







Earth Environmental
& Geotechnical

Phase 1 GeoEnvironmental Desk Study

The Albion Inn

Burnage

October 2023

On behalf of

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PHASE I GEOENVIRONMENTAL DESK STUDY

THE ALBION INN

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BURNAGE

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Report No. A5595/23/FDS **OCTOBER 2023**

Report Title:	**Phase I GeoEnvironmental Desk Study** **The Albion inn, Burnage**
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EARTH ENVIRONMENTAL & GEOTECHNICAL

CONTENTS

1.0 INTRODUCTION 1
Appointment 1
Objective 1
Scope 1
2.0 SITE LOCATION AND DESCRIPTION 2
Site Utility Services 4
3.0 ENVIRONMENTAL SETTING 5
Geology 5
Ground Workings 5
Mining and Other Underground Workings 5
Radon Potential 6
Hydrogeology and Hydrology 6
Landfill & Waste Management Activity 7
Industrial Land Use Information 7
Environmental Permits, Incidents and Registers 8
Environmentally Sensitive Sites 9
Ecology 9
Archaeology 10
Potential Flood Risks 10
Previous Site Investigations 10
4.0 SITE HISTORY 11
5.0 WALKOVER SURVEY 17
6.0 PRELIMINARY CONTAMINATION RISK ASSESSMENT 19
Introduction 19
Potential Sources 20
Potential Receptors 20
Potential Pathways 20
7.0 GEOTECHNICAL HAZARDS ASSOCIATED WITH THE DEVELOPMENT 23
8.0 CONCLUSIONS & RECOMMENDATIONS 25
Conclusions 25
Recommendations 25

FIGURES

Figure 1 Site Location Plan
Figure 2 Proposed Development Layout Plan
Figure 3 OS Map Extract 1849
Figure 4 OS Map Extract 1911
Figure 5 OS Map Extract: 1923
Figure 6 OS Map Extract: 1934
Figure 7 OS Map Extract: 1957
Figure 8 OS Map Extract: 1989
Figure 8 Google Earth Imagery: 2023
Figure 9 Site Features Plan

TABLES

Table 1	Environmental Permits, Incidents and Registers within 500m of the Site
Table 2	Summary of Site History
Table 3	Consequence, Probability and Risk
Table 4	Estimation of Level of Risk by Comparison of Consequence and Probability
Table 5	Preliminary Conceptual Model
Table 6	Summary of Geotechnical Hazards

APPENDICES

Appendix 1	GroundSure Reports
Appendix 2	Site Photographs
Appendix 3	Site Walkover Notes
Appendix 4	Report Limitations

1.0 INTRODUCTION

Appointment

1.1 Earth Environmental & Geotechnical Ltd. has been commissioned by H & K Developments Ltd. (the Client) to undertake a Phase I GeoEnvironmental Desk Study at the Albion Inn, Burnage.

1.2 It is understood that the Client wishes to convert the former public house into 11no. new residential apartments, involving the erection of a two-storey rear extension and a car park hardstanding to the east of the site.

1.3 Planning permission (application no. 134949/FO/2022) was granted on the 9th June 2023. Condition No. 4 requires the development of a Preliminary Risk Assessment in relation to potential ground contamination.

1.4 This report intends to satisfy planning condition No. 4.

1.5 Vehicle access will be gained easily from Burnage Lane to the south of the site.

Objective

1.6 The purpose of the Desk Study is to collate available geological and environmental data for the site (and its environment) and provide a preliminary geotechnical and geo-environmental appraisal, with a site-specific conceptual model. This enables a preliminary assessment of geo-environmental risks to be undertaken and, if necessary, provides information for the design of a Phase 2 Ground Investigation.

Scope

1.7 The Phase I Environmental Desk Study comprises of a site reconnaissance visit and a review of the following information sources, some of which was provided by the client.

- British Geological Survey online maps.
- Google Earth imagery.
- Environment Agency online mapping data.
- Historical Ordnance Survey maps.
- The site and surrounding areas environmental, geological, and mining data presented in the site specific GroundSure Reports (Appendix 1).
- Coal Authority Interactive Viewer.
- Manchester City Council planning portal.

2.0 SITE LOCATION AND DESCRIPTION

2.1 The site is in Burnage, approximately 7km south of Manchester city centre. The approximate National Grid Reference for the centre of the site is SJ 86269 91810 (X: 386269, Y: 391810) and the postcode is M19 1NA.

2.2 The site is a pentagon shaped parcel of land with current access via Burnage Lane immediately south of the site. The maximum dimensions of the proposed site are approximately 43m west to east and 28m north to south. The site occupies an area of approximately 0.14 hectares.

2.3 The site is located within an urban area and is the surrounding area is comprised of residential properties.

2.4 The proposed development is to convert the current building on site (the former public house/inn) to 11no. new residential apartments, with a two-storey extension to the rear of the building and a car park hardstanding to the east of the site.

2.5 A location plan is shown below as Figure 1, along with a proposed development layout plan as Figure 2.

Figure 1 Site Location Plan



Figure 2 Proposed Development Layout Plan



Site Utility Services

2.6 Site service plans have not been obtained for the site. The status of all services should be checked prior to any development (including site investigation) commencing.

3.0 ENVIRONMENTAL SETTING

3.1 The geology of the site is covered by British Geological Survey (BGS) online data and the site specific GroundSure Enviro+Geo Insight report (Appendix 1).

3.2 Environmental conditions are covered by Environment Agency (EA) and British Geological Survey (BGS) online data, and the site specific GroundSure Enviro+Geo Insight report (Appendix 1).

Geology

3.3 The site is underlain by superficial deposits of Devensian Till, which is comprised of Diamicton and more commonly known as Boulder Clay.

3.4 The solid geology beneath the south of the site is shown to be the Triassic Chester Pebble Bed Formation comprised of sandstone.

3.5 There is 1 record of a bedrock fault and linear feature within 500m of the site boundary. The record refers to a fault located 407m southwest of the site.

3.6 There are no records of a landslips within 500m of the site.

3.7 There are 21 borehole records identified within 250m of the site. The closest record is a borehole located 97m east of the site, however, all of this information is confidential.

3.8 The site is in an area where the hazard rating is very low with regards to shrink swell clays, running sands, collapsible deposits, and landslides. The site hazard rating is negligible with regards to compressible deposits and ground dissolution of soluble rocks.

Ground Workings

3.9 There are 12 records of historical surface ground working features identified within 250m of the site boundary. The closest record refers to a pond located 104m southwest of the site and dated to 1851.

3.10 According to the BGS, there are no records of British Pits within 500m of the site.

Mining and Other Underground Workings

3.11 The site is not located within an identified coal mining area. Reference to the Coal Authority Interactive viewer shows the site is not located within a Development High Risk Area.

3.12 There are no records of a non-coal mining area located within 1km of the site.

3.13 There are no areas of brine extraction, gypsum extraction, tin mining, or clay mining on the site.

3.14 There are no records of natural cavities within 500m of the site.

3.15 There are no records for mining cavities identified within 1km of the site.

3.16 There are no records for historical underground working features identified within 1km of the site.

3.17 There are no records of historic mineral planning areas within 500m of the site.

Radon Potential

3.18 The site is not located in a Radon Affected Area; less than 1% of the site is above the Action Level. Therefore, no radon protection measures will be required.

Hydrogeology and Hydrology

3.19 The superficial deposits of Devensian Till are classified by the EA as a Secondary Undifferentiated Aquifer with a mixed flow type and high to low permeability. The BGS states the following:

> ***Secondary undifferentiated:*** *'Assigned where it is not possible to attribute either category A or B to a rock type. In general, these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.'*

3.20 The Chester Formation is classified by the EA as a Principal Aquifer with a mixed flow type and high to moderate permeability. The BGS states the following:

> ***Principal:*** *'Assigned where it is not possible to attribute either category A or B to a rock type. In general, these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.'*

3.21 The groundwater vulnerability and soil leaching potential of the site have been classified as low vulnerability. The BGS states:

> ***Low:*** *'Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.'*

3.22 There are 8 ground water abstraction licence records within 2km of the site. The closest record refers to an active licence for spray irrigation – direct at Heaton Moor Golf Club, Stockport, located 1km east of the site.

3.23 There are no surface water abstraction licence records within 2km of the site.

3.24 There are no potable water abstraction licence records within 2km of the site.

3.25 The site is not located within a Total Catchment Source Protection Zone.

3.26 The site is not located within 500m of a Source Protection Zone within a confined aquifer.

3.27 There are no records of a water network entry within 250m of the site.

3.28 There are no records of surface water features identified within 250m of the site.

3.29 There is 1 record of a Water Framework Directive (WFD) surface water body catchment located on site. The record refers to the Chorlton Brook (Princess Parkway to Mersey), within the Mersey Upper management catchment.

3.30 There is 1 record of a WFD surface water body located 2.8km northwest of the site. The record refers to Chorlton Brook (Princess Parkway to Mersey). The water body received a fail chemical rating and a moderate ecological rating in 2019.

3.31 There is 1 record of a Water Framework Directive (WFD) groundwater body located on site. The record refers to Manchester and East Cheshire Permo – Triassic Sandstone Aquifers, which received a poor chemical rating in 2019.

Landfill & Waste Management Activity

3.32 There are no records for current Environment Agency/Natural Resource Wales landfill sites within 500m of the site.

3.33 There are no records of historic Environment Agency/Natural Resource Wales landfill sites within 500m of the site.

3.34 There are no records of BGS/DoE non-operational landfill sites within 500m of the site.

3.35 There are no records of a historical landfill from the Local Authority and Historical Mapping records within 500m of the site.

3.36 There are 6 records of a waste treatment, transfer, or disposal site within 500m of the site. The closest record refers to a treating waste exemption, not on a farm, for the sorting and de-naturing of controlled drugs for disposal located 389m southwest of the site.

3.37 There are no records of historical waste sites within 500m of the site.

3.38 There are no records of current Environment Agency/Natural Resources Wales licensed waste sites within 500m of the site.

Industrial Land Use Information

3.39 There are 46 records of potentially contaminative historical land uses identified within 500m of the site. The closest record refers to unspecified works located 275m south of the site and dated 1934.

3.40 There are 3 records of current potentially contaminative land uses identified within 250m of the site. The closest record refers to an Electricity Sub Station located 3m northwest of the site.

3.41 There are 20 records of historical tanks identified within 500m of the site. The closest record refers to tanks located 300m south of the site and dated between 1989 and 1992.

3.42 There are 16 records of historical energy features identified within 500m of the site. The closest record refers to an Electricity Sub Station located 2m northwest of the site and dated between 1971 and 1992.

3.43 There are 2 records for current petrol or fuel sites within 500m of the site. The closest record refers to obsolete located 455m southwest of the site.

3.44 There are no records of historical petrol or fuel sites within 500m of the site.

3.45 There are 5 records of historical garages and motor vehicle repair sites identified within 500m of the site. The closest record refers to a garage located 440m southwest of the site, dated 1957.

3.46 There are no historical military land use records within 500m of the site.

3.47 There are no National Grid high voltage underground electricity transmission cables within 500m of the site.

3.48 There are no National Grid high-pressure gas transmission pipelines within 500m of the site.

3.49 There is 1 historical railway and tunnel features identified within 250m of the site. The closest record refers to a railway siding located 211m south of the site and dated to 1922.

3.50 There are no historical railway lines identified within 250m of the site.

3.51 There are no current active railway line records identified within 250m of the site.

3.52 There are no underground railway lines or tunnels identified within 250m of the site.

3.53 The site is not within 500m of the route of the High Speed 2 rail project.

3.54 The site is not within 500m of the route of the Crossrail 1 and Crossrail 2 rail projects.

Environmental Permits, Incidents and Registers

3.55 The Groundsure Report includes records of environmental permits, incidents, and registers within 500m of the site, which are summarised in Table 1 below.

Table 1: Environmental Permits, Incidents and Registers within 500m of the Site

Permit/Incident/Register	Number
Historical Licensed Industrial Activities (IPC)	0
Part A (1) and IPPC Authorised Activities	0
Pollutant Release to Surface Waters (Red List)	0
List 1 Dangerous Substances Inventory Sites	0
List 2 Dangerous Substances Inventory Sites	0
Part A (2) and Part B Activities and Enforcements	1
Category 3 or 4 Radioactive Substance Authorisations	0
Licensed Discharge Consents	0
Planning Hazardous Substance Consents and Enforcements	0
Dangerous or Hazardous (COMAH and NIHHS) Sites	0
Sites Determined as Contaminated Land under Part 2A EPA 1990	0
Regulated Explosive Sites	0
Pollutant Release to Public Sewer	0
Substantiated Pollution Incidents (Category 1 and 2)	0
Pollution Inventory Substances, Wastes and Radioactive Wastes	0

3.56 There is 1 record of a part B current permit for the unloading of petrol into storage located 471m southwest of the site.

3.57 There are no further records environmental permits, incidents, and registers within 500m of the site.

Environmentally Sensitive Sites

3.58 There are no records of Sites of Special Scientific Interest (SSSI) within 2km of the site.

3.59 There are 3 records of Green Belt areas within 2km of the site. The closest record refers to Merseyside and Greater Manchester located 1.4km south of the site.

3.60 There are 3 records of a Local Nature Reserve (LNR) located within 2km of the site. The closest record refers to Heaton Mersey Common located 560m south of the site.

3.61 There are no further records of environmental sensitive sites within 2km of the site.

Ecology

3.62 An ecological assessment of the site falls outside the brief of this report. Where considered necessary, advice should be sought from an ecological specialist in this respect.

3.63 The site is classified as Urban land.

Archaeology

3.64 An archaeological assessment falls outside the brief of this report. Where considered necessary, advice should be sought from an archaeological specialist in this respect.

3.65 There are no records of listed buildings within 250m of the site.

3.66 There no records of Conversation Areas within 250m of the site.

3.67 There are no records of Areas of Outstanding Natural Beauty within 250m of the site.

3.68 There are no records of World Heritage Sites or Scheduled Ancient Monuments with 250m of the site.

3.69 There are no records of National Parks or Registered Parks and Gardens within 250m of the site.

Potential Flood Risks

3.70 Detailed assessment of flood risks is outside the scope of this report. However, the site does not lie within a EA Flood Zone 2 or 3.

3.71 There are no records of risk of flooding from rivers and sea (RoFRaS) within 50m of the site.

3.72 There are no records of historical flood events within 250m of the site.

3.73 There are no records of flood defences located within 250m of the site.

3.74 There are no records of areas benefitting from flood defences within 250m of the site.

3.75 There are no records of areas used for flood storage within 250m of the site.

3.76 The highest risk of surface water flooding occurring on-site is 1 in 30 year, 0.1m – 0.3m.

3.77 The highest risk of groundwater flooding occurring on-site is moderate.

Previous Site Investigations

3.78 Earth Environmental & Geotechnical Ltd. are not aware of any previous site investigations carried out for the site.

4.0 SITE HISTORY

4.1 The historical development of the site has been determined by reference historical plans and Google Earth imagery. The reviewed historical plans comprise only readily available records and may be limited; however, the information available to date indicates that additional searches are unlikely to add to our understanding of the site. The earliest available historical mapping covering the site dates to 1849.

4.2 The site history is summarised in Table 2, below, followed by selected extracts from maps and aerial photographs.

Table 2: Summary of Site History

Date	On-Site History	Surrounding Land Use History
1849 1:10,560 1881 1894 1:2,500	There are two residential properties located on site.	Burnage lane runs parallel to the eastern boundary of the site. The surrounding area is mainly comprised of vacant fields. There are some residential properties southwest of the site. There are some small patches of woodland surrounding the site. There is a fish pond 140m southwest of the site.
1911 1:10,560 1907 1:2,500	No significant changes.	Railway in the course of construction located 420m west of the site. Two small ponds located 90m southwest of the site.
1923 1:10,560	No significant changes.	Railway construction now complete. Burnage works and associated buildings located 420m south of the site.
1938 1:10,560 1934 1:2,500	Residential structures demolished and replaced with one large beer house.	Significant residential development within 500m of the site. Burnage works now recorded as Renold works. Pump house located 400m south of the site. Barcicroft Road runs parallel to the northern boundary of the site.
1957 1:1,250 1955 1965 - 1966 1:10,560	Beer house now recorded as the Albion Inn (Public house). However, no significant changes.	All the small patches of woodland surrounding the site cleared. Two ponds southwest of the site filled in. There is a nursery located 110m southwest of the site. More residential development within 500m of the site.
1976 1:10,000	Small build associated with pub constructed on site, however, no significant changes.	Residential properties southwest of the site demolished and replaced with new developments.

Date	On-Site History	Surrounding Land Use History
1971 1:1,250		Further residential development located 400m east of the site. Electricity substation offsite on north western boundary of the site. 2 new works located 400m south of the site. Fish pond southwest of site filled in.
1989 2001 1:10,000 1982 – 1986 1992 2003 1:1,2500	No significant changes.	Renold works demolished and replaced with residential properties. Old residences demolished and new residential properties constructed immediately southwest of the site.
2003 1:1,250 2010 2023 1:10,000 2023 Google Earth Imagery	No significant change.	Works south of the site demolished and superstore constructed. Aldi constructed 490m north of the site.

Historically, at the start of recording there were three residential structures located on the site, which were then demolished and replaced with the Albion Inn public house in the 1930s. However, since this development there have been no significant changes recorded on site.

Historically, at the start of recording the surrounding area was mainly comprised of vacant fields, however, in the 1930s significant residential development took place.

An electricity substation was established close to the north western boundary of the site by 1971.

Figure 3 OS Map Extract 1849

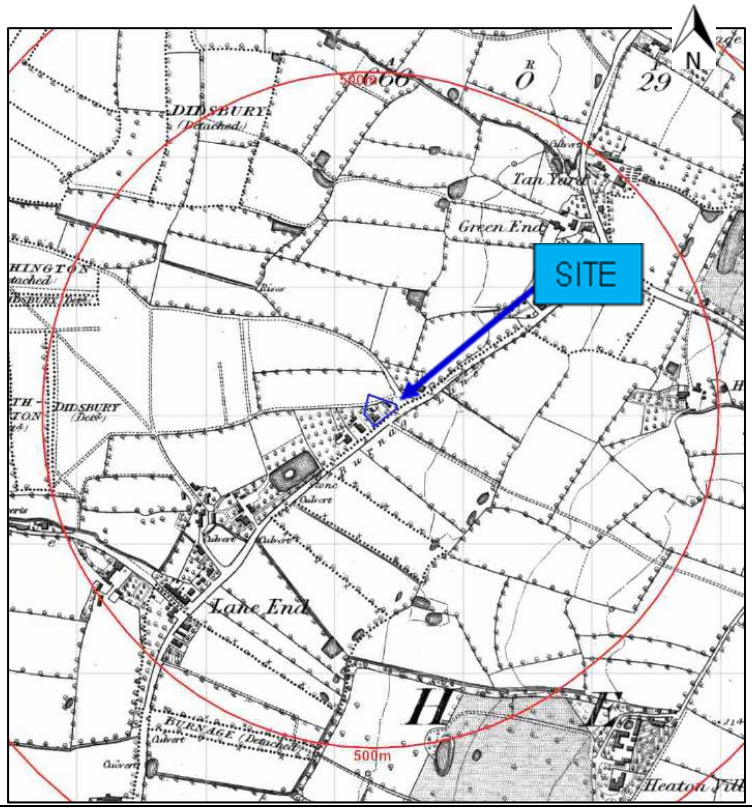


Figure 4 OS Map Extract 1911

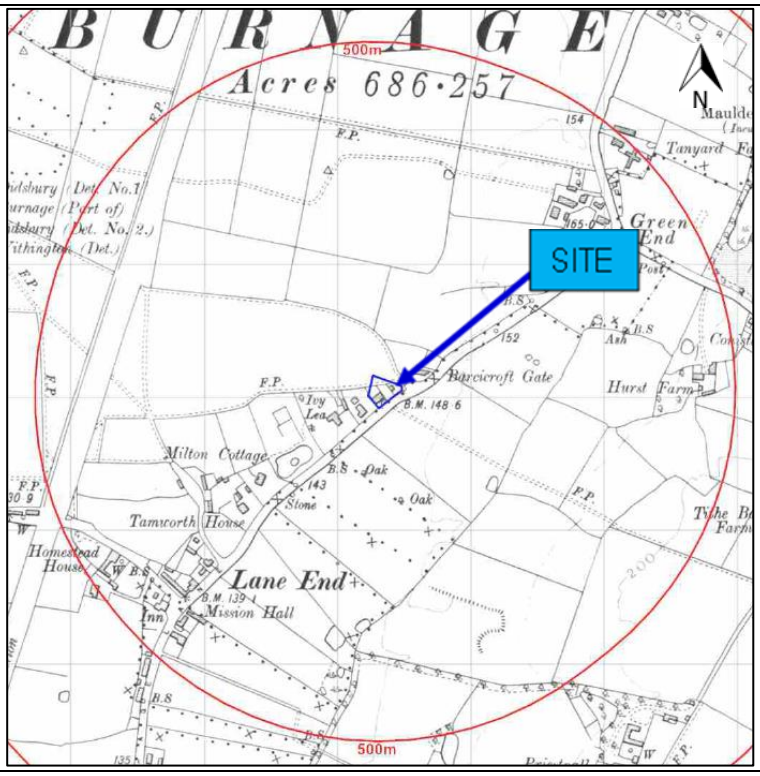


Figure 5 OS Map Extract 1923

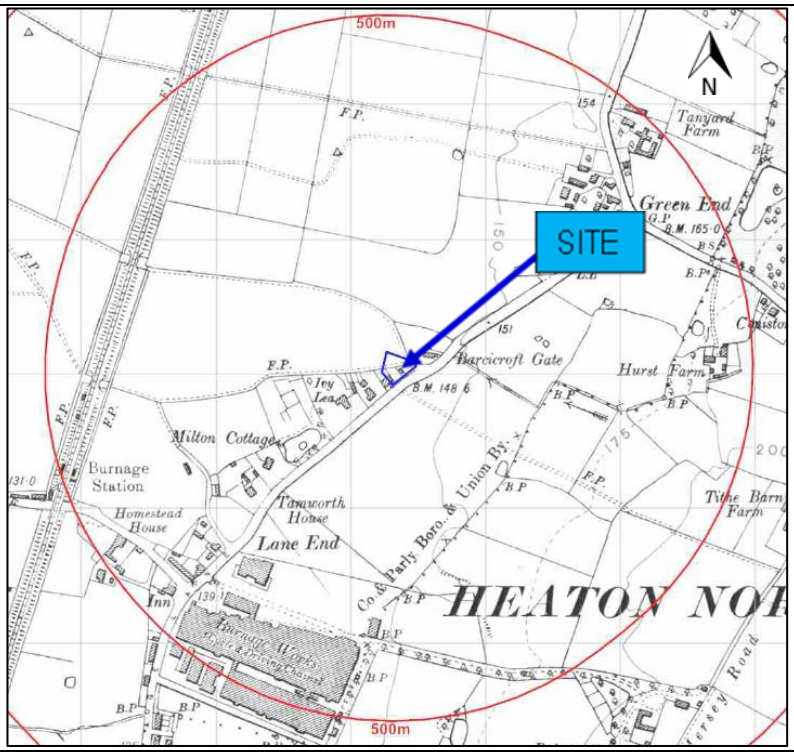


Figure 6 OS Map Extract 1934

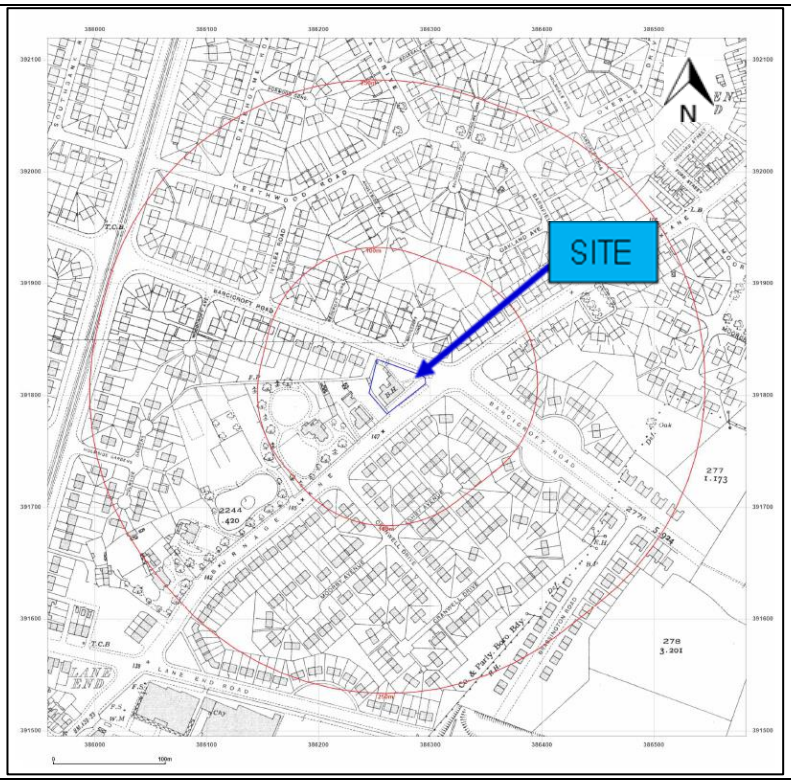


Figure 7 OS Map Extract 1957

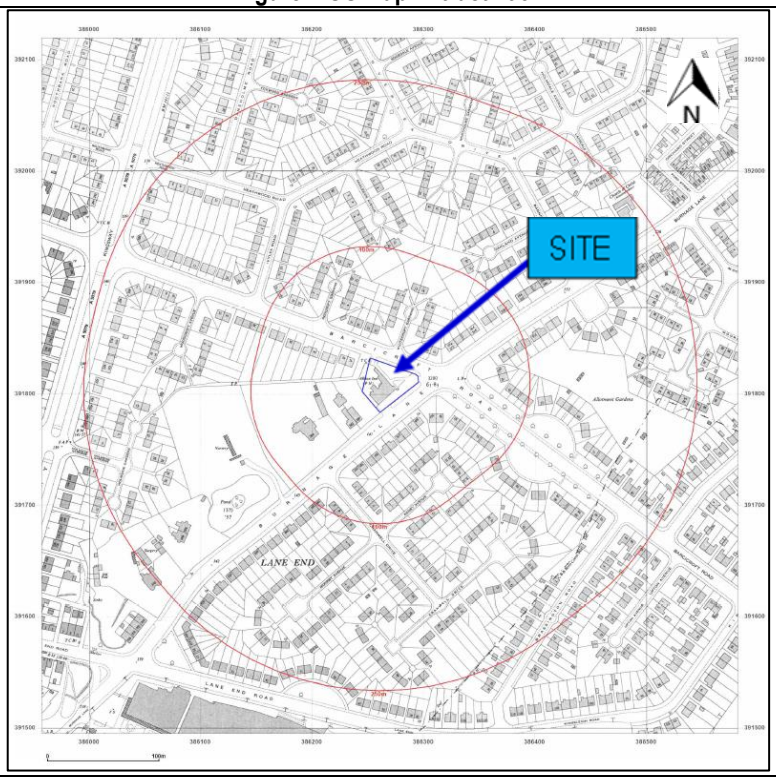


Figure 8 OS Map Extract 1989

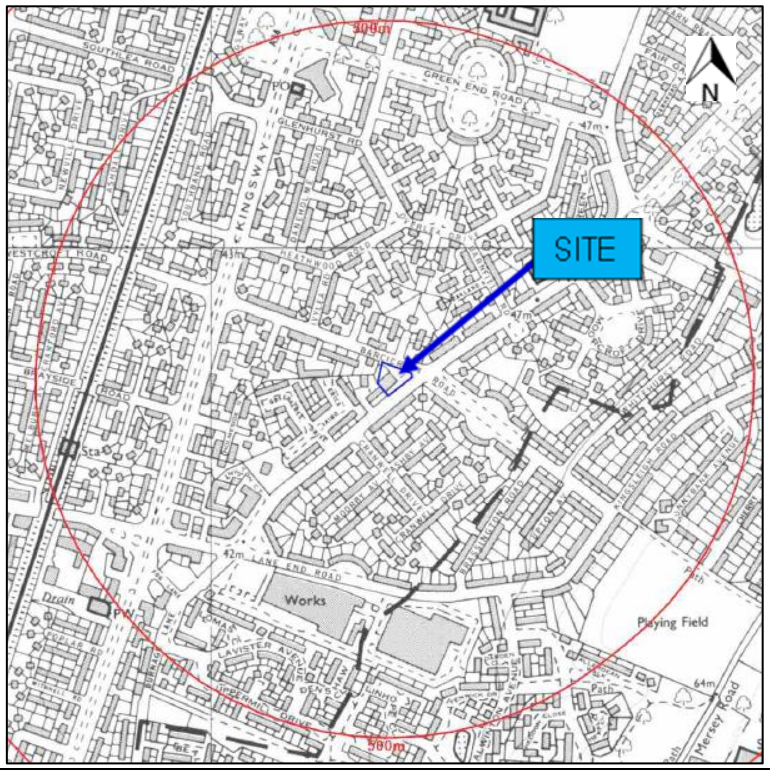


Figure 9 Google Earth Imagery 2023



5.0 WALKOVER SURVEY

5.1 A survey was completed on the 5th October 2023. The photographs and notes from this survey are appended to this report as Appendix 2 and Appendix 3, respectively.

5.2 The site is currently accessed via Burnage Lane or Barcicroft Road. The entrance to the rear of the pub is gated.

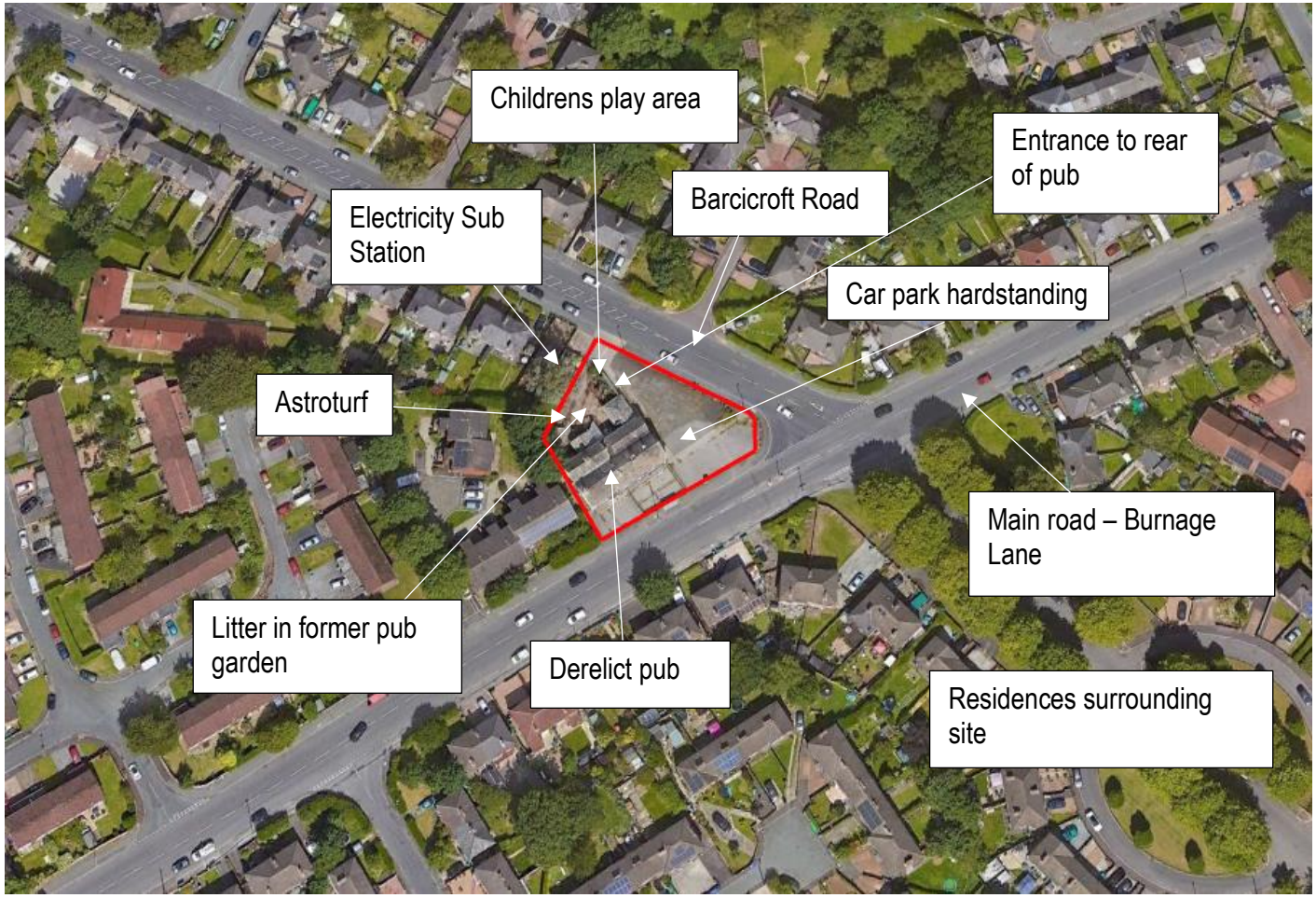
5.3 The surrounding area is comprised of residential properties. There is a bus stop and telephone box located along the eastern boundary of the site on Burnage Lane. Also, there is an Electricity Sub Station adjacent to the western boundary of the site.

5.4 There is a derelict pub in the southern section of the site with an associated pub garden to the rear. There is some vegetation to the rear of the pub and a single mature tree. Also, to the rear of the pub there is a large amount of litter including a children's play area, astroturf, broken wooden and metal fencing, waste bins, a donation bin, and a trolley. There is a car park hardstanding to the north and east of the site. Also, to the south of the site there is a small wooden fenced area.

5.5 There are no overhead cables on site. There are three various drainage manhole covers on the site, two of which are located to the rear of the pub and the other near the southern boundary of the site.

5.6 A site features plan is presented as Figure 9 overleaf.

Figure 9 Site Features plan



6.0 PRELIMINARY CONTAMINATION RISK ASSESSMENT

Introduction

6.1 The following paragraphs outline a Preliminary Risk Assessment (PRA) for the site based on the above desk study information as defined by Land Contamination Risk Management Environment Agency, July 2023

6.2 Table 5 provides a Preliminary Conceptual Model (PCM) which considers the source-pathway-receptor linkages present alongside the likelihood, severity and risk level as defined within Table 3 and Table 4 below. The assessment of probability, a modified risk table, and certain consequence definitions are based on CIRIA C552 and Land Contamination Risk Management Environment Agency, July 2023.

6.3 Table 5 considers whether a pollution linkage is potentially present and provides a preliminary qualitative assessment of risk based on the information currently available. Where a possible linkage is identified, it does not necessarily mean that a significant risk exists but indicates that further information is required through appropriate site investigation to substantiate the conceptual model.

6.4 The PCM/PRA is based on a residential end use.

Table 3: Consequence, Probability and Risk

Probability	Consequence,	Risk
High Likelihood- There is a pollution linkage and an event either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution	Very High – acute risk to the human health likely to result in significant harm. Risk of severe or irreversible effect on ground/surface water quality. Catastrophic damage to buildings / property.	Very High – there is a high potential that the source-pathway-receptor scenarios may give rise to harm to human health, or the environment and remedial action is likely to be required.
Likely – there is a pollution linkage, and all the elements are present, which means that it is probable 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.	High – Severe or irreversible effect on human health. Temporary severe or irreversible effect on ground/surface water quality. Reduction of water quality rendering groundwater or surface water unfit to drink and/or substantial adverse impact on groundwater dependant environmental receptors.	High – it is likely that the source-pathway-receptor scenarios may give rise to an impact on human health or the environment, which may require remediation and/or control measures to mitigate risks
Low likelihood– there is a pollutant linkage and circumstances are possible for an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term	Moderate – Long term or short-term moderate effect on human health. Moderate effect on ground/surface water quality, reversible with time. Reduced reliability of a supply at a groundwater or surface water abstraction source	Moderate – it is possible that the source-pathway-receptor scenarios may give rise to an impact on human health or the environment, however it is either relatively unlikely that such would be severe, or if any harm were to occur it is more likely that harm would be mild.
Unlikely – there is a pollution linkage, but circumstances are such that it is doubtful that an event would occur even in the very long term.	Low – Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc.) Slight effect on ground/surface water quality, reversible with time. Marginal reduced reliability of a supply at a groundwater or surface water abstraction source.	Low – it is possible that harm could arise at the source, however it is likely that this would at worst be mild.

Very Low – it is unlikely that the source-pathway-receptor scenarios will give rise to an impact on human health or the environment.

Table 4: Estimation of Level of Risk by Comparison of Consequence and Probability

		Consequence			
		High	**Moderate**	**Low**	**Very low**
Probability	**High Likelihood**	Very high	High risk	Moderate risk	Moderate to low risk
	Likely	High risk	Moderate risk	Moderate to low risk	Low risk
	Low Likelihood	Moderate risk	Moderate to low risk	Low risk	Very low risk
	Unlikely	Moderate to low risk	Low risk	Very low risk	Very low risk

Potential Sources

6.5 Historically, the site has solely been used a public house.

6.6 There is limited potential for the presence of contamination on the site. There is a nearby offsite electricity substation which could have been a source of contamination.

Potential Receptors

6.7 The following receptors have been considered for the construction and operational stages of the proposed redevelopment.

- Current site users;
- Adjacent land users;
- Future land users;
- Construction workers during site development works;
- Surface water and Groundwater within the underlying aquifer.

Potential Pathways

6.8 The following pathways have been considered for the construction and operational stages of the proposed redevelopment.

- Dermal contact, ingestion, inhalation pathways of potentially contaminated soils;
- Downward vertical migration of leachate to surface waters and shallow groundwater;
- Vertical or lateral migration of ground gas.

Table 5: Preliminary Conceptual Model

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
Potential soil contamination E.g., Heavy Metals, PAH, TPH, BTEX and ground gases.	Dermal contact, ingestion, and inhalation of soils dust	Current Site Users	Unlikely	Moderate	Low	There are no current site users. Therefore, the risk is **LOW.**
		Adjacent land users	Unlikely	Moderate	Low	Usual dust control measures should be implemented as part of good site working practices during any construction to reduce dust generation. Therefore, the risk is considered **LOW.**
		Future land users	Unlikely	Moderate	Low	The risk to future site users via direct exposure is **LOW.**
		Construction Workers	Low likelihood	Moderate	Moderate to low	Construction workers may be exposed to potentially contaminated soils during construction works, however, exposure duration will be short-term only. The risk to construction workers is considered **MODERATE** to **LOW.** Appropriate health and safety measures (in line with CDM and other relevant health and safety guidance) will reduce the risk to **LOW.**
	Downward vertical migration of leachate to shallow groundwater	Groundwater within the Underlying Aquifer	Unlikely	Moderate	Low	The underlying superficial soils are Devensian Till comprising of Diamicton. The solid geology beneath the site is shown to be Triassic sandstone. There are no potable water abstraction licence records within 2km of the site. The groundwater vulnerability is low. No significant sources of contamination have been identified on-site. Therefore, the risk to groundwater is considered **LOW.**
	Lateral migration in surface waters	Surface water	Unlikely	Moderate	Low	There are no surface water bodies in close proximity to the site. Therefore, the perceived risk to surface waters is **LOW.**
	Vertical or lateral migration of ground gas	Current Site Users	Unlikely	Moderate	Low	There is no risk of radon and protection measures are not required. Therefore, the risk to current site users is considered **LOW.**
		Adjacent land users	Unlikely	Moderate	Low	The site is not located in a Radon Affected Area; below 1% of the site is above the Action Level. Therefore, no radon protection measures will be required. The risk to adjacent site users from ground gas is considered **LOW.**
		Future land users	Unlikely	Moderate	Low	The risk to future site users from ground gas is considered **LOW.**
		Construction Workers	Unlikely	Moderate	Low	Construction workers may be exposed to ground gas/depleted oxygen conditions in confined spaces and excavations; however, the duration will be short-term. The risk to construction workers from ground gas is considered **LOW.**

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
Asbestos Containing Material (ACM)		Current Site Users	Unlikely	Moderate	Low	There have been structures historically on-site. There are no current land users. Asbestos may be present in small areas of the site associated with previous development. Asbestos is only harmful when disturbed. The risk to current site users is considered to be **LOW.**
		Adjacent land users	Unlikely	Moderate	Low	Commercial and residential properties are located within the vicinity of the site. Asbestos may be present in small areas of the site. Disturbance of soil during the construction phase may allow fibres to become airborne. Dust control measures (dampening down) should be implemented as part of good site working practices. Therefore, the risk is considered **LOW**.
		Future land users	Low likelihood	Moderate	Low	Therefore, the risk is considered **LOW.** A contamination assessment of the existing on-site soils and structures would be required to determine the level of risk and necessary mitigation measures.
		Construction Workers	Low likelihood	Moderate	Moderate to low	Construction workers may be exposed to potential asbestos in Made Ground soils. The risk is considered **MODERATE** to **LOW.** A contamination assessment of the existing on-site soils would be required to determine the level of risk and necessary mitigation measures.

7.0 GEOTECHNICAL HAZARDS ASSOCIATED WITH THE DEVELOPMENT

7.1 In addition to the environmental hazards there are also geotechnical hazards associated with the stability of the ground including load bearing capacity, slope stability and effects of ground mining activities. Local Authorities follow NPPF (2012) which requires that a site be suitable for its new use considering of ground conditions and land instability, including from natural hazards to former activities such as mining. A summary of the geotechnical considerations is provided below in Table 6.

Table 6: Summary of Geotechnical Hazards

Geohazards:	
Highly Compressible Ground	Negligible risk
Collapsible Soils	Very low risk
Swelling Clay	Very low risk
Running Sands	Very low risk
Ground Dissolution	Negligible risk
Landslip	Very low risk
Mining & Quarrying	The site is not located within an identified coal mining area and reference to the Coal Authority Interactive viewer shows the site is not located within a Development High Risk Area.
Geotechnical Design Considerations	
Site Clearance	
Trees	There are trees close to the western boundary of the site.
Existing Buildings/Obstructions	
Foundations	The depth and type of proposed new foundations would depend on the ground conditions present on-site. Made Ground artificial deposits associated with the previous residential development may underlie the site. Shallow foundations are feasible for any new structures. Foundations may need to be deepened to accommodate tree shrink/heave effects.

Geotechnical Design Considerations	
Floor Slabs	Again, an intrusive geotechnical investigation is recommended prior to any new structure construction works to discover the most suitable floor slab design for the on-site ground conditions.
Groundwater	Exact groundwater conditions are not known at this stage. For more detailed knowledge of the groundwater regime, an intrusive geotechnical investigation would be needed. The risk of groundwater flooding on-site is moderate.
Earthworks	Not necessary.
Slopes	No slopes on-site.
Retaining Walls	It is not expected that retaining walls will be necessary onsite.
Chemically aggressive ground conditions	Chemically aggressive ground conditions are not expected at this site. However, an intrusive geotechnical investigation would be necessary to confirm this.

8.0 CONCLUSIONS & RECOMMENDATIONS

Conclusions

8.1 Historically, the site has been used for two residential properties and a public house.

8.2 The site is recorded to be underlain by superficial Devensian till comprising of Boulder Clay. The solid geology beneath the site is shown to be Triassic sandstone.

8.3 The site is not located in a Radon Affected Area; as less than1% of the site is above the Action Level. Therefore, no radon protection measures will be required.

8.4 The overall risk from soil contamination to end users is concluded to be **LOW** to **MODERATE** based on the current proposed development. A **MODERATE** classification has been attributed due to the presence of an electricity substation close to the north western boundary of the site.

8.5 The risk to controlled waters is concluded to be **LOW** due to the absence of any significant sources of mobile contamination.

8.6 The risk from ground gas to end users and construction workers is **LOW**.

8.7 The risk of groundwater flooding occurring on-site is low and the risk of surface water flooding occurring on-site is 1 in 30 year, 0.1m – 0.3m.

Recommendations

8.8 An intrusive investigation should be undertaken to ensure the most up to date geotechnical parameters for the design foundations, floor slabs and pavement construction for the proposed new structures and surrounding area are gained.

8.9 Soil sampling should be conducted within proposed garden areas and proximal to the offsite electricity substation.

8.10 As there is a potential for made ground on site the ground gas regime will be established by reference to Contaminated Land: Applications in Real Environments (CL:AIRE) Research Bulletin 17 (RB17 A pragmatic approach to ground gas risk assessment). This alternative methodology involves a forensic description of made ground and determination of total organic carbon to assess the amount of degradable material present. On many low risk gassing sites it will allow gas well installation and monitoring to be avoided, for example where only natural soils are present or similarly made ground with low gas generation risk. In such cases, RB17 might provide a more reliable and rapid indicator than current approaches that rely on periods of gas monitoring.

APPENDIX 1

GROUNDSURE REPORTS

APPENDIX 2

SITE PHOTOGRAPHS

<table>
<tr><td>Earth Environmental & Geotechnical Ltd

Tel: 0161 975 6088
Email: info@earthenvironmental.co.uk
Web: www.earthenvironmental.co.uk</td><td>SITE PHOTOGRAPHS

EARTH ENVIRONMENTAL & GEOTECHNICAL</td></tr>
<tr><td>Job No.: A5595/23</td><td>Site: The Albion Inn, Burnage</td></tr>
<tr><td>Plate 1 Adjacent Site Boundary</td><td>Plate 2 View of Public House</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Date: 5th October 2023</td><td>Date: 5th October 2023</td></tr>
<tr><td>Plate 3 View of former public house</td><td>Plate 4 View of rear of former public house</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Date: 5th October 2023</td><td>Date: 5th October 2023</td></tr>
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APPENDIX 3

SITE WALKOVER NOTES

WALK OVER SURVEY REPORT

Site: The Albion Burnage **Date:** 5th October 2023

Job No: A5595/23 **Undertaken By:** Melissa McMonagle

Purpose of Site Walkover:
1) Provide further information for the Desk Study Report;
2) Identify potential contamination sources, pathways, and receptors;
3) Identify geotechnical features and potential geohazards;
4) Determine locations for exploratory boreholes.

Desk Study features checked during site visit	**Feature and Information required**	**Present**	**Description / Comments**
Site Setting	Description required for: Town/Country/Suburb Setting Industrial/Residential/Retail Usage Current Site use (if undertaking security and access to the site)		Urban setting.
Evidence of Past Activities	Are there: Any relevant street names in area? Features or relics which indicate past history?	~~Yes~~/No ~~Yes~~/No	
Geographic Setting	Description required for: Low lying flood plain/dry valley/rolling hills etc.		
Ground Conditions	Is there any evidence of: Mining, Mine entries Subsidence Landslip/slope erosion Former investigation works	 ~~Yes~~/No ~~Yes~~/No ~~Yes~~/No ~~Yes~~/No	

Desk Study features checked during site visit	**Feature and Information required**	**Present**	**Description / Comments**
Topography	Description required for: Are there apparent differences between site and surrounding area? (If yes describe the presence of retaining walls, and slopes). Is there evidence of Made Ground / Fill on site?	~~Yes~~/No ~~Yes~~/No	
Site Boundaries and Neighbours	Description required for: Type of boundary demarcation (if any) on each side of site, usage of adjacent land and name of industrial/commercial occupiers. Note any adjacent features such as water course and other potentially environmentally sensitive uses (residential, school, infirmary, SSSI etc)		
Vegetation	Are there any vegetation/trees on or close to site (if yes describe locations, type, maturity, etc) Is there any evidence of poor health / distress?	Yes/~~No~~ ~~Yes~~/No	Mature trees are located offsite on the western site boundary.
Ground Surface	Are there areas of hardstanding and estimate the split between hard and soft cover? (If yes describe locations, types, and conditions). Is there any evidence of any spillages or staining?	Yes/~~No~~ ~~Yes~~/No	The site is entirely comprised of hard cover. None visible on the site walkover.

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Site Drainage	Are there any drain covers / soakaways (if yes describe locations)	Yes/~~No~~	Various manholes are present around the edge of the site boundaries.
	Are there any outfalls/water courses on site (note the condition of water courses in open water courses. discolouration, odour, eutrophication, oily sheen, gas bubbling water, clear or cloudy)	~~Yes~~/No	N/A
	Where a watercourse runs alongside or crosses a site are there any differences in visible water quality upstream and downstream of the site?	~~Yes~~/No	N/A
Electrical Equipment	Are there any electricity sub stations on or adjacent to the site? Are there any electrical transformers, capacitors, pylons etc on site?	~~Yes~~/No	Located offsite to the north west.
Buildings	Is there any evidence of asbestos construction materials e.g., roofing, insulation materials.	~~Yes~~/No	
	Do any buildings have basements?	~~Yes~~/No	Yes
	Do any buildings have a boiler room (if yes, describe fuel type and storage arrangements)?	~~Yes~~/No	

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Landfilling	Is there any evidence of gas protection measures (gas membrane, gravel-filled trenches, venting pipes, etc)?	~~Yes~~/No	
Process Air Emissions	Point Source: Are there any stacks / vents / cooling towers / abatement equipment? Fugitive Source: is there any stockpiled material / windblown dust / vapour process?	~~Yes~~/No Yes/~~No~~	
Storage of fuels & Chemicals	Are there any drums / containers (if yes, describe quantity, full /empty, stored on hard standing / soft landscaping, bunding)? Are there any above ground fuel tanks (if yes, describe locations, volumes, how many, bunding, used / disused, condition?) Is there any evidence of underground fuel tanks (fuel pumps, covers, vent pipes, how many and how large, fill point, used / disused, and condition)?	~~Yes~~/No ~~Yes~~/No ~~Yes~~/No	
Accidents	In the event of a large spillage would runoff affect any vulnerable watercourse/culverts? Are emergency procedures / equipment in place?	~~Yes~~/No ~~Yes~~/No	

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Waste	Are there any waste skips present on site? Are waste storage facilities adequate? Is there any litter/fly tipped material?	~~Yes~~/No ~~Yes~~/No Yes/~~No~~	Small amount of litter on site.
Atmospheric	Are there any fumes, odours originating from site or affecting site from neighbouring sites?	~~Yes~~/No	
Access / Further Investigations	If a Phase 2 Investigation is likely to be required, describe any access problems including headroom where relevant, services, overhead cables, restricted access areas, confined spaces, trafficked areas, etc that are likely to affect investigation scope/techniques. Identify possible site office and storage locations. Identify possible water supply		.
Site Environs	Are there any local features that could have a harmful influence e.g., landfill, industrial processes, railway land? Are there any sensitive water features/courses near to the site?	~~Yes~~/No ~~Yes~~/No	
Local Knowledge / Anecdotal Evidence			
Site Dimensions	Describe shape of Site in plan and measure dimensions.		.

APPENDIX 4

REPORT LIMITATIONS

LIMITATIONS

This contract was completed by Earth Environmental & Geotechnical Ltd on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill, and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget, and staff resources allocated to the project.

Other than that, expressly contained in the above paragraph, Earth Environmental & Geotechnical Ltd provides no other representation or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Earth Environmental & Geotechnical Ltd.

If a third party relies on this report, it does so wholly at its own and sole risk and Earth Environmental & Geotechnical Ltd disclaims any liability to such parties.

It is Earth Environmental & Geotechnical Ltd understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was an important factor in determining the scope and level of the services. Should the purpose for which the report is used, or the proposed use of the site change, this report will no longer be valid and any further use of, or reliance upon the report in those circumstances by the client without Earth Environmental & Geotechnical Ltd review and advice shall be at the client's sole and own risk.

The report was written in 2023 and should be read in light of any subsequent changes in legislation, statutory requirements, and industry best practices. Ground conditions can also change over time and further investigations, or assessment should be made if there is any significant delay in acting on the findings of this report. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of Earth Environmental & Geotechnical Ltd. In the absence of such written advice of Earth Environmental & Geotechnical Ltd, reliance on the report in the future shall be at the client's own and sole risk. Should Earth Environmental & Geotechnical Ltd be requested to review the report in the future, Earth Environmental & Geotechnical Ltd shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between Earth Environmental & Geotechnical Ltd and the client.

The observations and conclusions described in this report are based solely upon the services that were provided pursuant to the agreement between the client and Earth Environmental & Geotechnical Ltd. Earth Environmental & Geotechnical Ltd has not performed any observations, investigations, studies or testing not specifically set out or mentioned within this report.

Earth Environmental & Geotechnical Ltd is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, Earth Environmental & Geotechnical Ltd did not seek to evaluate the presence on or off the site of electromagnetic fields, lead paint, radon gas or other radioactive materials.

The services are based upon Earth Environmental & Geotechnical Ltd observations of existing physical conditions at the site gained from a walkover survey of the site together with Earth Environmental & Geotechnical Ltd interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and whilst Earth Environmental & Geotechnical Ltd have no reason to doubt the accuracy and that it has been provided in full from those it was requested from, the items relied on have not been verified.

No responsibility can be accepted for errors within third party items presented in this report. Further Earth Environmental & Geotechnical Ltd was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Earth Environmental & Geotechnical Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to Earth Environmental & Geotechnical Ltd and including the doing of any independent investigation of the information provided to Earth Environmental & Geotechnical Ltd save as otherwise provided in the terms of the contract between the client and Earth Environmental & Geotechnical Ltd.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable and as investigation excavations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on-site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and Earth Environmental & Geotechnical Ltd] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The normal speed of investigation usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site.