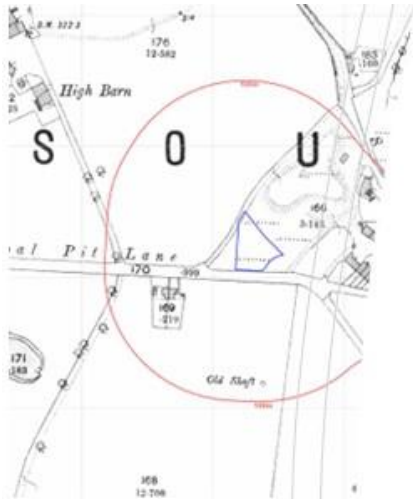




EARTH ENVIRONMENTAL
& GEOTECHNICAL



Phase 1 GeoEnvironmental Desk Study

Mount Road

Middleton

March 2024

On behalf of

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PHASE I GEOENVIRONMENTAL DESK STUDY

MOUNT ROAD

MIDDLETON

FOR

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Report Reference:	A5865/24
Client:	Margarita Pankovych
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CONTENTS

1.0	INTRODUCTION.....	1
	Appointment	1
	Objective	1
	Scope	1
2.0	SITE LOCATION AND DESCRIPTION.....	3
	Site Utility Services.....	4
3.0	ENVIRONMENTAL SETTING.....	5
	Geology.....	5
	Ground Workings	5
	Mining and Other Underground Workings	6
	Radon Potential.....	6
	Hydrogeology and Hydrology	6
	Landfill & Waste Management Activity	7
	Industrial Land Use Information.....	8
	Environmental Permits, Incidents and Registers	8
	Environmentally Sensitive Sites	9
	Ecology	10
	Archaeology	10
	Potential Flood Risks.....	10
	Previous Site Investigations	10
4.0	SITE HISTORY	11
5.0	WALKOVER SURVEY.....	15
6.0	PRELIMINARY CONTAMINATION RISK ASSESSMENT	17
	Introduction	17
	Potential Sources	18
	Potential Receptors	18
	Potential Pathways.....	18
7.0	GEOTECHNICAL HAZARDS ASSOCIATED WITH THE DEVELOPMENT	22
8.0	CONCLUSIONS & RECOMMENDATIONS	24
	Conclusions.....	24
	Recommendations	24

FIGURES

Figure 1	Proposed Development Plan
Figure 2	Site Location Plan
Figure 3	Site Photograph
Figure 4	OS Map Extract: 1893
Figure 5	OS Map Extract: 1932
Figure 6	OS Map Extract: 2001
Figure 7	Aerial Photograph 2022
Figure 8	Site Features Plan
Figure 9	Site Walkover Photo Locations

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 Mrs Margarita Pankovych (the client) to undertake a Phase I GeoEnvironmental Desk Study for the proposed residential development on vacant land on Mount Road, Middleton.
- 1.2 It is understood that the client wishes to construct two new detached residential dwellings with associated soft landscaping, parking, and boundary treatment.
- 1.3 A proposed development model for the site is shown in Figure 1 below.

Figure 1 Proposed Development Model



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.
- Rochdale Council Planning Portal.

2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is in Bury, Greater Manchester, approximately 0.6km to the southeast of Middleton Town Centre. The approximate National Grid Reference for the centre of the site is SD 87230 05225(X: 387230, Y: 405225), with the closest postcode being M24 1DY.
- 2.2 The maximum dimensions of the proposed dwelling site are 44m north to south, and 22m east to west. The site occupies an area of approximately 0.09 hectares.
- 2.3 The site is an irregularly shaped triangular parcel of land with current access from Mount Road. Currently the site is accessed through a locked metal gate.
- 2.4 The land is surfaced predominantly in grass vegetation and is generally flat lying but slightly undulating in the southern area. The site is bound by a mixture of metal and wooden fencing with commercial units directly adjacent to the west and a residential dwelling adjacent to the east.
- 2.5 The site is surrounded by a mixture of residential and commercial developments. Mount road is located directly south, and a roundabout is located directly southeast.
- 2.6 A location plan is shown below as Figure 2, together with a recent site photograph as Figure 3 (overleaf).

Figure 2 Site Location Plan

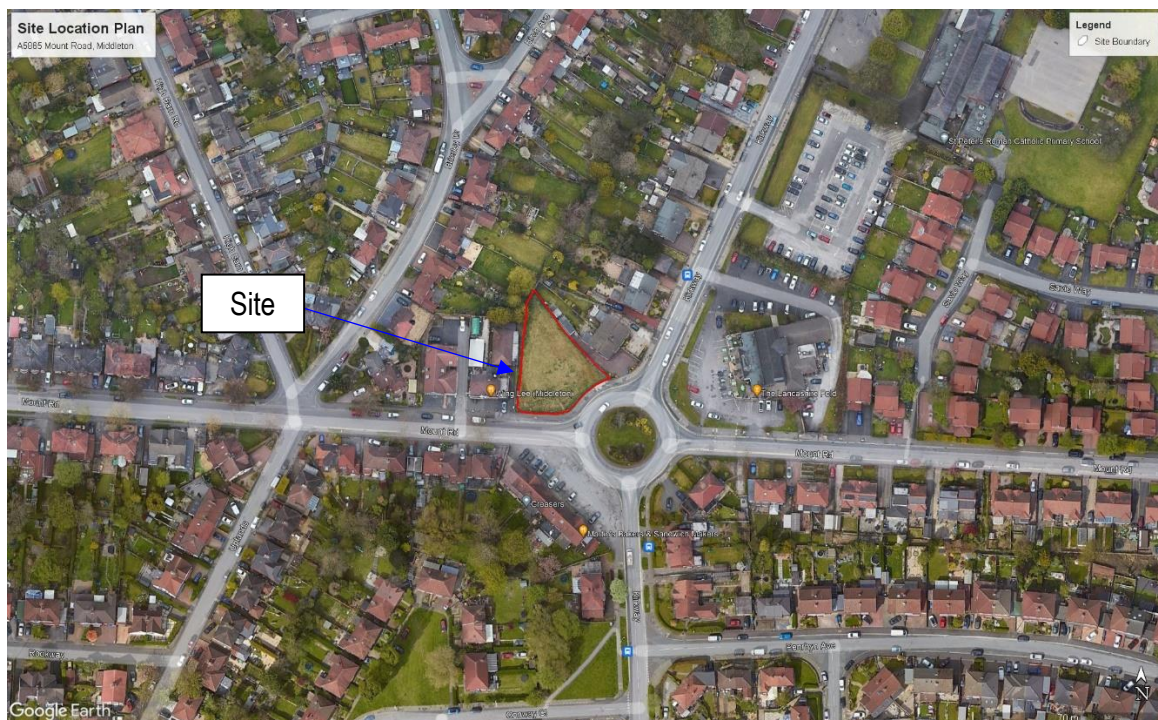


Figure 3 Site Photograph



Site Utility Services

- 2.7 Site service plans have not been obtained for the site by 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 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 BGS states that the site is not underlain by artificial deposits. However, records indicate that Made Ground and infilled ground deposits lie approximately 55m and 91m east of the site, respectively.
- 3.4 The site is underlain by superficial deposits of Devensian Till comprising Diamicton, commonly known as Boulder Clay and Glaciofluvial Sheets Deposits consisting of sand and gravel.
- 3.5 The solid geology beneath the site is shown to be the Pennine Lower Coal Measures Formation comprising coal seams, mudstone, siltstone, and sandstone.
- 3.6 There are 14no. records of linear features within 500m of the site boundary. The closest record refers to a coal seam, inferred located 55m north of the site.
- 3.7 There are no records of landslips within 500m of the site boundary.
- 3.8 There are 5no. borehole records identified within 250m of the site. The closest record is located 9m to the southwest of the site, BGS reference:SD80NE16. The borehole shows a depth summary of encountered underground mining activity:
- Little Mine at 51.81m to 76.42m.
 - Black Mine at 68.58m to 91.44m.
 - Bents Mine at 115.21m to 137.16m.
- 3.9 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 hazard rating is negligible with regards to compressible deposits and soluble rocks.

Ground Workings

- 3.10 There are 30no. records of historical surface ground working feature identified within 250m of the site boundary. The closest record refers to an onsite refuse heap, dated 1851. Other records in the vicinity refer to ponds, unspecified heaps, collieries, unspecified ground workings etc.
- 3.11 According to the BGS, there is 1no. record of a British Pit within 500m of the site. This record refers to the Little Park Sand Pit located 447m to the north of the site.

Mining and Other Underground Workings

- 3.12 The site is located within the specified search distance (1km) of an identified coal mining area. Reference to the Coal Authority interactive online viewer shows the site is located within a Development High Risk Area. The Coal Authority online interactive viewer shows a mineshaft on the site.
- 3.13 There are no records for non-coal mining areas located within 1km of the site.
- 3.14 There are no areas of brine extraction, gypsum extraction, tin mining or clay mining within 1km of the site.
- 3.15 There are no records for non-coal cavities or natural cavities identified within 1km of the site.
- 3.16 There are 16no. records for historical underground working features within 1km of the site. The closest record refers to an unspecified old shaft, dated 1891, 87m to the south of the site.

Radon Potential

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

Hydrogeology and Hydrology

- 3.18 The superficial deposits are classified by the Environment Agency (EA) as a Secondary A Aquifer. The Devensian Till deposits have a mixed flow type with a low to high permeability. The BGS states the following:

Secondary A *'Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.'*

- 3.19 The Pennine Lower Coal Measures Formation is classified by the Environment Agency (EA) as a Secondary A Aquifer with a fracture flow type and moderate to low permeability. The BGS states the following:

Secondary A *'Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.'*

- 3.20 The groundwater vulnerability and soil leaching potential of the site has been classified as medium superficial and low bedrock vulnerability with a high leaching potential. 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.'*

Medium – *'Intermediate between high and low vulnerability.'*

- 3.21 There are 4no. groundwater abstraction licence records within 2km of the site. The closest historical licence refers to a borehole at Don Mill, Don Street, Middleton, located 1.4km northeast of the site.
- 3.22 There are 7no. surface water abstraction licence records within 2km of the site. All the abstraction licences are historical. The closest licence refers to a reservoir fed by surface drainage at Middleton located 715m to the northwest of the site.
- 3.23 There are no potable abstraction licence records within 2km of the site.
- 3.24 The site is not located within 500m of a Source Protection Zone or a Source Protection Zone within a confined aquifer.
- 3.25 There are no water network entries within 250m of the site.
- 3.26 There are no surface water features identified within 250m of the site.
- 3.27 There is 1no. record of a Water Framework Directive (WFD) surface water body located within 250m of the site. This record refers to Wince Brook, located 324m northeast of the site and received a failed chemical rating in 2019.
- 3.28 There is 1no. record of a Water Framework Directive (WDF) groundwater body located on-site. The record refers to the Northern Manchester Carboniferous Aquifers located on site. The aquifer had a poor chemical rating in 2019.

Landfill & Waste Management Activity

- 3.29 There are no records for current Environment Agency/Natural Resource Wales landfill records within 500m of the site.
- 3.30 There are no records of historic Environment Agency/Natural Resource Wales landfill sites within 500m of the site.
- 3.31 There are no records of BGS/DoE non-operational landfill sites within 500m of the study site.
- 3.32 There are no records of a historical landfill site from the Local Authority and Historical Mapping Records within 500m of the site.
- 3.33 There are no records of a historical waste site from the Local Authority and Historical Mapping Records within 500m of the site.
- 3.34 There are no records of current Environment Agency/Natural Resources Wales licensed waste sites within 500m of the site.
- 3.35 There is 1no. record of a waste treatment, transfer, or disposal site within 500m of the study site. The closest record refers to the storage of waste in a secure place located 418m to the south of the site.

Industrial Land Use Information

- 3.36 There are 118no. records of potentially contaminative historical land uses identified within 500m of the site. The closest record refers to an onsite refuse heap dated 1851. Other records in the vicinity refer to unspecified heaps, collieries, an old barracks etc.
- 3.37 There are 4no. records of current potentially contaminative land uses identified within 250m of the site. The closest record refers to an electricity substation located 44m to the northeast of the site. Other records in the vicinity refer to other electricity substations.
- 3.38 There are 11no. records of a historical tank identified within 500m of the site. The closest record refers to tanks located 386m to the north of the site, dated 1932.
- 3.39 There are 19no. records of historical energy features identified within 500m of the site. The closest records refer to an electricity substation located 38m to the northeast of the site, dated 1984.
- 3.40 There is 1no. record for current petrol or fuel sites within 500m of the site. This record refers to an open Low Prices Always petrol station located 421m to the northwest of the site.
- 3.41 There are no records of historical petrol or fuel sites within 500m of the site.
- 3.42 There are 8no. records of a historical garages identified within 500m of the site. The nearest record refers to a garage located 378m to the northwest of the site, dated 1992.
- 3.43 There are no records of a high voltage underground electricity transmission cables within 500m of the site.
- 3.44 There are no records of high-pressure underground gas transmission pipelines within 500m of the site.
- 3.45 There are no historical railway and tunnel features identified within 250m of the site.
- 3.46 There are no historical railway lines identified within 250m of the site.
- 3.47 There are no current active railway line records identified within 250m of the site.
- 3.48 There are no underground railway lines or tunnels identified within 250m of the site.
- 3.49 The site is not within 5km of the route of the High Speed 2 rail project.
- 3.50 The site is not within 500m of the route of the Crossrail 1 rail project.

Environmental Permits, Incidents and Registers

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

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	4
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)	1
Pollution Inventory Substances, Wastes and Radioactive Wastes	0

- 3.52 There is 1no. records of Part A (2) and Part B activities and enforcements within 500m of the study site. The closest record refers to the unloading of petrol into storage at Alkrington Service Station located 423m northwest of the site.
- 3.53 There are 4no. records of Licensed Discharge Consents to controlled waters within 500m of the study site. The closest record refers to sewage discharge (sewer storm overflow) into Wince Brook located 338m to the north of the site.
- 3.54 There is 1no. record of a substantiated pollution incident within 500m of the study site. This record refers to agricultural materials and waste released 452m to the northwest of the site. The incident had a Category 4 (no impact) on air and a Category 3 (Minor Impact) on land and water.

Environmentally Sensitive Sites

- 3.55 There is 1no. record of a Site of Special Scientific Interest (SSSI) within 2km of the study site. This record refers to the Rochdale Canal located 1.6km to the east of the site.
- 3.56 There is 1no. record of Designated Ancient Woodland within 2km of the study site. This record refers to an unnamed ancient & semi-natural woodland located 1.9km to the south of the site.
- 3.57 There is 1no. record of a Local Nature Reserve (LNR) within 2km of the study site. This record refers to Alkrington woods located 423m to the northwest of the site.
- 3.58 There is 1no. records of Green Belt land within 2km of the study site. This record refers to the Merseyside and Greater Manchester Greenbelt located in Oldham, 1.7km to the northeast of the site.

- 3.59 There are no further records of Environmental Designations within 2km of the site.

Ecology

- 3.60 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.
- 3.61 However, the site is classified as urban land.

Archaeology

- 3.62 An archaeological assessment falls outside the brief of this report. Where considered necessary, advice should be sought from an archaeological specialist in this respect.
- 3.63 However, there are no records of Listed Buildings, Scheduled Ancient Monuments or Conservation Areas within 250m of the site.

Potential Flood Risks

- 3.64 Detailed assessment of flood risks is outside the scope of this report. However, an Environment Agency Flood Zone 2 and 3 are not located on site.
- 3.65 There are no records of flooding from rivers and sea (RoFRaS) within 50m of the site.
- 3.66 There are no records of flood defences within 250m of the site.
- 3.67 There are no record of areas benefitting from flood defences within 250m of the site.
- 3.68 There are no records of areas used for flood storage within 250m of the site.
- 3.69 The highest risk of surface water flooding occurring on-site for a 1 in 30-year event is 0.3m-1.0m.
- 3.70 The highest risk of groundwater flooding occurring on-site is moderate.

Previous Site Investigations

- 3.71 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.
- 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
1848, 1891, 1906-1907, 1915 1:10,560 1893, 1909 1:2,500	The 1848 OS map shows the site covered by refuse heaps associated with the nearby Alkington Colliery.	Some minor residential development located around the site including terraces approximately 70m east of the site. Coal Pit Lane adjacent to the southern border of the site. An old shaft is located approximately 90m south of the site. An old Barracks is located 75m northeast of the site. Refuse heaps are located 30m northwest of the site. There is a culvert located 100m northeast of the site. Alkington Colliery is located 100m south of the site. There is a gravel pit located 245m north of the site. There is a sand pit located 420m north of the site and another sand pit located 430m east of the site. There is a graveyard located 490m northeast of the site. There is a silk factory located 460m northwest of the site. Park mill is located 400m northeast of the site. Wince Brook is located 380m north of the site. Old sand pit located 260m southwest of the site.
1923 1:10,560 1922 1:2,500	No Significant Change.	Increased residential property development approximately 100m west of the site. Alkington Garden Village located approximately 200m southwest of the site. Road name change to Mount Road, directly to the south of the site.
1932-1933, 1938 1:10,560 1932 1:2,500	No Significant Change.	Workings no longer present directly adjacent to the site to the north. Increased residential property development directly to the northwest and west of the site.

Date	On-Site History	Surrounding Land Use History
1955-1956 1:10,560 1952-1954, 1951-1954 1:1,250	No Significant Change.	Increased residential property development to the north, south, west, and southeast of the site. An electricity substation is located approximately 50m to the northeast of the site. St Peter's R. C. Secondary school is located approximately 200m to the northeast of the site.
1965-1966 1:10,560 1975, 1980-1982 1:10,000 1961, 1960-1963, 1962-1967, 1984 1:2,500	2 residential property developments with associated outbuildings located on the site.	Significant increase in building development to the north, west, south, and east of the site. A tennis court is located approximately 70m to the northeast of the site. St. Dominic Savio Secondary school located approximately 150m east of the site. A roundabout has been developed directly to the southeast of the site. Mount road has been extended eastwards. A public house has been developed approximately 60m east of the site.
2001, 2010 1:10,000 1992, 2003 1:1,250	No Significant Change.	Secondary school no longer present on mapping records, replaced by residential property developments.
2024 1:10,000 2020, 2021. 2022, 2023 Google Earth Satellite Imagery	Building developments no longer present onsite.	No Significant Change.

Figure 4 OS Map Extract 1893

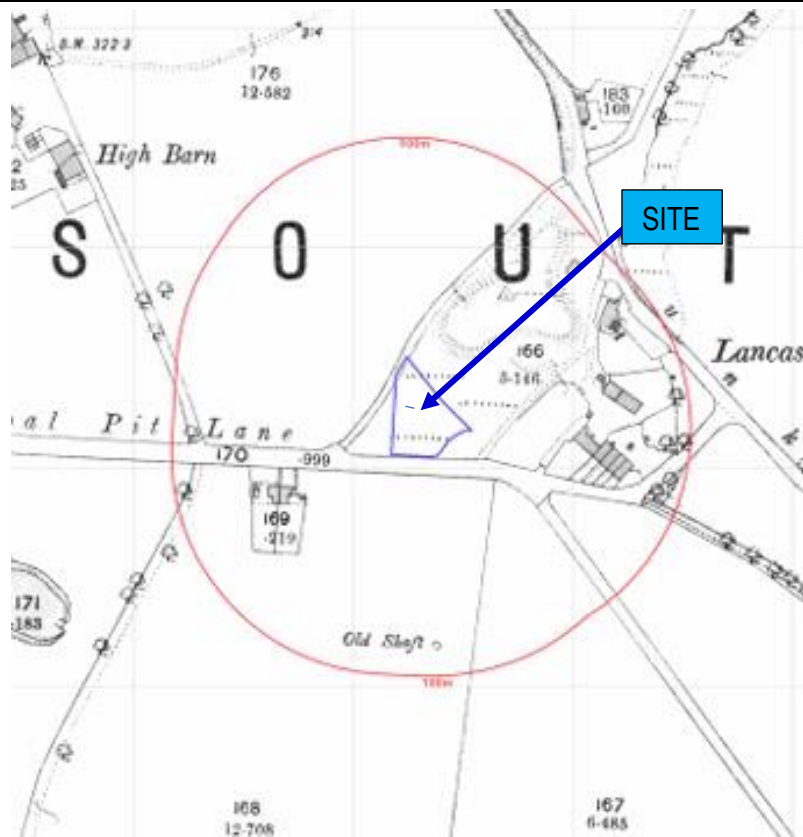


Figure 5 OS Map Extract 1932

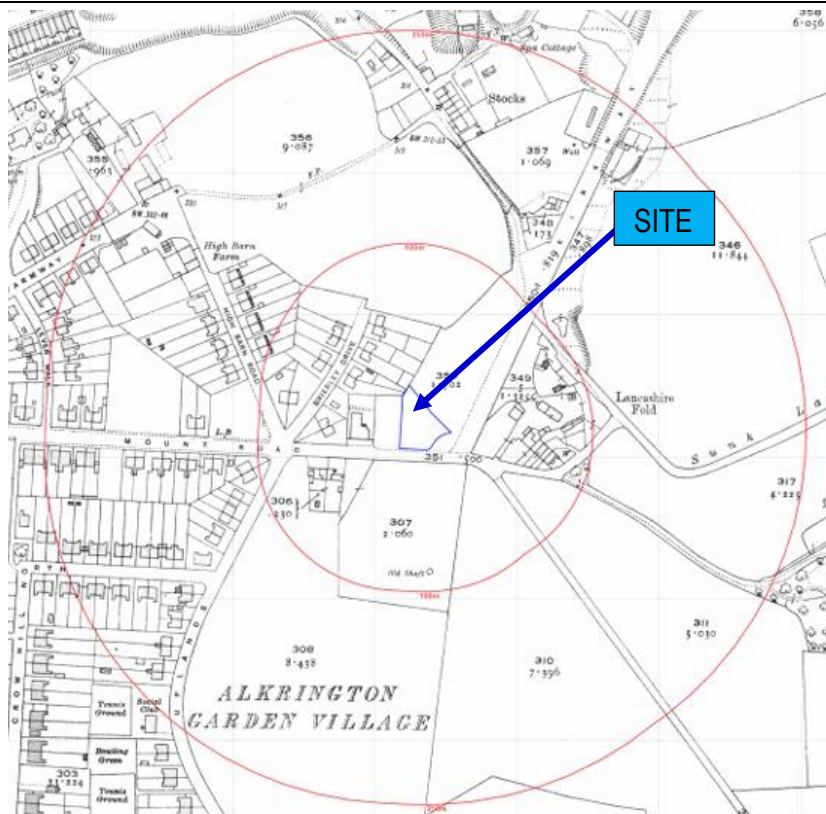


Figure 6 OS Map Extract 2001

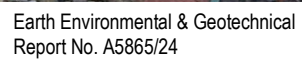


Figure 7 Aerial Photograph 2022



5.0 WALKOVER SURVEY

- 5.1 A walkover survey was completed on 23rd February 2024. The photographs and notes from this survey are appended to this report as Appendix 2 and Appendix 3, respectively.
- 5.2 The site is accessed via Mount Road to the south of the site. The site is a vacant roughly triangular patch of land which is accessible via a locked metal gate from south.
- 5.3 The site is covered predominantly in grass with a slightly undulating topography in the southern area of the site.
- 5.4 A tree stump is located in the southern area of the site.
- 5.5 Fly tipped litter was observed along the southern fence of the site, including black bin bags with general household waste.
- 5.6 The site is bound predominantly by metal fencing across all borders, with an access gate along the southern fence line. Immediately adjacent to the site to the east is a residential property and to the west, a commercial unit.
- 5.7 The immediate surrounding areas comprise of a mixture of commercial units and residential dwellings and associated gardens.
- 5.8 A site features plan is presented as Figure 8 overleaf.



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 Environmental 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 Environmental 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 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 There are records of a refuse heap on the site, associated with a nearby colliery. Colliery fill is therefore likely to be present on the site
- 6.6 An abandoned coal mine shaft is located on or very close to the site. This could be a source of mine gases.
- 6.7 Therefore, there is potential for the presence of contamination on the site.

Potential Receptors

- 6.8 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 aquifer

Potential Pathways

- 6.9 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
Potential ground contamination E.g., Heavy Metals, PAH	Dermal contact, ingestion, and inhalation of soils dust	Current Site Users	Low Likelihood	Low	Low	The site currently comprises a vacant patch of grassy land, inaccessible to members of the public. Two bungalow residential properties have existed previously on site. Therefore, the risk is considered LOW .
		Adjacent land users	Low Likelihood	Low	Low	The adjacent land comprises a residential property development with private garden. Given the development history of the site and the age of potential Made Ground soils it is unlikely adjacent land users will be affected. Usual dust control measures should be implemented as part of good site working practices during construction to reduce dust generation. Therefore, the risk is considered LOW .
		Future land users	Likely	Low	Moderate to Low	The proposed development consists of 2 residential property developments with associated parking and garden. Therefore, the risk to future site users via direct exposure is MODERATE TO LOW .
		Construction Workers	Low Likelihood	Low	Low	Construction workers may be exposed to potentially contaminated soils during construction works, however exposure duration will be short-term only. There has been historic development on site, however given the age of the previous development, there is a low likelihood contamination. The risk to construction workers is considered LOW . Appropriate health and safety measures (in line with CDM and other relevant health and safety guidance) should be adhered to.
	Downward vertical migration of leachate to shallow groundwater	Groundwater within the Underlying Aquifer	Unlikely	Low	Very Low	Leachable contaminants are unlikely to be present on site due to the limited development. The superficial soils underlying the site are anticipated to be cohesive with a low to medium leaching potential which will inhibit migration to the underlying aquifer. The risk is therefore considered LOW .
	Lateral migration in surface waters	Surface water	Unlikely	Low	Very Low	Leachable contaminants are unlikely to be present on site due to the limited development. There are no surface water features and no water network entries within 250m of the site, therefore the perceived risk to surface waters is VERY LOW .
	Vertical or lateral migration of ground gas	Current Site Users	Unlikely	Low	Low	The site currently comprises a vacant patch of grassy land inaccessible to the general public. Historically the site has had previous residential property development and historic ground workings may have encroached onto the site, therefore Made

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
						Ground is anticipated. There are no other significant sources of ground gas identified on site or within close proximity. Therefore, the risk to current site users from ground gas is considered LOW .
		Adjacent land users	Low Likelihood	Low	Low	The adjacent land comprises of residential dwellings. Made Ground is likely present onsite, however given the age, there are likely no significant sources of ground gas identified on site. The risk to adjacent land users from ground gas is therefore considered LOW .
		Future land users	Likely	Low	Moderate to Low	The proposed development consists of 2 new residential property buildings with associated vehicle parking and gardens. The site is not located within a radon affected area; however, significant sources of ground gas may be present onsite due to former ground workings. Therefore, the risk is considered MODERATE TO LOW .
		Construction Workers	Low Likelihood	Low	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 .
Potential Asbestos Containing Material (ACM)		Current Site Users	Low Likelihood	Moderate	Moderate to Low	The site currently comprises a vacant grassy patch of land inaccessible to the general public. Two bungalow residential property buildings have historically accommodated the site, which have been demolished. Asbestos may be present within the Made Ground, however, is only harmful when disturbed. The risk to current site users is MODERATE TO LOW .
		Adjacent land users	Low Likelihood	Moderate	Moderate to Low	The adjacent land comprises of residential dwellings. Given the historic onsite development, the presence of asbestos is likely within Made Ground soils. Dust control measures (dampening down) should be implemented as part of good site working practices to reduce the risk to MODERATE TO LOW .
		Future land users	Likely	Moderate	Moderate	The proposed development consists of 2 new residential property buildings with associated vehicle parking and garden areas. Historic onsite property building development may have contained ACMs due to their age. The risk is therefore considered MODERATE .

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
		Construction Workers	Low Likelihood	Moderate	Moderate to Low	Construction workers may be exposed to asbestos within the Made Ground due to the development history of the site, however, this will only be for a short amount of time. Therefore, the risk is considered MODERATE TO LOW .

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.
- 7.2 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 Sand	Very low risk
Ground Dissolution	Negligible risk
Landslip	Very low risk
Mining & Quarrying	No mining or quarrying is recorded as taking place on site; however, local knowledge indicates a mine shaft is present onsite. The site is located within a Coal Mining Reporting Area. The site is also located within a High Development Risk Area. Therefore, the risk from mining is MODERATE .
Geotechnical Design Considerations	
Site Clearance	The proposed dwelling site comprises a grassy patch of land which is already largely cleared. Fly-tipped litter and a tree stump will have to be removed.
Trees	No standing trees are present on the site. A tree stump is located in the southern area of the site.
Existing Buildings/Obstructions	No obstructions were observed during the site walkover.
Foundations	The depth and type of proposed foundations would depend on the ground conditions present on site. The site is underlain by superficial deposits of Devensian Till. If cohesive soils are encountered the depth of foundations will need to be adjusted for the effects of nearby trees in accordance with NHBC guidance. An intrusive ground investigation is recommended prior to any construction works taking place to discover the most suitable foundation options for the site and to make sure the ground conditions are the same across the entire site.
Geotechnical Design Considerations	
Floor Slabs	Again, an intrusive geotechnical investigation is recommended prior to any 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 investigation would be needed. However, it is recorded that the site is underlain by a Secondary A Aquifer. The highest risk of groundwater flooding occurring on-site is MODERATE .
Earthworks	Extensive earthworks are unlikely to be required for the proposed development. A tree stump may have to be removed in the southern area of the site.
Slopes	There are no slopes located on the site.
Retaining Walls	It is unlikely a retaining wall will be utilised on this site.
Chemically aggressive ground conditions	Chemically aggressive ground conditions are not expected at this site. An intrusive geotechnical investigation would be necessary to confirm chemically aggressive ground.

8.0 CONCLUSIONS & RECOMMENDATIONS

Conclusions

- 8.1 The site has historically accommodated two residential property developments with associated outbuildings. According to mapping records, the houses were no longer present after 2020. Due to the age of the former onsite structures, asbestos from ACMs could be encountered within the Made Ground underlying the site. It is unknown if the former buildings had basements.
- 8.2 It is understood that the client wishes to construct two new property dwellings with associated parking and garden areas.
- 8.3 There is potential for contamination on the site due to the development history of the site and the presence of ground workings.
- 8.4 The site is underlain by superficial deposits of Devensian Till comprising Diamicton (Secondary A Aquifer) and the solid geology of the Pennine Lower Coal Measures Formation comprising sandstone (Secondary A Aquifer).
- 8.5 The site is located within the specified search distance of an identified coal mining area. The site is also located within a Development High Risk area. A coal mine shaft is located on the site or very close to it. It is understood that the mineshaft has been treated by the Coal Authority.
- 8.6 The property is not located in a Radon Affected Area, as less than 1% of the properties are above the Action Level.
- 8.7 Given the limited development on site, the overall risk from soil contamination to end users and construction workers is **LOW**.
- 8.8 The overall risk to controlled waters is concluded to be **VERY LOW** based on the low leaching potential of the soils and absence of any nearby surface water features.
- 8.9 The risk from ground gas to end users and construction workers is **MODERATE TO LOW** due to the possible presence of mine gases.
- 8.10 An Environment Agency Flood Zone 2 and 3 are not located on site and the highest risk of groundwater flooding is **MODERATE**.

Recommendations

- 8.11 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.
- 8.12 As part of the ground investigation soil samples should be taken for laboratory chemical and geotechnical analysis.
- 8.13 Monitoring wells should be installed in order to measure the concentration of possible ground and mine gases.

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.: A5865	Site: Mount Road, Middleton
Plate 1 Photo across site viewing north	Plate 2 Photo across site viewing west.
	
Date: 23rd February 2024	Date: 23rd February 2024
Plate 3 Photo of Mount Road signpost adjacent to the southern fence border	Plate 4 Photo through access gate of fly tipped litter
	
Date: 23rd February 2024	Date: 23rd February 2024

Earth Environmental & Geotechnical Ltd Tel: 0161 975 6088 Email: info@earthenvironmental.co.uk Web: www.earthenvironmental.co.uk	SITE PHOTOGRAPHS 
Job No.: A5865	Site: Mount Road, Middleton
Plate 5 Photo along western border looking north	Plate 6 Photo of southern boundary fence
	
Date: 23rd February 2024	Date: 23rd February 2024
Plate 7 Photo of tree stump in southern area of the site.	Plate 8 Photo along southern boundary looking east.
	
Date: 23rd February 2024	Date: 23rd February 2024

Figure 9 Site Walkover Photo Locations



APPENDIX 3

SITE WALKOVER NOTES

WALK OVER SURVEY REPORT

Site: Mount Road, Middleton

Date:

23rd February 2024

Job No: A5865

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 potential 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)		Suburb Mixed, residential, and commercial Vacant
Evidence of Past Activities	Are there: Any relevant street names in area? Features or relics, which indicate past history?	Yes/No Yes/No	Mount Road
Geographic Setting	Description required for: Low lying flood plain/dry valley/rolling hills etc.		Flat, slightly undulating in the southern area.
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	
Topography	Description required for: Are there apparent differences between site and surrounding area? (If yes describe the presence of retaining walls, and slopes).	Yes/No	

	Is there evidence of Made Ground / Fill on site?	Yes/No	Potential Made Ground below red brick footings.
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.)		Bound by green metal fencing on all sides of the site. Directly adjacent to the east is a residential property, to the west a commercial unit.
Vegetation	Are there any vegetation/trees on or close to side (if yes describe locations, type, maturity, etc.)? Is there any evidence of poor health / distress?	Yes/No Yes/No	
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	
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	

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
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	
Buildings	Description of Buildings, including age, state of repair, materials used in construction. 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 Yes/No	
Landfilling	Is there any evidence of gas protection measures (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, and condition).	Yes/No Yes/No Yes/No	
Accidents	In the event of a large spillage would runoff affect any vulnerable watercourse/culverts?	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	Various fly-tipped litter onsite.
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		Office space on the vacant land N/A
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			Potential mine shaft on the site. Not observed during walkover.
Site Dimensions	Describe shape of Site in plan and measure dimensions.		Rectangular in shape. Approximately 44m north to south and 22m east to west. Approximately 0.1 acres in size.

APPENDIX 4

REPORT LIMITATIONS

LIMITATIONS

This contract was completed by Earth Environmental & Geotechnical Ltd based on 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 2024 and should be read considering 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 of 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.