



Earth Environmental
& Geotechnical

Phase I GeoEnvironmental Desk Study

Bury Old Road

Cheetham Hill

August 2023

On behalf of



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CHEETHAM HILL

FOR

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Report No. A5545/23/FDS

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1.0 INTRODUCTION

Appointment

- 1.1 Earth Environmental & Geotechnical Ltd have been commissioned by Adept Manchester on behalf of Mayfair Estates (the client), to undertake a Phase I Environmental Desk Study for the proposed development at the land adjacent to Catherine Road, Cheetham.
- 1.2 It is understood that the Client intends to develop the area with 12no. residential dwellings with associated soft landscaping and hardstanding driveways. The development will comprise 6no. terraced dwellings accessed via Bury Old Road and 6no. semi-detached dwellings accessed via Catherine Road.
- 1.3 A proposed development plan for the site is shown in Figure 1 below.

Figure 1 Proposed Development Plan



Objective

- 1.4 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

1.5 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 Application Portal

2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is located approximately 4.16km southeast from Manchester City Centre. The approximate National Grid Reference for the centre of the site is SD 8329102340 (X: 383291, Y: 402340) with the closest postcode being M7 4QY.
- 2.2 The site is a rectangular shaped parcel of land with maximum dimensions of 43m west to east and 54m southeast to northwest. The site occupies an area of approximately 0.22 hectares.
- 2.3 The site is currently unoccupied and is surfaced predominantly with vegetation with areas of gravel.
- 2.4 The areas surrounding the site comprise of residential developments to the east and west. Bury Old Road and further residential developments are located directly south of the site. Cheetham Hill Sports Club is located directly north of the site.
- 2.5 A location plan is shown below as Figure 2, together with a recent site photograph as Figure 3 (overleaf).

Figure 2 Site Location Plan

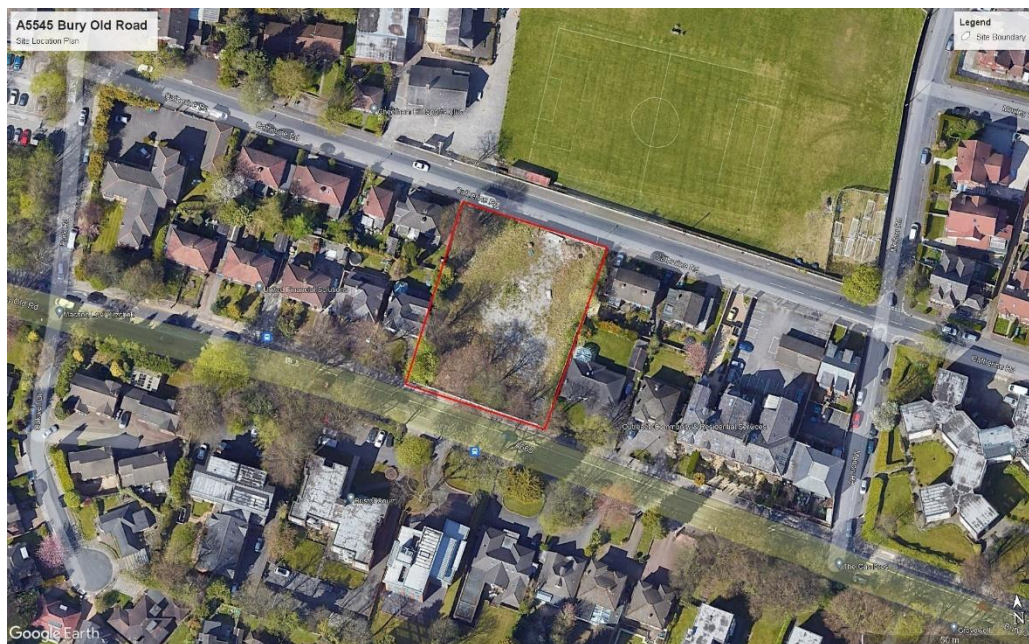


Figure 3 Site Photograph



Site Utility Services

- 2.0 Site service plans have not been obtained for the site on behalf of the client. 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 GeolInsight 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 EnviroInsight report (Appendix 1).

Geology

- 3.3 The BGS states that the site is not underlain by artificial deposits.
- 3.4 The site is underlain by superficial deposits of Glaciofluvial Sheet Deposits, comprising sand and gravel.
- 3.5 The solid geology beneath the site is shown to be predominantly the Manchester Marls Formation comprising mudstone. However, the Chester Pebble Beds Formation comprising sandstone are present on the southwest corner of the site.
- 3.6 There is 1 record of linear features within 500m of the site boundary. This record refers to an inferred normal fault located 359m to the northeast of the site.
- 3.7 There are no records of landslips within 500m of the site boundary.
- 3.8 There are no borehole records identified within 250m of the site.
- 3.9 The site is in an area where the hazard rating is negligible with regards to shrink-swell clays, compressible deposits and soluble rocks. The hazard rating is very low with regard to landslides, collapsible deposits and running sands.

Ground Workings

- 3.10 There are 3 records of historical surface ground working features identified within 250m of the site boundary. The closest record refers to unspecified ground workings located 202m to the west of the site. Other records in the vicinity refer to an unspecified heap and unspecified ground workings.
- 3.11 According to the BGS, there are no records of a British Pit within 500m of the site.

Mining and Other Underground Workings

- 3.12 There are no records of historical underground workings within 1km of the site boundary.
- 3.13 The site is located within the specified search distance (1km) of an identified coal mining area. Reference to the Coal Authority Interactive viewer shows that the site is not located within a Development High Risk Area.
- 3.14 There are no records for non-coal mining areas located within 1km of the site.
- 3.15 There are no areas of brine extraction, gypsum extraction, tin mining, or clay mining within 1km of the site.

- 3.16 There is 1 record for non-coal cavities or natural cavities identified within 1km of the site. The record refers to piping in non-cohesive deposits within the Sherwood Sandstone Group located 398m west of the site.

Radon Potential

- 3.17 The property is not located in a Radon Affected Area. Less than 1% of properties are above the Action Level. Therefore, radon protection measures are not necessary.

Hydrogeology and Hydrology

- 3.18 The superficial deposits are classified by the Environment Agency (EA) as a Secondary A Aquifer. The Glaciofluvial Sheet Deposits have an intergranular flow type with a high to very high permeability. The BGS states the following:

'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.'

- 3.19 The Manchester Marls Formation is classified by the Environment Agency (EA) as a Secondary B Aquifer. The BGS states the following:

'Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.'

- 3.20 The Chester Pebble Beds Formation is classified by the Environmental Agency (EA) as a Principal Aquifer. The BGS states the following:

'Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers.'

- 3.21 The groundwater vulnerability and soil leaching potential of the soils at the site has been classified as low vulnerability with a low leaching potential. The BGS states:

'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 10 groundwater abstraction licence records within 2km of the site. The closest active license refers to general cooling at a site located 1.4km to the northeast of the site. The license was for process water abstracted via borehole.

- 3.23 There are no surface water abstraction licence record 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 500m of a Source Protection Zone or Source Protection Zone within a confined aquifer.

- 3.26 There are 3 water network entries within 250m of the site. The closest record refers to an inland river not influenced by normal tidal action located 190m to the northwest of the site.
- 3.27 There are 3 surface water features identified within 250m of the site.
- 3.28 There are no records of a Water Framework Directive (WDF) surface water body located on site. The closest record refers to the Irwell River. The water body received a failed chemical rating and moderate ecological rating in 2019.
- 3.29 There is 1 record of a Water Framework Directive (WDF) groundwater body located on site. This record refers to the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers. The water body received a poor chemical and overall rating tested in 2019.

Landfill & Waste Management Activity

- 3.30 There are no records for current Environment Agency landfill records within 500m of the site.
- 3.31 There are no records of historic Environment Agency landfill sites within 500m of the site.
- 3.32 There are no records of a BGS/DoE non-operational landfill sites within 500m of the study site.
- 3.33 There are no records of landfills from the Local Authority and Historical Mapping Records within 500m of the site.
- 3.34 There is 1 record of a waste treatment, transfer, or disposal site within 500m of the study site. The record refers to a treating waste exemption located 361m to the northeast of the site.
- 3.35 There are no records of a historical waste site from the Local Authority and Historical Mapping Records within 500m of the site.
- 3.36 There are no records of Environment Agency licensed waste sites within 500m of the site.

Industrial Land Use Information

- 3.37 There are 33 records of potentially contaminative historical land uses identified within 500m of the site. The closest record refers to a nursery located 4m to the northeast of the site. Other records in the vicinity refer to unspecified ground workings, a smithy, unspecified heaps, an electrical substation, and police stations etc.
- 3.38 There are 4 records of potentially contaminative current land uses identified within 500m of the site. The closest record refers to an electricity substation located 77m to the northwest of the site. Other records in the vicinity refer to Elite Signs & Print, and Spalco Ltd which is a food and beverage industry.
- 3.39 There are no records of historical tanks identified within 500m of the site.
- 3.40 There are 35 records of historical energy features identified within 500m of the site. The closest record refers to an electricity substation located 69m to the northwest of the site, dated 1995.
- 3.41 There are 2 records for current petrol or fuel sites within 500m of the site. The closest record refers to an obsolete Essar located 325m southeast of the site.

- 3.42 There are no records of historical petrol or fuel sites within 500m of the site.
- 3.43 There are 6 historical garage and motor vehicle repair site records identified within 500m of the site. The closest record refers to a garage located 308m to the southeast of the site, dated 1995.
- 3.44 There are no National Grid high voltage underground electricity transmission cables within 500m of the site.
- 3.45 There are no National Grid high-pressure gas transmission pipelines within 500m of the site.
- 3.46 There are no historical railway and tunnel features identified within 250m of the site.
- 3.47 There are no historical railway lines identified within 250m of the site.
- 3.48 There are 9 current active railway lines identified within 250m of the site.
- 3.49 There are no underground railway lines or tunnels identified within 250m of the site.
- 3.50 The site is not within 5km of the route of the High Speed 2 rail project.
- 3.51 The site is not within 500m of the route of the Crossrail 1 rail project.

Environmental Permits, Incidents and Registers

- 3.52 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
Sites Determined as Contaminated Land under Part 2A EPA 1990	0
Dangerous or Hazardous (COMAH and NIHS) Sites	0
Regulated Explosive Sites	0
Planning Hazardous Substance Consents and Enforcements	0
Historical Licensed Industrial Activities (IPC)	0
Part A (1) and IPPC Authorised Activities	0
Part A (2) and Part B Activities and Enforcements	5
Category 3 or 4 Radioactive Substance Authorisations	0
Licensed Discharge Consents	0
Pollutant Release to Surface Waters (Red List)	0
Pollutant Release to Public Sewer	0
List 1 Dangerous Substances Inventory Sites	0
List 2 Dangerous Substances Inventory Sites	0
Substantiated Pollution Incidents (Category 1 and 2)	0

- 3.53 There are 5 records for Part A (2) and Part B Activities and Enforcements within 500m of the study site. The closest record refers to a revoked permit for petrol vapour recovery at Crumpsall Service Station located 226m southeast of the site.

Environmentally Sensitive Sites

- 3.54 There are no Sites of Special Scientific Interest (SSSI) within 2km of the study site.
- 3.55 There are no Special Areas of Conservation (SAC) within 2km of the study site.
- 3.56 There are no Special Protection Areas within 2km of the study site.
- 3.57 There are 5 records of Local Nature Reserves (LNR) within 2km of the study site. The closest record is the Cliff / Kersal Dale located 980m to the southwest of the site.
- 3.58 There are no records of National Parks (NP) within 2km of the study site.
- 3.59 There are no records of Ancient Woodland within 2km of the study site.
- 3.60 There is 1 record of Greenbelt land within 2km of the study site. The closest is the Merseyside and Greater Manchester Greenbelt located 1.0km to the northwest of the site.
- 3.61 There site is located within a Nitrate Vulnerable Zone. The record refers to surface water at the Irwell/Manchester Ship canal.
- 3.62 There are no records of Designated Environmentally Sensitive Areas within 2km of the study site.

Ecology

- 3.63 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.

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.

Potential Flood Risks

- 3.65 Detailed assessment of flood risks is outside the scope of this report.
- 3.66 There are no records of flood defences, areas benefitting from flood defences or areas used for flood storage within 250m of the site.
- 3.67 There is no risk of flooding from rivers and sea (RoFRaS) within 50m of the site.
- 3.68 The highest risk of surface water flooding occurring on-site is a 1 in 100 year, 0.3 – 1.0m.
- 3.69 The highest risk of groundwater flooding occurring on-site is moderate.

Previous Site Investigations

- 3.70 Earth Environmental & Geotechnical Ltd are not aware of any previous site investigations carried out for the site.
- 3.71 A Drainage Statement (ref: 11.20004-ACE-XX-XX-RP-C-0001) has been conducted by Adept Civil and Structural Engineers to support the planning application for residential development on the land off Bury Old Road, Manchester. This investigation concluded that the site is not at risk from flooding from any source, and existing drainage consists of a public sewer located adjacent to the site.
- 3.72 A planning application has been approved with conditions by Manchester City Council (ref: 127106/FO/2020) for the erection of 12 dwellings to front both Bury Old Road and Catherine Road, together with associated parking, landscaping and boundary treatment.

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 back to 1848.
- 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
1850 1:1,056 1848 1:10,560	The site is undeveloped with a Parliamentary Boundary through the centre running east to west.	Surrounding the site is relatively undeveloped with some residential development 10m to the south and 80m to the east. Bury Old Road is located adjacent to the site to the south. A smithy is located 300m to the east of the site. A nursery is located 200m east of the site.
1893 1:2,500 1891-1894, 1906-1907 1:10,560	Two semi-detached residential dwellings located onsite named Heaton Villas with associated gardens and small outbuildings.	More residential development surrounding the site to the south, east and west. Cricket ground with bowling green located directly north of the site. Catherine road located directly north of the site.
1922 1:2,500 1915, 1923 1:10,560	No Significant Change.	More residential development located 100m northeast of the site. A tennis ground and pavilions have developed adjacent the cricket ground. An open air school is located 250m to the northeast.
1951 1:1,250 1932 1:2,500 1931-1933, 1938, 1956 1:10,560	No Significant Change.	More residential development surrounding the site.
1968 1:2,500 1990-1992, 1992-1995, 2003 1:1,250	Additional small outbuildings developed onsite.	No Significant Change.

Date	On-Site History	Surrounding Land Use History
1968, 1977, 1985, 2001, 2010 1:10,560		
2000, 2003, 2005, 2009, 2013 Google Earth Aerial Imagery	The site is in a suburban setting with a residential property with associated driveway located onsite.	The site is surrounded by residential development to the east, west and south of the site. Cheetham Hill Sports Club is located directly north of the site with associated cricket field and bowling green.
2017, 2018, 2019 Google Earth Aerial Imagery	House no longer present on satellite imagery. Vegetation located on the former building footprint. Some seemingly scrapped carse located onsite.	No Significant Change.
2020, 2021, 2022, 2023 Google Earth Aerial Imagery 2023 1:10,000	Site is currently vacant.	No Significant Change.

Figure 4 OS Map Extract 1893

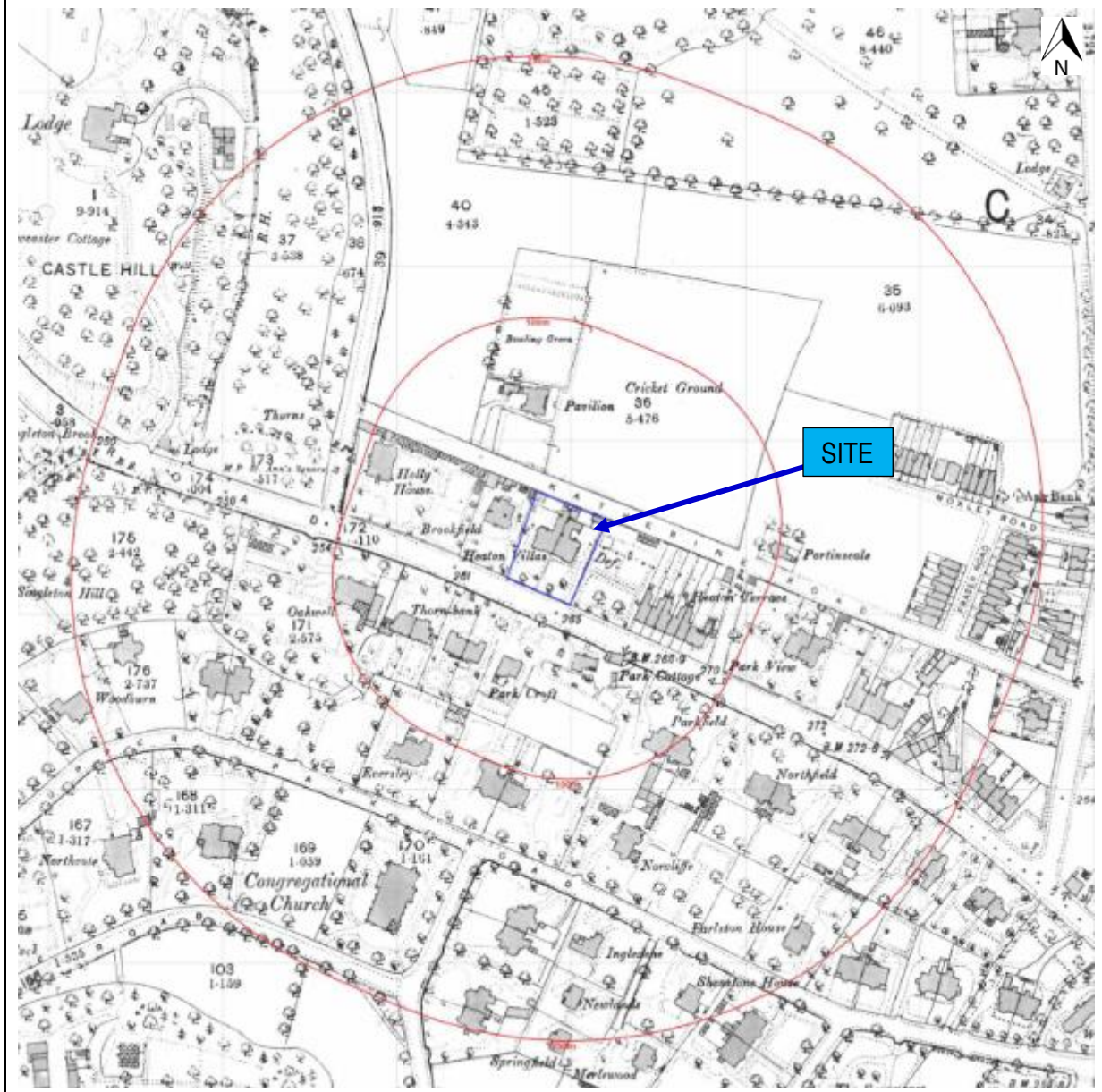


Figure 5 OS Map Extract 1932

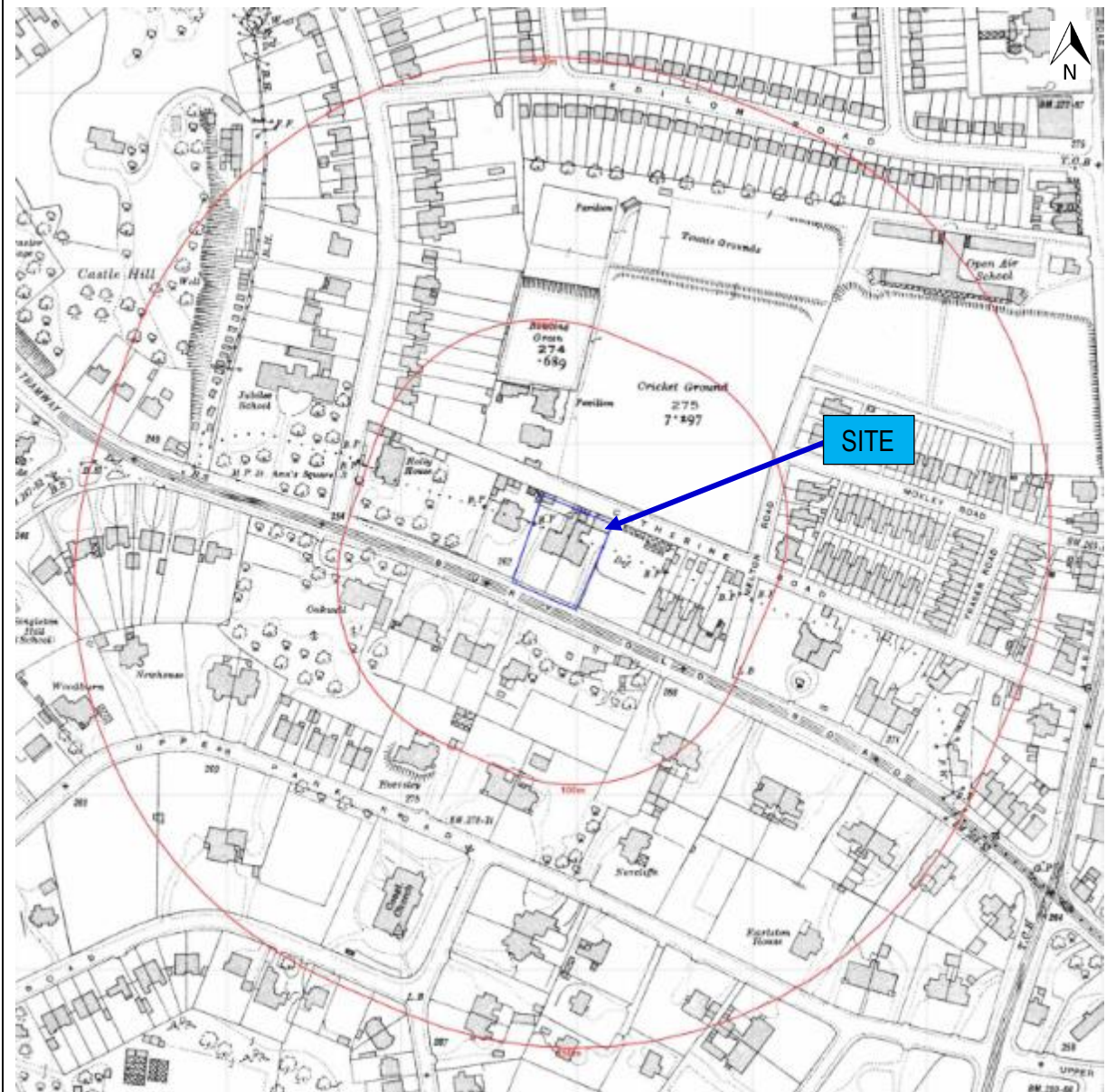


Figure 6 OS Map Extract 1977

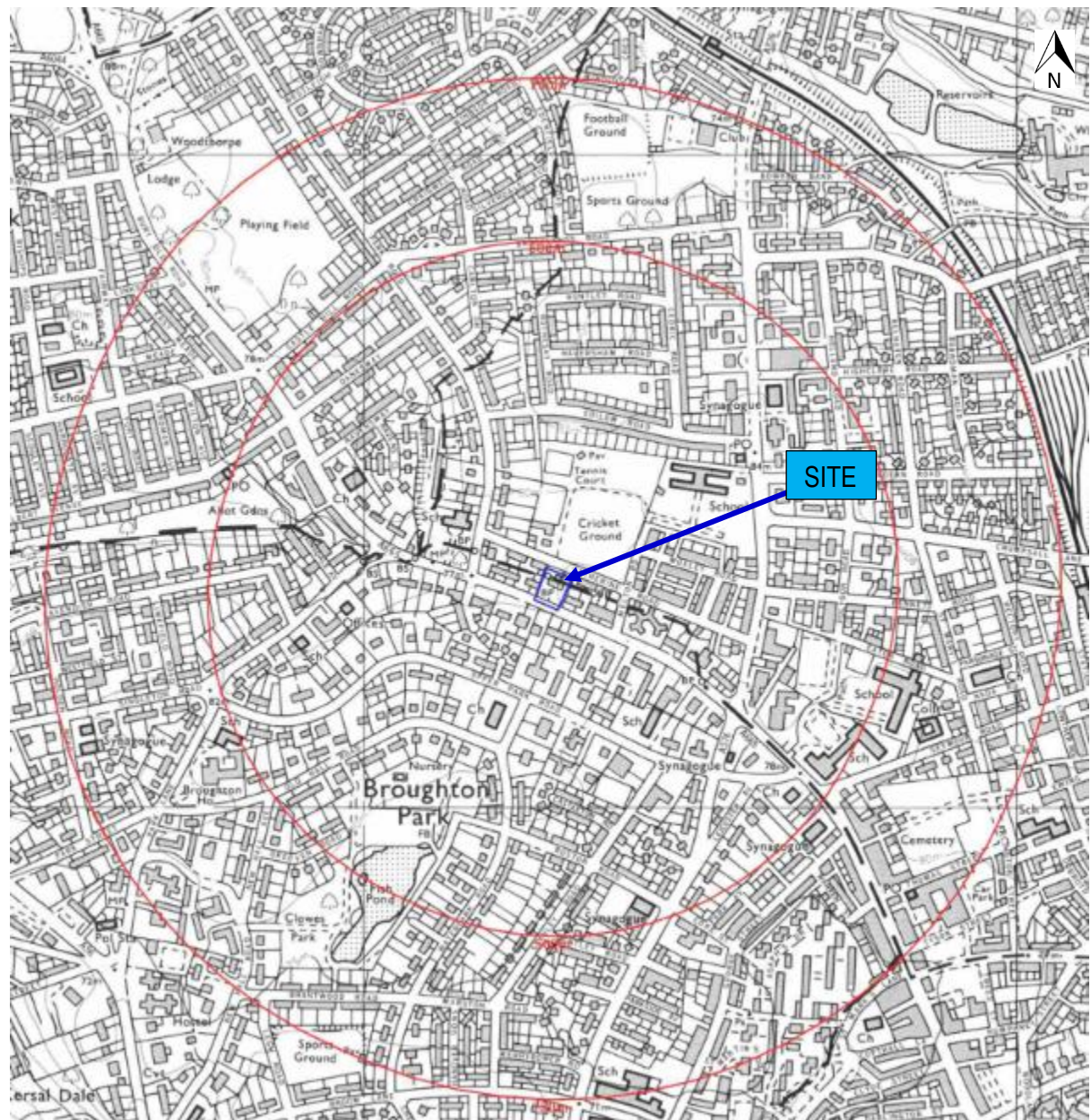


Figure 7 Google Earth Aerial Photograph 2021



5.0 SITE HISTORY WALKOVER SURVEY

- 5.1 A walkover survey was completed on 28th July 2023. The photographs and notes from this survey are appended to this report as Appendix 2 and Appendix 3, respectively.
- 5.2 The site consists of a rectangular area of land with a flat lying topography, slightly sloping towards Bury Old Road. The site is surfaced with vegetation with some patches of gravel. The site is currently unoccupied.
- 5.3 Catherine Road lies adjacent to the site to the north and Bury Old Road lies adjacent to the south.
- 5.4 Rubble heaps are located along the eastern boundary consisting of red brick, concrete and insulating foam which may be a source of contamination.
- 5.5 The boundaries comprise of predominantly red brick walls along the northern, western and southern areas of the site. The eastern area of the site is bound by concrete fencing and metal boards. The southern entrance gates are bund by concrete blocks.
- 5.6 Mature trees are located on the eastern, southern and western boundaries.
- 5.7 Directly to the east and west are residential properties which comprise a small proportion of the site boundary.
- 5.8 The surrounding area comprises of suburban residential development and community buildings such as the Cheetham Hill Sports Club directly to the north.
- 5.9 There is evidence of a former ground investigation onsite, with two monitoring standpipes located in the central area of the site, within Made Ground patches of gravel.
- 5.10 Canisters of gas were observed near the northern boundary, and an empty Trade Eggshell paint can was observed near the southeastern access gate.

Figure 8 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 DEFRA and the EA Model Procedures for the Management of Land Contamination, CLR11(2004).
- 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 CLR11.
- 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 proposed 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 The site is located in a suburban residential area and historically featured two semi-detached Victorian villas, which have been observed in mapping records since 1893. As stated in the Drainage Statement (ref: 11.20004-ACE-XX-XX-RP-C-0001), obtained by the client, the dwellings sustained fire damage and were demolished circa 2013. The site has remained vacant since.
- 6.6 The site is currently unoccupied and surfaced with vegetation and gravel. Fly tipped household material and canisters of gas are present in the northern and southern area of the site. Mature trees are present along the southern, eastern and western boundaries.
- 6.7 There is potential for the presence of contamination associated with the following:
- Asbestos containing materials (ACM) from demolished structures and fly-tipped materials
 - Ground gas associated with potentially deep made ground, albeit unlikely.
 - Fire damaged rubble and burnt ground from the previous residential development.
- 6.8 Contaminants may therefore include heavy metals, polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), BTEX compounds, asbestos and ground gases (carbon dioxide and methane).

Potential Receptors

- 6.9 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;
 - Groundwater within the underlying aquifers.

Potential Pathways

- 6.10 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 shallow groundwater;
- Vertical or lateral migration of ground gas.

Table 5: Preliminary Conceptual Model

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
Made Ground across site (Heavy Metals, PAH & TPH)	Dermal contact, ingestion, and inhalation of soils dust	Current Site Users	Low Likelihood	Low	Low	The site appears to be underlain predominantly by gravel and vegetation. However, the site is unoccupied. The risk to current land users is considered to be LOW .
		Adjacent land users	Low Likelihood	Moderate	Moderate to Low	Areas surrounding the site are currently occupied by residential dwellings. Contamination may be present beneath the site associated with the former properties damaged by fire. The risk is considered MODERATE to LOW . Usual dust control measures should be implemented as part of good site working practices during construction to reduce dust generation.
		Future land users	Low Likelihood	Moderate	Moderate to Low	The proposed development includes 12 new residential properties with associated driveways and soft landscaping. Contamination may be present beneath the site associated with the former properties damaged by fire. The risk to future land users is considered MODERATE to LOW . This assessment is based on the sensitivity of the receptor and the potential for contamination to be present beneath the proposed garden area.
		Construction Workers	Low Likelihood	Moderate	Moderate to Low	Construction workers may be exposed to potentially contaminated Made Ground materials during construction works, however exposure duration will be short-term only. Assuming appropriate health and safety measures are adopted (in line with CDM and other relevant health and safety guidance) a LOW risk to construction workers is anticipated.
	Downward vertical migration of leachate to shallow groundwater	Groundwater within the Underlying Aquifers	Low Likelihood	Low	Low	Shallow groundwater may be present beneath the site. The underlying superficial soils are anticipated to be granular with high permeability. However, there are no surface water bodies near the site and no obvious leachable contaminants present. The risk to groundwater is therefore considered LOW .
	Vertical or lateral migration of ground gas	Current Site Users	Low Likelihood	Low	Low	There is potential for Made Ground soils beneath the site from former structures. The granular nature of the underlying superficial deposits would likely allow the migration of any ground gases present.

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
						Due to the site being unoccupied, the risk to current site users from ground gas is therefore considered LOW .
		Adjacent land users	Low Likelihood	Low	Low	Due to the granular nature of the underlying superficial deposits, there is potential for ground gas migration. However, it is likely any ground gases have now dissipated. Therefore, the risk to adjacent land users is considered LOW .
		Future land users	Low Likelihood	Low	Low	There is potential for Made Ground from former structures. The underlying superficial deposits are anticipated to be granular, therefore it is likely any ground gases have now dissipated. The risk to future land users is considered LOW .
		Construction Workers	Likely	Low	Moderate to 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 MODERATE to LOW .
Asbestos Containing Material (ACM)		Current Site Users	Unlikely	Moderate	Low	Asbestos may have been present in the former fire damaged buildings onsite. These building have since been demolished. Asbestos is only harmful when disturbed. The site is currently unoccupied which means there is no pollutant linkage. The risk to current site users is considered to be LOW .
		Adjacent land users	Unlikely	Moderate	Low	No structures remain onsite. Any structure remaining was demolished in 2013. Dust control measures (dampening down) should be implemented as part of good site working practices. The risk is considered to be LOW .
		Future land users	Low Likelihood	Moderate	Moderate to Low	The proposed development comprises residential dwellings with associated car parking and soft landscaping. Asbestos may be present in the made ground soils and fly-tipped materials. The risk is considered to be MODERATE to LOW . A contamination assessment of the existing on-site soils and appropriate remediation, will reduce the risk.
		Construction Workers	Low Likelihood	Moderate	Moderate to Low	Construction workers may be exposed to potential asbestos during groundworks. 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 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- 7.1 Historically, the site was occupied by two semi-detached Victorian villas until 2013, when they were demolished due to fire damage. Currently, the site is covered with vegetation and areas of gravel.
- 7.2 There is potential for the presence of contamination associated with demolished structures, fly-tipped materials and burnt ground.
- 7.3 The proposed development includes the construction of 12no. residential dwellings with associated driveways and private gardens.
- 7.4 The site is underlain by superficial deposits of Glaciofluvial Sheet Deposits (Secondary A aquifer) and the solid geology of the Chester Pebble Beds Formation (Principal aquifer) and the Manchester Marls Formation (Secondary B Aquifer).
- 7.5 The site is located within the specified search distance (1km) of an identified coal mining area. However, the site is not located within a Development High Risk Area.
- 7.6 The overall risk from soil contamination to residential end users and construction workers is concluded to be **MODERATE TO LOW**.
- 7.7 The risk to controlled waters is concluded to be **LOW** based on the absence of leachable contaminants and nearby abstractions.
- 7.8 Given the anticipated depth and age of the Made Ground, the risk from ground gas to end users is considered to be **LOW**.
- 7.9 The site is not located within a Zone 2 and Zone 3 flood plain.

Recommendations

- 7.10 An intrusive investigation should be undertaken to establish geotechnical parameters for the design of foundations, floor slabs and pavement construction for the proposed new structures and surrounding area.
- 7.11 As part of the geotechnical investigation, it is recommended that samples of soil are recovered for contamination testing and to confirm whether there are any potential risks.

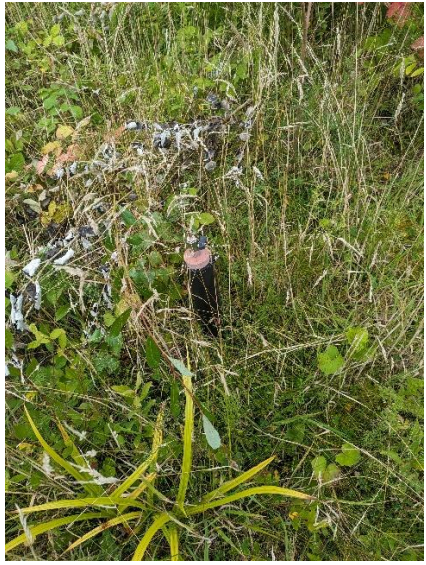
APPENDIX 1

GROUNDSURE REPORTS

APPENDIX 2

SITE PHOTOGRAPHS

Earth Environmental & Geotechnical Ltd Tel: 0161 975 6088 Email: info@earthenvironmental.co.uk Web: www.earthenvironmental.co.uk	SITE PHOTOGRAPHS 
Job No.: A5545/23	Site: Bury Old Road, Cheetham Hill
Plate 1 View of northern access to the site.	Plate 2 View of Catherine Road street sign located northwest to the site.
	
Date: 28th July 2023	Date: 28th July 2023
Plate 3 Overview of the site from the northern area.	Plate 4 Area of fly tipped material in the northern area of the site.
	
Date: 28th July 2023	Date: 28th July 2023

Earth Environmental & Geotechnical Ltd Tel: 0161 975 6088 Email: info@earthenvironmental.co.uk Web: www.earthenvironmental.co.uk	SITE PHOTOGRAPHS 
Job No.: A5545/23	Site: Bury Old Road, Cheetham Hill
Plate 5 Fly tipped material and plant cuttings in the northern area of the site.	Plate 6 Overview of eastern area of the site from the northern access.
	
Date: 28th July 2023	Date: 28th July 2023
Plate 7 Monitoring standpipe located in the central region of the site.	Plate 8 Empty Trade Eggshell paint can located near south eastern access gate.
	
Date: 28th July 2023	Date: 28th July 2023

Earth Environmental & Geotechnical Ltd Tel: 0161 975 6088 Email: info@earthenvironmental.co.uk Web: www.earthenvironmental.co.uk	SITE PHOTOGRAPHS 
Job No.: A5545/23	Site: Bury Old Road, Cheetham Hill
Plate 9 Southern border of the site taken from Bury Old Road.	Plate 10 Overview of southwestern access gate.
	
Date: 28th July 2023	Date: 28th July 2023
Plate 11 Overview of vegetation in central area of site.	Plate 12 Overview of northern border from the eastern area of the site.
	
Date: 28th July 2023	Date: 28th July 2023

Figure 9 Site Walkover Photo Locations



APPENDIX 3

SITE WALKOVER NOTES

WALK OVER SURVEY REPORT

Site: Bury Old Road, Cheetham Hill

Date: 28th July 2023

Job No: A5545-23

Undertaken By: Joseph Tuzio

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. Residential properties. The site is currently unoccupied with access from Catherine Road to the north. The access is a metal gate which is padlocked. Other possible access is from Bury Old Road to the south, however, this access is blocked by concrete blocks.
Evidence of Past Activities	Are there: Any relevant street names in area? Features or relics which indicate past history?	Yes/No Yes/No	Catherine road is located to the north, Bury Old Road is located to the south.
Geographic Setting	Description required for: Low lying flood plain/dry valley/rolling hills etc.		Site is flat lying with a slight slope in the southern area of the site towards Bury Old Road.
Ground Conditions	Is there any evidence of: Mining, Mine entries Subsidence Landslip/slope erosion Former investigation works	Yes/No Yes/No Yes/No	Standpipes located in the central area of the site.

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	Mounds of rubble from previous demolition works located on the eastern boundary of the site. Areas of gravel located in the central area of site.
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)		Red brick walls located around the site on the north, south and western boundaries. Metal board and concrete panel fencing is located on the eastern boundary. Directly to the east and west are residential properties. Padlocked metal fence gate access is located on the northern and southern boundaries.
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 and young trees located on the eastern, southern and western boundaries. The site is predominantly overgrown with vegetation.
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	Some Made Ground in the central area of the site with gravel surfacing. There is no evidence of hardcover onsite.

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) 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) 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 Yes/No Yes/No	Not observed directly onsite.
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	Junction box located on the southern border of the site. Streetlamps are located on the pavement of Catherine Road, directly north of the site.
Buildings	Is there any evidence of asbestos construction materials e.g., roofing, insulation materials. Do any buildings have basements? Do any buildings have a boiler room (if yes, describe fuel type and storage arrangements)?	Yes/No Yes/No 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	Monitoring standpipes located onsite.
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	No evidence of fuel/chemical storage.
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	There is no evidence of a watercourse nearby.

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	No waste skips located onsite. There is evidence of fly tipped household waste in the northern area of the site.
Atmospheric	Are there any fumes, odours originating from site or affecting site from neighbouring sites?	Yes/No	Surrounding area is residential end use, there is no odours originating from the surrounding area.
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		There is evidence of a recent ground investigation with monitoring standpipes in the central area of the site.
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.		Roughly square, 57m north to south and 45m east to west, with an area of 0.24 hectares.

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.