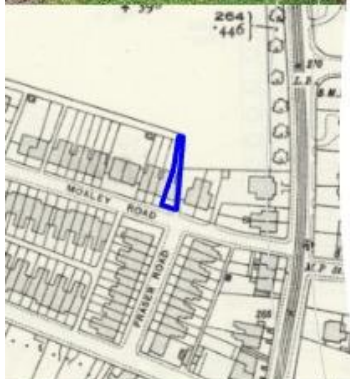


EARTH ENVIRONMENTAL
& GEOTECHNICAL

Phase I GeoEnvironmental Desk Study

10 Moxley Road

Crumpsall

July 2021

On behalf of

Welcome Estates

Earth Environmental & Geotechnical Ltd
Houldsworth Mill Business & Arts Centre
Houldsworth Street
Stockport
SK5 6DA

Tel : 0161 975 6088

Email info@earthenvironmental.co.uk
www.earthenvironmental.co.uk



**MOXLEY ROAD
CRUMPSALL
PHASE I GEOENVIRONMENTAL DESK STUDY
FOR
WELCOME ESTATES**

Earth Environmental & Geotechnical Ltd
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Houldsworth Street
Stockport
SK5 6DA

www.earthenvironmental.co.uk

Tel: 0161 975 6088

Report No. A4255/21

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Report Reference:	A4255/21
Client:	Welcome Estates
Issue Date:	31st July 2021
Drafted By:	Dr. S McLoughlin
Reviewed By:	A Czarnecki
Authorised By:	A Czarnecki

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1.0 INTRODUCTION

Appointment

- 1.1 Earth Environmental & Geotechnical Ltd has been commissioned by DEBTAL Architecture on behalf of Welcome Estates (the client) to undertake a Phase I GeoEnvironmental Desk Study for the proposed development to the north of Moxley Road, Crumpsall, Manchester.
- 1.2 It is understood that the client intends to construct a residential development on the site comprising a three storey, end terrace dwelling house. The development will consist of 5no. bedrooms and front and rear gardens.
- 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 Planning Portal.

2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is located in Crumpsall, Manchester approximately 4.15km to the north of Manchester City Centre. The approximate National Grid Reference for the centre of the site is SD8353902373 (X: 383539, Y: 402373), with the closest postcode being M8 4HJ.
- 2.2 The site is an irregular shaped parcel of land with current access from Moxley Road to the south. The maximum dimensions of the site are 37m north to south and 8m west to east. The site occupies an area of approximately 0.02 hectares.
- 2.3 The site is currently a derelict parcel of land demarcated by metal and wooden fence panels. Current site access is via a wooden gate on the southwest of the site. A tree is located on the southeast corner of the site. There are waste bins from the adjoining property and a swing located on the site. Suspected fly- tipped materials are located on site such as disused furniture, construction material and shopping crates.
- 2.4 The site is located within a suburb of Manchester and is surrounded by residential dwellings. Terraced houses are located along the site boundary to the west. A public alleyway is located along the site boundary to east of the site. Further to the north is an area of public open space.
- 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

- 2.6 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 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.
- 3.4 The site is underlain by superficial deposits of Glaciofluvial Deposits comprising Devensian sand and gravel.
- 3.5 The solid geology beneath the site is shown to be the Manchester Marls Formation comprising mudstone.
- 3.6 There is 1no. record of linear features within 500m of the site boundary, the record refers to a fault located 171m to the northeast of the site.
- 3.7 There are no records of landslips within 500m of the site boundary.
- 3.8 There are 2no. borehole records identified within 250m of the site. However, all the boreholes records are confidential.
- 3.9 The site is in an area where the hazard rating is negligible with regard to shrink swell clays, compressible deposits and soluble rocks. The hazard rating is very low with regard to running sands, collapsible deposits and landslides.

Ground Workings

- 3.10 There are 2no. records of historical surface ground working features identified within 250m of the site boundary. The closest record refers to a pond located 131m to the east of the site, dated 1851.
- 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 The site is located within the specified search distance (1km) of an identified coal mining area. However, reference to the Coal Authority Interactive viewer shows the site is not located within a Development High Risk Area.
- 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 no records for historical underground working features identified within 1km of the site.

Radon Potential

- 3.17 The property is not located in a Radon Affected Area, as between 1% and 3% or 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 of Glaciofluvial Deposits are classified by the Environment Agency (EA) as a Secondary A Aquifer with a intergranular flow type and a high to very high permeability. The BGS states the following:

Secondary A Aquifer *'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 are classified by the Environment Agency (EA) as a Secondary B Aquifer with a fracture flow type and a low permeability. The BGS states the following:

Secondary B Aquifer *'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 groundwater vulnerability and soil leaching potential of the site has been classified as low with a low 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'*

- 3.21 There are 10no. groundwater abstraction licence records within 2km of the site. The closest active licence refers to general cooling at British Cables Company Ltd, located 1.2km to the northeast of the site.
- 3.22 There are no surface water abstraction licence records within 2km 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 Source Protection Zone within a confined aquifer.
- 3.25 There are no records of 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 (WDF) surface water body located within 250m of the site. The record refers to the River Irwell located 1.4km to the southwest of the site. The river was a good chemical rating and moderate ecological rating in 2016.
- 3.28 There is 1no. record of a Water Framework Directive (WDF) groundwater body located on-site. The record refers to the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers which were a poor chemical rating in 2015.

Landfill & Waste Management Activity

- 3.29 There are no 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 is 1no. record of a waste treatment, transfer or disposal site within 500m of the study site. The closest record refers to a treating waste exemption located 164m to the northeast of the site.
- 3.35 There are no records of current Environment Agency/Natural Resources Wales licensed waste sites within 500m of the site.

Industrial Land Use Information

- 3.36 There are 22no. records of potentially contaminative historical land uses identified within 500m of the site. The closest record refers to a nursery located 2m to the south of the site, dated 1851. Other records in the vicinity refer to a smithy, electric substation, nurseries, cemeteries, hospital, and unspecified ground workings 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 115m to the southwest of the site. Other records in the vicinity refer to Spalco Ltd industrial products, a telephone exchange, and Halfway House Garage.
- 3.38 There are no records of historical tanks identified within 500m of the site.
- 3.39 There are 14no. records of historical energy features identified within 500m of the site. The closest record refers to an electricity substation located 92m to the southwest of the site, dated 1986-1990.
- 3.40 There is 1no. record for current petrol or fuel sites within 500m of the site. The record refers to ESSAR located 193m to the south of the site with an obsolete status.

- 3.41 There are no records of historical petrol or fuel sites within 500m of the site.
- 3.42 There are 7no. historical garage and motor vehicle repair site records identified within 500m of the site. The closest record refers to a garage located 168m to the south of the site, dated 1979-1996.
- 3.43 There are no National Grid high voltage underground electricity transmission cables within 500m of the site.
- 3.44 There are no National Grid high-pressure 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	5
Category 3 or 4 Radioactive Substance Authorisations	0
Licensed Discharge Consents	0
Planning Hazardous Substance Consents and Enforcements	0
Dangerous or Hazardous (COMAH and NIHHS) Sites	0
Sites Determined as Contaminated Land under Part 2A EPA 1990	0
Regulated Explosive Sites	0
Pollutant Release to Public Sewer	0
Substantiated Pollution Incidents (Category 1 and 2)	0

Pollution Inventory Substances, Wastes and Radioactive Wastes	0
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- 3.52 There are 5no. records of Part A (2) and Part B Activities and Enforcements within 500m of the study site. The closest record refers to a historical Part B permit for petrol vapour recovery located 164m to the south of the site.

Environmentally Sensitive Sites

- 3.53 There are 5no. records of a Local Nature Reserve (LNR) within 2km of the study site. The closest record refers to Blackley Forest located 892 to the north of the site.
- 3.54 There is 1no. record of Greenbelt land within 2km of the study site. The record refers to Merseyside and Greater Manchester Greenbelt located 1.1km to the north of the site.

Ecology

- 3.55 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.
- 3.56 However, the site is classified as Urban Land.

Archaeology

- 3.57 An archaeological assessment falls outside the brief of this report. Where considered necessary, advice should be sought from an archaeological specialist in this respect.
- 3.58 However, the site is located within Crumpsall Lane Conservation Area.
- 3.59 There are no records of World Heritage Sites, Scheduled Ancient Monuments and Listed Buildings within 250m of the site.

Potential Flood Risks

- 3.60 Detailed assessment of flood risks is outside the scope of this report. However, the site does not lie within 50m of an Environment Agency Flood Zone 2 and 3.
- 3.61 There are no records of flooding from rivers and sea (RoFRaS) on site.
- 3.62 There are no records of flood defences or areas benefitting from flood defences within 250m of the site.
- 3.63 There are no records of areas used for flood storage within 250m of the site.
- 3.64 The highest risk of surface water flooding occurring on-site is negligible.
- 3.65 The highest risk of groundwater flooding occurring on-site is moderate.

Previous Site Investigations

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

4.0 SITE HISTORY

- 4.1 The historical development of the site has been determined by reference historical plans and Google Earth imagery. The reviewed historical plans comprise only readily available records and may be limited; however, the information available to date indicates that additional searches are unlikely to add to our understanding of the site. The earliest available historical mapping covering the site dates 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
1848 1:10,560 1850 1:1,056	The site is an undeveloped parcel of land.	A nursery is located along the site boundary to the south of the site. A smithy is located approximately 140m to the south of the site. A cemetery is located approximately 400m to the southeast of the site.
1890 1:500 1893 1:10,560 1894-1895, 1909-1910 1:10,560 1909 1:2,500	The site is occupied by an end of terrace dwelling with a front and rear garden. On the north of the garden is a shed/garage.	Terraced houses are located along the site boundary to the west. The surrounding areas are predominantly residential. A cricket ground and bowling green are located approximately 125m to the west of the site. A nursery is located approximately 240m to the northeast of the site. A hospital is located approximately 410m to the south of the site. Crumpsall station and railway line are located 500m to the east of the site.
1922 1:2,500 1923 1:10,560	The shed/garage to the south of the garden has been demolished.	An open-air school is located approximately 85m to the north of the site. Tennis grounds are located approximately 135m to the northwest of the site. Allotment gardens are located approximately 95m to the southeast of the site. An alleyway is located along the site boundary to the east. Adjacent are residential dwellings. A tramway is located on Bury Old Road 170m to the south of the site.
1952 1:1,250	No significant change.	A telephone exchange is located approximately 140m to the southeast of the site

Date	On-Site History	Surrounding Land Use History
1953 1:2,500 1956 1:10,560		An electricity substation is located approximately 160m to the southeast of the site.
1963-1974 1:1,250 1968-1970 1:2,500 1966-1968, 1:10,560 1978-1979 1:10,000	The end of terrace dwelling has been demolished. However, the remaining terraced dwellings to the west remain.	A surgery is located 35m to the east of the site. A garage is located approximately 177m to the southeast of the site. An electricity transformer is located 280m to the northwest of the site.
1986-1990 1:10,000	No significant change.	Tennis grounds are located approximately 135m to the northwest of the site The bowling green located approximately 125m to the west of the site is no longer present.
Google Earth Imagery 2000	The site appears to be surfaced in grass with trees shrubs to the north.	The open-air school is located approximately 85m to the north of the site is now a residential development.

Figure 4 OS Map Extract 1888-1913

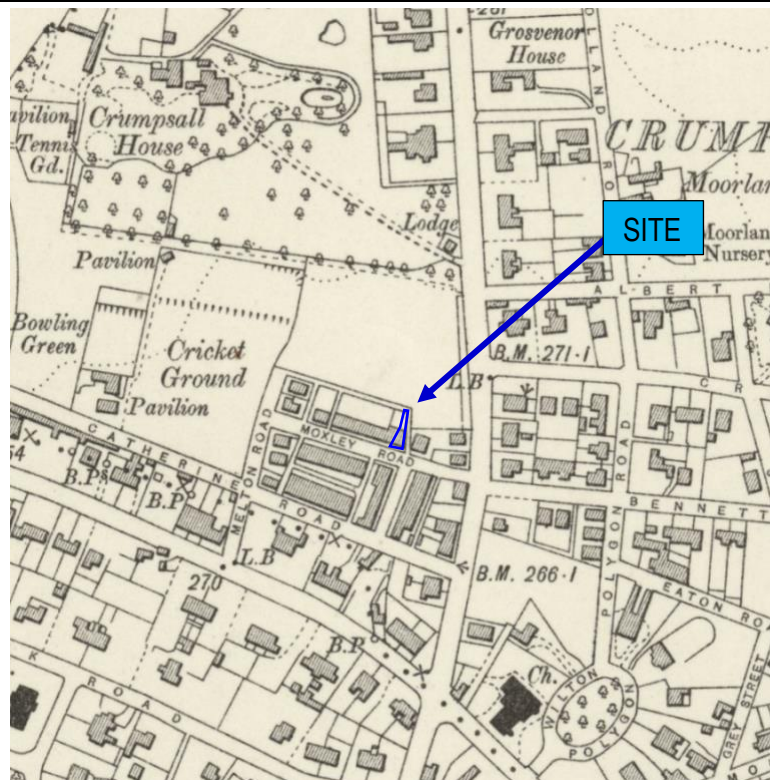


Figure 5 OS Map Extract 1892-1914

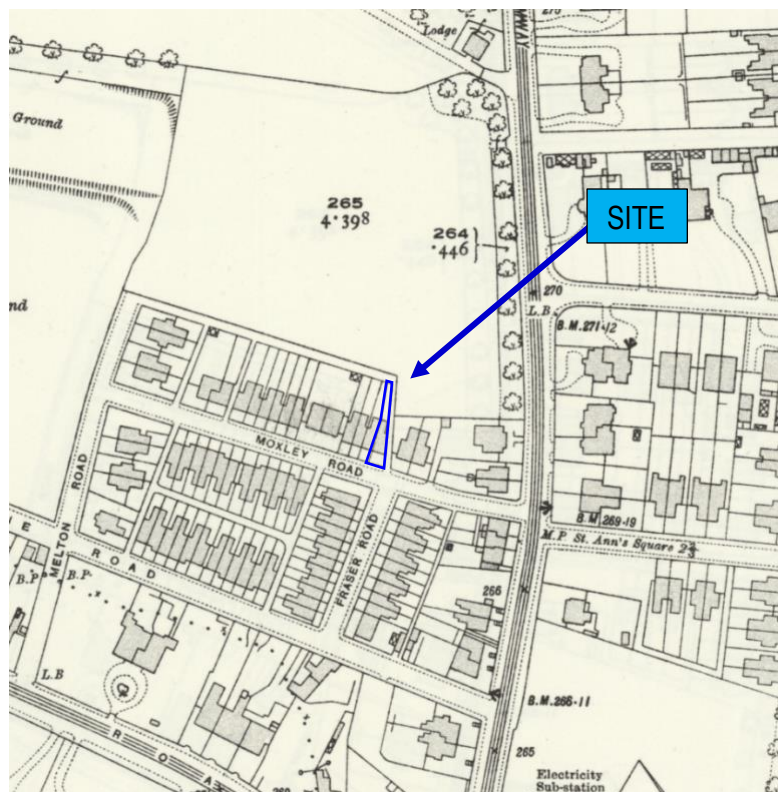


Figure 6 OS Map Extract 1949-1970

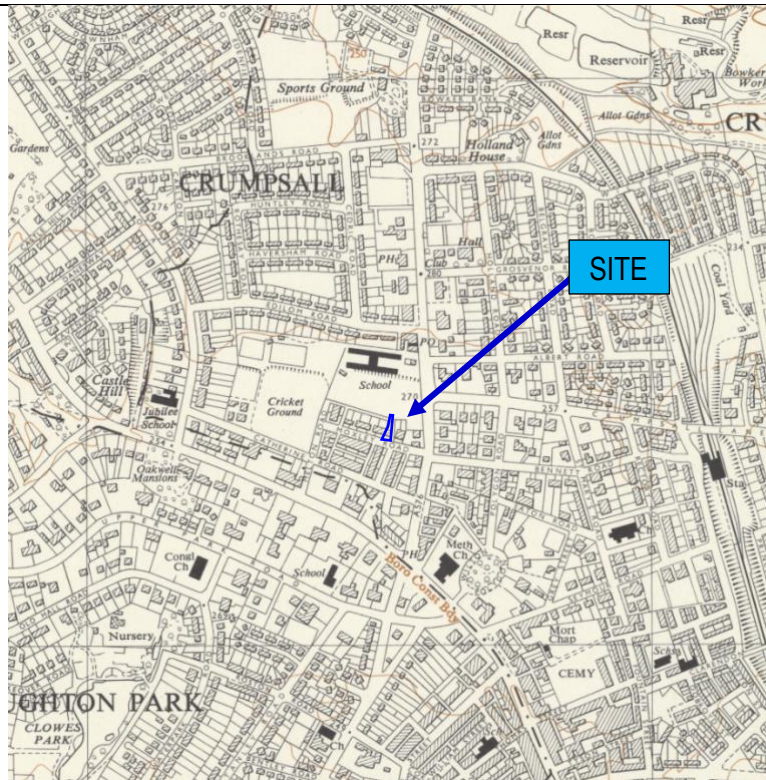


Figure 7 Aerial Photograph 2017

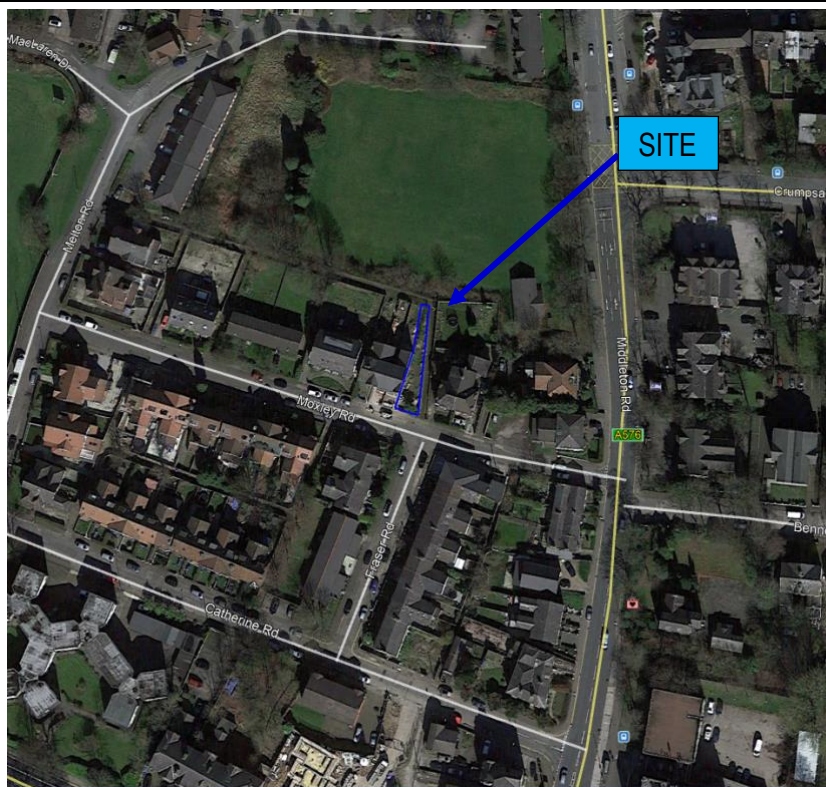
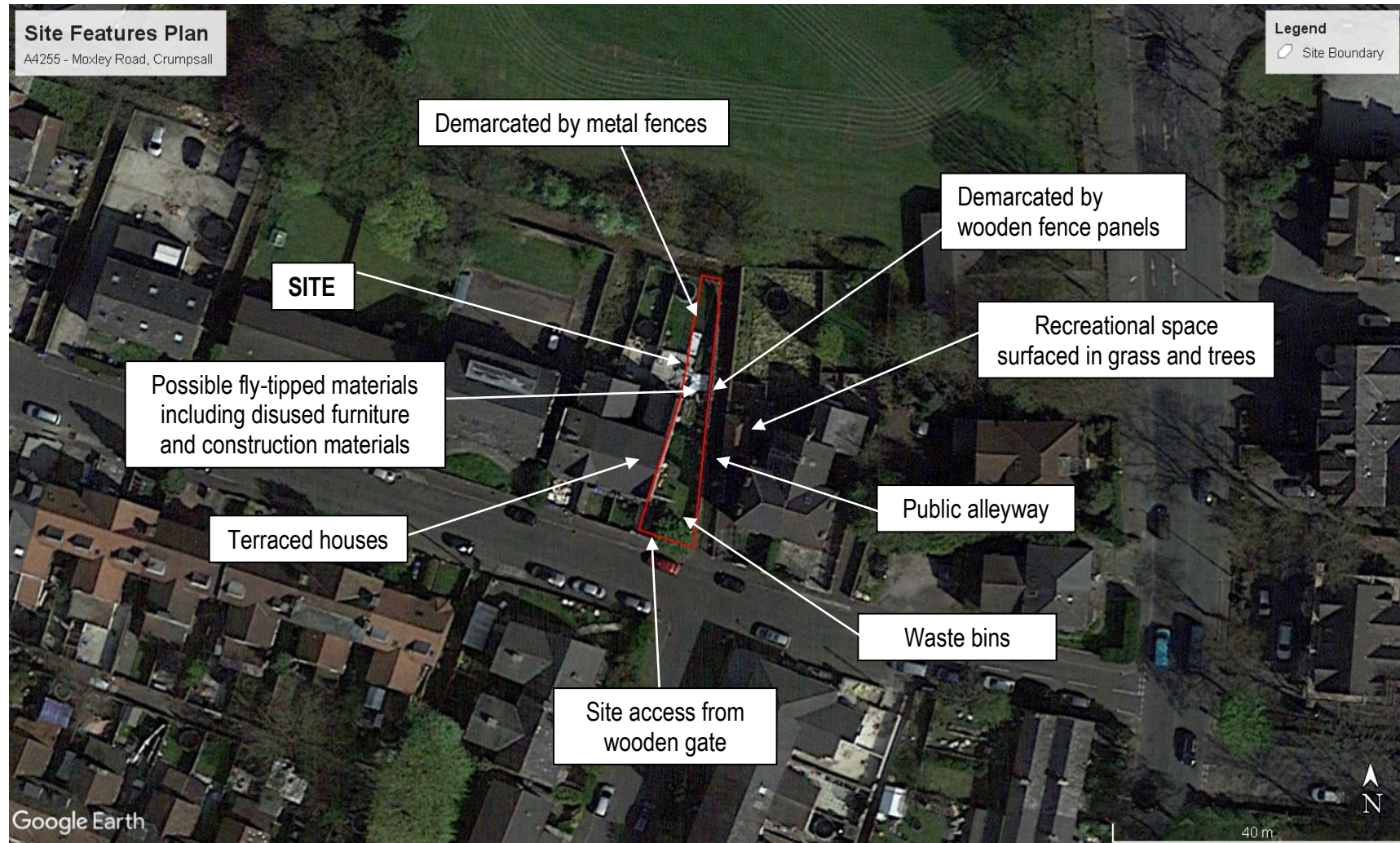


Figure 8 Site Features Plan



5.0 PRELIMINARY CONTAMINATION RISK ASSESSMENT

Introduction

- 5.1 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⁾.
- 5.2 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.
- 5.3 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.
- 5.4 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 are 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

- 5.5 The site is currently a derelict parcel of land with waste bins from the adjoining property and fly tipped materials present which may be sources of contamination. Historically the site was occupied by an end of terrace dwelling with a shed/garage in the rear garden in 1890. The shed/garage was demolished by 1922 and the building demolished by 1963-1974.b Therefore, Made Ground may be present beneath the site.
- 5.6 Potential off-site sources of contamination include a historical nursery located 2m to the south.
- 5.7 There is potential for the presence of contamination associated with the following:
- Made Ground associated with the demolished building
 - Ground gas associated with the Made Ground
 - Asbestos containing materials (ACM) from former structures and fly-tipped materials.

Potential Receptors

- 5.8 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

- 5.9 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., Ground gases, heavy metals, TPH, PAH.	Dermal contact, ingestion and inhalation of soils dust	Current Site Users	Unlikely	Moderate	Low risk	The site is currently derelict, however waste bins from the adjoining property and fly tipped materials are located on site. Made Ground is anticipated beneath the soft landscaped areas associated with the demolished building. Therefore, the risk is considered to be LOW .
		Adjacent land users	Unlikely	Moderate	Low risk	Terraced houses are located adjacent the site to the west and a public alleyway is located on the boundary to the east. Made Ground is anticipated beneath the soft landscaped areas associated with the demolished building. 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	Low Likelihood	Moderate	Moderate to Low risk	The site is a proposed residential development. The site was previously occupied by an end of terrace dwelling which has been demolished. A refuse area and fly tipped materials appear to be present on site. Therefore, there is potential for contaminated Made Ground. The risk to future site users via direct exposure is considered to be MODERATE to LOW .
		Construction Workers	Low Likelihood	Moderate	Moderate to Low risk	Construction workers may be exposed to potentially contaminated soils during construction works, however exposure duration will be short-term only. The risk to construction workers is considered MODERATE to LOW . Appropriate health and safety measures (in line with CDM and other relevant health and safety guidance) will reduce the risk to LOW .
	Downward vertical migration of leachate to shallow groundwater	Groundwater within the Underlying Aquifer	Unlikely	Low	Very low risk	The soil leaching potential and groundwater vulnerability are classified as low. There are no nearby active groundwater abstraction licences. There are no obvious sources of leachable contaminants. The risk to groundwater is therefore considered VERY LOW .
	Lateral migration in surface waters	Surface water	Unlikely	Low	Very low risk	There are no surface water features located within 250m of the site and the site is not located in a Flood Zone. There are no obvious sources of leachable contaminants. Therefore, the perceived risk to surface waters is considered to be VERY LOW .
	Vertical or lateral migration of ground gas	Current Site Users	Unlikely	Moderate	Low	The site is currently derelict, however waste bins from the adjoining property and fly tipped materials are located on site. Ground gas may be present within the

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
						Made Ground associated with the demolished building. However, given the existing land use, the risk to current site users from ground gas is considered LOW .
		Adjacent land users	Unlikely	Moderate	Low	Terraced houses are located adjacent the site to the west and a public alleyway is located on the boundary to the east. Ground gas may be present within the Made Ground associated with the demolished building. However, it is likely any ground gas will have dissipated. The risk to current site users from ground gas is therefore considered LOW .
		Future land users	Unlikely	Moderate	Low	The site is a proposed residential development. Ground gas may be present associated with the Made Ground across the site. However, any void spaces will be backfilled. Modern construction practices will provide a barrier and ventilation. Therefore, the risk is considered LOW .
		Construction Workers	Low Likelihood	Moderate	Moderate to Low risk	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	The site is currently derelict, however waste bins from the adjoining property and fly tipped materials are located on site. Asbestos may be present within the Made Ground on site associated with the demolished building. Asbestos may be present in fly tipped materials. However, asbestos is only harmful when disturbed. The risk to current site users is considered to be LOW .
		Adjacent land users	Unlikely	Moderate	Low	Terraced houses are located adjacent the site to the west and a public alleyway is located on the boundary to the east. Asbestos may be present within the Made Ground on site associated with the demolished building. Asbestos may be present in fly tipped materials. Dust control measures (dampening down) should be implemented as part of good site working practices in order to reduce the risk to LOW .
		Future land users	Low Likelihood	Moderate	Moderate to Low risk	The site is a proposed residential development. Asbestos may be present within the Made Ground on site associated with the demolished building. Asbestos may be present in fly tipped materials. Disturbance may cause fibres to become airborne. The risk is therefore considered MODERATE to LOW .

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
		Construction Workers	Low Likelihood	Moderate	Moderate to Low risk	Construction workers may be exposed to potential asbestos in the Made Ground on site associated with the demolished building. Therefore, the risk is considered MODERATE to LOW . A contamination assessment of the existing on-site soils will determine the level of risk and necessary mitigation measures.

6.0 GEOTECHNICAL HAZARDS ASSOCIATED WITH THE DEVELOPMENT

6.1 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 is suitable for its new use taking into account of ground conditions and land instability, including from natural hazards to former activities such as mining. A summary of the geotechnical considerations is provided below in Table 6.

Table 6: Summary of Geotechnical Hazards

Geohazards:	
Highly Compressible Ground	Negligible risk
Collapsible Soils	Very low risk
Swelling Clay	Negligible 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. The site is located within a Coal Mining Reporting Area but not located within a Development High Risk Area. Therefore, the mining risk is considered low.
Geotechnical Design Considerations	
Site Clearance	The site is currently derelict, however there are waste bins, constructions materials and disused furniture etc located on site which will need to be carefully removed. Access to the site is via a wooden gate on Moxley Road which is narrow and fence panels may need to be removed.
Trees	There is a tree located on the southeast corner of the site which may influence ground conditions.
Existing Buildings/Obstructions	No buildings are present on site; however, an end of terrace dwelling was demolished in the 1960s therefore Made Ground and relict concrete foundations may be present beneath the site.
Foundations	The depth and type of proposed foundations would depend on the ground conditions present on site. The site is underlain by Glaciofluvial Deposits comprising sand and gravel. 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 geotechnical investigation would be needed. However, it is recorded that the site is underlain by a Secondary A aquifer. The highest risk of groundwater flooding on site is recorded as moderate.
Earthworks	Due to the relatively even topography of the site, it is not expected that extensive earthworks will be necessary for the proposed development plan.
Slopes	No steeply dipping slopes were observed on site.
Retaining Walls	No retaining walls were observed on site.
Chemically aggressive ground conditions	Chemically aggressive ground conditions are not expected at this site. However, an intrusive geotechnical investigation would be necessary to confirm this.

7.0 CONCLUSIONS & RECOMMENDATIONS

Conclusions

- 7.1 Historically the site was occupied by an end of terrace dwelling with a shed/garage in the rear garden. However, the shed/garage was demolished by 1922 and the building demolished by 1963-1974. The site is currently derelict however waste bins and potential fly-tipped materials are present.
- 7.2 Potential on-site sources of contamination were identified to be Made Ground associated with the demolished building. Asbestos within the Made Ground, waste and fly-tipped materials present on site.
- 7.3 Potential off-site sources of contamination include a historical nursery located 2m to the south.
- 7.4 It is understood that the client intends to construct a residential development on the site comprising a three storey, end terrace dwelling house.
- 7.5 The site is underlain by superficial deposits of Glaciofluvial Deposits comprising Devensian sand and gravel (Secondary A Aquifer) and the solid geology beneath the site is shown to be the Manchester Marls Formation comprising mudstone (Secondary B Aquifer).
- 7.6 The site is located in a Coal Mining Reporting Area, however it is not within a Development High Risk Area.
- 7.7 The overall risk from soil contamination and asbestos to end users and construction workers is concluded to be **MODERATE to LOW**.
- 7.8 The risk to controlled waters is concluded to be **VERY LOW** due to the absence of leachable contaminants, low soil leaching potential and low groundwater vulnerability.
- 7.9 The overall risk from ground gas to end users and construction workers is considered to be **LOW** as only shallow Made Ground is anticipated associated with the demolished building.
- 7.10 The site is not located within a Flood Zone 2 and a Flood Zone 3. However, the risk of groundwater flooding is **MODERATE**.

Recommendations

- 7.11 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.
- 7.12 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.: A4255/21	Site: Moxley Road, Crumpsall
Plate 1 View of the site entrance from Moxley Road	Plate 2 View of the derelict site from the entrance gate on Moxley Road.
	
Date: 27th July 2021	Date: 27th July 2021
Plate 3 View showing the waste bins and possible fly tipped materials	Plate 4 View from the alleyway on the eastern site boundary. The site is demarcated by wooden fence panels
	
Date: 27th July 2021	Date: 27th July 2021

APPENDIX 3

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 2021 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.