from Envirolab.
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 **six 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.
The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client.
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.

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 "^"	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
N/A	Not applicable

Asbestos
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
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing, and fibre counting by sedimentation/phase contrast optical microscopy if required. 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) quantification by sedimentation is performed. 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.

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 @ 25ºC / 11550µS/cm @ 20ºC fall outside the accreditation 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: Obsidian Environmental Ltd, The Foundry Business Centre, Marcus Street, Birkenhead, Wirral, UK, CH41 1EU

Project: Alexander Road Frampton Cotteril

Clients Project No: OE/1702/1057

Project No: 23/12620

Date Received: 20/12/2023 (am)

Cool Box Temperatures (°C):

NO DEVIATIONS IDENTIFIED

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, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	23/12620/1	23/12620/2	23/12620/3	23/12620/4	23/12620/5	23/12620/6
Client Sample No	A	A	B	A	A	A
Client Sample ID/Depth	WS1 0.30m	WS2 0.30m	WS2 1.30m	WS3 0.40m	WS4 0.60m	WS5 0.7-0.8m
Date Sampled	19/12/23	19/12/23	19/12/23	19/12/23	19/12/23	19/12/23
A-T-007s	03/01/2024	03/01/2024	03/01/2024	03/01/2024	03/01/2024	03/01/2024
A-T-019s	02/01/2024	02/01/2024	02/01/2024	02/01/2024	02/01/2024	02/01/2024
A-T-022s	03/01/2024	03/01/2024	02/01/2024	02/01/2024	02/01/2024	02/01/2024
A-T-024s	03/01/2024	03/01/2024	03/01/2024	03/01/2024	03/01/2024	03/01/2024
A-T-026s	02/01/2024	02/01/2024	02/01/2024	02/01/2024	02/01/2024	02/01/2024
A-T-027s	02/01/2024	02/01/2024	02/01/2024	02/01/2024	02/01/2024	02/01/2024
A-T-028s			22/12/2023			
A-T-031s	22/12/2023	22/12/2023	22/12/2023	22/12/2023	22/12/2023	22/12/2023
A-T-032s	05/01/2024	05/01/2024	05/01/2024	05/01/2024	05/01/2024	05/01/2024
A-T-033s			02/01/2024			
A-T-041s	02/01/2024	02/01/2024	02/01/2024	02/01/2024	02/01/2024	02/01/2024
A-T-042sFCN	22/12/2023	22/12/2023	22/12/2023	22/12/2023	22/12/2023	04/01/2024
A-T-042sTCN	22/12/2023	22/12/2023	22/12/2023	22/12/2023	22/12/2023	22/12/2023
A-T-043-s	21/12/2023	21/12/2023	21/12/2023	21/12/2023	21/12/2023	21/12/2023
A-T-044	22/12/2023	22/12/2023	22/12/2023	22/12/2023	22/12/2023	22/12/2023
A-T-045	21/12/2023	21/12/2023	21/12/2023	21/12/2023	21/12/2023	21/12/2023
A-T-050s	08/01/2024	08/01/2024	08/01/2024	08/01/2024	08/01/2024	08/01/2024
A-T-055s	22/12/2023	22/12/2023	22/12/2023	22/12/2023	22/12/2023	22/12/2023
A-T-SOLMETS			03/01/2024			
Calc-As Recd	03/01/2024	03/01/2024	02/01/2024	02/01/2024	02/01/2024	02/01/2024

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

APPENDIX F - Chemical Assessment Criteria

Maximum Allowable Levels Human Health Risk Assessment Criteria – Residential with plant uptake

Determinant	Residential with plant uptake 1% SOM (mg/kg) LQM/CIEH S4ULs	Criteria
Arsenic	37	LQM/CIEH/S4ULs
Beryllium	1.7	LQM/CIEH/S4ULs
Boron	290	LQM/CIEH/S4ULs
Cadmium	11	LQM/CIEH/S4ULs
Chromium	910	LQM/CIEH/S4ULs
Copper	2400	LQM/CIEH/S4ULs
Mercury	<1	GAC
Molybdenum	4	GAC
Nickel	180	LQM/CIEH/S4ULs
Lead	200	(c4sl)
Selenium	250	LQM/CIEH/S4ULs
Vanadium	410	LQM/CIEH/S4ULs
Zinc	370	LQM/CIEH/S4ULs
SPECIATED TPH CWG		
Aliphatic		
EC 5-6	42	LQM/CIEH/S4ULs
EC> 6-8	100	LQM/CIEH/S4ULs
EC> 8-10	27	LQM/CIEH/S4ULs
EC> 10-12	130	LQM/CIEH/S4ULs
EC> 12-16	1100	LQM/CIEH/S4ULs
EC> 16-21	65000	LQM/CIEH/S4ULs
EC> 21-35	65000	LQM/CIEH/S4ULs
Aromatic		
EC 6-7(benzene)	70	LQM/CIEH/S4ULs
EC> 7-8 (toluene)	130	LQM/CIEH/S4ULs
EC>8-10	34	LQM/CIEH/S4ULs
EC<10-12	74	LQM/CIEH/S4ULs
EC<12-16	140	LQM/CIEH/S4ULs
EC<16-21	260	LQM/CIEH/S4ULs
EC<21-35	1100	LQM/CIEH/S4ULs
BTEX		
Benzene	0.087	LQM/CIEH/S4ULs
Toluene	130	LQM/CIEH/S4ULs
Ethylbenzene	47	LQM/CIEH/S4ULs
Xylenes	56	LQM/CIEH/S4ULs

SPECIATED PAH	mg/kg	
Acenaphthene	210	LQM/CIEH/S4ULs
Acenaphthylene	170	LQM/CIEH/S4ULs
Anthracene	2400	LQM/CIEH/S4ULs
Benzo(a)anthracene	7.2	LQM/CIEH/S4ULs
Benzo(a)pyrene	2.2	LQM/CIEH/S4ULs
Benzo(b)fluorathene	2.6	LQM/CIEH/S4ULs
Benzo(ghi)perylene	320	LQM/CIEH/S4ULs
Benzo(k)fluorathene	77	LQM/CIEH/S4ULs
Chrysene	15	LQM/CIEH/S4ULs
Dibenzo(ah)anthracene	0.24	LQM/CIEH/S4ULs
Fluoranthene	280	LQM/CIEH/S4ULs
Fluorene	170	LQM/CIEH/S4ULs
Indeno(123-ed) pyrene	27	LQM/CIEH/S4ULs
Naphthalene	2.3	LQM/CIEH/S4ULs
Phenanthrene	95	LQM/CIEH/S4ULs
Pyrene	620	LQM/CIEH/S4ULs

VOCs/SVOCs	mg/kg	
Vinyl Chloride	0.0064	LQM/CIEH/S4ULs 2021
Trichloroethene	0.0093	LQM/CIEH/S4ULs 2021
Tetrachloroethene	0.31	LQM/CIEH/S4ULs 2021

2021

APPENDIX G - Ground Gas Results

Project: 22a & 22b, Alexander Road, Frampton Cotteril, South Gloucestershire, , BS36 2PZ - Ground Gas Monitoring Results (2024)
Ref: OE/1702/1057/R3

A single round of ground gas measurements has been taken within the three Window Sample holes WS1, WS3 & WS4. The results are detailed below:

Table 1 – Ground Gas Measurements

Location	Date	Time	Water Level (M) bgl	Methane (CH_4)	Carbon Dioxide (CO_2)	Oxygen (O_2)	Carbon Monoxide (CO)	Balance (N_2)	Atmospheric Pressure (mbars)	Peak Flow (l/hr)	Steady Flow (l/hr)	Atmospheric Pressure Falling/Rising	Weather	Temp.
WS1	11/01/2024	09:00	1.25	0.0	1.9	18.1	0.0	80.4	1030	1.0	0.0	Static	Sunny	3°
WS3	11/01/2024	0920	0.75	0.0	0.2	19.8	0.0	80.0	1030	0.0	-0.1	Static	Sunny	3°
WS4	11/01/2024	10:40	Dry	0.0	1.2	18.9	0.0	80.1	1030	0.0	-0.1	Static	Sunny	3°

Table 2 - Gas Screening Values (GSV) & Characterisation

Location	Date	Highest Recorded Methane or Carbon Dioxide	Peak Flow Value	Calculation	GSV Result	Characteristic Situation
WS1	11/01/2024	0.0019	1.0	0.0019	<0.07	1
WS3	11/01/2024	0.2	0.0	0	<0.07	1
WS4	11/01/2024	1.2	0.0	0	<0.07	1

It should be noted that from the Phase I Geoenvironmental Assessment that Radon Gas in the general area is elevated and consequently, and Radon Gas Mitigation Measures will be required.

APPENDIX H - Copy of Planning Permission

South Gloucestershire Council

Delivering for you

David Cahill Design Consultants Ltd
Unit 2, Office 4
Tower Lane Business Park
Tower Lane
Warmley
South Gloucestershire
BS30 8XT

APP REF: P23/00067/F
DATE VALID: 17th April 2023
DECISION DATE: 1st December 2023
PARISH: Frampton Cotterell Parish Council

NOTICE OF DECISION
TOWN AND COUNTRY PLANNING ACT 1990

South Gloucestershire Council in pursuance of powers under the above mentioned Act hereby PERMIT:

APPLICATION NO: P23/00067/F

DESCRIPTION OF DEVELOPMENT: Demolition of existing dwellings. Erection of 5 no. detached dwelling with associated access and parking

APPLICANT: Whitehorse Homes Ltd

LOCATION: Land At The Depot 22 Alexandra Road Coalpit Heath South Gloucestershire BS36 2PZ

In accordance with the application and accompanying plans, subject to the conditions specified below:

1. The development hereby permitted shall be begun before the expiration of three years from the date of this permission.

   Reason
   To comply with the requirements of Section 91 of the Town & Country Planning Act 1990 (as amended).

South Gloucestershire Council

Delivering for you

2. No development shall commence until;
a) a scheme of intrusive investigations has been carried out on site to establish the risks posed to the development by past shallow coal mining activity; and
b) any remediation works and/or mitigation measures to address land instability arising from coal mining legacy, as may be necessary, have been implemented on site in full in order to ensure that the site is made safe and stable for the development proposed.

The intrusive site investigations and remedial works shall be carried out in accordance with authoritative UK guidance.

Reason
The undertaking of intrusive site investigations, prior to the commencement of development, is necessary to ensure that adequate information pertaining to ground conditions and coal mining legacy is available to enable appropriate remedial and mitigatory measures to be identified and carried out before building works commence on site. This is in order to ensure the safety and stability of the development, in accordance with paragraphs 183 and 184 of the National Planning Policy Framework.

3. No development shall commence until surface water drainage details including SUDS (Sustainable Drainage Systems e.g. soakaways if ground conditions are satisfactory), for flood prevention; pollution control and environmental protection have been submitted and approved by the Local Planning Authority. Development shall be carried out in accordance with the agreed details.

Full planning application - A detailed development layout showing the location of surface water proposals is required along with results of percolation tests and infiltration calculations to demonstrate that the proposal is suitable for this site.

Reason
To comply with South Gloucestershire Local Plan: Policies, Sites and Plans Plan (Adopted) November 2017 Policy PSP20; South Gloucestershire Local Plan: South Gloucestershire Local Plan: Core Strategy (Adopted) December 2013 Policy CS1 and Policy CS9; and National Planning Policy Framework.

This condition is pre-commencement to avoid unnecessary remedial works.

4. A site-specific Construction Environmental Management Plan (CEMP), shall be agreed in writing with the Local Planning Authority prior to commencement of work. The CEMP as approved by the Council shall be fully complied with at all times.

The CEMP shall include but not necessarily be limited to:

(i) Measures to control the tracking of mud off-site from vehicles.
(ii) Measures to control dust from the demolition and construction works approved.
(iii) Adequate provision for the delivery and storage of materials.
(iv) Adequate provision for contractor parking.
(v) A lorry routing schedule, to include access from Church Road and Alexandra Road only. Measures to coordinate the arrival and departure of construction and delivery vehicles to avoid conflict.
(vi) Highway condition surveys of Alexandra Road including photographs carried prior to commencement of the development and after completion. The condition surveys are to be carried out jointly with a representative from the Local Highway Authority (LHA) Streetcare Team. Any damage to the highway caused as a result of the construction works will need to be repaired to the satisfaction of the LHA representative.
(vii)Temporary access arrangements for construction traffic.
(viii) Details of Main Contractor including membership of Considerate Constructors scheme or similar.
(ix) Site Manager contact details.
(x) Processes for keeping local residents and businesses informed of works being carried out and dealing with complaints.

Reason
In the interests highway safety and to accord with Policies PSP11 of the South Gloucestershire Local Plan: Policies, Sites and Places Plan (Adopted) November 2017.

This condition is pre-commencement to avoid unnecessary remedial works.

5. Prior to the commencement of development a programme of archaeological investigation and recording for the site shall be submitted to and approved by the Local Planning Authority. Thereafter, the approved programme shall be implemented in all respects, unless the Local Planning Authority agrees in writing to any variation.

Reason
In the interest of archaeological investigation or recording, and to accord with Policy CS9 of the South Gloucestershire Local Plan: Core Strategy (Adopted) December 2013 and the National Planning Policy Framework.

6. Prior to the commencement of the relevant part of the development details/samples of the roofing and external facing materials proposed to be used shall be submitted to and approved in writing by the Local Planning Authority. Development shall be carried out in accordance with the approved details.

Reason
To ensure a satisfactory standard of external appearance and to accord with Policy CS1 of the South Gloucestershire Local Plan: Core Strategy (Adopted) December 2013; and the National Planning Policy Framework.

7. Prior to occupation of any dwelling, a hard and soft landscape plan shall be submitted to the local planning authority for approval. Said plan shall include full details of all hard surface finishes and boundary treatments, and all proposed planting (to include species, location and stock size). Hard landscaping shall be implemented as approved prior to occupation of any dwelling, and soft landscaping in the first available planting season following occupation of each dwelling.

Reason
To ensure a satisfactory standard of external appearance and to accord with Policy CS1 of the South Gloucestershire Local Plan: Core Strategy (Adopted) December 2013; and the National Planning Policy Framework.

8. Prior to the occupation of the development, or it being taken into beneficial use, a signed statement or declaration prepared by a suitably competent person confirming that the site is, or has been made, safe and stable for the approved development shall be submitted to the Local Planning Authority for approval in writing. This document shall confirm the methods and findings of the intrusive site investigations and the completion of any remedial works and/or mitigation necessary to address the risks posed by past coal mining activity.

Reason
To ensure that the site is safe for its intended use and remains so, in conjunction with condition 2.

9. Development shall proceed at all times in accordance with the submitted arboricultural report (Silverback, July 2023).

Reason

To ensure that retained trees are protected appropriately and to accord with PSP3 of the South Gloucestershire Local Plan: Policies Sites and Places Plan (Adopted) November 2017.

10. The rear first floor windows shall be obscured as described on plan 3432/103 (plot 2 and 3 plans and elevations - as received 13th April 2023) to a level 3 standard or above. Notwithstanding the submitted plan, this shall apply to both plots 1 and 3.

Reason
To preserve the amenity of neighbouring occupiers and to accord with PSP8 of the South Gloucestershire Local Plan: Policies Sites and Places Plan (Adopted) November 2017.

11. Prior to the use or occupation of the dwelling on plot 5 hereby permitted, and at all times thereafter, the first floor East facing part of the bay window to plot 5 and the first floor East side elevation window (plot 5) shall be glazed with obscure glass to level 3 standard or above with any opening part of the window being above 1.7m above the floor of the room in which it is installed'.

Reason
To preserve the amenity of neighbouring occupiers and to accord with PSP8 of the South Gloucestershire Local Plan: Policies Sites and Places Plan (Adopted) November 2017.

12. No windows other than those shown on the plans hereby approved shall be inserted at any time in the elevations of the dwellings.

Reason
To preserve the amenity of neighbouring occupiers and to accord with PSP8 of the South Gloucestershire Local Plan: Policies Sites and Places Plan (Adopted) November 2017.

13. Notwithstanding the provisions of Schedule 2 of the Town & Country Planning (General Permitted Development) (England) Order 2015 (or any Order revoking and re-enacting that Order with or without modification) no development as specified in Part 1 (Classes A, AA, B, and C), other than such development or operations indicated on the plans hereby approved, shall be carried out without the prior written consent of the Local Planning Authority.

Reason

In view of the plot size and constrained nature of the site, this condition is necessary to allow the LPA to retain control over future additions in the interest of preserving the amenities of neighbouring occupiers.

14. The dwellings shall not be occupied until the footway improvement works and accesses have been completed in accordance with the submitted details drawing no. 3432/102 Rev B (proposed site plan, as received 8th June 2023).

Reason
In the interest of highway safety and to accord with Policy PSP11 of the South Gloucestershire Local Plan: Policies Sites and Places Plan (Adopted) November 2017.

15. The dwellings shall not be occupied until the car and cycle parking arrangements have been provided in accordance with the submitted details plus a cycle store for plot 5. Parking facilities shall be retained thereafter.

Reason
In the interest of highway safety, to promote sustainable travel and to accord with Policies PSP11 and 16 of the South Gloucestershire Local Plan: Policies Sites and Places Plan (Adopted) November 2017.

16. Development shall be implemented in accordance with the following plans:

3432/100 - existing site plan
3432/102 - plot 1: plans and elevations
3432/103 - plot 2 and 3: plans and elevations
3432/106 - location plan
As received 13th April 2023

3432/104 B - plot 5 plans and elevations
3432/107 B - proposed site drainage plan
3432102 B - proposed site plan
3432/105 A - proposed site sections
As received 8th June 2023

Reason
To define the exact terms of the permission.

IN ACCORDANCE WITH ARTICLE 35 OF THE TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) ORDER 2015.
POSITIVE AND PROACTIVE STATEMENT:

In dealing with this planning application the Local Planning Authority have worked with the applicant in a positive and proactive manner on seeking solutions to problems arising in the following ways: revised plans have been accepted and the application has been determined within an agreed extension of time.

ADDITIONAL INFORMATION

1. This permission shall not be construed as granting rights to carry out works on, or over, land not within the ownership, or control, of the applicant.

2. You must obtain the prior written consent of the owner and occupier of any land upon which it is necessary for you to enter in order to construct, externally finish, decorate or in any other way carry out any works in connection with this development including future repairs/maintenance, or to obtain support from adjoining property. This permission does not authorise you to take such action without first obtaining this consent. Your attention is also drawn to the Access of Neighbouring Land Act 1992 and Party Wall Act 1996.

3. This Decision Notice grants planning permission. You are advised that it does not imply compliance with Building Regulations and it is essential that you contact the Council's Building Control Manager with regard to your proposals before proceeding.

4. Ground Investigations and groundworks

   Under the Coal Industry Act 1994 any intrusive activities which disturb or enter any coal seams, coal mine workings or coal mine entries (shafts and adits) require the prior written permission of the Coal Authority since these activities can have serious public health and safety implications. Such activities could include site investigation boreholes, excavations for foundations, piling activities, other ground works and any subsequent treatment of coal mine workings and coal mine entries for ground stability purposes. Failure to obtain permission to enter or disturb our property will result in the potential for court action. Application forms for Coal Authority permission and further guidance can be obtained from The Coal Authority's website at: www.gov.uk/get-a-permit-to-deal-with-a-coal-mine-on-your-property.

Shallow coal seams

In areas where shallow coal seams are present caution should be taken when carrying out any on site burning or heat focused activities.

5. For the avoidance of doubt we would expect to see the following details when discharging the drainage conditions:

A clearly labelled drainage layout plan showing the exact location of any soakaways.

Evidence is required to confirm that the ground is suitable for soakaways. Percolation / Soakage test results in accordance with BRE Digest 365 and as described in Building Regs H - Drainage and Waste Disposal.

The submitted infiltration rate/s must be expressed in m/s (meters per second).

Evidence that the soakaway is appropriately sized in accordance with BRE Digest 365 Soakaway Design.

Sp. Note; - Soakaways must be located 5 Metres from any structure including the Public Highway

Sp. Note: - No surface water discharge will be permitted to an existing foul sewer without the expressed approval of the sewage undertaker.

Ownership and/or responsibility, along with details of the maintenance regime in relation to the Surface Water Network and any components such as Attenuation/Infiltration/Conveyance features, Flow Control Devices, and Pumping Stations where applicable, for the lifetime of the development, must also be provided.

This should clearly outline which elements/components will be offered for adoption and those which are to remain privately maintained and by whom (in this context this refers to the wider scheme infrastructure such as ponds, basins, swales, ditches, soakaways, and permeable paving which may form part of the surface water network).

If privately maintained, the document should also consider any future sale scenarios and how tentative purchasers will also be made aware of their jointly vested highway and drainage assets.

PLEASE NOTE: The development hereby permitted must be implemented in accordance with plans hereby approved and any conditions specified above. The conditions may specify that works are to be carried out or details are required to be submitted for further approval, before all or part of the development is otherwise commenced. For further information regarding the discharge of Planning Conditions and the relevant forms please view "compliance with conditions" on our website, www.southglos.gov.uk If the permission is commenced without these requirements being fully met, or in any other manner, the development may be unauthorised and the permission invalidated. The council holds a definitive copy of this planning decision notice. You should be aware of the risk that subsequent copies of the decision notice may be subject to unauthorised alteration and if necessary you are advised to refer to the council for verification. The definitive copy can be viewed via the council's planning website.

DEVELOPMENT MANAGER

DATE: 1st December 2023

PLANNING PERMISSION THE NEXT STEPS

Your Decision could be subject to conditions. It is essential that you comply with these conditions in order to protect your planning permission. If you have conditions requiring details to be submitted prior to the commencement of development then failure to discharge these conditions could invalidate your planning permission and result in enforcement action being taken against the development.

HOW TO APPLY TO DISCHARGE CONDITIONS ON YOUR PLANNING PERMISSION

If the condition requires you to agree something in writing with the Authority before development commences then you will need to consider submitting these details at least 8 weeks prior to starting work. In order to submit your application, you can do so by one of the following options:

- Submit an online application using the Planning Portal online application service www.planningportal.gov.uk/
- Complete an application form online via the Planning Portal online Application service, www.planningportal.gov.uk/ printing it off and enclosing it with the correct plans, fee and details before sending it to Development Services.
- Download a copy of the application form from the South Gloucestershire website on www.southglos.gov.uk/planning.
- Request a paper copy from our PT&SE Customer Contact Centre by calling 01454 868004.
- Visit one of the Council One Stop Shop receptions to collect a paper copy of the application form.

The fee amount is £34 per request relating to 'householder' applications and £116 for any other full planning applications.

The fee is payable for each submission (a single submission may be for more than one condition to be discharged).

COMMUNITY INFRASTRUCTURE LEVY (CIL)

If this application has been identified as being liable to CIL you should not commence development until the requirements and obligations under CIL have been established. If we require further information we will write to you requesting this. Where we already have clear information about the proposal and assumed liability we will issue a liability notice shortly. Further information can be found on our website at www.southglos.gov.uk/environment-and-planning/planning/community-infrastructure-levy

BUILDING REGULATIONS

You might require separate Building Control approval and you can also secure this through the Council. For advice on development requiring Building Regulations approval please visit the Planning Portal or contact our Team on 01454 863451

ACTING AS AN AGENT?

Please forward the full copy of this decision to your client and advise them of any conditions. The Council continues to be involved with enforcement action taken against applicants who claim not to have been passed the decision by their Agent.

APPEALS AGAINST THE DECISION OF THE LOCAL PLANNING AUTHORITY (LPA)

If the applicant is aggrieved by the decision to refuse this proposal – or to grant subject to conditions – they may appeal to the Secretary of State under section 78 of the Town and Country Planning Act 1990 or section 20 of the Planning (Listed Buildings and Conservation Areas) Act 1990. Appeals can be made online at: https://www.gov.uk/planning-inspectorate. If they are unable to access the online appeal form, please contact the Planning Inspectorate to obtain a paper copy of the appeal form on 0303 444 5000.

Appeals must be made to the Planning Inspectorate in accordance with the provisions below:

(a) for a **householder application**, an appeal must be made within 12 weeks of the date of this notice;
(b) for a **minor commercial application**, an appeal must be made within 12 weeks of the date of this notice;
(c) for the **display of an advertisement**, an appeal must be made within 8 weeks of the date of receipt of this notice;
(d) for **works to trees** subject to a Tree Preservation Order or part of a woodland, an appeal must be made within 28 days of the date of this notice;
(e) if this planning application relates to the same, or substantially the same, land and development as is **already the subject of an enforcement notice**, an appeal must be made within 28 days of the date of this notice;
(f) if an **enforcement notice is served** relating to the same or substantially the same land and development as in this application an appeal must be made within: 28 days of the date of service of the enforcement notice, or within 6 months [12 weeks in the case of a householder appeal] of the date of this notice, whichever period expires earlier;
(g) in **all other cases**, an appeal must be made within 6 months of the date of this notice.

The Secretary of State can allow a longer period for giving notice of an appeal but will not normally be prepared to use this power unless there are special circumstances which excuse the delay in giving notice of appeal. The Secretary of State need not consider an appeal if it seems to the Secretary of State that the local planning authority could not have granted planning permission/listed building consent for the proposed development/works or could not have granted it without the conditions imposed, having regard to the statutory requirements, to the provisions of any development order and to any directions given under a development order.

If you intend to submit an appeal that you would like examined by inquiry then you must notify the Planning Inspectorate (inquiryappeals@planninginspectorate.gov.uk) and local planning authority (registrationteam@southglos.gov.uk) at least 10 days before submitting the appeal. Further details are available on GOV.UK website.

When submitting an appeal, it is a requirement that an identical set of documents be submitted to the local planning authority. A copy of all appeal documents (and any subsequent documents required to validate the appeal) should be sent to registrationteam@southglos.gov.uk when the appeal is made. Please ensure this instruction is complied with in order to avoid any unnecessary delay.

APPENDIX I - Copy of Shallow Mining Coal Authority Permit

The Coal Authority

CON29M
coal mining report

THE BUNGALOW, HARRIS YARD, 22 ALEXANDRA ROAD, COALPIT HEATH, SOUTH GLOUCESTERSHIRE, BS36 2PZ

Known or potential coal mining risks

Further action

No further reports from the Coal Authority are required. Further information on any next steps can be found in our Professional opinion.

For more information on our reports please visit www.groundstability.com

Professional opinion

According to the official mining information records held by the Coal Authority at the time of this search, evidence of, or the potential for, coal mining related features have been identified. In view of the coal mining circumstances we would recommend that any planned or future development should follow detailed technical advice before beginning work on site. Please see page 3 for further details on Future development.

Your reference:
Our reference: 51003344289001
Date: 15 March 2023

Client name:
Dean Iles

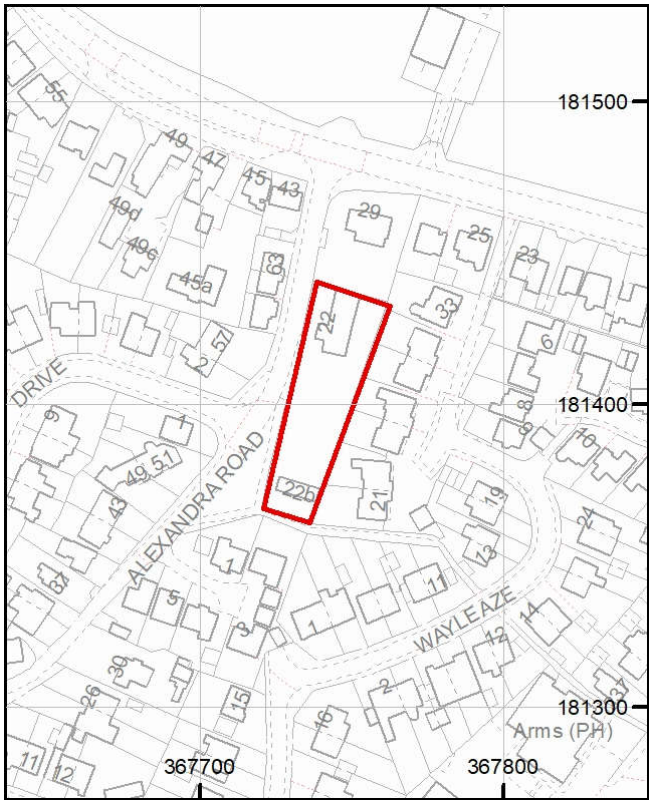
If you require any further assistance please contact our experts on:
0345 762 6848
groundstability@coal.gov.uk

The Law Society

Enquiry boundary

Key

Approximate position of enquiry boundary shown



We can confirm that the location is **on the coalfield**

This report is prepared in accordance with the latest Law Society's Guidance Notes 2018, the User Guide 2018 and the Coal Authority's Terms and Conditions applicable at the time the report was produced.

Accessibility

If you would like this information in an alternative format, please contact our communications team on **0345 762 6848** or email **communications@coal.gov.uk**.

Professional opinion

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

If you are looking to develop, or undertake works, within a coal mining development high risk area your Local Authority planning department may require a Coal Mining Risk Assessment to be undertaken by a qualified mining geologist or engineer. Should you require any additional information then please contact the Coal Authority on 0345 762 6848 or email cmra@coal.gov.uk.

Detailed findings

Information provided by the Coal Authority in this report is compiled in response to the Law Society's CON29M Coal Mining enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL.

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1 Past underground coal mining

The property is not within a surface area that could be affected by any past recorded underground coal mining.

However the property is in an area where the Coal Authority believes 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, particularly prior to any site works or future development activity, as ground movement could still be a risk. Your attention is drawn to the Professional opinion sections of the report.

2 Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3 Future underground coal mining

The property is not in an area where the Coal Authority has received an application for, and is currently considering whether to grant a licence to remove or work coal by underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

4 Mine entries

There are no recorded coal mine entries known to the Coal Authority within, or within 20 metres, of the boundary of the property.

This information is based on the information that the Coal Authority has at the time of this enquiry.

Based on the Coal Authority's knowledge of the mining circumstances at the time of this enquiry, there may be unrecorded mine entries in the local area that do not appear on Coal Authority records.

5 Coal mining geology

The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6 Past opencast coal mining

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7 Present opencast coal mining

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8 Future opencast coal mining

There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

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.

9 Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

10 Mine gas

The Coal Authority has no record of a mine gas emission requiring action.

11 Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Coal Authority, under its Emergency Surface Hazard Call Out procedures.

12 Withdrawal of support

The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

13 Working facilities order

The property is not in an area where 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.

14 Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Statutory cover

Coal mining subsidence

In the unlikely event of any coal mining related subsidence damage, the Coal Authority or the mine operator has a duty to take remedial action in respect of subsidence caused by the withdrawal of support from land or property in connection with lawful coal mining operations.

When the works are the responsibility of the Coal Authority, our dedicated public safety and subsidence team will manage the claim. The house or land owner ("the owner") is covered for these works under the terms of the Coal Mining Subsidence Act 1991 (as amended by the Coal Industry Act 1994). Please note, this Act does not apply where coal was worked or gotten by virtue of the grant of a gale in the Forest of Dean, or any other part of the Hundred of St. Briavels in the county of Gloucester.

If you believe your land or property is suffering from coal mining subsidence damage and you need more information on what to do next, please use the following link to our website which sets out what your rights are and what you need to consider before making a claim.
www.gov.uk/government/publications/coal-mining-subsidence-damage-notice-form

Coal mining hazards

Our public safety and subsidence team provide a 24 hour a day, 7 days a week hazard reporting service, to help protect the public from hazards caused by past coal workings, such as a mine shaft or shallow working collapse. To report any hazards please call **0800 288 4242**. Further information can be found on our website: www.gov.uk/coalauthority.

Glossary

Key terms

adit - horizontal or sloped entrance to a mine

coal mining subsidence - ground movement caused by the removal of coal by underground mining

Coal Mining Subsidence Act 1991 - the Act setting out the duties of the Coal Authority to repair damage caused by coal mining subsidence

coal mining subsidence damage - damage to land, buildings or structures caused by the removal of coal by underground mining

coal seams - bed of coal of varying thickness

future opencast coal mining - a licence granted, or licence application received, by the Coal Authority to excavate coal from the surface

future underground coal mining - a licence granted, or licence application received, by the Coal Authority to excavate coal underground. Although it is unlikely, remaining coal reserves could create a possibility for future mining, which would be licensed by the Coal Authority

mine entries - collective name for shafts and adits

mine gas - reports of alleged mine gas emissions received by the Coal Authority within the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded

payments to owners of former copyhold land - historically, copyhold land gave rights to coal to the copyholder. Legislation was set up to allow others to work this coal, but they had to issue a notice and pay compensation if a copyholder came forward

shaft - vertical entry into a mine

site investigation - investigations of coal mining risks carried out with the Coal Authority's permission

stop notice - a delay to repairs because further coal mining subsidence damage may occur and it would be unwise to carry out permanent repairs

subsidence claim - a formal notice of subsidence damage to the Coal Authority since it was established on 31 October 1994

withdrawal of support - a historic notice informing landowners that the coal beneath their property was going to be worked

working facilities orders - a court order which gave permission, restricted or prevented coal mine workings

APPENDIX J - Copy of Contaminated & Waste Legislation

Contaminated Land Regime

Review of Part IIA Requirements

Statutory Framework

Part IIA was inserted into the Environmental Protection Act 1990 (The Act) by section 57 of the Environmental Act 1995. The purpose of The Act is to remove unacceptable risks to human health and the environment due to contaminated land and to bring this land back into beneficial use.

Statutory guidance (DETR Circular 02/2000 Ref 2) was issued to ensure a consistent and logical approach to the identification and remediation of contaminated land across England.

Definition of Contaminated Land

Land will be designated as contaminated if it is in such a condition that significant harm is being caused or there is a significant possibility of such harm being caused to a series of receptors defined in the statutory guidance. The land will also be designated as contaminated if the pollution of controlled waters is being or is likely to be caused.

The assessment of whether significant harm is or is likely to be caused is based on the concept of a pollutant linkage – that is a linkage between a contaminant on the land in question and a receptor, by means of a pathway. In assessing the likelihood of a pollution linkage being present the principles of risk assessment will apply. This will involve the consideration of the likelihood that harm or pollution will occur and what magnitude it will be. If a piece of land is to be designated as contaminated it must be proven that both a pollution linkage exists and that the linkage will result in significant harm or the pollution of controlled waters.

Receptors

The Statutory Guidance defined the receptors that need to be addressed when considering if significant harm or pollution is being caused, these are summarised below:

- Human Health.
- Any ecological system or organism forming part of such a system. The guidance provides a definition of such systems and includes Special Sites of Scientific Interest, National Nature Reserves, Special Protection Areas and Special Areas of Conservation, Ramsar Sites among others.
- Property including crops timber and livestock.
- Property in the form of buildings.

The Local Authority should not consider harm to any receptors that are not included on the list in the Statutory Guidance. For example, harm to ecological systems outside of the designations in the table should be disregarded. Only the receptors, which are likely to be present on and near the site given its current use should be considered. Current use is defined as any use, which is currently being made or is likely to be made that is consistent with the lands existing planning permission.

Pollution of controlled waters is defined as *"the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter*". The term controlled waters covers

virtually all fresh and saline natural waters up to the UK offshore territorial limit, including rivers, streams, lochs, estuaries, coastal waters and groundwater. Groundwater is defined as any water below the surface of the ground and it therefore includes waters in both the saturated and unsaturated zones.

However, land should not be designated as contaminated land if the substance in question is already present in controlled waters or if its entry has now ceased and it is unlikely that further entry will take place. The above comments refer to legal powers under The Act, however, it should be noted that the site owner has wider responsibilities in common law and statutory nuisance for any adverse effects caused by the contaminated land on a third parties property.

Inspection Strategy

Under section 78B (1) of the Act, the Local Authority has a responsibility to develop an inspection strategy to identify land that merits detailed individual inspection. It is stated that this should be proportionate to the seriousness of the risk and should include some form of prioritisation. The strategy should therefore concentrate on existing evidence that a contaminant is likely to be present on a site and the extent to which receptors, as defined in the guidance, are likely to be exposed to a contaminant as a result of the use of the land or of the geological and hydrogeological features of the area.

This initial phase of inspection will result in the identification of land, which is likely to be contaminated and where a possible pollution linkage exists. The Local Authority must then undertake a detailed inspection of such sites, which could vary from collection of documentary information to an intrusive investigation. However, the land can only be designated as contaminated when a "*scientific and technical assessment of the risks arising from the pollution linkage, according to relevant, appropriate, authoritative and scientifically based guidance on such risk assessment"* has been completed and this assessment indicates that harm, the potential for such harm or pollution is being caused.

Human Health Risk Assessment

The UK Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency (EA) have recently published guidance on the assessment of contaminated land from a human health perspective, including "The Contaminated Land Exposure Assessment Model" (CLEA) and "Soil Guideline Values" (SGVs) for selected heavy metals / metalloids. Soil Guideline Values are quoted in a "suitable for use" context, with four guideline values provided for four separate Standard Land Uses.

- Residential with plant uptake.
- Residential without plant uptake.
- Allotments.
- Commercial / Industrial.
- Public Open Space – Residential
- Public Open Space

Soil Guideline Values (SGV) and supporting technical guidance are intended to assist professionals in the assessment of long-term risk to health from human exposure to chemical contamination in soil. There are different SGVs according to land-use (residential, allotments, commercial) because people use land differently and this affects who and how people may be exposed to soil contamination. SGV are 'trigger values' for screening-out low

risk areas of land contamination. They give an indication of representative average levels of chemicals in soil below which the long-term health risks are likely to be minimal. Exceeding an SGV does not mean that remediation is always necessary, although in many cases some further investigation and evaluation of the risk will be carried out.

SGV should not be used where they are not representative of the site under investigation. They do not assess other types of risk to human health such as fire, suffocation, explosion, or short-term and acute exposures. They also cannot be used to assess risks to controlled waters, property, pets and livestock, or ecological receptors.

SGV are available only for a limited number of chemical substances. Reference should be made to the explanatory notes for each element provided in the DEFRA / EA Soil Guideline Value Reports SGV1 – 10 Soil Guideline Values for contamination in soils for specific substances. Phenol Values are subject to soil organic matter content (SOM) as noted above and outlined by the DEFRA / EA Soil Guideline Value Report SGV1 – 8.

In addition to the published SGVs use is made of widely adopted Land Quality Management generic assessment criteria (GACs) for chemical compounds not covered by the published SGVs. The following document and the proposed GAC have been adopted for heavy metals compared either against the LQM/CIEH/S4ULs Human Health Risk Assessment. (NATHANIAL, C.P, M^{C}CAFFREY, C. ASHMORE, M. CHENG, Y. GILLETT, A. HOOKER, and P. OGDEN, R.C., 2015. Generic Assessment Criteria for Human Health Risk Assessment. Land Quality Press. Nottingham) - (ISBN 0-9547474-3-7), where available and Category 4 screening values.

Waste Management Legislation

Hazardous Waste Regulations – off-site disposal

In order to evaluate the various on-site soils for potential offsite disposal, soils are classified in accordance with the Hazardous Waste Directive (HWD) that enables the provision of a European Waste Catalogue (EWC) Code for use during offsite disposal and a Hazardous or Non-Hazardous Classification. Non-Hazardous material is suitable for disposal in a Non-Hazardous landfill; however disposal to an Inert Landfill requires further Waste Acceptance Criteria (WAC) testing in accordance with BS EN 12457–3. Material classed as Hazardous also requires WAC testing to assign a suitable hazardous classification.

It should be noted that WAC testing has not been undertaken at this time. Should offsite disposal of soils that are Hazardous or possibly Inert be required WAC testing should be undertaken by suitably qualified personnel. Further information on sampling and analysis of soils destined for offsite disposal can be provided by It is also recommended that prior to offsite disposal of the soils; the receiving landfill facility should be sent copies of all relevant chemical analysis and written confirmation of acceptance of soils provided.

The Landfill Directive requires that all Hazardous and Non-Hazardous solid waste must be treated prior to offsite disposal to landfill. Treatment can be defined by using the following 'three-point test'. All three criteria must be satisfied for all of the waste to qualify as being treated:

1. It must be a physical, thermal, chemical or biological process including sorting.
2. It must change the characteristics of the waste.
3. It must do so in order to:
a. Reduce its volume; or
b. Reduce its hazardous nature; or
c. Facilitate its handling; or
d. Enhance recovery.

It is recommended that the Made Ground and underlying natural ground should be carefully segregated and stockpiled separately during earthworks and piling operations in order to prevent mixing of the waste streams. Careful segregation at the earliest stage may allow costs saving in offsite disposal costs to be realised. It is recommended that a qualified geoenvironmental/waste engineer undertakes the organisation of the removal of soils from the site in order to ensure that the relevant legislation is adhered to at all stages of the process. Improper management of the process or improper disposal may lead to prosecution by the Environment Agency.