

**EARTH ENVIRONMENTAL
& GEOTECHNICAL**

Phase 1 GeoEnvironmental Desk Study

43 Hilton Lane

Prestwich

April 2022

On behalf of

**Field Willow Real Estate
Investments B.V**

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

Tel : 01619756088

Email
headoffice@earthenvironmental.co.uk

www.earthenvironmental.co.uk



PHASE I GEOENVIRONMENTAL DESK STUDY

43 HILTON LANE

PRESTWICH

FOR

FIELD WILLOW REAL ESTATE INVESTMENTS B.V

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

www.earthenvironmental.co.uk

Tel: 0161 975 6088

Report No. A4736/22

APRIL 2022

Report Title:	43 Hilton Lane, Prestwich Phase I GeoEnvironmental Desk Study
Report Reference:	A4736/22 FDS
Client:	Field Willow Real Estate Investments B. V
Issue Date:	8th April 2022
Drafted By:	A Graham
Reviewed By:	A Czarnecki
Authorised By:	A Czarnecki

This document has been prepared for the titled project (or named part thereof) and should not be relied upon or used for any other project without an independent check being carried out as to its suitability and prior written authorisation being obtained from Earth Environmental & Geotechnical. Earth Environmental & Geotechnical accepts no responsibility or liability for the consequences of the use of this document, wholly or in part, for any other purpose than that for which it was commissioned. Any persons so using or relying upon this document for such other purpose do so at their own risk.

This report was prepared for the sole use of the Client and shall not be relied upon or transferred to any other party without the express written authorisation of Earth Environmental & Geotechnical. It may contain material subject to copyright or obtained subject to license; unauthorised copying of this report will be in breach of copyright/license.

The findings and opinions provided in this document are given in good faith and are subject to the limitations imposed by employing site assessment methods and techniques, appropriate to the time of investigation and within the limitations and constraints defined within this document. The findings and opinions are relevant to the dates when the assessment was undertaken but should not necessarily be relied upon to represent conditions at a substantially later date.

The findings and opinions conveyed in this report are based on information obtained from a variety of sources as detailed and which Earth Environmental & Geotechnical assumes to be reliable but have not been independently confirmed. Therefore, Earth Environmental & Geotechnical cannot and does not guarantee the authenticity or reliability of third-party information it has relied upon.

Where opinions expressed in this report are based on current available guidelines and legislation, no liability can be accepted by Earth Environmental & Geotechnical for the effects of any future changes to such guidelines and legislation.

The limitations of liability of Earth Environmental & Geotechnical for the contents of this document have been agreed with the Client, as set out in the terms and conditions of offer and related contract documentation.

CONTENTS

1.0	INTRODUCTION	1
	Appointment	1
	Objective	2
	Scope	2
2.0	SITE LOCATION AND DESCRIPTION	3
	Site Utility Services.....	4
3.0	ENVIRONMENTAL SETTING	5
	Ground Workings	5
	Mining and Other Underground Workings.....	5
	Radon Potential.....	5
	Geology.....	5
	Hydrogeology and Hydrology	6
	Landfill & Waste Management Activity	7
	Industrial Land Use Information	7
	Environmental Permits, Incidents and Registers.....	9
	Environmentally Sensitive Sites	9
	Ecology.....	10
	Archaeology	10
	Potential Flood Risks.....	10
	Previous Site Investigations	11
4.0	SITE HISTORY	12
5.0	WALKOVER SURVEY.....	17
6.0	PRELIMINARY CONTAMINATION RISK ASSESSMENT	19
	Introduction.....	19
	Potential Sources	20
	Potential Receptors.....	20
	Potential Pathways.....	20
7.0	GEOTECHNICAL HAZARDS ASSOCIATED WITH THE DEVELOPMENT	24
8.0	CONCLUSIONS & RECOMMENDATIONS.....	26
	Conclusions.....	26
	Recommendations	26

FIGURES

Figure 1	Proposed Development Plan
Figure 2	Site Location Plan
Figure 3	Site Photograph
Figure 4	OS Map Extract: 1848
Figure 5	OS Map Extract: 1922
Figure 6	OS Map Extract: 1932
Figure 7	OS Map Extract: 1977
Figure 8	OS Map Extract: 2003
Figure 9	Google earth Imagery 2021
Figure 10	Site Features Plan
Figure 11	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

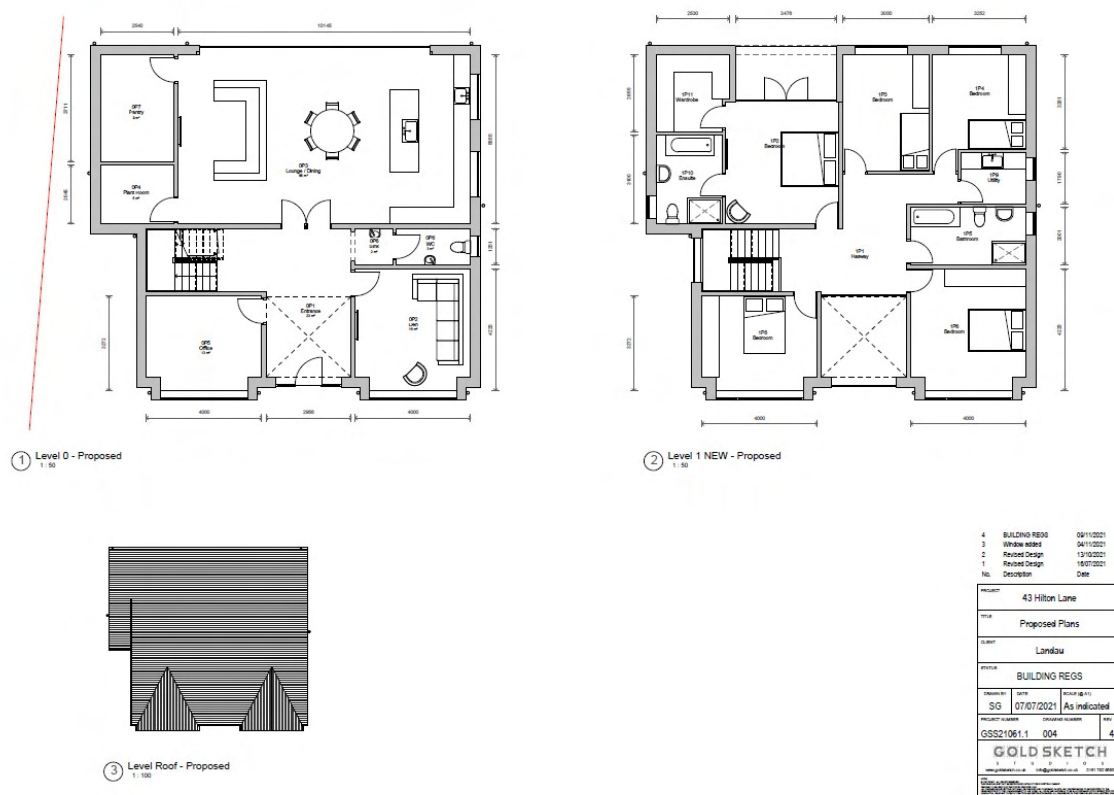
Appendix 1	GroundSure Reports
Appendix 2	Site Photographs
Appendix 3	Site Walkover Notes
Appendix 4	Report Limitations

1.0 INTRODUCTION

Appointment

- 1.1 Earth Environmental & Geotechnical Ltd has been commissioned by Gold Sketch Studios Ltd on behalf of Field Willow Real Estate Investments B.V (the Client) to undertake a Phase I GeoEnvironmental Desk Study for a proposed development on the site occupied by 43 Hilton Lane, Prestwich to support a planning application to Bury Metropolitan Borough Council.
- 1.2 It is understood that the client wishes to demolish the current property in order to construct a new detached five-bedroom property.
- 1.3 Vehicle access will be gained from Hilton Lane, north of the property.
- 1.4 A proposed development plan for the site is shown in Figure 1 below.

Figure 1 Proposed Development Plan



Objective

- 1.5 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

- 1.6 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.
 - Bury Metropolitan Borough Council Planning Portal.

2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is in Prestwich on a residential road; Hilton Lane. The National Grid Reference for the centre of the site is SK 38610 74112 (X:438610, Y: 374112), with the closest postcode being M25 9SA.
- 2.2 The site is a near rectangular shaped parcel of land to the south of Hilton Lane, with Prestwich Golf Club located to the south. Access to the site is from a sloped driveway off Hilton Lane. The site is currently occupied by a detached dwelling, garage and associated gardens. The surrounding land use is of a similar suburban nature.
- 2.3 The site is currently occupied by a residential property along with associated garage, concrete car parking area and a grass garden.
- 2.4 The maximum dimensions of the proposed site are 36m northwest to southeast and 18m northeast to southwest. The site occupies an area of approximately 0.06 hectares.
- 2.5 A current and proposed 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).

Ground Workings

- 3.3 There are 8 records of historical surface ground workings identified within 250m of the site boundary. The closest of these records refers to a pond located 208m west of the site dated 1851.
- 3.4 According to the BGS, there are 2 records of a British Pit within 500m of the site. The closest record refers to Carr Hill Sand Pit located 311m north, which has ceased operations.

Mining and Other Underground Workings

- 3.5 Reference to the Coal Authority Interactive viewer shows the site is located within an identified Coal Mining Reporting Area but is not deemed to be in a Development High Risk Area.
- 3.6 There is no record of natural cavities within 500m of the site. This record refers to piping in non-cohesive superficial deposits located 459m east of the site.
- 3.7 There are no records for non-coal mining areas identified within 1km of the site.
- 3.8 There are no records of non-coal mining cavities, which may result in subsidence, located within 1km of the site.
- 3.9 There are no records for historical underground working features, identified from Ordnance Survey Mapping, within 1km of the site.
- 3.10 There are no areas of brine extraction, gypsum extraction, tin mining or clay mining on the site.

Radon Potential

- 3.11 The site is located in a Radon Affected Area, however only between 1% and 3% of the properties on site are estimated to be above the Action Level. This percentage is low enough that radon protection measures are not required.

Geology

- 3.12 The BGS states that the site is not underlain by artificial made ground deposits. The closest records of artificial ground is an area of made and infilled ground 246m north of the site.
- 3.13 The site is shown to be underlain by superficial deposits of Hummocky Glacial Deposits consisting of sand and gravel.

- 3.14 The solid geology beneath most of the site is mapped as the Pennine Upper Coal Measures Formation, consisting of mudstone, siltstone and sandstone. The bedrock geology found in the southwest corner of the site is identified as the Chester Pebble Beds Formation consisting of sandstone.
- 3.15 There are 2 records of linear features within 500m of the site boundary. These both refer to inferred normal faults, with one located on site and the other located 390m northeast.
- 3.16 There are no records of landslips within 500m of the site.
- 3.17 There are no BGS borehole records identified within 250m of the site.
- 3.18 The site is in an area where the hazard rating is very low with regard to running sands, landslides and collapsible deposits.
- 3.19 The site is in an area where the hazard rating is negligible to low regarding shrink swell clays, dissolution of soluble rocks and compressible deposits.

Hydrogeology and Hydrology

- 3.20 The superficial Glacial Deposits on site are classified by the Environment Agency (EA) as a Secondary A Aquifer. The sand and gravel has an intergranular flow type and low to very high to 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.'*

- 3.21 The Pennine Upper Coal Measures Formation is classified by the Environment Agency (EA) as a Principal Aquifer. The mudstone and siltstone have a low to moderate permeability and a fracture flow type. The Chester Pebble Beds Formation is also described as a Principal Aquifer with mixed flow type and moderate to high permeability.

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

- 3.22 The groundwater vulnerability of the site has been classified as a medium vulnerability for superficial deposits and low for bedrock. The soil leaching potential is high. The BGS states:

High Vulnerability- *'Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.'*

- 3.23 There are 12 groundwater abstraction licence records within 2km of the site. The closest active licence, issued in 1995, is held by Prestwich Golf Club for spray irrigation, located 486m south of the site.
- 3.24 There are no surface water abstraction licence records within 2km of the site.

- 3.25 There are no potable water abstraction licence record within 2km of the site.
- 3.26 The site is not located within a Source Protection Zone or Source Protection Zone of a confined aquifer.
- 3.27 There are 2 water network entries within 250m of the site. The closest records refer to an inland river located 80m southwest of the site.
- 3.28 There is 1 surface water feature identified within 250m of the site which refers to rivers streams and lakes and can be seen on the hydrology map in Appendix 1.
- 3.29 There is 1 record of a Water Framework Directive (WDF) surface water body. This refers to the River Irwell (Croal to Irk). The River had a fail chemical rating and a moderate ecological rating in 2019.
- 3.30 There are 2 records of a Water Framework Directive (WDF) groundwater body located on-site. The records refer to the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers and the Northern Manchester Carboniferous Aquifers.

Landfill & Waste Management Activity

- 3.31 There are no records for current Environment Agency/Natural Resource Wales landfill records within 500m of the site.
- 3.32 There are no records of a BGS/DoE non-operational landfill sites within 500m of the site.
- 3.33 There are no records of a historical landfill from the Local Authority and Historical Mapping records within 500m of the site.
- 3.34 There are 3 records of an historic Environment Agency/Natural Resource Wales landfill within 500m of the site. The closest record refers to a site off Heathlands Drive 396m south of the site for unknown waste.
- 3.35 There are no records of historical waste sites from the Local Authority and Historical Mapping records within 500m of the site.
- 3.36 There are no records of current Environment Agency/Natural Resources Wales licensed waste sites within 500m of the site.
- 3.37 There are 3 records of a waste treatment, transfer or disposal site which are exempt from needing a permit within 500m of the site. The closest record is a using waste exemption for the use of waste in construction and is located 455m southeast of the site.

Industrial Land Use Information

- 3.38 There are 45 records of potentially contaminative historical land uses identified within 500m of the site. The closest record refers to unspecified ground workings 225m north of the site.
- 3.39 There are 4 records of current potentially contaminative land uses identified within 250m of the site. The closest record is for a Gas Governor Station located 129m east of the site.

- 3.40 There are 32 records of historical tanks identified within 500m of the site. The closest record refers to an unspecified tank, mapped in 1893, located 140m west of the site.
- 3.41 There are 8 records of historical energy features identified within 500m of the site. All records refer to electricity substations, with the closest record located 213m north dated 1963-1988.
- 3.42 There are 3 records of historical garages within 500m of the site. The closest record of a garage is located 476m to the east, first mapped in 1970.
- 3.43 There are no records of a current petrol or fuel sites within 500m of the site.
- 3.44 There are no records of a historical petrol or fuel sites within 500m of the site.
- 3.45 There are no National Grid high voltage underground electricity transmission cables within 500m of the site.
- 3.46 There are no National Grid high-pressure gas transmission pipelines within 500m of the site.
- 3.47 There are no historical railway and tunnel features identified within 250m of the site.
- 3.48 There are no historical railway lines identified within 250m of the site.
- 3.49 There are no current active railway line records identified within 250m of the site.
- 3.50 There are no underground railway line or tunnels identified within 250m of the site.
- 3.51 The site is not within 500m of the route of the High Speed 2 rail project.
- 3.52 The site is not within 500m of the route of the Crossrail 1 or Crossrail 2 rail project.

Environmental Permits, Incidents and Registers

- 3.53 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
Sites Determined as Contaminated Land under Part 2A EPA 1990	0
Dangerous or Hazardous (COMAH and NIHHS) Sites	0
Regulated Explosive Sites	0
Planning Hazardous Substance Consents and Enforcements	0
Historical Licensed Industrial Activities (IPC)	0
Part A (1) and IPPC Authorised Activities	0
Part A (2) and Part B Activities and Enforcements	0
Licensed Discharge Consents	11
Pollutant Release to Surface Waters (Red List)	0
List 1 Dangerous Substances Inventory Sites	0
List 2 Dangerous Substances Inventory Sites	0
Substantiated Pollution Incidents (Category 1 and 2)	0
Pollutant Release to Public Sewer	0
Pollution Inventory Substances, Wastes and Radioactive Wastes	0
Category 3 or 4 Radioactive Substance Authorisations	0

- 3.54 There are 11 records of licenced discharges to controlled waters located within 500m of the site. The closest record refers to Prestwich Golf Course and refers to sewage discharges to Singleton Brook. This licence was revoked in 2018.
- 3.55 There are no other records of Environmental Permits, Incident or Registers within 500m of the site.

Environmentally Sensitive Sites

- 3.56 There are no records of Sites of Special Scientific Interest (SSSI) within 2km of the site.
- 3.57 There are no Conserved Wetland sites (Ramsar sites) or Special Areas of Conservation (SAC) within 2 km of the site.
- 3.58 There are no Special Protection Area of Conservation (SPA) within 200m of the site.
- 3.59 There are no National Nature Reserves (NNR) or Forest Parks within 2km of the site.
- 3.60 There are 5 Local Nature Reserves (LNR) located within 2km of the site. The closest record refers to Kersal Moor located 495m south.

- 3.61 There are 3 records of designated Ancient Woodland located within 2km of the site. The closest record refers to Prestwich Clough Wood located 799m north.
- 3.62 There are 4 areas of greenbelt identified within 2km of the site. All refer to the Merseyside and Greater Manchester Greenbelt, and the closest record is located 611m southwest.
- 3.63 There are 2 Nitrate Vulnerable Zones located within 200m of the site. The closest record is on site and refers to the Irwell/ Manchester Ship Canal.

Ecology

- 3.64 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.
- 3.65 The site is within an area classified as Urban Land.

Archaeology

- 3.66 An archaeological assessment falls outside the brief of this report. Where considered necessary, advice should be sought from an archaeological specialist in this respect.
- 3.67 There is 1 record of a listed building within 250m of the site. This refers to Rookwood 141m northeast and is a Grade II listed building.
- 3.68 There are no conservation areas recorded within 250m of the site.
- 3.69 There are no records of Ancient Monuments or Registered Parks and Gardens within 250m of the site
- 3.70 There are no records of World Heritage Sites within 250m of the site.

Potential Flood Risks

- 3.71 Detailed assessment of flood risks is outside the scope of this report. The site does not lie within 50m of both an Environment Agency Zone 2 and 3 floodplain.
- 3.72 There are no records of a flood risk from rivers and sea (RoFRaS) within 50m of the site.
- 3.73 There are no records of historical flood events recorded within 250m of the site.
- 3.74 There are no records of flood defences located within 250m of the site.
- 3.75 There are no records of areas benefiting from flood defences located within 250m of the site.
- 3.76 There are no records of an area used for flood storage within 250m of the site.
- 3.77 The highest risk of surface water flooding occurring on-site (because of extreme rainfall) in a 1-to-30-year return period according to data from the Ambient Risk Analytics surface water FloodMap is negligible.

- 3.78 The highest risk of groundwater flooding occurring on-site, based on the Ambient Risk Analytics 1 in 100-year 5m Digital Terrain Model is moderate.

Previous Site Investigations

- 3.79 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	Site is unoccupied agricultural land. Hilton Lane exists as today to the north of the site.	Bury New Road identified 500m to the east Sporadic cottages and lodges along roads in local area Hilton Lane bleach works located 400m southwest Myrtle Grove dye works located 500m southeast
1891-1894 1: 10,560 1893 1:2,500	No significant change	Prestwich Hills reservoirs located 300m northwest Other reservoirs located 500m southeast Few other sporadic dwellings constructed in local area
1922 1:2,500	No significant change	Other dwellings constructed along Hilton Lane Sand Pit 250m north Area to the south and southeast labelled as golf course
1931-1932 1:10,560 1932 1:2,500	Current house built on site	Increased residential development along Hilton Lane and other local roads. Housing appears to generally be detached or semi detached Tanks identified 270m north of site
1956 1:10,560 1952 1:1,250	Small possible garage building identified east of current house building	Tanks 270m north labelled as disused Extensive residential expansion into local area, particularly north, east and west.
1977 1:10,560 1976	No significant change	Manchester Jewish Home for the Aged located 300m south Continued residential development

Date	On-Site History	Surrounding Land Use History
1:1,250		Residential dwelling constructed just east of eastern site boundary
1988-1992 1:1,250 1985 1:10,000	Garage structure located next to road	Mountheath Industrial Park located on site of Myrtle Grove dye works 500m southeast
2003 1:1,250 2001 1:10,000	No significant change	No significant change
2022 1:10,000	No significant change	No significant change
2021 Google Earth Imagery	No significant change- satellite imagery matches structures shown on historical maps.	No significant change

Figure 4 OS Map Extract 1848

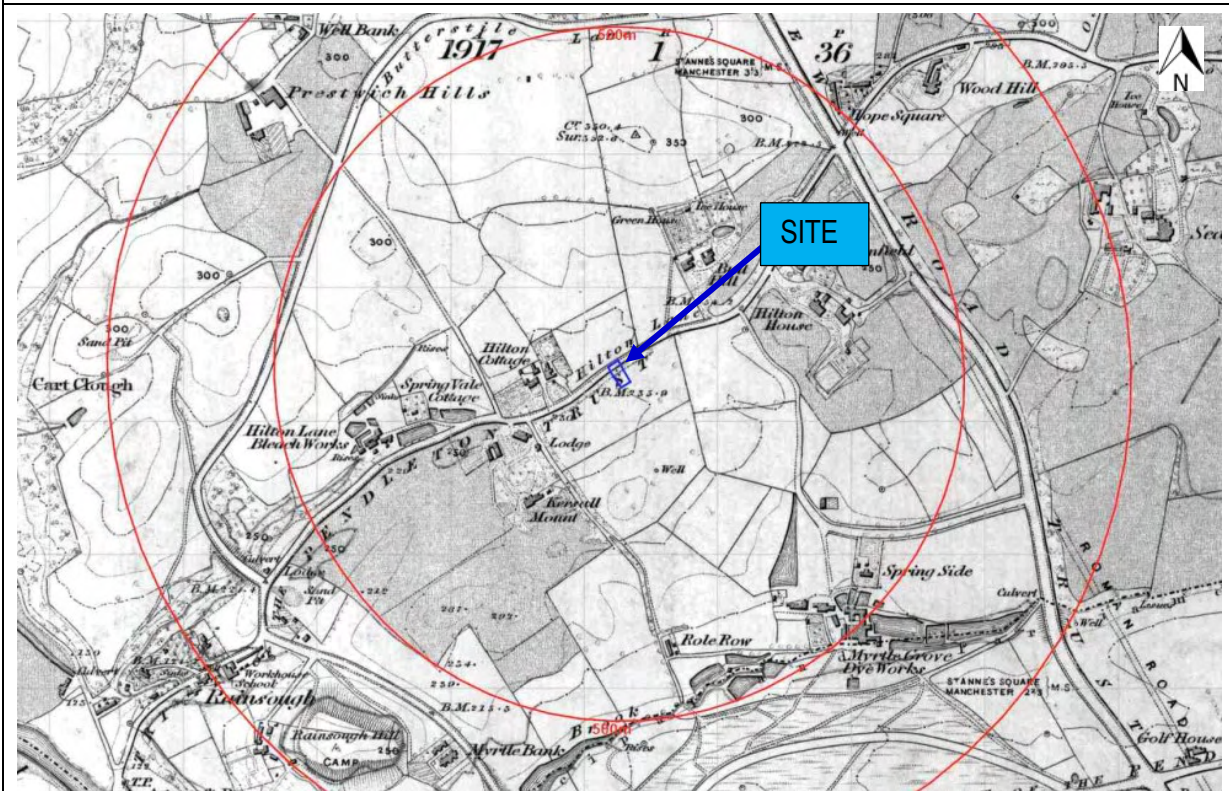


Figure 5 OS Map Extract 1922

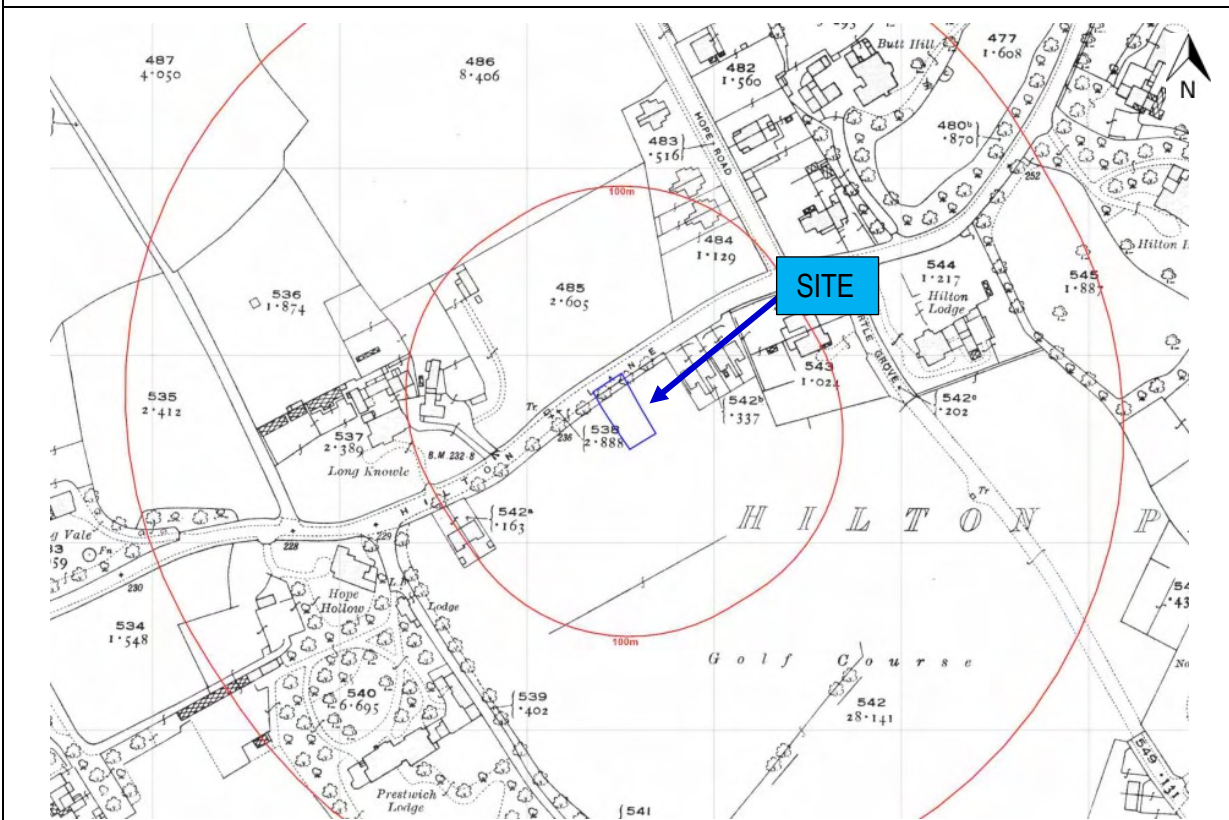


Figure 6 OS Map Extract 1932

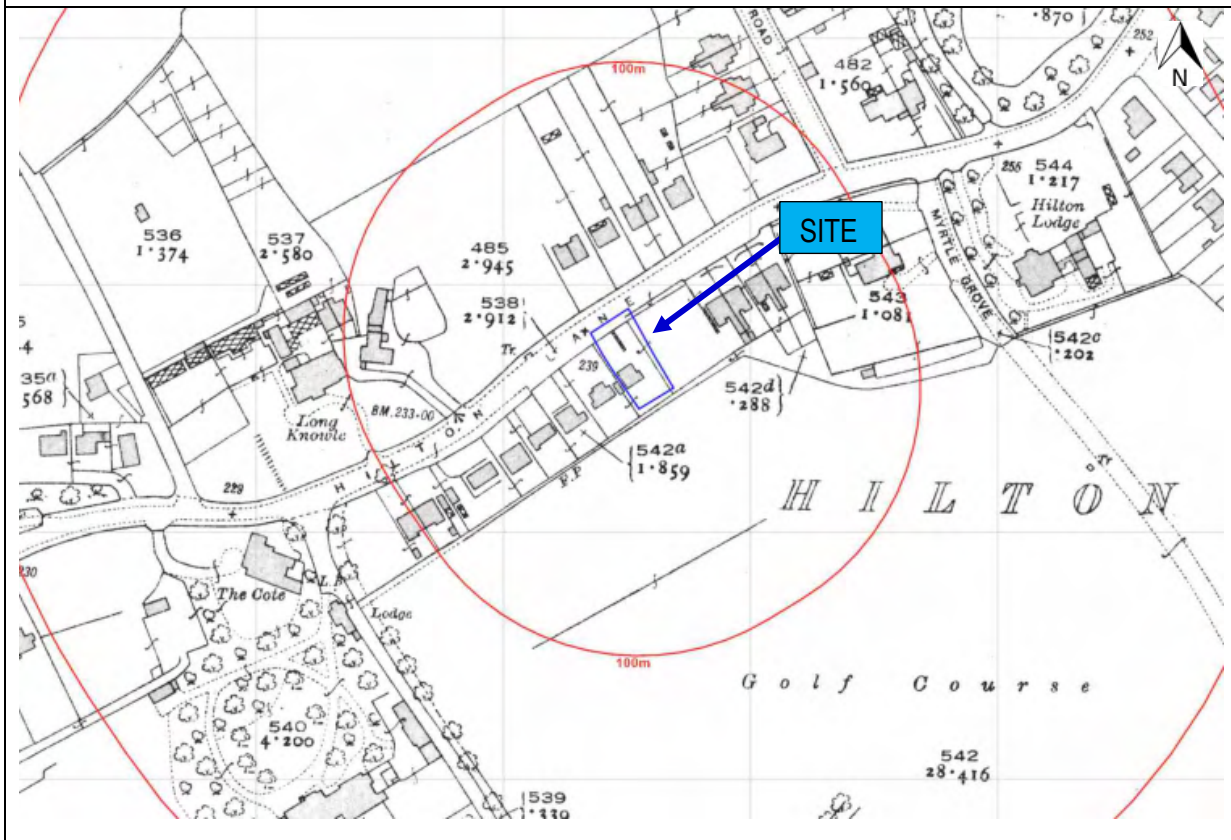


Figure 7 OS Map Extract 1977

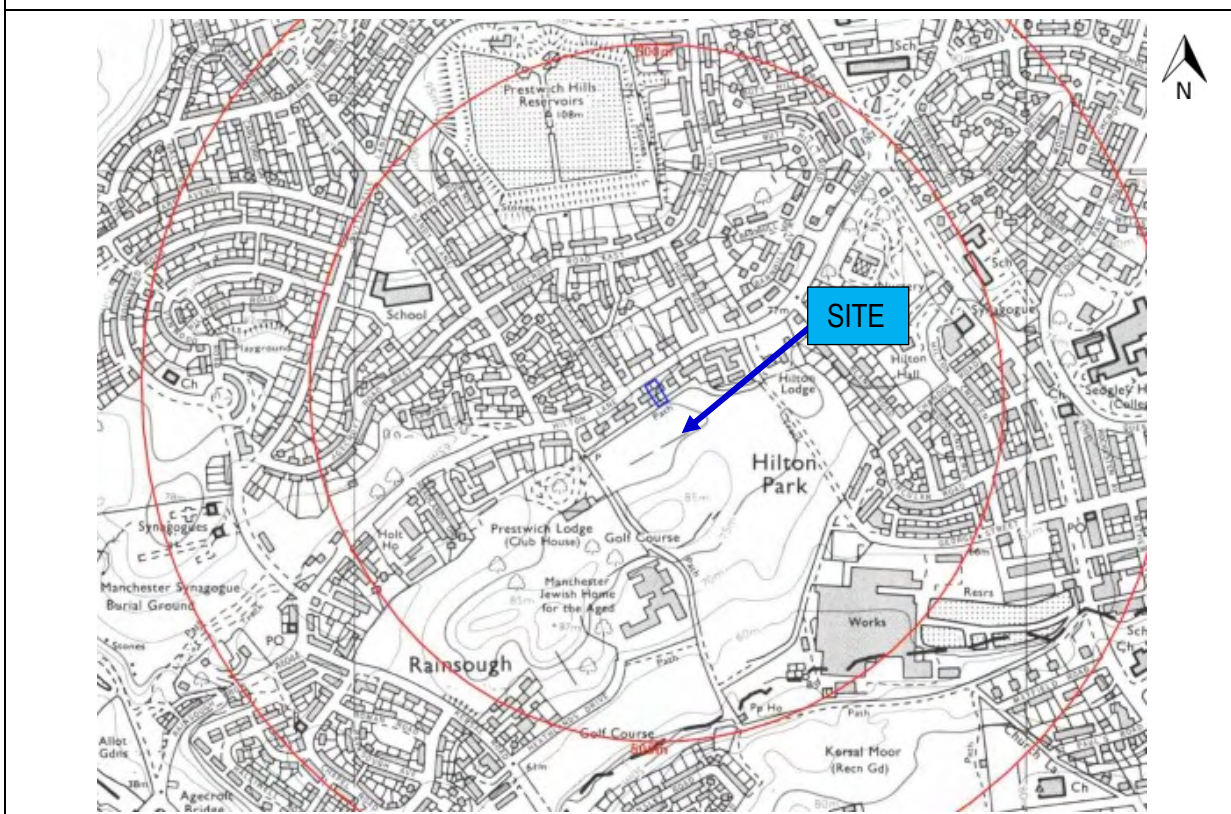


Figure 8 OS Map Extract 2003

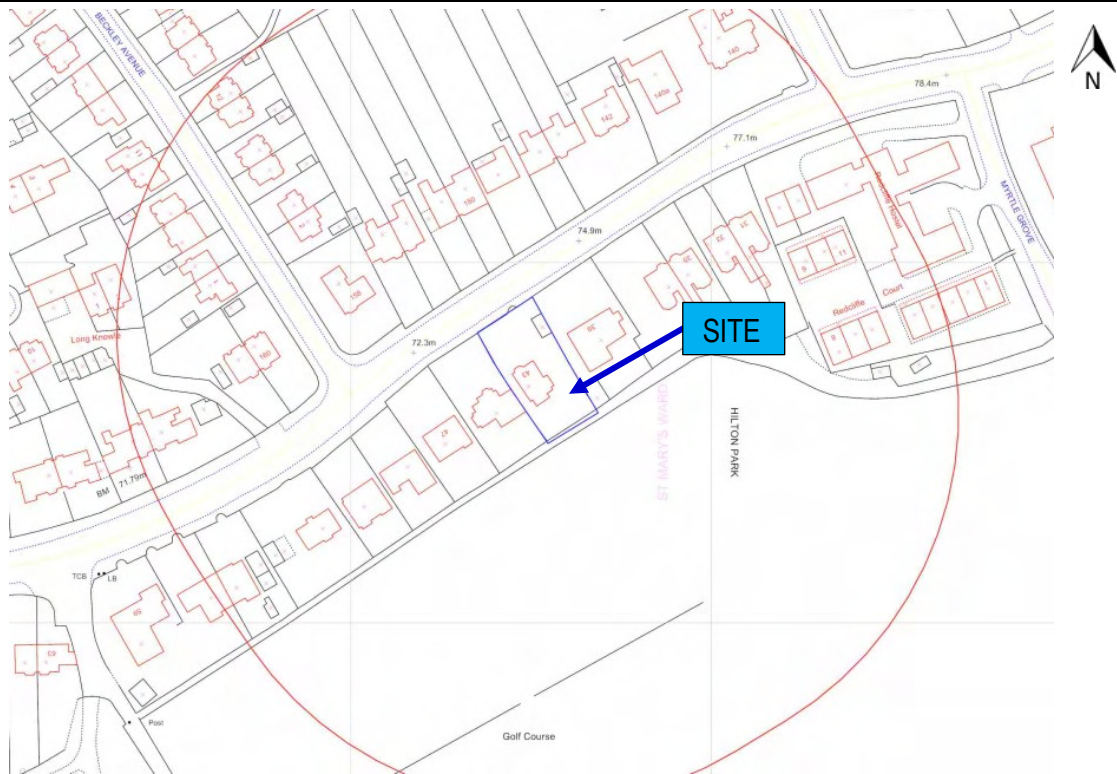


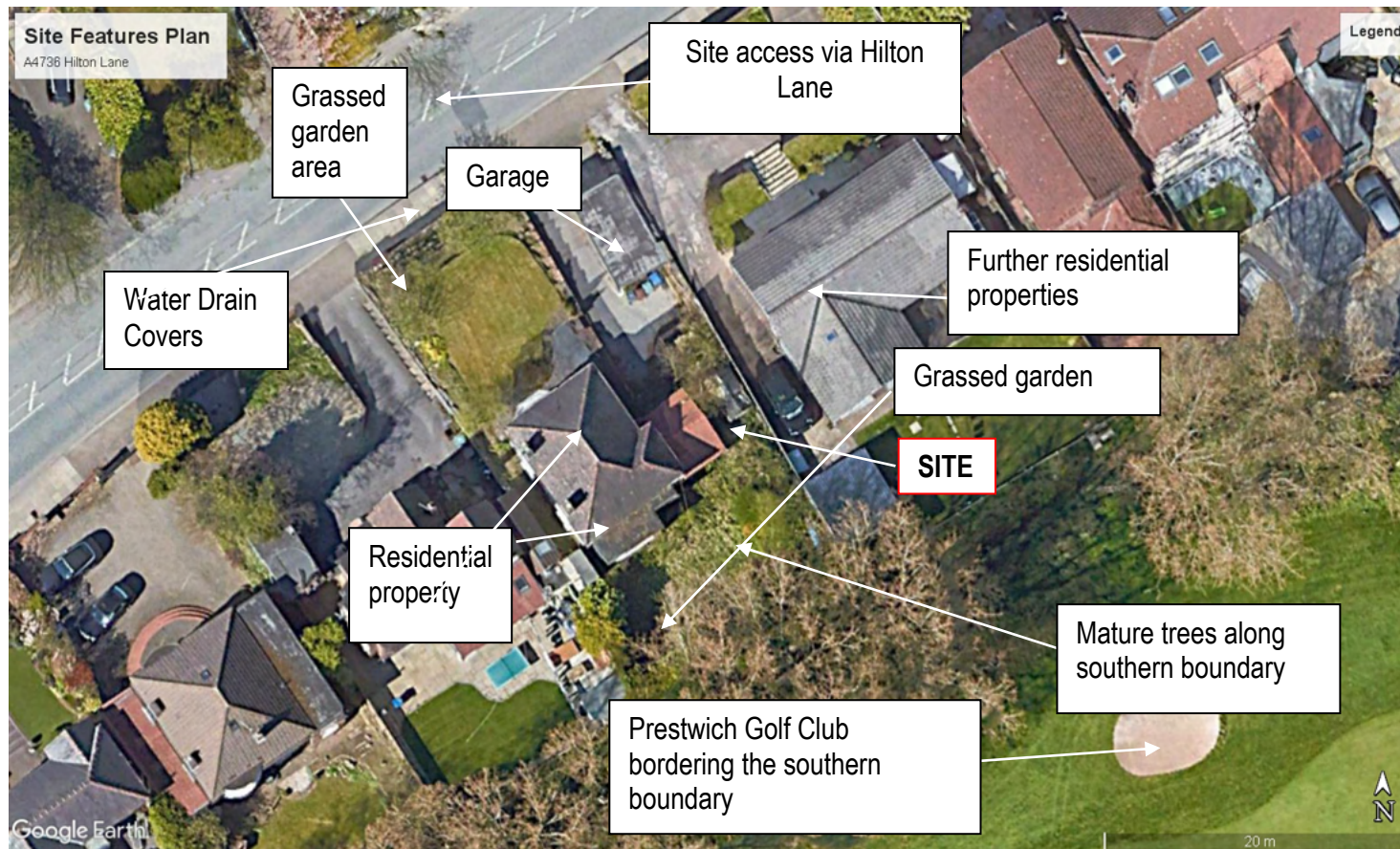
Figure 9 Google Earth Imagery 2021



5.0 WALKOVER SURVEY

- 5.1 A walkover survey was completed on the 6th April 2022. The photographs and notes from this survey are appended to this report as Appendix 2 and Appendix 3 respectively.
- 5.2 The site access is via Hilton Lane, a major road, located north of the site.
- 5.3 The site consists of a generally rectangular compound comprising a residential property along with associated garden, garage and driveway. Grassed areas are present along the front and back of the properties.
- 5.4 The site is completely covered by concrete hardstanding, pathed concrete slabs and grassed areas.
- 5.5 Various mature trees are present onsite, including trees located along the southern boundary bordering Prestwich Golf Club.
- 5.6 The site is relatively flat across the majority of the area, however a steep dipping slope towards the north is present on the driveway along with a raised area along the eastern site boundary.
- 5.7 There were no obvious signs of contamination, however made ground and small piles of waste material were present on the site walkover.
- 5.8 The surrounding area is comprised of a residential property with Prestwich Golf Club located adjacent to the southern site boundary.
- 5.9 A site features plan is presented as Figure 10 overleaf.

Figure 10 Site Features Plan



6.0 PRELIMINARY CONTAMINATION RISK ASSESSMENT

Introduction

- 6.1 The following paragraphs outline a Preliminary Risk Assessment (PRA) for the site based on the above desk study information as defined by DEFRA and the EA Model Procedures for the Management of Land Contamination, CLR11⁽²⁰⁰⁴⁾.
- 6.2 Table 5 provides a Preliminary Conceptual Model (PCM) which considers the source-pathway-receptor linkages present alongside the likelihood, severity and risk level as defined within Table 3 and Table 4 below. The assessment of probability, a modified risk table, and certain consequence definitions are based on CIRIA C552 and CLR11.
- 6.3 Table 5 considers whether a pollution linkage is potentially present and provides a preliminary qualitative assessment of risk based on the information currently available. Where a possible linkage is identified, it does not necessarily mean that a significant risk exists but indicates that further information is required through appropriate site investigation to substantiate the conceptual model.
- 6.4 The PCM/PRA is based on a 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 Residential occupation within the site boundary can be dated back to the 1930s, however the occupation and use of the land immediately surrounding the site dates back to at least the 1840s. The current use of the site as a residential dwelling means that the potential for contamination to be found on site is low.

Potential Receptors

- 6.6 The following receptors have been considered for the construction and operational stages of the proposed redevelopment.
- Current site users;
 - Adjacent land users;
 - Future land users;
 - Construction workers during site development works;
 - Surface water and Groundwater within the underlying aquifer

Potential Pathways

- 6.7 The following pathways have been considered for the construction and operational stages of the proposed redevelopment.
- Dermal contact, ingestion, inhalation pathways of potentially contaminated soils.
 - Downward vertical migration of leachate to surface waters and shallow groundwater.
 - Vertical or lateral migration of ground gas.

Table 5: Preliminary Conceptual Model

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
Potential soil contamination E.g., Heavy Metals, PAH, TPH, BTEX, PCBs and ground gases.	Dermal contact, ingestion and inhalation of soils dust	Current Site Users	Unlikely	Moderate	Low	The site is currently a residential dwelling with associated garage and driveway. The risk is therefore considered to be LOW .
		Adjacent land users	Unlikely	Moderate	Low	The site is surrounded by other residential properties including Prestwich Golf Club to the south. There were no obvious signs of contamination on the walkover. Much of the site is surrounded by palisade fences with trees to the south. The risk is considered LOW .
		Future land users	Unlikely	Moderate	Low	The proposed development consists of constructing a new detached dwelling on the site of the current one. No obvious sign of contamination was noted on the walkover. Some pollution may remain in any soils retained, but exposure is unlikely. The risk is therefore considered to be LOW .
		Construction Workers	Low Likelihood	Moderate	Moderate to Low	Construction workers may be exposed to potentially contaminated soils during construction works, however exposure duration will be short-term only. The risk to construction workers is considered MODERATE to LOW . Appropriate health and safety measures (in line with CDM and other relevant health and safety guidance) will reduce the risk to LOW .
	Downward vertical migration of leachate to shallow groundwater	Groundwater within the Underlying Aquifer	Unlikely	Moderate	Low	The superficial soils are mapped as Alluvium. The site is flat and well drained in an urban area where storm water is managed. The risk to groundwater is therefore considered LOW .
	Lateral migration in surface waters	Surface water	Low Likelihood	Moderate	Low	The site lies on a significant slope to the north and well drained in an urban industrial area where storm water is managed. Therefore, the perceived risk to surface waters is LOW .

	Vertical or lateral migration of ground gas	Current Site Users	Low Likelihood	Moderate	Low	The site is in a Coal Mining Reporting Area as defined by the Coal Authority, so mine gas may be present. The radon risk is defined as between 1-3% of properties are above the Radon Action Level. This risk to current site users is therefore LOW .
		Adjacent land users	Unlikely	Moderate	Low	Sources of potential ground gas were not observed on site and research indicates it is unlikely. Ground gas may be present within the Made Ground onsite, however this is unlikely. The risk to adjacent site users from ground gas is therefore considered LOW .
		Future land users	Unlikely	Moderate	Low	Sources of potential ground gas were identified as Made Ground on site, however it is not anticipated to be an issue. There is low potential for radon gas and no radon protection measures should be implemented, therefore the risk is considered LOW .
		Construction Workers	Unlikely	Moderate	Low	Construction workers are unlikely to be exposed to ground gas or depleted oxygen conditions when working in confined spaces, however this will only be short term. The risk to construction workers from ground gas is considered LOW .
Asbestos Containing Material (ACM)		Current Site Users	Unlikely	Moderate	Low	Asbestos was not observed on site and made ground is unlikely to be present on site. Asbestos is only harmful when disturbed. The risk to current site users is considered to be LOW .
		Adjacent land users	Unlikely	Moderate	Low	Other residential properties are located immediately next to the site. Asbestos is only harmful when disturbed. Dust control measures (dampening down) should be implemented as part of good site working practices. Therefore, the risk is considered LOW .
		Future land users	Low Likelihood	Moderate	Moderate to Low	The proposed development consists of constructing a new, larger residential property. However, disturbance during construction, particularly in the hard standing, may cause fibres to become airborne. The risk is therefore considered MODERATE to LOW . A pre-demolition asbestos survey and soil contamination assessment will reduce the risk to LOW .
		Construction Workers	Low Likelihood	Moderate	Moderate to Low	Construction workers may be exposed to potential asbestos during the ground works for the new construction and site clearance. The duration will be short term. The risk is considered MODERATE to LOW . Appropriate health and safety measures (in line with CDM and other relevant health and safety guidance) would reduce the risk. A pre-demolition asbestos

						survey and soil contamination assessment will reduce the risk 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 is suitable for its new use considering of ground conditions and land instability, including from natural hazards to former activities such as mining. A summary of the geotechnical considerations is provided below in Table 6.

Table 6: Summary of Geotechnical Hazards

Geohazards:	
Highly Compressible Ground	Negligible risk.
Collapsible Soils	Very low risk.
Swelling Clay	Negligible risk.
Running Sand	Very low risk.
Ground Dissolution	Negligible risk.
Landslip	Very low risk.
Mining & Quarrying	The site is identified as being in a Coal Mining Reporting Area but not a Development High Risk Area by the Coal Authority.
Geotechnical Design Considerations	
Site Clearance	The proposed development calls for the demolition of any current structures on the site. there are also retaining walls present in the front garden which may need to be moved or altered to accommodate the proposed development.
Trees	There are trees located within the site, predominantly along the southern and eastern site boundaries.
Existing Buildings/Obstructions	There is a detached house which needs to be demolished and a garage structure.
Foundations	The depth and type of proposed foundations would depend on the ground conditions present on site. BGS maps suggest that made ground is unlikely to be found on site and that the superficial deposits consist of Glacial Deposits, however there are no available local borehole logs to suggest a depth. An intrusive geotechnical investigation is recommended prior to any construction works to explore the on-site ground conditions.
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.

Geotechnical Design Considerations	
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 bedrock deposits on site are expected to be the Pennine Upper Coal Measures Formation. The site slopes northwest and will utilise the current stormwater / sewer system. The highest risk of groundwater flooding occurring on-site, based on the Ambient Risk Analytics 1 in 100-year 5m Digital Terrain Model is MODERATE .
Earthworks	Extensive earthworks are not necessary.
Slopes	The site slopes northwest in the direction of Hilton Lane
Retaining Walls	There retaining walls located in the front garden and along the current driveway
Chemically aggressive ground conditions	Chemically aggressive ground conditions are not expected at this site. However, an intrusive geotechnical investigation would be necessary to confirm this.

8.0 CONCLUSIONS & RECOMMENDATIONS

Conclusions

- 8.1 Historically the site was unoccupied agricultural land until 1931 where the current property was constructed. Throughout the 1980s a small garage was also constructed on the site.
- 8.2 It is understood that the client wishes to construct demolish the existing property and construct a new residential development.
- 8.3 There is an absence of potential source of contamination on the site and in the local area.
- 8.4 The solid geology on site comprises of the Pennine Upper Coal Measures Formation and the Chester Pebble Beds Formation (Principal Aquifers). Superficial deposits are mapped as Devensian hummocky glacial deposits consisting of sand and gravel.
- 8.5 The site is located in a Radon Affected Area, as 1-3% of the properties are above the Action Level. However Radon Protection Measures are not required.
- 8.6 Given the historical land use both on and off the site, the overall risk from soil contamination to end users and construction workers is concluded to be **LOW**.
- 8.7 The risk to controlled waters is concluded to be **MODERATE to LOW** based on the current drainage of the site.
- 8.8 Given the historical land uses, the risk from ground gas to end users and construction workers is considered to be **LOW**.
- 8.9 The site is located within both a flood zone 2 and 3, and the area including the site has experienced floods as recently as 2007. The risk of groundwater flooding is considered **MODERATE** based on the Ambient Risk Analytics 1 in 100 year 5m Digital Terrain Model however this is considered to be less given that the majority of the site is to be covered in hardstanding and there is adequate drainage in place.

Recommendations

- 8.10 The site is considered within a low-risk environmental setting. As a result, no further recommendations are considered necessary.

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.: A4736/22	Site: 43 Hilton Lane, Prestwich
Plate 1 Viewing east showing site access via Hilton Lane, running parallel to the site.	Plate 2 Viewing south showing general overview of the site. Note the steep dipping slope away from the property.
	
Date: 6th April 2022	Date: 6th April 2022
Plate 3 Viewing southwest showing view of the garden area along with pathed concrete slab area.	Plate 4 Viewing north showing raised area of redbrick along with wooden shed situated on the site.
	
Date: 6th April 2022	Date: 6th April 2022

Earth Environmental & Geotechnical Ltd Tel: 0161 975 6088 Email: info@earthenvironmental.co.uk Web: www.earthenvironmental.co.uk	SITE PHOTOGRAPHS 
Job No.: A4736/22	Site: 43 Hilton Lane, Prestwich
Plate 5 Viewing east showing small areas of litter and waste material present on the site.	Plate 6 Viewing south showing southern site boundary of a wooden fence.
	
Date: 6th April 2022	Date: 6th April 2022
Plate 7 Viewing south showing the western boundary along with surrounding residential properties.	Plate 8 viewing south showing small brick garage located on site along with the sloped car parking area.
	
Date: 6th April 2022	Date: 6th April 2022

Figure 11 Site Walkover Photo Locations



APPENDIX 3

SITE WALKOVER NOTES

WALK OVER SURVEY REPORT

Site: 43 Hilton Lane, Prestwich

Date: 6th April 2022

Job No: A4736/21

Undertaken By: Bethany Garratty

Purpose of Site Walkover:

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

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Site Setting	Description required for: Town/Country/Suburb Setting Industrial/Residential/Retail Usage Current Site use (if undertaking security and access to the site)		Suburban setting on major road. Surrounding areas are predominantly residential. The site is currently occupied by a residential property with associated garden, garage and parking area.
Evidence of Past Activities	Are there: Any relevant street names in area? Features or relics which indicate past history?	Yes/ No Yes /No	The site is located to the south of Hilton Lane.
Geographic Setting	Description required for: Low lying flood plain/dry valley/rolling hills etc.		The site is located within rolling hills.
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	Slope erosion is observed as a result of onsite construction.

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Topography	Description required for: Are there apparent differences between site and surrounding area? (If yes describe the presence of retaining walls, and slopes). Is there evidence of Made Ground / Fill on site?	Yes/No Yes/No	The site slopes down steeply towards the north along the driveway and grass area. The garden located towards the south of the property lies flat. Concrete, concrete slabs and brick work is present across the site.
Site Boundaries and Neighbours	Description required for: Type of boundary demarcation (if any) on each side of site, usage of adjacent land and name of industrial/commercial occupiers. Note any adjacent features such as water course and other potentially environmentally sensitive uses (residential, school, infirmary, SSSI etc)		The site is demarcated by a mixture of boundaries including fenced boundaries to the south, residential properties to the east and west and a major road to the north. The site is predominantly surrounded by residential properties, including a golf course to the south of the site.
Vegetation	Are there any vegetation/trees on or close to site (if yes describe locations, type, maturity, etc) Is there any evidence of poor health / distress?	Yes/No Yes/No	Vegetation is located around the outside of the site, predominantly around the southern boundary. There are multiple mature trees on the site boundary. N/A
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	50% of the site is covered in made ground material. 50% is vegetation coverage. None visible on the site walkover.

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Site Drainage	Are there any drain covers / soakaways (if yes describe locations)	Yes /No	Drain covers were present on Hilton Lane, located north of the site
	Are there any outfalls/water courses on site (note the condition of water courses in open water courses. discolouration, odour, eutrophication, oily sheen, gas bubbling water, clear or cloudy)	Yes /No	
	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	
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	None identified on site walkover.
Buildings	Is there any evidence of asbestos construction materials e.g. roofing, insulation materials.	Yes /No	Asbestos may be present within the residential building or within the garage also located within the site boundary.
	Do any buildings have basements?	Yes /No	None identified on site walkover.
	Do any buildings have a boiler room (if yes, describe fuel type and storage arrangements)?	Yes /No	None identified on site walkover.

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Landfilling	Is there any evidence of gas protection measures (gas membrane, gravel-filled trenches, venting pipes, etc)?	Yes /No	N/A
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	N/A Small quantities of material are present on made ground across the site.
Storage of fuels & Chemicals	Are there any drums / containers (if yes, describe quantity, full /empty, stored on hard standing / soft landscaping, bunding)? Are there any above ground fuel tanks (if yes, describe locations, volumes, how many, bunding, used / disused, condition?) Is there any evidence of underground fuel tanks (fuel pumps, covers, vent pipes, how many and how large, fill point, used / disused, and condition)?	Yes /No Yes /No Yes /No	N/A N/A N/A
Accidents	In the event of a large spillage would runoff affect any vulnerable watercourse/culverts? Are emergency procedures / equipment in place?	Yes /No Yes /No	

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Waste	Are there any waste skips present on site? Are waste storage facilities adequate? Is there any litter/fly tipped material?	Yes/No Yes/No Yes/No	N/A Minimal litter and waste disposal bins.
Atmospheric	Are there any fumes, odours originating from site or affecting site from neighbouring sites?	Yes /No	N/A
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		Tight residential access roads are not ideal to transport large, heavy machinery to the site. Various mature trees are present which may reduce headroom. Drain covers located adjacent indicates service to the site (suspected water pipe.) Site lies on a significant slope towards the north. On made ground within the site. Water supply from a suspected water pipe located at the site entrance.
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	N/A
Local Knowledge / Anecdotal Evidence			N/A
Site Dimensions	Describe shape of Site in plan and measure dimensions.		The maximum dimensions of the proposed site are 37.4m north to south and 17.3m west to east. The site occupies an area of approximately 0.06 hectares.

APPENDIX 4

REPORT LIMITATIONS

LIMITATIONS

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

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

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

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

The report was written in 2022 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 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.