

+
Intelligent
Ground
Remediation **+**

Phase I / II

Contaminated Land Site Assessment

103 Heckmondwike Road
Dewsbury Moor,
WF13 3PG

For Urban Future Planning Consultancy Ltd

03 May 2023
Report ref. 23/1149.3.1



Report ref. 23/1149.3.1

Revision log

Issue No.	Date	Description
1	03 May 2023	Issue of first issue for review by client.

Report Prepared By	Date
Paolo De Marchi Graduate Environmental Engineer	03 May 2023
Report Reviewed By	Date
Siobhán Hyde Project Manager	03 May 2023

Contents

1.0	Introduction.....	1
1.1	Scope of Works	1
2.0	Description of the Site and Surroundings	2
2.1	Site Description	2
2.2	Site Surroundings	3
3.0	Summary of Desk Study	4
3.1	Desk Study Data	4
3.2	Coal Report	5
3.3	Site History	6
4.0	Preliminary Risk Assessment	7
4.1	Source – Pathway – Receptor	7
4.2	Hazard Identification	7
4.3	Initial Conceptual Site Model	7
5.0	Site Investigation	9
5.1	Site Investigation	9
5.2	Ground Conditions	9
6.0	Laboratory Analysis	11
6.1	Analysis Rationale	11
6.2	Soils Analysis	11
6.2.1	Soil Testing Results	12
7.0	Risk Estimation.....	13
7.1	Discussion of Investigation Findings	13
7.2	Limitations and Uncertainty	13
7.3	Qualitative Risk Assessment	13
8.0	Conclusions and Recommendations	15
8.1	Conclusions	15
8.2	Recommendations	15
9.0	Limitations.....	16
10.0	References	17

Appendices

- Appendix A – Figures
- Appendix B – Photographs
- Appendix C – Coal Mining Risk Investigation Report
- Appendix D – Exploratory Hole Logs
- Appendix E – Environmental Testing Results
- Appendix F – Risk Assessment Terminology

1.0 Introduction

Geo² Remediation Limited were commissioned by Urban Future Planning Consultancy Ltd to conduct a Phase I Preliminary Risk Assessment and Phase II Intrusive Investigation of a parcel of land located at

103 Heckmondwike Road,

Dewsbury Moor,
WF13 3PG.

The site is approximately 0.22 hectares in area and located at grid reference 422740, 421900.

The study was undertaken prior to proposed redevelopment of part of the site for commercial use. A proposed development plan for the site can be referred to within Appendix A.

1.1 Scope of Works

The assessment has been undertaken in accordance with the Environment Agency Guidance, Land Contamination Risk Management, consisting of a desk-study and preliminary risk assessment followed by an intrusive sub-surface ground investigation and generic quantitative risk assessment, conducted in order to establish the presence and extent of sub-surface contaminants, if any, resulting from the site's current and historic land use.

A Phase 1 Preliminary Risk Assessment report for the site has previously been completed by Geo², report ref. 21/1149.1.1 dated 30th April 2021.

A shallow intrusive investigation was conducted by Geo² on 21st March 2023. A second intrusive investigation to inspect the presence of underlying coal measures was undertaken by Cape Site Service on 3rd April 2023. The investigations were carried on in accordance with Geo²'s Method Statement SMS SI 1149. The findings of the investigations are presented herein.

2.0 Description of the Site and Surroundings

2.1 Site Description

The site is located in the town of Dewsbury, approximately 1.5km east of the town centre. Figures 1 and 2 in Appendix A show the location of the site.

A site walkover was undertaken on 21st March 2023, with a photographic record included in Appendix B of this report.

No known Underground Storage Tanks (USTs) are present on site, but the current and previous use as MOT / maintenance garage suggests the possibility of Aboveground Storage Tanks (ASTs). The presence of a garage directly south of the site until the 2000s, could indicate a potential source of contamination. An unknown culvert Ø900mm approximately was identified crossing the site during the GPR survey, part of it directly underneath the proposed development.

The site is located on Heckmondwike Road (B6117) and is accessed by one ingress/egress point on the eastern boundary. The site is currently a MOT garage (Image 3, Appendix B), comprising two main buildings located to the north and south and car parking area in the western segment (Image 4, Appendix B).

The area shown within the pink site boundary on Figure A below, will be referred to throughout this document as 'the site'.

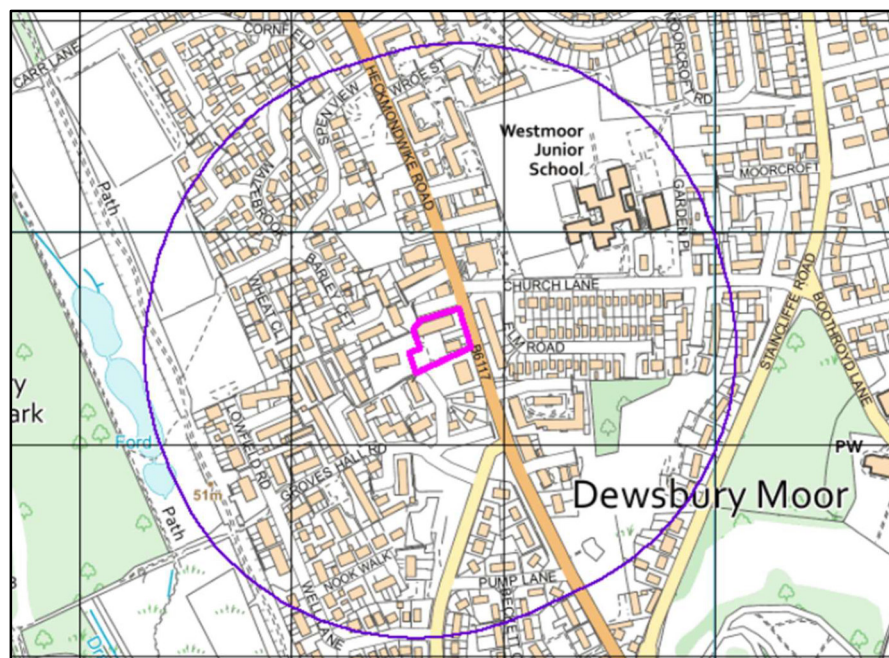


Figure A: Site Location Plan. Pink is approximate site boundary and purple is 250m buffer.
Extract from Report Ref. 21/1149.1.1

Please refer to Geo²'s Phase 1 PRA ref no. 21/1149.1.1 report for detailed site information. The data collected in the desk study is briefly summarised in the following sections.

2.2 Site Surroundings

The surrounding land uses are summarised in Table 1.

Direction	Land Use
North	Residential and commercial properties beyond.
West	Derelict residential dwelling.
East	Heckmondwike Road (B6117)
South	Residential properties.

Table 1. Land Uses in the Surrounding Area.

3.0 Summary of Desk Study

3.1 Desk Study Data

Information regarding the environmental setting of the site was obtained from an Envirocheck report, which collates information from a variety of sources. A copy of the Envirocheck report is included within the Geo² Phase 1 PRA report ref no. 21/1149.1.1 and is not included in this report.

Site Geology	BGS data indicates bedrock consists of Pennine Lower Coal Measures Formation, comprising sandstone, formed approximately 318 to 319 million years ago in the Carboniferous Period. There are no records of superficial deposits underlying the site. Five BGS Recorded Mineral Sites are present within 1,000m of the site. The closest is an opencast Dewsbury Moor Quarry 80m to the north, operation of which has now been ceased. The site has no to very low hazard regarding the potential for ground stability hazards including collapsible ground, compressible ground, ground dissolution, running sand and shrinking and swelling clays. The hazard for potential ground stability regarding landslide is low.
Coal	The site is located in a coal mining reporting area, with a review of the Coal Authority online interactive mapping indicating that the site is within a Development High Risk Area (DHRA), with mine shafts and potential shallow coal mining within 100m. A Coal Mining Risk Assessment (CMRA) report has been previously undertaken and is summarised in Section 3.2. The full report is presented in Appendix C.
Radon	The site is in a low probability radon area (less than 1% of homes are estimated to be at or above the Action Level). As such, no radon protective measures are necessary in the construction of new dwellings or extensions.
Site Hydrogeology	The bedrock is classified as a Secondary A Aquifer – defined as 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. The site is not located within a Source Protection Zone (SPZ). One recorded groundwater abstraction exists within 1,000m of the site. It is located 837m to the north and is used for ‘chemicals: evaporative cooling’, operated by Rhom & Haas (UK) Ltd. The groundwater beneath the site within the bedrock has been classed as medium vulnerability, with low pollutant migration speed.

Table 2. Environmental Assessment of the Site.

Site Hydrology	The nearest surface water feature is a pond located 246m west of the site. The River Spen is located 485m to the south west of the site. There are eighteen recorded discharge consents within 1,000m of the site. The nearest of these is related to a storm tank/CSO on sewerage network (water company) at Yorkshire Water Services Ltd 310m to the west. There have been thirteen recorded Pollution to Controlled Waters incidents that have occurred within 1,000m of the site. The closest of these was located 276m north of the site and relates to a Category 3 – minor incident involving the release of chemicals – detergents/surfactant from a textile industry. Fish were killed in River Calder during this incident. There have been four recorded Substantiated Pollution Incidents within 1,000m of the site. The most proximal of these was located 558m west and relates to the release of atmospheric pollutants and effects: fumes in 2004, This created a significant incident for air impact, with no impact to land.
Waste and Infilled Land	There are three BGS Recorded landfill sites within 1,000m of the site. The closest is located 334m south-west of the site. Five historical landfill sites exist within 1,000m of the site. The nearest is located 333m southwest of the site and consisted of deposited waste, including commercial waste. There are twelve areas of potentially infilled land (non-water) within 1,000m of the site. The closest of these is located 47m north and relates to Dewsbury Moor Quarry (Sandstone) mapped 1854 followed by construction of residential properties. Thirteen areas of potentially infilled land (water) exist within 1,000m of the site. The closest of these is 591m north-east and relates to an industrial building being demolished, with residential properties developed over this area.
Unexploded Ordnance	A review of Zetica online risk mapping for the area indicates the site is located in a Low risk area with respect to unexploded ordnance.

Table 3. Environmental Assessment of the Site.

3.2 Coal Report

Along with Phase 1 PRA report ref no. 21/1149.1.1, the Consultants Coal Mining Report was obtained and reviewed; the findings are summarised below:

- 71m below the site runs a coal seam of approximately 61cm thickness, it was last mined in 1878. There are additional three coal seams that run below the property.
- One disused mine shaft is noted to the close proximity of the south-eastern site boundary.
- Given the shallow coal mining position of the Cromwell (New Hards) coal seam, the site should be checked via an intrusive borehole investigation, to ensure sound stability for the proposals. The advised critical depth to investigate for shallow coal formations is 15m beneath foundation level.

- Gas monitoring of the site is recommended via boreholes and standpipes over a period of 6 to 12 months.

3.3 Site History

Details regarding the development of the site, its immediate surroundings and potentially contaminative land uses were obtained from a review of historical maps, included within the Envirocheck report. A summary of the detailed history of the site from the Phase 1 PRA report (ref no. 21/1149.1.1) is provided below.

From the 1850s the southern part of site is a vegetated parcel of land, while the northern part contains a cluster of residential properties. The surrounding area is predominantly undeveloped land; a sandstone quarry is located 45m northeast of site.

By the 1890s there is no change in the site land use, however two woollen mills with associated tenters are constructed 50m southeast and 40m northwest of site. A Conyers' Colliery is located 120m to the southeast, with associated shafts marked 180m in the same bearing. Residential development occurred 500-1000m northwest of site. Sewage works are located 800m northwest.

Demolition of the residential properties on site occurred in the 1930s, and by that time Conyers' Colliery is no longer labelled on the map. Low Mill woollen factory expanded its filler tanks and beds to the northwest.

A small rectangular structure is found in the northeastern corner of the site by 1956, while the northeastern wall is part of the neighbouring buildings. There is an access road labelled as Brick Row running across the centre of the site.

By 1972, the northern segment contains seven small rectangular buildings, while a garage has been built directly south of the site. Residential development expanded further north, east and south.

In the 1980s the buildings in the northern segment have been demolished, and the site redeveloped into its present-day configuration. Furthermore, Westfield Mill has been demolished by 1976, and afterwards residential properties have been constructed in that area.

Between 1991 and 2000 the only change observed in the area is the demolition of Low Mill and related railway tracks located northwest of the site, while disused sewage works 300m southwest of site no longer appear on the maps.

Based on aerial mapping a derelict building in the 2009 map has been converted and used as a MOT garage from 2012- 2019. Part of the northern building in 2009 was a craft shop, in 2012 the north-western part of a building was operated by DC Waste Management Ltd. In 2016 the building was used as a furniture warehouse/shop. The buildings are currently used as MOT garages. A garage directly south of the site has been demolished and new residential properties have been developed in the area.

4.0 Preliminary Risk Assessment

4.1 Source – Pathway – Receptor

UK legislation and guidance on assessing potentially contaminated land recommends the use of a risk assessment process based on a review of source/pathway/receptor relationships for various environmental media. The first stage of any risk assessment is to identify, using the desk study data and site information, the presence and extent of any hazard at the site, theoretical or demonstrable.

A key component of the overall risk assessment process is identification of “significant contaminant linkages” between contaminants and receptors. This can be accomplished through development of a site-specific conceptual model in which the potential contaminants, pathways and receptors identified on-site are described.

Each element can be defined as follows:

- **Contaminant source:** A substance either on or under the land and which has the potential to cause harm or pollution to human or environmental receptors.
- **Pathway:** A route or means by which a receptor can be exposed to or affected by a source.
- **Receptor:** A living organism or an ecological system, or controlled water, or property including buildings, crops and livestock.

The presence of all three of the above elements identifies a contaminant linkage and a potentially unacceptable risk. To ensure that any risk present to, or, from the site can be appropriately managed each of these contamination linkages will be targeted by the investigation.

4.2 Hazard Identification

The desk study identified the use of the site as a garage to be the main potential contaminant source at the property. Contamination may have occurred through leaks and spills from current and historic oil or fuel storage and distribution infrastructure and site drainage.

No asbestos register has been obtained; the pre-2000 development of the site makes asbestos presence in building fabrics possible.

There is a potential for ground gas generation and migration to the site from historical colliery 120m to the south-east and infilled land 47m north.

In addition, historical off-site industrial and commercial activities such as a garage directly south and wool mills 40m north-west and 50m south-east may have a potential to impact the site.

4.3 Initial Conceptual Site Model

All contamination linkages arising as a result of the interconnection of the contaminant source, contamination pathways and potential receptors are summarised in Table 4 on the following page. These contamination linkages are used to design the site investigation, guiding the type of investigation, location of exploratory boreholes and the required sample analysis.

Linkage No.	Source	Pathway	Receptor
1	Potential contamination (e.g. hydrocarbons) associated with historical operation of the site as a garage.	Leaching to groundwater, lateral and vertical flow, followed by migration within the aquifer.	Surface water such as unnamed pond, 246m west of the site.
2			Bedrock Secondary A Aquifer No SPZ or potable abstraction points within 500m
3	No asbestos register has been obtained; the pre-2000 development of the site makes asbestos presence in building fabrics and made grounds possible.	Exposure to harmful vapours, hazardous ground gas and tainting of water supply.	Current and proposed Commercial site end users
4			Neighbouring site users, principally within enclosed spaces.
5		Direct contact, inhalation of vapours and ingestion.	Current and proposed Commercial site end users.
6	Potential contamination associated with historical nearby industrial land use.	Direct contact, inhalation of vapours and ingestion.	Current and proposed commercial site end users.
7	Potential for ground gas generated associated with the adjacent infilled land and a historic colliery.	Exposure to harmful vapours, hazardous ground gas and tainting of water supply.	Current and proposed commercial site end users.

Table 4. Identified Initial Contamination Linkages

5.0 Site Investigation

In order to provide an assessment of each of the identified contamination linkages, an intrusive investigation was specified to obtain further information regarding the geology of the site and the quality of the soils and groundwater.

5.1 Site Investigation

Seven window sample boreholes (WS01-07) were constructed on 21st March 2023 to depths of up to 3.5m below ground level (m bgl) at locations indicated on the exploratory hole location plan presented in Appendix A.

Three additional boreholes (BH1-3) were constructed on 3rd April 2023 using water flush rotary drilling techniques, in order to investigate soil stability, uncharted mine entries and fugitive gas emissions, reaching maximum depths of 16m bgl. The rotary drilling, undertaken as a part of the coal investigation, is reported separately within Appendix C.

As a result of the window sampling drilling techniques, relatively undisturbed soils were able to be obtained for field and laboratory analysis and for logging of ground conditions. Field analysis comprised the examination of each of the samples for visual and olfactory indications of contamination. Analysis was also conducted for volatile hydrocarbons using a photo-ionisation detector (PID).

The site investigation was limited by a combination of the small size of the site and the existence of buried services. Borehole positions were chosen strategically so to target areas of the site most likely to be contaminated. Table 5 below, shows the location rationale of boreholes.

Target / Rational for Investigative Locations	Location						
	WS01	WS02	WS03	WS04	WS05	WS06	WS07
General site coverage	✓	✓	✓	✓	✓	✓	✓
Proposed new garage	✓	✓	✓	✓			

Table 5. Borehole Location Rationale

5.2 Ground Conditions

The logs of the boreholes, which are presented in Appendix D, detail the ground conditions and the sampling depths together with the visual and olfactory characteristics of the soils.

Ground conditions encountered across the site comprised tarmac or gravel over made ground, underlain by clay superficial deposits.

Made ground comprised a layer of brown/light brown gravelly sandy clay, with gravels of brick and concrete, and a black ashy layer at about 0.5m bgl. The base of the made ground was not encountered in WS02-WS06, with the exploratory holes terminated at depths of 3.0m bgl and 1.5m bgl (WS06).

An obstruction was recorded in boreholes WS02 and WS03 at 0.4m bgl, possibly due to concrete or large cobbles.

Natural superficial soils were described as brown sandy clay and occasionally gravelly sandy clay, recorded in WS01 and WS07 from depths of 2.8m and 2.2m bgl respectively.

As detailed within the rotary logs contained within Appendix C, the clay was found to be underlain by bedrock at depths of 3.8-4.0m bgl. Bedrock comprised interbedded mudstone, coal and sandstone. The coal seams are discussed further within the Coal Mining report contained within Appendix C.

PID measurements from soils were recorded across the boreholes. Maximum readings from WS01 and WS04 recorded 4.3ppm and 2.1 ppm respectively; both were found at the same depth, about 2.5m bgl. WS01 and WS04 are located in the southern area of the site. PID levels lower than 1ppm were recorded in all the remaining soil samples. No evident hydrocarbon odours were detected or visual hydrocarbon contamination identified by the Geo² engineer during the shallow ground investigation.

Monitoring wells were installed in three boreholes, WS01, WS04 and WS07. No groundwater strikes were recorded during the drilling works.

6.0 Laboratory Analysis

6.1 Analysis Rationale

Eight soil samples were selected for laboratory analysis following field screening, via visual and olfactory methods. As the boreholes were dry at the time of the investigation, no groundwater samples were collected for chemical analysis.

Samples were analysed for contaminants associated with historical and current use of the site as a garage in line with guidance provided in CIRIA's Contaminated Land Risk Assessment: a guide to good practise (CIRIA C552, 2001).

All samples were placed in laboratory provided containers and stored in cool boxes prior to being transported to the laboratory under the laboratory's chain of custody documentation. The laboratory used for the ground investigation on this occasion was Envirolab, a UKAS and MCERTS accredited laboratory.

6.2 Soils Analysis

Analysis scheduled for soil samples is shown below in Table 6. The soil samples were selected from a range of depths and strata and from across the site, to gain an understanding of site-wide ground conditions.

Exploratory Hole	Sample Depth (m bgl)	Target Strata	Suite of Analysis
WS01	0.5	Made Ground	TPH-CWG, CLEA Metals, Asbestos ID
	2.5	Made Ground	TPH-CWG
	3.4	Sandy Clay	TPH-CWG
WS04	0.4	Made Ground	TPH-CWG, CLEA Metals, Asbestos ID
	2.6	Made Ground	TPH-CWG
WS05	1.1	Made Ground	TPH-CWG, CLEA Metals, Asbestos ID
WS06	0.7	Made Ground	TPH-CWG, CLEA Metals, Asbestos ID.
WS07	0.8	Made Ground	TPH-CWG, CLEA Metals, Asbestos ID.

Table 6. Soil Sample Selection Strategy

The analysis, conducted by a Gas Chromatography / Flame Ionisation Detector (GC/FID) and Gas Chromatography / Mass Spectrometry (GC / MS) comprised fractionation and speciation of hydrocarbons including analysis for benzene, toluene, ethylbenzene and xylenes (BTEX) and MTBE compounds. Selected samples were analysed for:

- Heavy metals by IRIS emission spectroscopy.
- Asbestos Containing Materials (ACMs) by Polarised light microscopy / Gravimetry.

The analytical results were analysed for contaminants associated with use of the site as a garage and generic industrial land use. The results of soil analysis were compared using the following UK guidance:

- LQM/CIEH's Suitable for Use Levels (S4ULs)
- DEFRA Category 4 Screening Levels (C4SLs)

- EIC Soil Generic Assessment Criteria for Human Health (2010)

6.2.1 Soil Testing Results

The results of laboratory analyses on the soil samples undertaken are presented in Appendix E.

Due to the site's current and proposed development end use as a garage, the soil analysis testing results have been compared against 'Commercial' end use Generic Assessment Criteria (GACs) thresholds. GAC concentrations associated with a conservative 1% Soil Organic Matter (SOM) have been utilised.

All TPH and CLEA Metals concentrations within the soil samples were below Commercial GAC guidelines.

Asbestos identification testing was undertaken on 5no made ground soil samples, with a negative result obtained in all of them. No potential asbestos containing materials (ACMs) were identified within shallow site soils during the investigation works.

7.0 Risk Estimation

7.1 Discussion of Investigation Findings

Current and historic use of the site as a garage was identified in the Preliminary Risk Assessment as the main potential source of site contamination.

Environmental chemical analysis on 8no soil samples for a range of pollutants did not identify any contaminants above the relevant Commercial GAC. No asbestos fibres or ACM fragments were positively identified in made ground soils.

Encountered ground conditions across the site identified 2.8m to >3m thickness of made ground in the proposed development area south of site, with shallower made ground (up to 1m bgl in WS07) recorded in the northern area. Superficial deposits were encountered in WS01 and WS07, described as soft to firm gravelly to sandy clay with interbedded sand lenses. The deeper rotary borehole investigation identified bedrock from 3.8-4.0m bgl, comprising interbedded mudstone, coal and sandstone.

No evidence of an offsite source impacting upon the site, or offsite migration of any contaminants was identified, although gas migration cannot be ruled out.

7.2 Limitations and Uncertainty

It is important to note that the investigation was restricted in areas of the site due to the presence of buildings, buried services and parked vehicles.

7.3 Qualitative Risk Assessment

Each of the identified potential contamination linkages in the preliminary conceptual site model is reviewed based upon the findings of the site investigation which allows a greater understanding of the ground conditions at the site, site observations, soil and groundwater quality and chemical analysis.

The qualitative risk assessment is undertaken, detailed in Table 7 on the following page, in line with guidance provided in CIRIA's Contaminated Land Risk Assessment: a guide to good practice CIRIA C552, 2001. The purpose of this assessment is to determine the relative significance of the identified contamination linkages by assessing the probability of an impact occurring and by assessing the perceived severity of an impact to a receptor.

The perceived risk is based on a consideration of both the likelihood of an event (probability) occurring, and the severity of the potential consequence. Classification of these two factors is detailed in Appendix F.

Those linkages considered of low risk or less on the basis of the available site data will not be considered any further in this assessment. Linkages considered to be more significant are identified as presenting potentially unacceptable risk to the identified receptor. In these instances, further works may be considered necessary.

Source	Pathway	Receptor	Probability	Severity	Risk Classification
Due to historic use of the site as a Garage and demolition of previous buildings, there is potential for concrete obstructions and possible unknown underground tanks. An unknown culvert of approximately Ø 900mm is crossing the site in the area proposed for the redevelopment. The nearest groundwater abstraction point is located 837m north of the site. Soil analysis recorded no GAC exceedances. No asbestos register has been obtained; the pre-2000 development of the site makes asbestos presence in building fabrics possible. No asbestos fibres or ACM fragments positively identified in made ground soils. Historic coal mining or infilling in the area could potentially lead to the generation and release of ground gas to the site that may affect current and future site users.	Leaching to groundwater, lateral and vertical flow, followed by migration within the aquifer.	Surface water such as unnamed pond 246m west of the site.	Unlikely Taking into account the low permeable superficial deposits, the distance to the nearest surface water receptor and the absence of known fuel or oil tanks on site.	Mild	Very Low
		Bedrock Secondary A Aquifer. The site is not located within a Source Protection Zone.	Unlikely Taking into account high vulnerability of the underlying aquifers and nearest groundwater abstraction point.	Medium	Low
	Exposure to harmful vapours, hazardous ground gas and tainting of water supply.	Current and proposed Commercial site end users.	Low Likelihood Although the Coal Authority report states that there have been no Mine Gas emissions at the site that have required remedial works, it cannot be ruled out that pathways exist by which receptors may become impacted, though the proposed commercial use of the site reduce any potential risks.	Medium	Moderate / Low
		Neighbouring site users, principally within enclosed spaces.	Unlikely Taking into account that the site is located within a residential area. The nearest residential properties are bordering the site to the north and south, as well as across Heckmondwike Rd to the east.	Medium	Low
	Direct contact, inhalation of vapours and ingestion.	Current and proposed Commercial site end users.	Unlikely Taking into account possible infilled culvert across site, however all soil samples obtained recorded contaminants concentrations below GAC limits.	Medium	Low

Table 7. Summary of Qualitative Risk Assessment

8.0 Conclusions and Recommendations

8.1 Conclusions

A Phase I and II Risk Assessment of the site, located on 103 Heckmondwike Road, Dewsbury Moor, WF13 3PG was undertaken, prior to proposed development of a vehicle repair garage, with a new building proposed.

The purpose of the assessment was to evaluate the potential for risk to be posed to human health and sensitive environmental receptors from historical and current use of the site.

During the site walkover undertaken on 21st March 2023, no visual or olfactory evidence of contamination or contaminative activities were identified at the site. Elevated PID readings were recorded in soil samples from WS01 and WS04 only, but at low concentrations (<30ppm), no commercial GAC exceedances were noted in any of the samples analysed and no asbestos fibres or ACM fragments were positively identified in made ground soils.

The historical and current activities as a garage and previous phases of demolition, may have resulted in the site containing a variable thickness of made ground that may contain harmful materials (e.g., ACMs). No known hydrocarbon leaks from current and past use of the garage have been made known to Geo² at the time of writing this report.

Ground conditions encountered during the window sampling investigation typically comprised 1m to >3m of made ground, underlined by gravelly to silty clays before encountering the sandstone and mudstone bedrock at 3.8-4.0m bgl. A further intrusive site investigation using rotary drill methods has been undertaken on 3rd April 2023 to assess the risk for soil instability, uncharted mine entries and fugitive gas emissions. No fugitive gases were detected at any point during the rotary drilling operations.

As such, Geo² considers there is a **Very Low** and **Low** risk to surface water and groundwater receptors respectively. The risk to Commercial site end users and neighbouring residents from contamination within soils is considered to be **Low**, however the risk from ground gas is considered to be **Moderate/Low** due to the recorded presence of a coal seam 0.90m thick at depths of 12.5-14.2m bgl.

8.2 Recommendations

The following measures are some of the recommended to address the identified risks:

- When development works take place on site, any unidentified contaminated material should be considered in the event of a redevelopment as costs for offsite disposal of these materials may be significant.
- A watching brief may be required in order to deal with the uncovering of unknown underground storage tanks (USTs), if encountered during the site's redevelopment.

Recommendations can be found in the Coal Mining Risk Interpretation Report found in Appendix C, including:

- A gas monitoring programme over 3 to 6 months, given the shallow coal workings and the variability of site conditions, in order to ensure that no fugitive gases are released.
- A watching brief is recommended during future ground works for any associated signs of either old mine shafts or adits.

It is envisaged that a Remediation Statement would be suitable to present the ground gas results and any recommendations required, in line with planning conditions.

9.0 Limitations

Geo²'s conclusions, recommendations and opinions are based on information gathered at the time of the investigation from a variety of third-party sources and from observations made during site reconnaissance. Therefore, there may be conditions at the site that have not been taken into account which were not apparent at the time of investigation.

A portion of this report is based solely upon information provided by third parties. The information has not been independently verified by Geo². Whilst this report and the opinions given in it are accurate to the best knowledge of Geo², Geo² cannot guarantee the completeness or accuracy of any descriptions, opinions or conclusions based solely upon information that has not been independently verified.

The recommendations contained within this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted industry practices and hydrological and engineering practices at this time. As such they are not a guarantee that the site is free of hazardous materials or conditions.

Geo² prepared this report for our Client; any third parties using this report do so entirely at their risk. Geo² makes no warranty or representation whatsoever, express or implied, with respect to the use by a third party of any information contained in this report or its suitability for any purpose. Geo² assumes no responsibility for any costs, claims, damages or expenses (including any consequential damages) resulting from the use of this report or any information contained in this report by a third party.

10.0 References

British Standards Institute

BS10175:2011 "Investigation of potentially contaminated land sites – code of practice"

CIRIA

C552 Contaminated Land Risk Assessment, a guide to good practise, 2001.

C665, Assessing risks posed by hazardous ground gases to buildings, 2007.

CL:AIRE

Good Practice For Risk Assessment For Coal Mine Gas Emissions, October 2021.

Environmental Agency

Land Contamination Risk Management (LCRM) Guidance, 2020

Geo² Remediation Limited

Phase 1 Environmental Assessment (desk study) for 103 Heckmondwike Road, ref 1149.1.1, dated Apr 2021

Coal Mining Risk Assessment (CMRA) for proposed development at 103 Heckmondwike Rd, ref 1149.2.1, dated Apr 2021



Appendix A – Figures

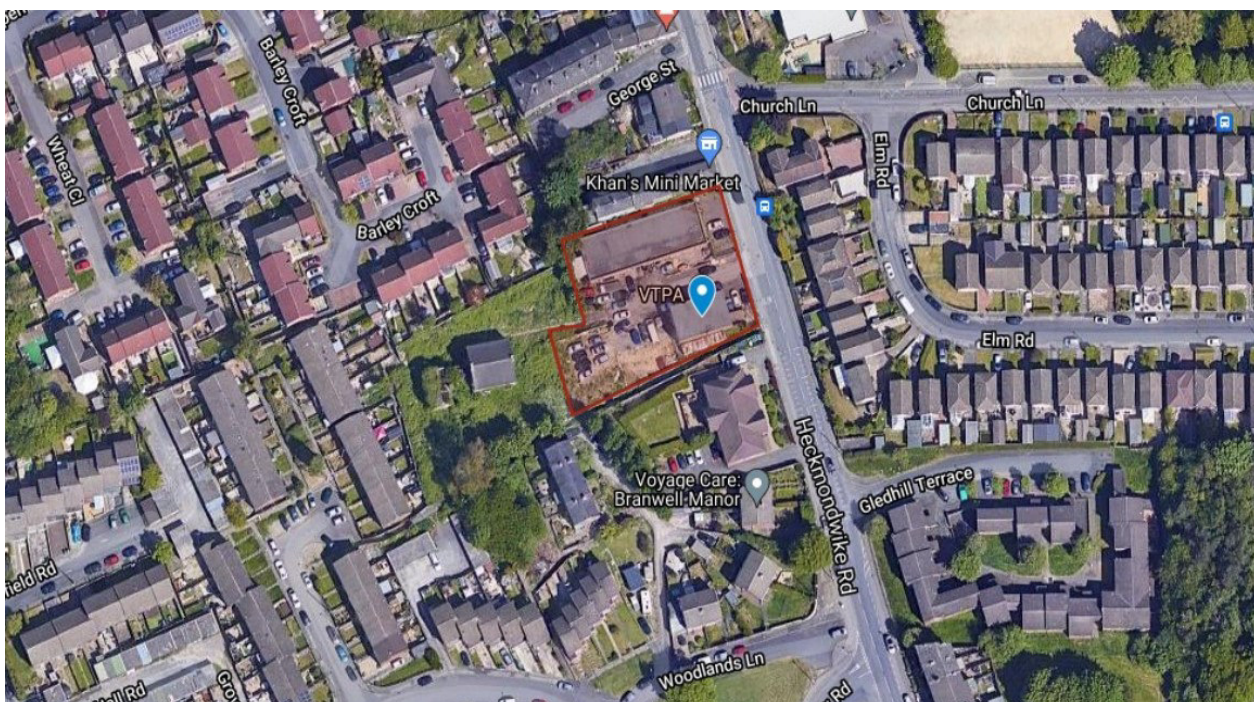


Figure 1 - Site Location

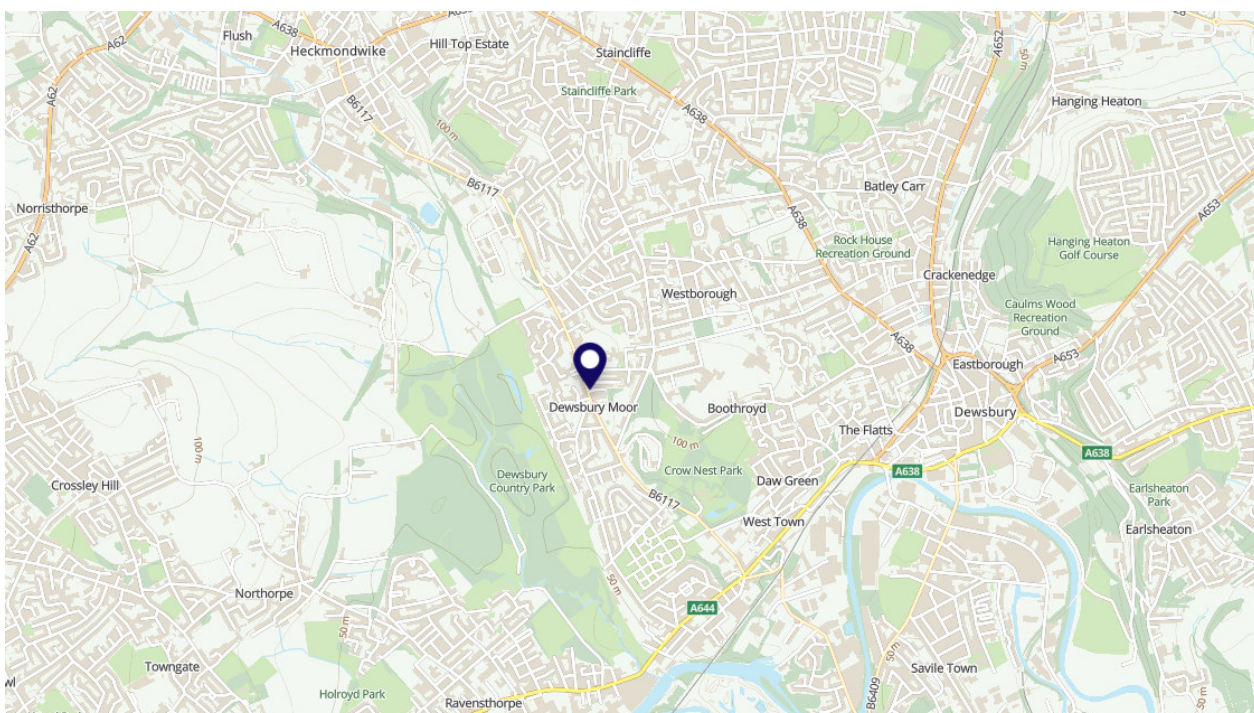


Figure 2 - Site Location



Figures 1 & 2 - Site Location

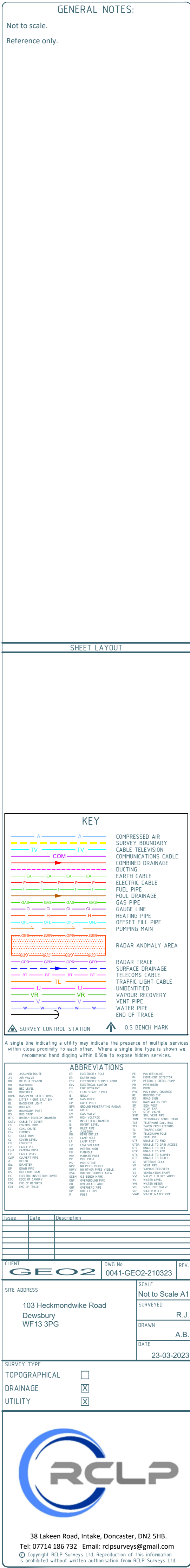
NOT TO SCALE

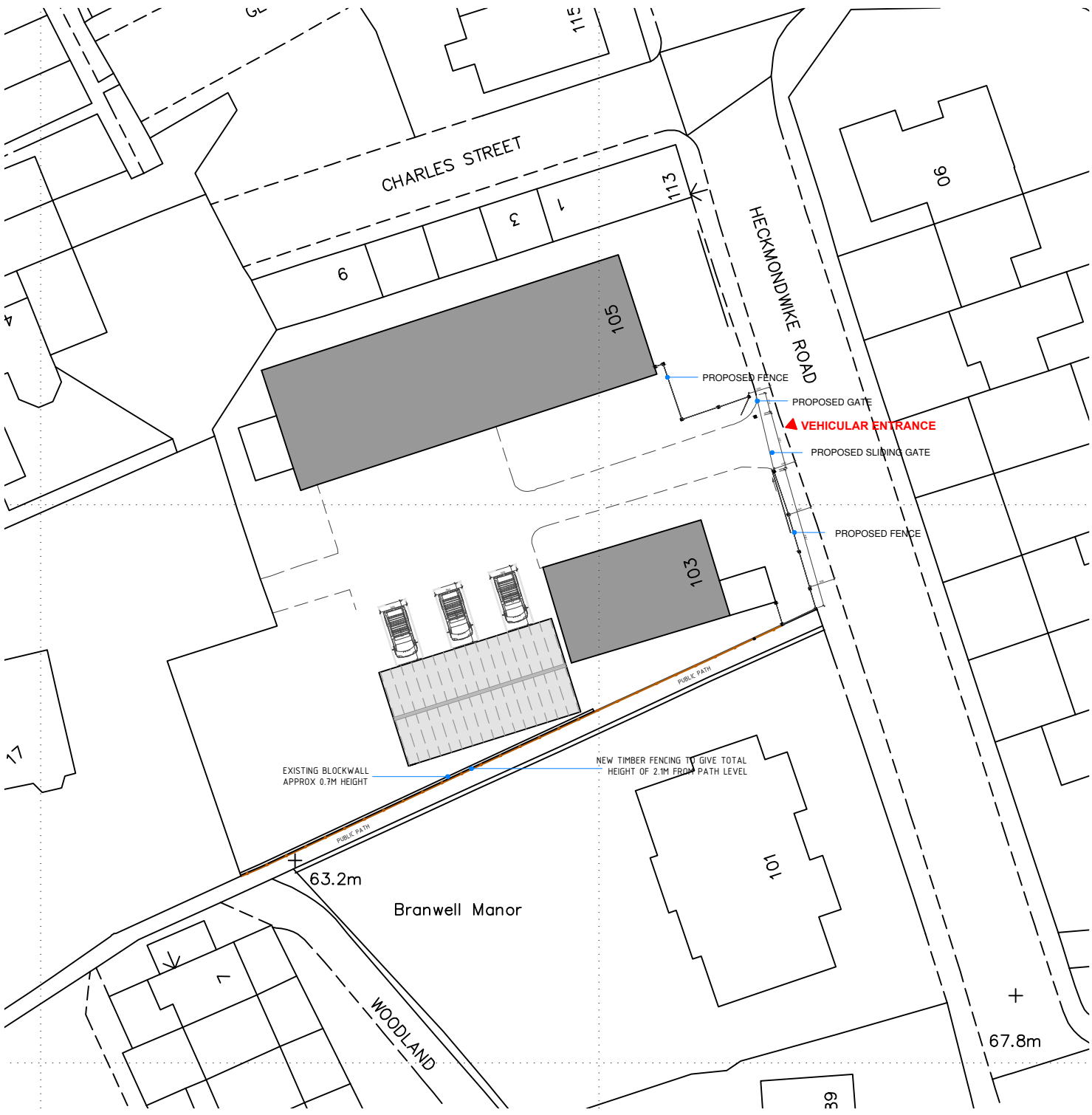
103 Heckmondwike Road, Dewsbury Moor, WF13 3PG

Geo² Remediation Limited, The Coniston, Louisa Street, Idle, West Yorkshire, BD10 8NE

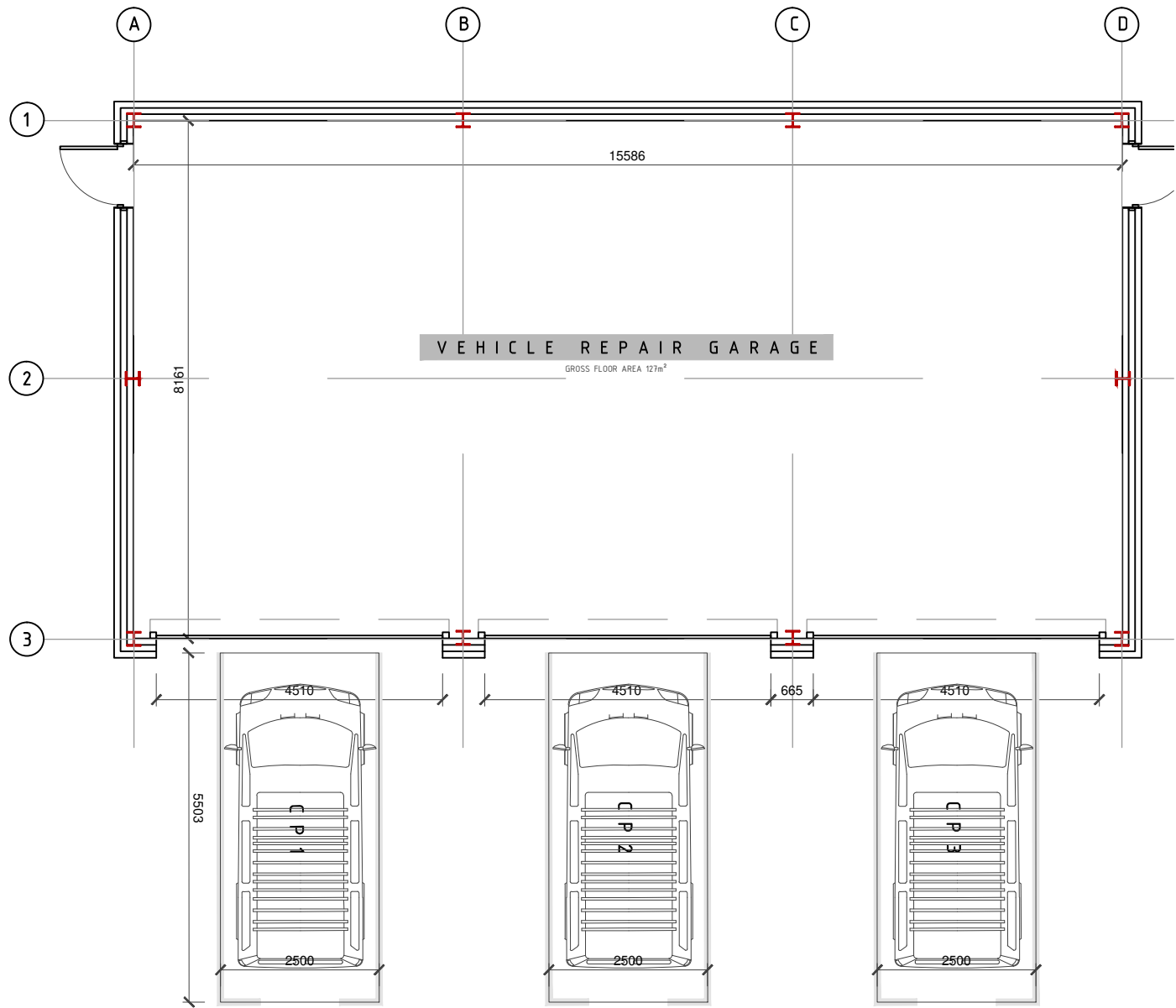
Tel: (0113) 2575397

www.geo2.co.uk

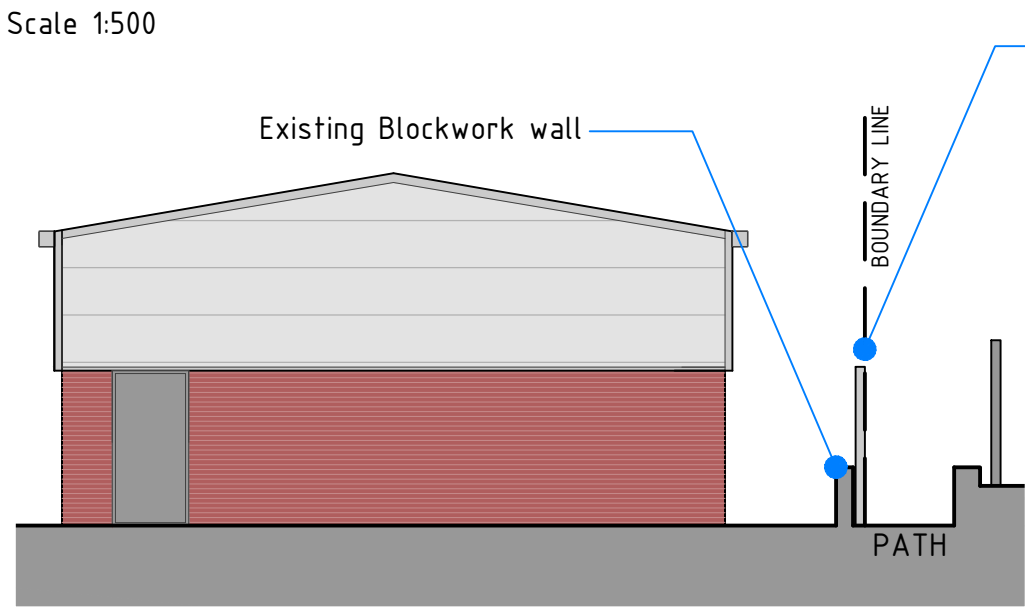




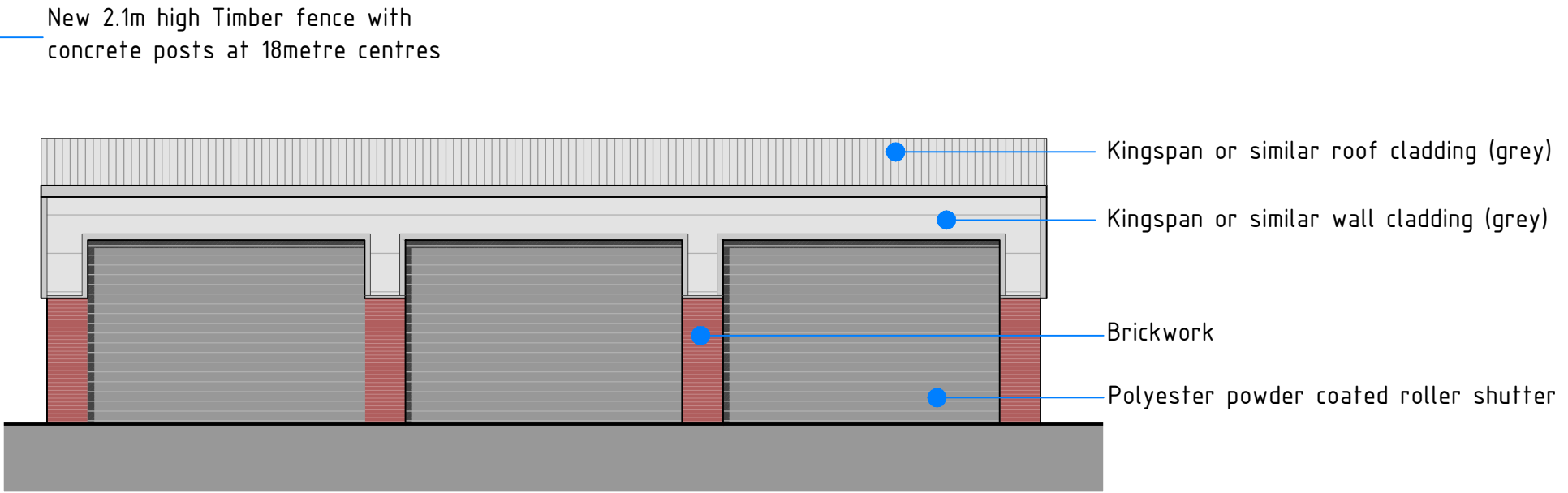
PROPOSED SITE PLAN
Scale 1:500



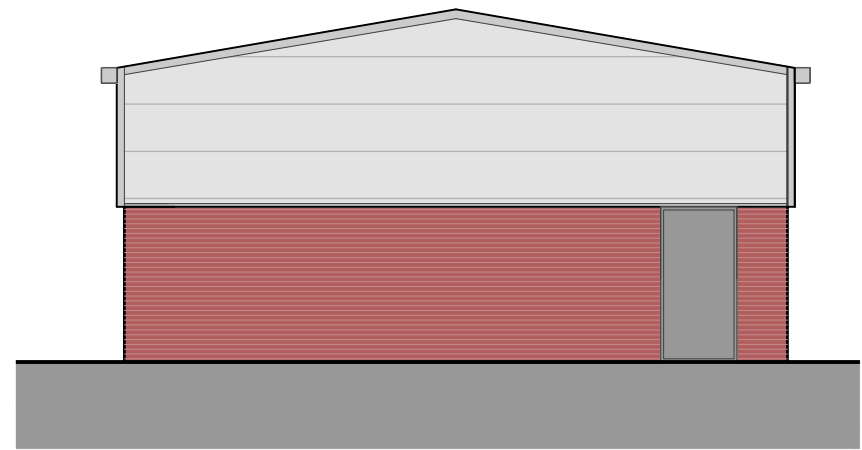
PROPOSED FLOOR PLAN
Scale 1:100



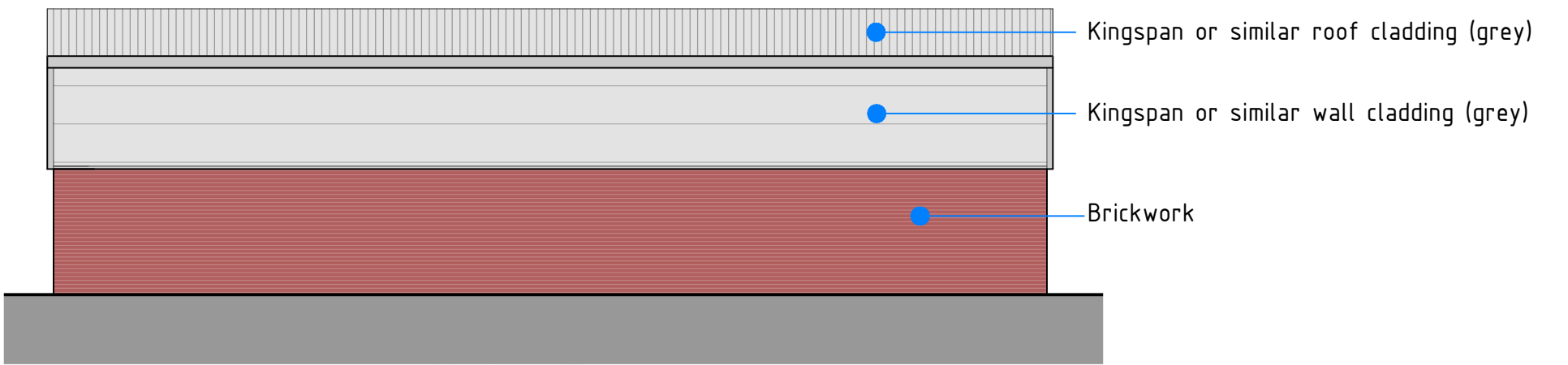
PROPOSED SIDE ELEVATION (1)
Scale 1:100



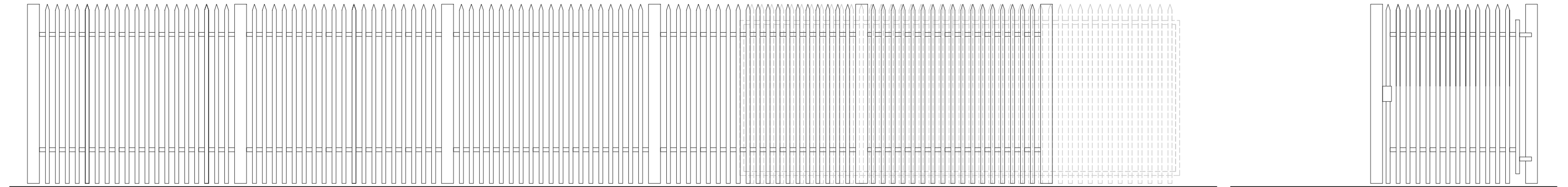
PROPOSED FRONT ELEVATION
Scale 1:100



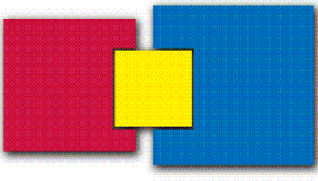
PROPOSED SIDE ELEVATION (2)
Scale 1:100



PROPOSED REAR ELEVATION
Scale 1:100



PROPOSED FENCE ELEVATION
Scale 1:50



S C H E M E
D E S I G N S

Suite 15, Business Development Centre,
Eanam Wharf, Blackburn, BB1 5BL

T 01254 503200 T 01924 692090
E mail@schemedesigns.co.uk
W www.schemedesigns.co.uk

Client	S HUSSAIN 103 HECKMONDWIKE ROAD, DEWSBURY		
Project	PROPOSED VEHICLE REPAIR GARAGE		
Drawing Title	Proposed Elevations		
Drawing No.	0642/003/A2/Rev A	Scale	See DWG
Issued Date	16 / 09 / 2020	Revision Date	16 / 09 / 20
Drawn By	E.K.	Checked By	E.K.
Drawing Issue:			
☐ Outline Proposals	☒ Planning Approval	☐ Building Regulations	☐ Construction

This drawing is the copyright of Scheme Designs Limited and no reproduction is allowed without prior permission. All Drawings must be checked and verified prior to commencement of work on site. All dimensions are in millimeters, unless otherwise stated. Anyone using this drawing e.g. Contractor, Client, Supplier is to check all dimensions on site prior to carrying out work or ordering of materials. DO NOT SCALE FROM THIS DRAWING.



Appendix B – Photographs

1149 – 103 Heckmondwike Road – Photographic Survey 1

Image 1: Proposed development location, facing east.



Image 2: Proposed development location, facing south.



Image 3: MOT garage actively operating on site.



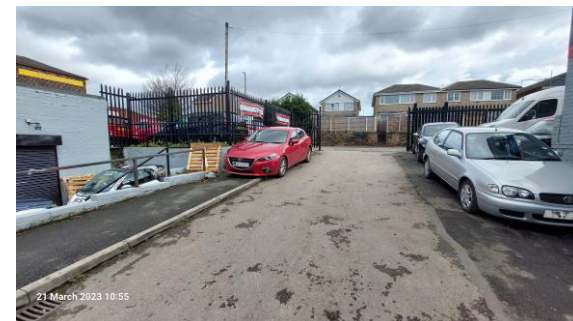
Image 4: Vehicle car park, facing west.



Image 5: Ongoing works in the northwest side of the site.



Image 6: Main Ingress/Egress to Heckmondwike Road.





Appendix C – Coal Mining Risk Investigation Report

Geo2 Remediation Ltd
Coniston House
Louisa Street
Bradford
BD10 8NE

LYONS CMC
COAL MINING & GEOTECHNICAL
CONSULTANCY

Web: www.lyonscmc.co.uk
Email: mark@lyonscmc.co.uk
Mob: 07887555580

Date: 14th April 2023
Your ref: (WF13 3PG)
My Ref: SI 00296

FOR THE ATTENTION OF MR STEVEN JACKSON

Dear Sir,

COAL MINING RISK INTERPRETATION REPORT – FOLLOWING THE SITE
INVESTIGATION FOR PROPOSED DEVELOPMENT AT 103 DEWSBURY MOOR,
HECKMONDWIKE ROAD, DEWSBURY, WEST YORKSHIRE WF13 3PG

I am pleased to supply the following report for the above named project and trust that this satisfies your requirements. Please do not hesitate to contact myself at any time for further clarification or advice.

Yours Sincerely,

M Lyons

M. Lyons
Consultant Mining Engineer
BSci CSci MIMMM

THIS REPORT IS BASED ON AND LIMITED TO THE INFORMATION IN MY RECORD AT THE TIME THE ENQUIRY IS ANSWERED. It is based on my professional opinion in line with the guidelines set out in CIRIA Special Publication 32 - "Construction Over Abandoned Mine Workings. Copyright in this report belongs to M.A.Lyons. All rights are reserved and unauthorised use is prohibited. Copyright is not transferred to external parties by possession of this report, however, those for whom the report is compiled have the right to use it. If any unauthorised third party comes into possession of this report, they rely upon it entirely at their own risk and the author does not owe them any Duty of Care or Skill.

Contents

Page No.

1. Introduction	3
2. Scope of the Report	3
3. Site Investigation	3
3.1 Methodology	3
3.2 Interpretation of Findings	4
4. Conclusions and Recommendations	4
5. Appendix	7
5.1 References	7
5.2 Borehole Location Plan	8
5.3 Drilling Log Sheets	9
5.4 Site Investigation Process	10
5.5 Coal Authority Permit	11

1. Introduction

Planning permission is being considered for the development of a vehicle repair garage at the above location subject to the mining legacy risks been fully realised and mitigated from on site, if necessary. Cape Site Services has now undertaken this work via an intrusive site investigation of 3 boreholes, the location of which is outlined on plan no. 00260/B – as attached and illustrated in appendix 5.2. We were advised by the client that two of the holes are located within the proposed footprint and one just outside of it.

2. Scope of the Report

The mining legacy risks to the development are as follows:

- Instability from shallow underground coal workings
- Uncharted mine entries
- Fugitive gas emissions

As such, these risks need to be properly determined to ensure sound stability for the development. A borehole investigation consisting of 3 to 5 holes was deemed a reasonable level of investigation in the outset regarding potential void migration given the scale and nature of development combined with the available geological and mining information. A watching brief would also be implemented for any signs of mine entries.

It should be noted that this investigation is focused mainly on determining stability from potential shallow historic coal workings and will only provide limited information regarding the risks of uncharted mine entries. A good level of detail should be obtained to provide a more informed opinion as to fugitive gas risks.

3. Site Investigation

3.1 Methodology

Prior to the intrusive site investigation, a search for utilities was undertaken both via online data providers and physically on site using a Cable Avoidance Tool (CAT). Boreholes were marked out with tape measure from boundary lines as illustrated on plan no. 00260/B outlined in appendix 5.2. As part of the mine entry watching brief, a pre survey was undertaken with no visible evidence of any uncharted mine entries. The process for the intrusive coal seam investigation is outlined via the system chart in appendix 5.4.

An investigation utilising a tracked Beretta Rotary Drill Rig equipped with 2m long 75mm diameter drill rods was deemed appropriate in this instance along with water flush techniques to analyse returns and minimise any risks associated with mine gas emissions and spontaneous combustion. Gas monitoring equipment would be employed during works for risks associated

with Methane, Carbon Monoxide, Oxygen and Carbon Dioxide. Any boreholes emitting a dangerous level of methane would be terminated and sealed immediately. All holes to be filled and sealed as soon as possible with bentonite upon termination. Prior agreement had been secured for these works from the Coal Authority -permit ref: 26349 – as attached for reference in appendix 5.5.

Considering our previous Coal Mining Risk Assessment report (ref: CMRA 00257 dated 7th May 2021) boreholes were decided to be taken into firm strata beneath the base of the Cromwell coal seam/workings, or to 15m below rock-head if no coal was encountered.

The works were to be supervised by the Drilling Engineers Mr. S. Fish and Mr I. Wiles, and overseen by the Principal Engineer Mr. M. Lyons.

3.2 Interpretation of Findings

Beneath around 1m to 1.8m of fill/gravelly fill, boreholes proved boulder clay up to 4m deep, followed by firm natural bedrock of coal measure mudstones and sandstones above what is believed to be the Cromwell coal seam. Hole no. 1 encountered the seam in-tact at 14.2m deep with a coal thickness of 0.9m recorded. Holes nos. 2 & 3 proved voided old workings in the seam from 12.6m to 13.9m and 12.5m to 14m concurrently. Given the recorded seam section from hole no. 1, it is very likely that voids encountered involved an element of roof collapse above the old workings; the former top of the seam in holes 2 & 3 would be expected at circa 13m deep. Boreholes were terminated in 1m of firm strata beneath the base of the seam/workings.

No fugitive gases were detected at any point during the drilling operations.

The logs appear to match well at the same elevation which would infer no signs of any geological faulting between the borehole locations.

4. CONCLUSIONS AND RECOMMENDATIONS

- 1) From this investigation it is reasonable to conclude that shallow coal mining has taken place beneath this site in the Cromwell coal seam proved as 0.9m in thickness, which is consistent with local mines records of this seam. Given the nature, it is very likely that the workings are via historic pillar and stall methods where coal pillars will have been left to provide support for the surrounding workings. It would be reasonable to assume that such workings are very likely to exist across the rest of the site. Large spine roadways would be very unlikely in these types of old workings.

- 2) Current guidelines (CIRIA C758D) suggest that a future development would require 10 times the coal seam thickness of natural strata between bedrock and the seam horizon for it to be classed as stable from a shallow mining void migration aspect. In this instance it would equate to 9m (10 x 0.9m). Considering this, should development be such that foundations can be strengthened and sited directly upon bedrock once encountered, or indeed be designed to remain within the firm boulder clay (with a reinforced raft designed to span a 3m soft spot and cantilever 1.5m for example) then it may be reasonable to assume that the development would be stable from the shallow coal mining perspective – **provided** that the depth to bedrock/formation levels are not in excess of 4m – which is right on the limit of critical depth (9m). ***It Should be noted that other areas across the site NOT covered by this investigation may vary in such detail – therefore if the proposed new garage is considered in a different part of the site then further investigation may be required.***
- 3) Should the development be such that foundation designs are required to go to depths within the bedrock (piles for example), that are likely to extend so as NOT to achieve the 10 times ratio as detailed above, then stability is likely to be compromised by the potential void migration aspect and further stabilisation works should be considered - such as a drilling and grouting regime. A suitably qualified structural engineer should be consulted to advise further for an appropriate solution and this should be presented to the regulators (LA, Building Control and Coal Authority) for their approval prior to any works taking place. Further geotechnical investigations such as penetration tests may be required to establish this.
- 4) No signs of any mine entries were observed during the investigation, however given the relatively shallow coal workings a moderate risk will be present for discovering an unrecorded entry. Watching briefs would be prudent during future ground works for any associated signs of either an old mine shaft or adit; grey areas of fill material within natural bedrock/strata is an indication. The Coal Authority should be notified where any such feature is suspected.
- 5) No fugitive gases were encountered, and given the clay and mudstone deposits the risk of such is considered low. However, given the relatively shallow coal workings the actual position may vary significantly across the site depending on site specific conditions in areas not covered by this investigation (note: associated risks will increase significantly if any uncharted mine entries are discovered). As such the position should be considered further by way of a future monitoring programme over 3 to 6 months for example along with mitigation designs incorporated into foundation designs such as methane membranes and/or positive ventilation layers.

This report and future development proposals should be submitted to the regulators for their approval prior to any works taking place.

I trust that this satisfies your requirements, however please do not hesitate to contact myself at any time for further clarification or advice.

Yours Sincerely,

M Lyons

M. Lyons
Consultant Mining Engineer
BSc CSci MIMMM

Enc.

THIS SITE INVESTIGATION INTERPRETATIVE REPORT IS BASED ON AND LIMITED TO THE INFORMATION IN MY RECORD AT THE TIME THE ENQUIRY IS ANSWERED. It is based on my professional opinion in line with the guidelines set out in CIRIA Special Publication 32 - "Construction Over Abandoned Mine Workings." The opinion may be overruled by Government Authorities based on other information not in my record. Further site investigations may be undertaken which would supersede the factual findings of this investigation. Copyright in this report belongs to M.A.Lyons. All rights are reserved and unauthorised use is prohibited. Copyright is not transferred to external parties by possession of this report, however, those for whom the report is compiled have the right to use it. If any unauthorised third party comes into possession of this report, they rely upon it entirely at their own risk and the author does not owe them any Duty of Care or Skill.

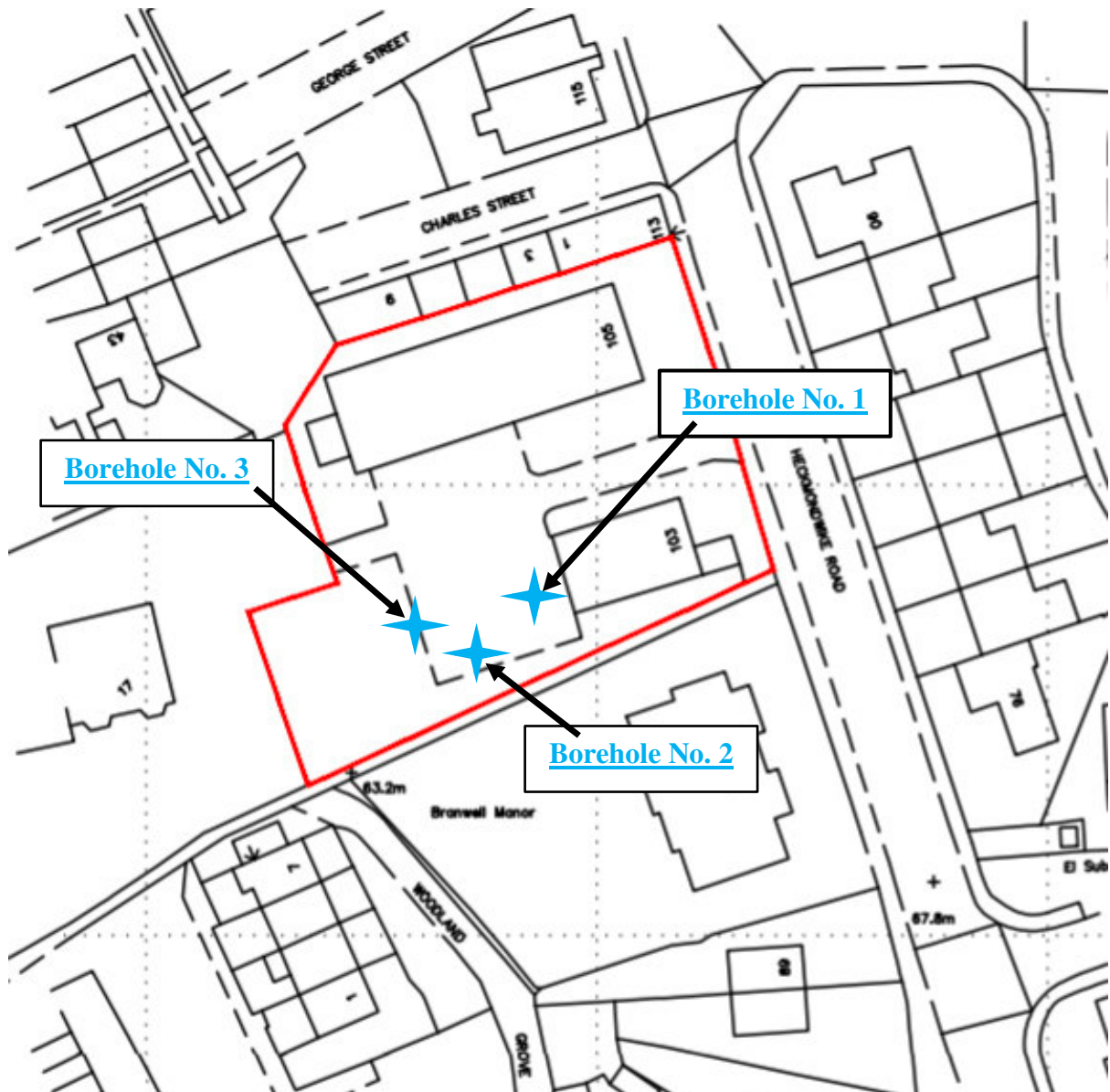
5 Appendix

5.1 References

- 5.1.1 CIRIA C758D 'Abandoned mine workings manual'.
- 5.1.2 British Standards Institution: BS 5930:2015 'Code of practice for ground investigations' BSI 2015.
- 5.1.3 British Standards Institution: BS EN ISO 14688-1: 2002 + A1 2013 'Geotechnical Investigation and Testing - Identification and Classification of Soil - Part 1 - Identification and Description. BSI 2013.
- 5.1.4 British Standards Institution: BS EN ISO 14689-1: 2003 'Geotechnical Investigation and Testing – Identification and Classification of Rock – Part 1 – Identification and Description. BSI 2003. Incorporating Corrigendum No. 1 February 2007.
- 5.1.5 British Standards Institution: BS 10175 'The Investigation of Potentially Contaminated Sites. Codes of Practice'. BSI 2011+A1 2013.
- 5.1.6 British Standards Institution: BS EN ISO 22476-3: 2005 + A1 2011 'Geological Investigating and Testing. Field Testing. Standard Penetration Test'.
- 5.1.7 British Standard 1377:1990 Parts 1-9 'Methods of Test for Soils for Civil Engineering Purposes'.

5.2 Borehole Location Plan No. 00260/B

LAND AT 103 DEWSBURY MOOR,
HECKMONDWIKE ROAD, DEWSBURY,
WEST YORKSHIRE WF13 3PG



5.3 Drilling log sheets

Client: Lyons CMC	Site: 103. Dewsbury Moor, Heckmonwike Road, Dewsbury.		Cape Site Services unit 2, rear of Castle Buildings Carlton Road, Barnsley, S71 3HX	
Date: 03/04/2023	Method: water flush	Permit No: 26349		
Driller: Ian Wiles			Driller Assistant: Richard Hawkins, Simon Fish	
Drillers Signature: 			Page No: 1	

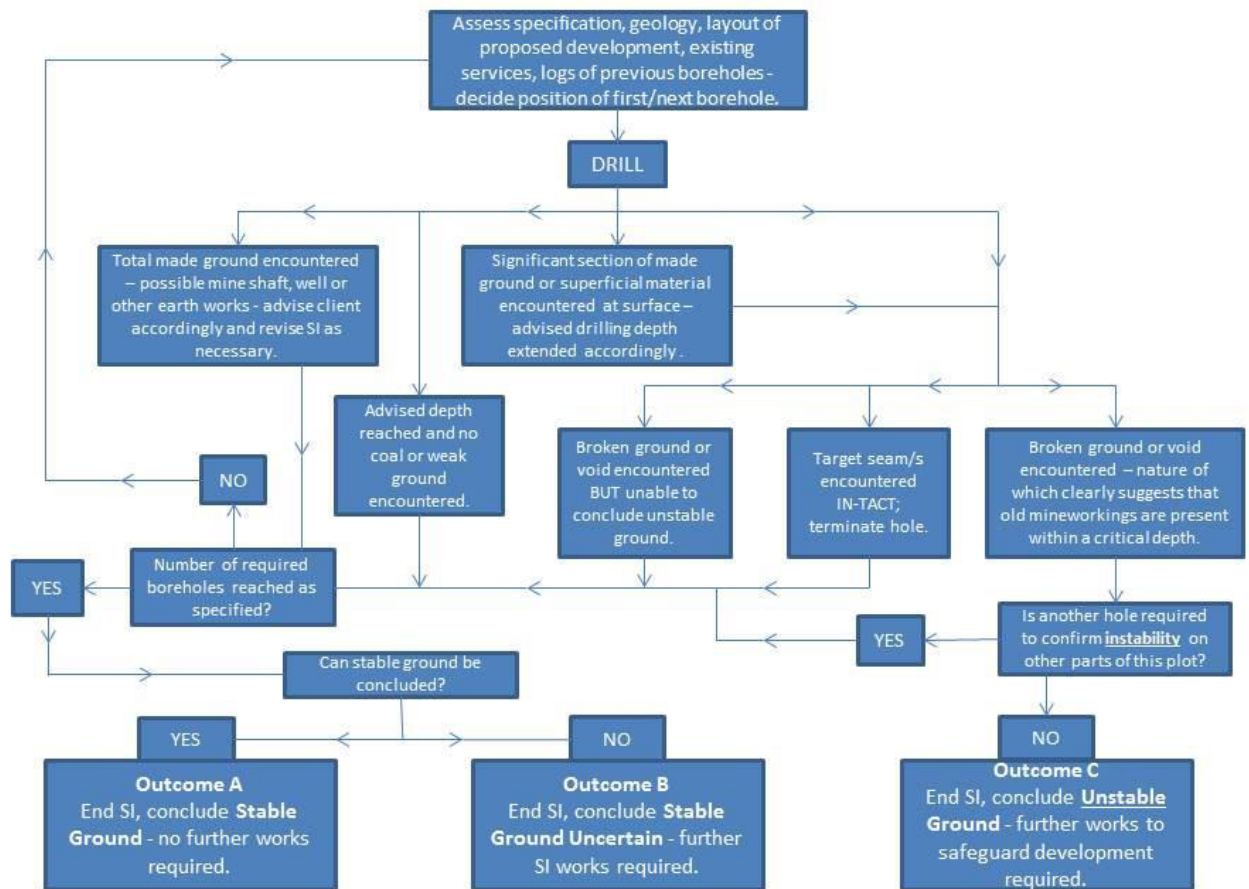
Measurements In Meters

BH No:	FROM	TO	THICKNESS	DESCRIPTION
1				Next to WS01
	0	1.1	1.1	Fill with hardcore
	1.1	4	2.9	Clay brown with sandstone lumps
	4	6.4	2.4	Mudstone grey some brown silty
	6.4	6.8	0.4	Coal with some black mudstone
	6.8	8.8	2	Mudstone grey silty
	8.8	8.9	0.1	Flash of coal
	8.9	9.7	0.8	Mudstone grey silty
	9.7	14.2	4.5	Sandstone grey silty odd mudstone band
	14.2	15.1	0.9	Coal
	15.1	16	0.9	Mudstone grey silty
2				Next to WS02
	0	1	1	Fill with hardcore
	1	3.8	2.8	Clay brown with sandstone lumps
	3.8	5.7	1.9	Mudstone grey some brown silty
	5.7	6.1	0.4	Coal with some black mudstone
	6.1	8.2	2.1	Mudstone grey silty
	8.2	8.3	0.1	Flash of coal
	8.3	9	0.7	Mudstone grey silty
	9	12.6	3.6	Sandstone grey silty odd mudstone band
	12.6	13.9	1.3	Voided lost water
	13.9	15	1.1	Solid
3				Next to WS05
	0	0.8	0.8	Fill brick stone concrete soil
	0.8	1.8	1	Soil black gravel some ash coal traces
	1.8	3.9	2.1	Clay brown with sandstone lumps
	3.9	5.5	1.6	Mudstone brown grey
	5.5	6	0.5	Coal with some black mudstone
	6	8	2	Mudstone grey silty
	8	8.1	0.1	Flash of coal
	8.1	8.9	0.8	Mudstone grey silty
	8.9	12.5	3.6	Sandstone grey silty odd mudstone band
	12.5	14	1.5	Voided Lost water & returns
	14	15	1	Solid

5.4 Site Investigation Process

Borehole Site Investigation (SI) Process Guide (Shallow Underground Coal Workings)

© M.A.Lyons - Jan 2016



5.5 Coal Authority Permit



The Coal
Authority

Permit to Enter or Disturb Coal Authority Interests

Permit 26349

Name and Address of Permit Holder:

RS Autos
103 Heckmondwike Road
Dewsbury
WF13 3PG

Site Location:

103 Dewsbury Moor
Heckmondwike Road
Dewsbury
WF13 3PG

This certificate hereby grants the above named Permit Holder a Permit to carry out:-

A Ground Investigation comprising five boreholes to 15m to determine presence of shallow mine workings within the Authority's interests at the identified site location above as shown on the Grant Permit Boundary (overleaf) for the period of **12 months** from the granted date shown below. *The granting of this Permit does not constitute advice given by the Authority in relation to the proposed operations. It is the Permit Holder's responsibility to obtain appropriate health, safety, environmental, technical and legal advice.*

Conditions:

- *Manned entry (i.e.) into mine entries/workings is strictly prohibited.*
- *Water flush*
- *Gas Monitoring CO, CH₄, CO₂, O₂, H₂S at borehole and rig*
- *Operators undertaking the work must be in possession of this certificate and the Permit boundary plan at the time of works*
- *Appropriate borehole sealing without delay and to withstand site level changes*

Signed: Michael Amirtash Granted Date: 14th March 2023

For and on behalf of The Coal Authority

Nominated Representative: Michael Amirtash, Permitting Manager;

The Coal Authority, Permitting Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG

Tel: 01623 637450; E-Mail: permissions@coal.gov.uk



Appendix D – Exploratory Hole Logs



Borehole Log

Project Name: Heckmondwike Rd, Dewsbury		Client: Urban Future Planning Consultancy Ltd		Date: 21/03/2023	
Location: 103 Heckmondwike Rd, Dewsbury Moor, WF13 3PG		Contractor: Cape SS			
Project No. : 1149		Crew Name:		Drilling Equipment: Window Sampler Rig	
Borehole Number WS01	Hole Type WS	Level	Logged By P. De Marchi	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50 0.50	ES PID	PID=0.1	0.40 0.50			MADE GROUND - Light brown sandy GRAVEL, subangular, fine to coarse	
								MADE GROUND - Black/dark brown dry gravelly sandy CLAY, very brittle, with fine gravels. Possible ash layer.	
		1.50	PID	PID=3.7				MADE GROUND - Brown sandy CLAY with black and orange lenses of unknown origin. Occasional subangular coarse gravels and cobbles.	1
		2.50 2.50	ES PID	PID=4.3	2.80			Brown firm sandy CLAY with numerous subangular fine to medium gravels. Crushed bedrock at the bottom, possible sandstone.	2
		3.40 3.40	ES PID	PID=3.6	3.50				3
								End of Borehole at 3.500m	4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
		3.50	50								

Remarks	
Refused at 3.5m on bedrock	



Borehole Log

Project Name: Heckmondwike Rd, Dewsbury		Client: Urban Future Planning Consultancy Ltd		Date: 21/03/2023	
Location: 103 Heckmondwike Rd, Dewsbury Moor, WF13 3PG		Contractor: Cape SS			
Project No. : 1149		Crew Name:		Drilling Equipment: Window Sampler Rig	
Borehole Number WS02	Hole Type WS	Level	Logged By P. De Marchi	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.40			MADE GROUND - Light brown to brown sandy GRAVEL, subangular, fine to coarse, with numerous brick fragments and cobbles.	
								End of Borehole at 0.400m	
									1
									2
									3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks	
Refused at 0.4m on hard surface	



Borehole Log

Project Name: Heckmondwike Rd, Dewsbury		Client: Urban Future Planning Consultancy Ltd		Date: 21/03/2023	
Location: 103 Heckmondwike Rd, Dewsbury Moor, WF13 3PG		Contractor: Cape SS			
Project No. : 1149		Crew Name:		Drilling Equipment: Window Sampler Rig	
Borehole Number WS03	Hole Type WS	Level	Logged By P. De Marchi	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.40			MADE GROUND - Light brown to brown sandy GRAVEL, subangular fine to coarse, with brick fragments and cobbles.	
								End of Borehole at 0.400m	
									1
									2
									3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks	
Refused at 0.4m on hard surface	



Borehole Log

Project Name: Heckmondwike Rd, Dewsbury		Client: Urban Future Planning Consultancy Ltd		Date: 21/03/2023	
Location: 103 Heckmondwike Rd, Dewsbury Moor, WF13 3PG		Contractor: Cape SS			
Project No. : 1149		Crew Name:		Drilling Equipment: Window Sampler Rig	
Borehole Number WS04	Hole Type WS	Level	Logged By P. De Marchi	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40	ES	PID=2.0	0.30			MADE GROUND - Light brown gravel of fill, fine to coarse, subangular	
		0.40	PID		0.50			MADE GROUND - Black sandy GRAVEL, subangular, fine to coarse, with numerous brick fragments	
		1.00	PID	PID=0.5				MADE GROUND - Brown sandy GRAVEL, subangular, fine to coarse gravels, with numerous brick fragments. Large concrete cobbles. Black lenses of gravel. No hydrocarbon odour.	1
		1.90	PID	PID=0.2	1.60			MADE GROUND - Brown gravelly silty CLAY, with subangular fine to coarse gravels and brick fragments.	2
		2.60	ES	PID=2.1	3.00			End of Borehole at 3.000m	3
		2.60	PID						4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
		3.00	50								

Remarks	
Refused at 3m on hard surface	



Borehole Log

Project Name: Heckmondwike Rd, Dewsbury		Client: Urban Future Planning Consultancy Ltd		Date: 21/03/2023	
Location: 103 Heckmondwike Rd, Dewsbury Moor, WF13 3PG		Contractor: Cape SS			
Project No. : 1149		Crew Name:		Drilling Equipment: Window Sampler Rig	
Borehole Number WS05	Hole Type WS	Level	Logged By P. De Marchi	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	PID	PID=0.4	0.30			MADE GROUND - Light brown gravel of fill, with subangular medium to coarse gravels and occasional subangular cobbles.	
		1.10 1.10	ES PID	PID=0.5	1.30			MADE GROUND - Black sandy CLAY with large brick fragments and rootlets. Becoming stiffer with depth.	1
		2.00	PID	PID=0.5				MADE GROUND - Brown sandy gravelly CLAY with fine to medium subangular gravels. Occasional coarse gravel and brick fragments. No hydrocarbon odour.	2
		2.70	PID	PID=0.3	3.00			End of Borehole at 3.000m	3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks Refused at 3m on hard surface											



Borehole Log

Project Name: Heckmondwike Rd, Dewsbury		Client: Urban Future Planning Consultancy Ltd		Date: 21/03/2023	
Location: 103 Heckmondwike Rd, Dewsbury Moor, WF13 3PG		Contractor: Cape SS			
Project No. : 1149		Crew Name:		Drilling Equipment: Window Sampler Rig	
Borehole Number WS06	Hole Type WS	Level	Logged By P. De Marchi	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.70 0.70	ES PID	PID=0.2	0.10			MADE GROUND - Tarmac	
								MADE GROUND - Brown sandy GRAVEL, subangular, fine to coarse. Numerous subangular cobbles and fine to coarse brick fragments. At 0.3m gravels are black subangular fine to medium.	1
					1.50			End of Borehole at 1.500m	2
									3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks Refused at 1.5m on cobbles											



Borehole Log

Project Name: Heckmondwike Rd, Dewsbury		Client: Urban Future Planning Consultancy Ltd		Date: 21/03/2023	
Location: 103 Heckmondwike Rd, Dewsbury Moor, WF13 3PG		Contractor: Cape SS			
Project No. : 1149		Crew Name:		Drilling Equipment: Window Sampler Rig	
Borehole Number WS07	Hole Type WS	Level	Logged By P. De Marchi	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	PID	PID=0.4	0.40			MADE GROUND - Light brown and black sandy GRAVEL with subangular fine to medium gravels.	1
		0.60	ES		0.80			MADE GROUND - Black to brown silty clayey GRAVEL, with subangular fine to medium gravels. Occasional large brick fragments and subangular black coarse gravel.	
		0.80	PID	PID=0.6	1.00			MADE GROUND - Brown gravelly CLAY, with subangular fine to medium gravels.	
					2.20			NO RECOVERY - Possible loose GRAVEL.	
		2.60	PID	PID=0.6	2.70			Brown gravelly CLAY with fine to coarse subangular gravels and grey lenses of CLAY.	
								End of Borehole at 2.700m	3
									4
									5

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
		2.70	50								

Remarks	
Refused at 2.7m on cobbles	

Client: Lyons CMC	Site: 103. Dewsbury Moor, Heckmonwike Road, Dewsbury.		Cape Site Services unit 2, rear of Castle Buildings Carlton Road, Barnsley, S71 3HX	
Date: 03/04/2023	Method: water flush	Permit No: 26349		
Driller: Ian Wiles		Driller Assistant: Richard Hawkins, Simon Fish		
Drillers Signature: 		Page No: 1		

Measurements In Meters

BH No:	FROM	TO	THICKNESS	DESCRIPTION
1				Next to WS01
	0	1.1	1.1	Fill with hardcore
	1.1	4	2.9	Clay brown with sandstone lumps
	4	6.4	2.4	Mudstone grey some brown silty
	6.4	6.8	0.4	Coal with some black mudstone
	6.8	8.8	2	Mudstone grey silty
	8.8	8.9	0.1	Flash of coal
	8.9	9.7	0.8	Mudstone grey silty
	9.7	14.2	4.5	Sandstone grey silty odd mudstone band
	14.2	15.1	0.9	Coal
	15.1	16	0.9	Mudstone grey silty
2				Next to WS02
	0	1	1	Fill with hardcore
	1	3.8	2.8	Clay brown with sandstone lumps
	3.8	5.7	1.9	Mudstone grey some brown silty
	5.7	6.1	0.4	Coal with some black mudstone
	6.1	8.2	2.1	Mudstone grey silty
	8.2	8.3	0.1	Flash of coal
	8.3	9	0.7	Mudstone grey silty
	9	12.6	3.6	Sandstone grey silty odd mudstone band
	12.6	13.9	1.3	Voided lost water
	13.9	15	1.1	Solid
3				Next to WS05
	0	0.8	0.8	Fill brick stone concrete soil
	0.8	1.8	1	Soil black gravel some ash coal traces
	1.8	3.9	2.1	Clay brown with sandstone lumps
	3.9	5.5	1.6	Mudstone brown grey
	5.5	6	0.5	Coal with some black mudstone
	6	8	2	Mudstone grey silty
	8	8.1	0.1	Flash of coal
	8.1	8.9	0.8	Mudstone grey silty
	8.9	12.5	3.6	Sandstone grey silty odd mudstone band
	12.5	14	1.5	Voided Lost water & returns
	14	15	1	Solid



Appendix E – Environmental Testing Results

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 23/02746
Issue Number: 1

Date: 29 March, 2023

Client: Geo2 Remediation Ltd
Coniston House,
Louisa Street
Bradford
BD10 8NE

Project Manager: Paolo de Marchi/Steven Jackson
Project Name: RS Auto
Project Ref: 1149
Order No: 1149-PDH
Date Samples Received: 22/03/23
Date Instructions Received: 23/03/23
Date Analysis Completed: 29/03/23

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 23/02746

Client Project Name: RS Auto

Client Project Ref: 1149

Lab Sample ID	23/02746/1	23/02746/2	23/02746/3	23/02746/4	23/02746/5	23/02746/6	23/02746/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS01	WS04	WS05	WS07	WS01	WS04			
Depth to Top	2.50	3.40	2.60	1.10	0.80	0.50	0.40			
Depth To Bottom										
Date Sampled	21-Mar-23	21-Mar-23	21-Mar-23	21-Mar-23	21-Mar-23	21-Mar-23	21-Mar-23			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	5A	4A	4A	4A	4A	4AB	4ABE			
% Stones >10mm _A	<0.1	<0.1	<0.1	5.7	13.1	3.1	8.4	% w/w	0.1	A-T-044
Arsenic _D ^{M#}	-	-	-	56	70	54	33	mg/kg	1	A-T-024s
Cadmium _D ^{M#}	-	-	-	1.5	1.5	1.8	2.0	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	-	-	-	59	106	74	53	mg/kg	1	A-T-024s
Chromium _D ^{M#}	-	-	-	25	23	27	31	mg/kg	1	A-T-024s
Lead _D ^{M#}	-	-	-	92	187	78	87	mg/kg	1	A-T-024s
Mercury _D	-	-	-	0.35	0.48	<0.17	0.19	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	-	-	-	26	30	35	30	mg/kg	1	A-T-024s
Selenium _D ^{M#}	-	-	-	<1	<1	<1	<1	mg/kg	1	A-T-024s
Zinc _D ^{M#}	-	-	-	77	140	92	134	mg/kg	5	A-T-024s

Envirolab Job Number: 23/02746

Client Project Name: RS Auto

Client Project Ref: 1149

Lab Sample ID	23/02746/1	23/02746/2	23/02746/3	23/02746/4	23/02746/5	23/02746/6	23/02746/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS01	WS04	WS05	WS07	WS01	WS04			
Depth to Top	2.50	3.40	2.60	1.10	0.80	0.50	0.40			
Depth To Bottom										
Date Sampled	21-Mar-23	21-Mar-23	21-Mar-23	21-Mar-23	21-Mar-23	21-Mar-23	21-Mar-23			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	5A	4A	4A	4A	4A	4AB	4ABE			
Asbestos in Soil (inc. matrix)										
Asbestos in soil _D [#]	-	-	-	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			A-T-045

Envirolab Job Number: 23/02746

Client Project Name: RS Auto

Client Project Ref: 1149

Lab Sample ID	23/02746/1	23/02746/2	23/02746/3	23/02746/4	23/02746/5	23/02746/6	23/02746/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS01	WS04	WS05	WS07	WS01	WS04			
Depth to Top	2.50	3.40	2.60	1.10	0.80	0.50	0.40			
Depth To Bottom										
Date Sampled	21-Mar-23	21-Mar-23	21-Mar-23	21-Mar-23	21-Mar-23	21-Mar-23	21-Mar-23			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	5A	4A	4A	4A	4A	4AB	4ABE			
TPH CWG with Clean Up										
Ali >C5-C6 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	<1	<1	6	9	<5	<1	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1	<1	4	5	<5	<1	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1	<1	<1	5	7	<5	<1	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	<1	<1	<1	4	6	8	<1	mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	1	1	<1	17	25	28	48	mg/kg	1	A-T-055s
Total Aliphatics _A	1	1	<1	35	52	37	48	mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<1	<1	<1	4	5	<5	<1	mg/kg	1	A-T-055s
Aro >C10-C12 _A	<1	<1	<1	4	5	<5	<1	mg/kg	1	A-T-055s
Aro >C12-C16 _A	<1	<1	<1	11	18	103	112	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	<1	<1	<1	21	34	555	700	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	<1	<1	<1	53	95	921	1360	mg/kg	1	A-T-055s
Total Aromatics _A	<1	<1	<1	92	158	1580	2180	mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	1	1	<1	127	211	1620	2220	mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 23/02746

Client Project Name: RS Auto

Client Project Ref: 1149

Lab Sample ID	23/02746/8							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS06									
Depth to Top	0.70									
Depth To Bottom										
Date Sampled	21-Mar-23									
Sample Type	Soil									
Sample Matrix Code	4AE									
% Stones >10mm _A	24.2							% w/w	0.1	A-T-044
Arsenic _D ^{M#}	13							mg/kg	1	A-T-024s
Cadmium _D ^{M#}	<0.5							mg/kg	0.5	A-T-024s
Copper _D ^{M#}	14							mg/kg	1	A-T-024s
Chromium _D ^{M#}	14							mg/kg	1	A-T-024s
Lead _D ^{M#}	26							mg/kg	1	A-T-024s
Mercury _D	0.71							mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	11							mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1							mg/kg	1	A-T-024s
Zinc _D ^{M#}	40							mg/kg	5	A-T-024s

Envirolab Job Number: 23/02746

Client Project Name: RS Auto

Client Project Ref: 1149

Lab Sample ID	23/02746/8							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS06									
Depth to Top	0.70									
Depth To Bottom										
Date Sampled	21-Mar-23									
Sample Type	Soil									
Sample Matrix Code	4AE									
Asbestos in Soil (inc. matrix)										
Asbestos in soil _D [#]	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									A-T-045

Envirolab Job Number: 23/02746

Client Project Name: RS Auto

Client Project Ref: 1149

Lab Sample ID	23/02746/8									
Client Sample No										
Client Sample ID	WS06									
Depth to Top	0.70									
Depth To Bottom										
Date Sampled	21-Mar-23									
Sample Type	Soil									
Sample Matrix Code	4AE									
TPH CWG with Clean Up										
Ali >C5-C6 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1							mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	6							mg/kg	1	A-T-055s
Total Aliphatics _A	6							mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<1							mg/kg	1	A-T-055s
Aro >C10-C12 _A	<1							mg/kg	1	A-T-055s
Aro >C12-C16 _A	2							mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	6							mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	23							mg/kg	1	A-T-055s
Total Aromatics _A	32							mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	38							mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
MTBE _A [#]	<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 with the same delivery, will be disposed of six weeks after 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 the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples 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.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

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 analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

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.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Subscript "A" indicates analysis has dependant options against results. Testing dependant on results appear in the comments area of your sample receipt.

EPH CWG results have humics mathematically subtracted through instrument calculation

TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these

humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	Geo2 Remediation Ltd, Coniston House,, Louisa Street, Bradford, BD10 8NE	Project No:	23/02746
Project:	RS Auto	Date Received:	23/03/2023 (am)
Clients Project No:	1149	Cool Box Temperatures (°C):	14.1

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	23/02746/1	23/02746/2	23/02746/3	23/02746/4	23/02746/5	23/02746/6	23/02746/7	23/02746/8
Client Sample No								
Client Sample ID/Depth	WS01 2.50m	WS01 3.40m	WS04 2.60m	WS05 1.10m	WS07 0.80m	WS01 0.50m	WS04 0.40m	WS06 0.70m
Date Sampled	21/03/23	21/03/23	21/03/23	21/03/23	21/03/23	21/03/23	21/03/23	21/03/23
A-T-022s	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023	27/03/2023
A-T-024s				28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
A-T-044	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023
A-T-045				24/03/2023	24/03/2023	24/03/2023	24/03/2023	24/03/2023
A-T-055s	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023	29/03/2023	29/03/2023	28/03/2023
Calc-As Recd	28/03/2023	28/03/2023	28/03/2023	28/03/2023	28/03/2023	29/03/2023	29/03/2023	28/03/2023

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 – Risk Assessment Terminology

Definitions and Classifications of Risk Assessment Terminology.

Probability

Probability can be defined as the chance of a particular event occurring in a given period of time.

Descriptions of each of the four qualitative terms to be use in this report to describe the perceived probability of any identified pollutant linkage becoming realised are shown below in Table W.

Term	Description
High Likelihood	There is pollutant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.
Likely	There is pollutant linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.
Low Likelihood	There is pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place, and is less likely in the shorter term.
Unlikely	There is pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.

Table W. Description of Probability Classifications

Severity

Severity (consequence) can be defined as the adverse effects (or harm) arising from a defined hazard, which impairs the quality of human health or the environment in the short or longer term.

Descriptions of each of the four qualitative terms to be use in this report to describe the perceived potential severity of any identified pollutant linkage becoming realised are shown overleaf in Table X.

Term	Description
Severe	Highly elevated concentrations likely to result in “significant harm” to human health as defined by the EPA 1990, Part 2A, if exposure occurs. Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce. Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Catastrophic damage to crops, buildings or property.
Medium	Elevated concentrations which could result in “significant harm” to human health as defined by the EPA 1990, Part 2A if exposure occurs. Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce. Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Significant damage to crops, buildings or property.
Mild	Exposure to human health unlikely to lead to “significant harm”. Equivalent to EA Category 3 pollution incident including minimal or short lived effect on water quality; marginal effect on amenity value, agriculture or commerce. Minor or short lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population. Minor damage to crops, buildings or property.
Minor	No measurable effect on humans. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects of damage to buildings, structures and services.

Table X. Description of Severity Classifications

Once the severity and probability of a pollutant linkage has been determined the risk can be assessed using the risk matrix shown overleaf on Table Y.

Risk Matrix

By cross referencing the derived severity and probability in Table Y, below the perceived potential risk can be determined.

		Severity			
		Severe	Medium	Mild	Minor
Probability	High likelihood	Very high risk	High risk	Moderate risk	Moderate / low risk
	Likely	High risk	Moderate risk	Moderate / low risk	Low risk
	Low likelihood	Moderate risk	Moderate / low risk	Low risk	Very low risk
	Unlikely	Moderate / low risk	Low risk	Very low risk	Very low risk

Table Y. Risk Assessment Matrix

The risk categories detailed above are defined below in the following Table Z.

Term	Description
Very High Risk	There is a high probability that significant harm could arise to a designated receptor from an identified hazard at the site without appropriate remedial action.
High Risk	Significant Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remedial action.
Moderate Risk	It is possible that without appropriate remedial action, harm could arise to a designated receptor but it is relatively unlikely that any such harm would be severe and if any harm were to occur, it is likely that such harm would be relatively mild.
Low Risk	It is possible that significant harm could arise to a designated receptor from an identified hazard but it is likely that at worst this harm if realised would normally be mild.
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

Table Z. Definition of Risk