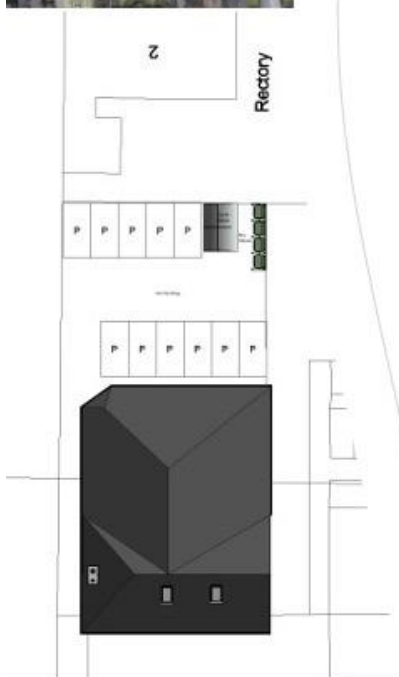




EARTH ENVIRONMENTAL
& GEOTECHNICAL

Phase I GeoEnvironmental Desk Study

Mount Road
Gorton

December 2021

For

Ozma Khan

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**197 -201 MOUNT ROAD
GORTON**

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Report Title:	Mount Road, Gorton Phase I GeoEnvironmental Desk Study
Report Reference:	A4506/21
Client:	Ozma Khan
Issue Date:	16th December 2021
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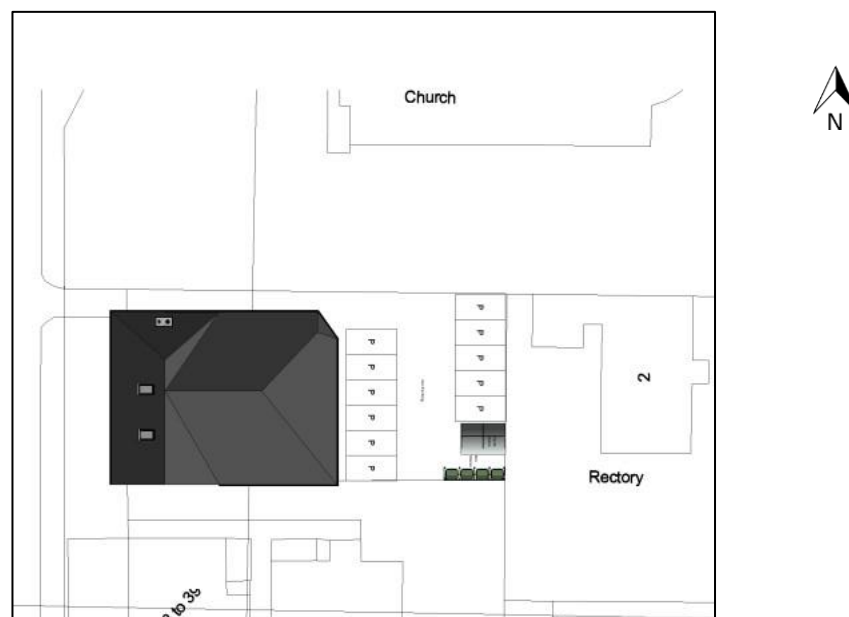
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1.0 INTRODUCTION

Appointment

- 1.1 Earth Environmental & Geotechnical Ltd has been commissioned by Ozma Khan (the Client) to undertake a Phase I GeoEnvironmental Desk Study for a retrospective planning application to Manchester City Council.
- 1.2 It is understood that the Client is acting on behalf of a Mr. Teja Singh Sahota who has extended the existing building at 197-201 Mount Road, Gorton, to include 4 self-contained apartments, associated parking, a bicycle shed and bin store.
- 1.3 Vehicle access is gained from Mount Road to the west of the site.
- 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.
- Manchester City Council Planning Portal.

2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is in Gorton, Manchester approximately 5km southeast of Manchester City Centre. The approximate National Grid Reference for the centre of the site is SJ 88089 95327 (X: 388089, Y: 395327) with the closest postcode being M18 7GG.
- 2.2 The site is a rectangular shaped parcel of land with current access via Mount Road to the west of the site. The maximum dimensions of the site are 18m north to south and 37m west to east. The site occupies an area of approximately 0.07 hectares.
- 2.3 The site currently possesses a ground floor retail outlet and seven self-contained apartments, four of which have been added recently and are part of the retrospective planning application.
- 2.4 The site is surrounded by a predominantly residential area, characterised by older (1930's) two storey terraced dwellings within which there are pockets of more recent apartment development.
- 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 made ground deposits.
- 3.4 The site is underlain by superficial Glacial Deposits, comprising Devensian Till (Boulder Clay).
- 3.5 The solid geology beneath the site is shown to be the Triassic Chester Pebble Beds Formation comprising of fine to coarse grained, cross bedded sandstone with conglomerates and sporadic siltstones.
- 3.6 There are no records of linear features within 500m of the site boundary.
- 3.7 There are no records of landslips within 500m of the site.
- 3.8 There are 25 BGS borehole records identified within 250m of the site. The closest record refers to a 2.8m deep borehole at 8 Longsight Road Gorton, 84m southwest of the site drilled in 1990. Beneath the tarmac, the hole encountered firm-stiff mottled clay, with occasional gravel and coal fragments to the base of the hole.
- 3.9 The site is in an area where the hazard rating is very low with regard to shrink swell clays, running sands, collapsible deposits and landslides. The hazard rating is negligible with regard to compressible deposits and the dissolution of soluble rocks.

Ground Workings

- 3.10 There are 15 records of historical surface ground working features identified within 250m of the site boundary. The closest record refers to a pond 144m west of the site mapped in 1851. Other records in the vicinity refer to further ponds, clay pits and brickworks.
- 3.11 According to the BGS, there is 1 record of a British Pit within 500m of the site. The closest record refers to the ceased, Gorton Brick Works, located 458m west of the site.

Mining and Other Underground Workings

- 3.12 The site is located within an identified coal mining area. Reference to the Coal Authority Interactive viewer shows the site is not located within a Development High Risk Area.
- 3.13 There are no records of 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 on the site.

- 3.15 There are no records of natural cavities within 500m of the site.
- 3.16 There are no records for non-coal cavities identified within 1km of the site.
- 3.17 There are no records for historical underground working features identified within 1km of the site.

Radon Potential

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

Hydrogeology and Hydrology

- 3.19 The superficial deposits are classified by the Environment Agency (EA) as a Secondary Undifferentiated Aquifer. The Glacial Till deposits have a mixed flow type and a low to high permeability. The BGS states the following:

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

- 3.20 The Chester Pebble Beds Formation is classified by the Environment Agency (EA) as a Principal Aquifer. The Chester Pebble Beds Formation has a mixed flow type and a high to moderate permeability. The BGS states the following:

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.'

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

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

- 3.22 There are 9 ground water abstraction licence records within 2km of the site. The closest record refers to a historical borehole at Sandfold Lane, Levenshulme and is located 718m southeast of the site.
- 3.23 There are no surface water abstraction licence records within 2km of the site.
- 3.24 There are no potable water abstraction licence records within 2km of the site.
- 3.25 The site is not located within 500m of a Source Protection Zone or Source Protection Zone within a confined aquifer.
- 3.26 There is 1 water network entry within 250m of the site, which refers to an inland river located 15m southwest of the site.

- 3.27 There are no surface water features identified within 250m of the site.
- 3.28 There is 1 record of a Water Framework Directive (WDF) surface water body located 415m north of the site, which refers to the Platt Brook, which had a failed chemical rating and a moderate ecological rating in 2019.
- 3.29 There is 1 record of a Water Framework Directive (WDF) groundwater body located on-site. The record refers to Manchester and East Cheshire Permo-Triassic Aquifers which had a poor chemical rating in 2019.

Landfill & Waste Management Activity

- 3.30 There are no records for current Environment Agency/Natural Resource Wales landfill records within 500m of the site.
- 3.31 There are 3 records of historic Environment Agency/Natural Resource Wales landfill sites within 500m of the site. The closest record refers to Matthews Lane, Longsight, with a waste type of inert, industrial, commercial, household, special and liquid sludge permitting, located 121m southwest of the site. This landfill site was first recorded in 1969 and last recorded in 1978.
- 3.32 There is 1 record of a BGS/DoE non-operational landfill sites within 500m of the site. The closest record refers to Matthews Lane, Levenshulme, located 357m southwest of the site and poses no risk to the aquifer.
- 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 6 records of a waste treatment, transfer or disposal site within 500m of the site. The closest record refers to a “using waste in construction” exemption for Bemus Construction Services, Melland Road, Gorton, located 86m southeast of the site.
- 3.35 There are 14 records of historical waste sites derived from Local Authority planning records, within 500m of the site. The closest record refers to a refuse destructor located 365m north of the site, dated 1934. All other records refer to refuse destructors in the same vicinity dated between 1908 and 1968.
- 3.36 There are no records of current Environment Agency/Natural Resources Wales licensed waste sites within 500m of the site.

Industrial Land Use Information

- 3.37 There are 84 records of potentially contaminative historical land uses identified within 500m of the site. The closest record refers to a clay pit located 154m southwest of the site, dated 1978. Other records in the vicinity refer to clay pits, unspecified pits, brick works, unspecified ground workings, tramway sidings, railway sidings, a refuse heap, sewage works, filter beds, a refuse destructor, unspecified tanks and a corporation yard.
- 3.38 There are 2 records of current potentially contaminative land uses identified within 250m of the site. The closest record refers to an electricity substation 97m south of the site.

- 3.39 There are 9 records of historical tanks identified within 500m of the site. The closest record refers to an unspecified tank located 84m south of the site, dated 1933.
- 3.40 There are 6 records of historical energy features identified within 500m of the site. The closest offsite record refers to an electricity substation, located 314m north of the site, dated 1950.
- 3.41 There are no records for current petrol or fuel sites within 500m of the site.
- 3.42 There are no records of historical petrol or fuel sites within 500m of the site.
- 3.43 There are 2 historical garage and motor vehicle repair site records identified within 500m of the site. The closest record refers to a garage located 438m east of the site, dated 1972.
- 3.44 There are no National Grid high voltage underground electricity transmission cables within 500m of the site.
- 3.45 There are no National Grid high-pressure gas transmission pipelines within 500m of the site.
- 3.46 There are no historical railway and tunnel features identified within 250m of the site.
- 3.47 There are no historical railway lines identified within 250m of the site.
- 3.48 There are no current active railway line records identified within 250m of the site.
- 3.49 There are no underground railway lines or tunnels identified within 250m of the site.
- 3.50 The site is not within 500m of the route of the High Speed 2 rail project.
- 3.51 The site is not within 500m of the route of the Crossrail 1 rail project.

Environmental Permits, Incidents and Registers

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

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

Permit/Incident/Register	Number
Sites Determined as Contaminated Land under Part 2A EPA 1990	0
Dangerous or Hazardous (COMAH and 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	5
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

- 3.53 There are 5 records of Licensed Discharge Consents within 500m of the site. The closest record refers to sewage discharges in the Gore Brook located 45m south of the site.
- 3.54 There are no other records of Environmental Permits, Incident or Registers within 500m of the site.

Environmentally Sensitive Sites

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

Ecology

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

Archaeology

- 3.57 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, there is 1 record of a Listed Building within 250m of the site which refers to the grade II listed "The Church of Our Lady and St Thomas of Canterbury", Longsight, located 25m north of the site.

- 3.59 There are no records of World Heritage Sites or Scheduled Ancient Monuments 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 Zone 2 and Zone 3 floodplain.
- 3.61 There is no risk of flooding from rivers and sea (RoFRaS) within 50m of the site.
- 3.62 There are no records of historical flood events within 250m of the site.
- 3.63 There are no records of flood defences located within 250m of the site.
- 3.64 There are no records of areas benefitting from flood defences within 250m of the site.
- 3.65 There are no records of areas used for flood storage within 250m of the site.
- 3.66 The highest risk of surface water flooding occurring on-site is negligible.
- 3.67 The highest risk of groundwater flooding occurring on-site is moderate.

Previous Site Investigations

- 3.68 A planning application (reference: 099001/FO/2012/N2) was submitted to Manchester City Council in April 2012 for the erection of a two storey, three bedroomed house, to the rear of the shops. The application was refused.
- 3.69 A planning application (reference:117981/00/2017) was withdrawn in January 2018/
- 3.70 A planning application (reference:119782/00/2018) was submitted to Manchester City Council in April 2018 for the proposed double storey rear extension to include a third floor to accommodate 7 self-contained apartments. It was approved with relevant conditions; one of which was to include a gas protection membrane, due to the site being within 250m of a landfill or historical source of landfill gas. CDN/19/1014 | Discharge of conditions 5 (gas membrane), 6 (waste), 7 (bin store), 8 (car park), 9 (vehicular access) and 12 (CMP) attached to planning permission referenced 119782/OO/2018 | 199 - 201 Mount Road Manchester M18 7GG

4.0 SITE HISTORY

- 4.1 The historical development of the site has been determined by reference historical plans and Google Earth imagery. The reviewed historical plans comprise only readily available records and may be limited; however, the information available to date indicates that additional searches are unlikely to add to our understanding of the site. The earliest available historical mapping covering the site dates to 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
1848-1849 1:10,056	The site lies on part of a racecourse and a footpath north of Pink Bank Lane leading to Whitley Farm and Whitley Cottage 300m north of the site.	The area is rural with irregular shaped fields surrounded by hedgerows. There are scattered farmsteads and ponds. Nico Ditch a 5th century archaeological feature runs west to east, 500m south of the site. Crowcroft Cotton Mill, the main Stockport Road and the railway lie approximately 800m to the west. Levenshulme Printworks lies 750m to the south
1890 -1892 1:10,056	Pink Bank Cottages have been constructed a couple of metres south of the site next to the footpath and the site occupies the garden of the end of the terrace.	The area is still predominantly rural. The Sheffield -Midland Joint Railway and the Manchester Central Station Line have been constructed 500m and 1km to the east of the site. There is a quarry 700m south of the site near the print works. Reservoirs have been built 800m south. There is an iron works, and a dye works 500m to the northwest Within a km of the site, residential areas, churches, mills, a mattress works, mechanics institute, brickworks and schools have expanded along the railway and Stockport Road. Belle Vue zoological Gardens exist to the north. Gorton to the northeast has expanded to include terraced housing, saw mills, Belle Vue Station, the church
1893 1:2,500		
1907-1908 1:2,500	No significant change	500m surrounding the site is still predominantly rural. A sewerage works in constructed 500m to the north A brickworks is 500m to the west A dye works and Ironworks 500m to the north and a tarpaulin works 600m to the northwest. Rows of terrace housing 750m to the northwest and Crowcroft Park to the southwest.
1905-1906 1:10,560		

Date	On-Site History	Surrounding Land Use History
1923 1:10,560 1922 1:2,500	No significant change.	Allotment Gardens exist 250m southwest and 500m to the southeast on Pink Bank Lane. A football ground has been allocated with a pavilion 200m to the south Terrace housing has been constructed 600m to the southwest A refuse destructor is located at the sewage works 500m to the north.
1933-34 1:10,560 1933 1:2,500	There are now four buildings on the site and a church has been built adjacent to it to the north. The area is built up with detached houses with gardens.	The area is now mainly residential with crescents of detached houses with large gardens both sides of the railway within 500m. There is a large school and playing fields 200m to the south A clay pit 200m to the west with brickworks 500m west A laundry 600m to the southwest Allotment Gardens 400m to the southwest.
1950 1:1,250 1951 1:1,250 1950-1951 1:2,500 1955-1956 1:10,560	There are six small buildings on the site which is surrounded by residential housing and adjacent to the church and Sunday school.	A clay pit 200m to the southwest with a tramway. A brick works 300m to the west A corporation yard 500m to the northeast A refuse destructor 500m north Victoria Works 600m to the northeast Belle Vue Racecourse 750m north
1965 -1968 1:10,560	There are buildings on the site at the front of the plot facing Mount Road	Reddish Electric Locomotive Depot 750m to southeast No other significant changes
1968 - 1972 1:2,500	No significant change. The three narrow buildings have frontage on to Mount Road. There are three associated sheds / out houses to the rear of the properties.	Clay pit 200m to southwest Running track 150m to southeast

1976-1981 1:10,000	No significant change	Refuse tip now a recreation ground 500m north Brickworks and clay pits 200-300m west and southwest Sports grounds, playing fields and school 500m south Greyhound track 750m north Unspecified works 600m northwest and northeast.
1983-1985 1:10,000 1984-1985 1:1,250	No significant change.	The brick works and clay pits have been covered over. Brick residential apartments have been constructed adjacent to the south. No other changes.
1989-1991 1:10,000 1991 – 1992 1:1,250	No significant change.	One of the reservoirs to the south has been covered over
2001 1:10,000 2003 1:1,250	No significant change.	The Railway (Manchester Station Line) has been dismantled
2021 1:10,000	No significant change.	There are six educational facilities and playing fields within 500m of the site and no heavy industry.

Figure 4 OS Map Extract 1848

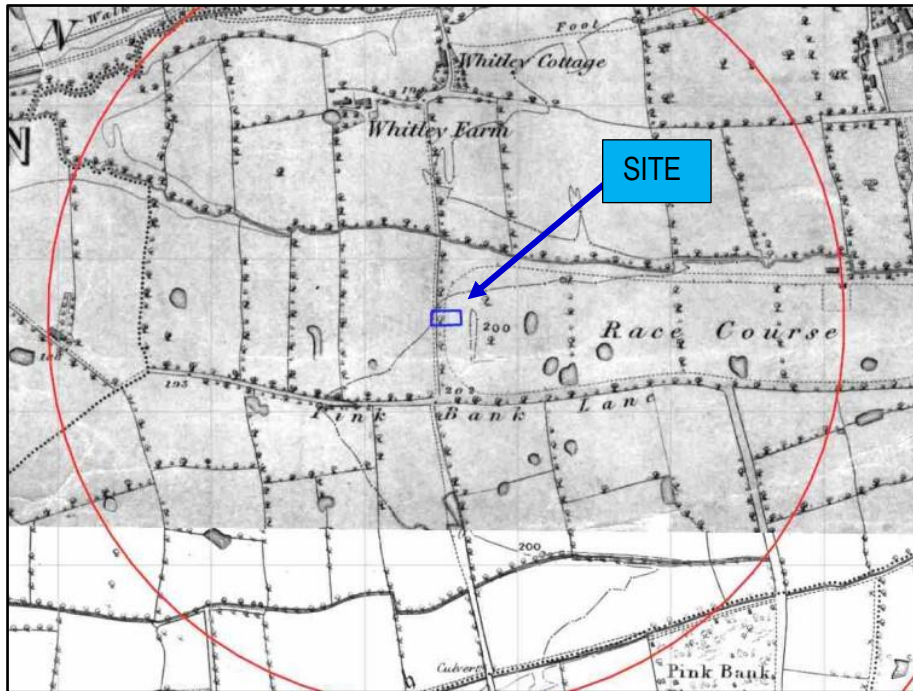


Figure 5 OS Map Extract 1923

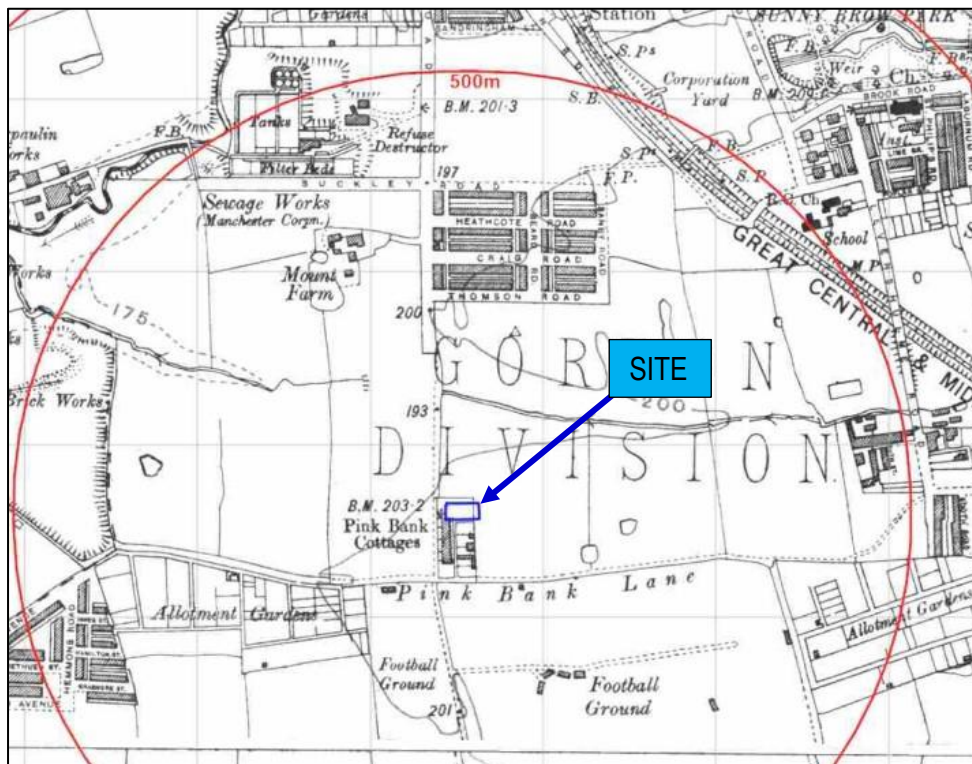


Figure 6 OS Map Extract 1934

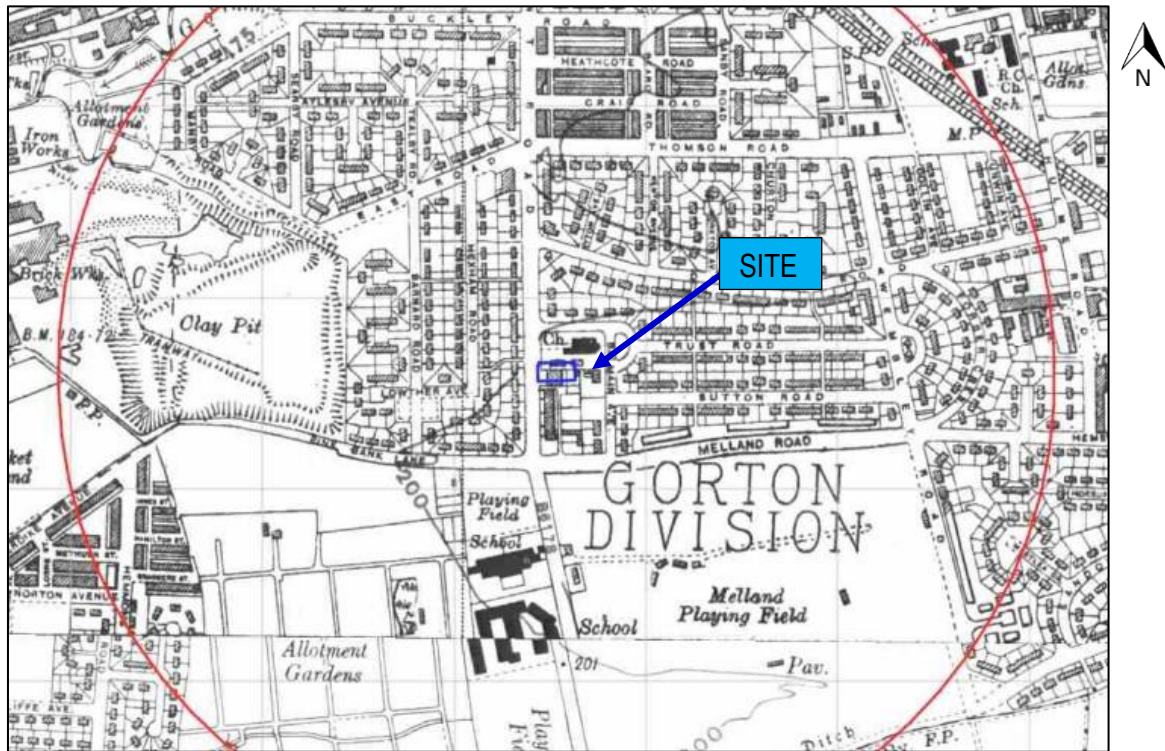


Figure 7 OS Map Extract 1965

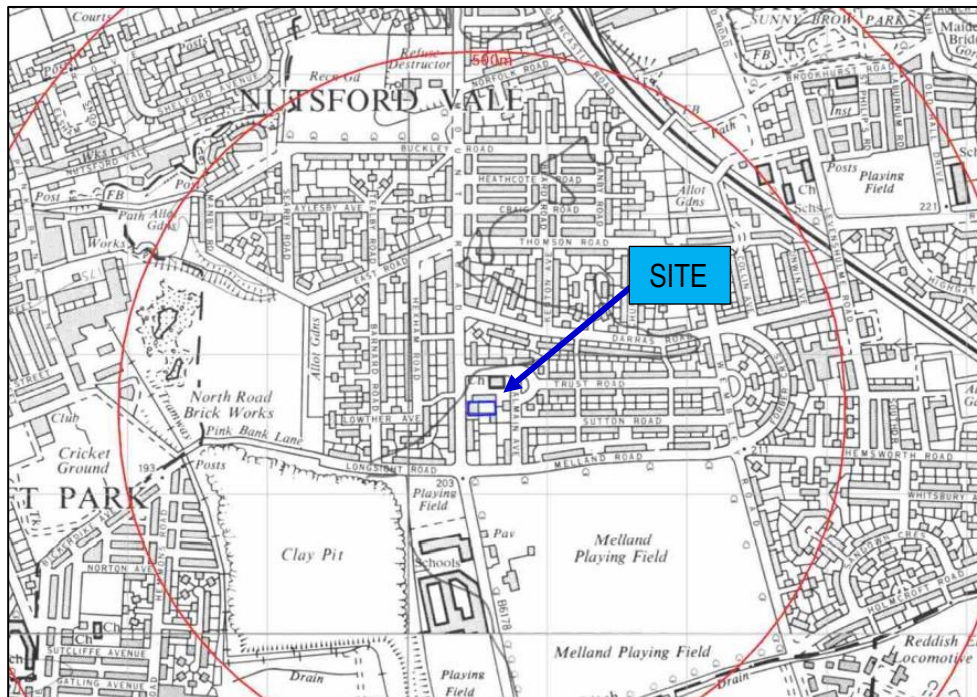


Figure 8 OS Map Extract 1989

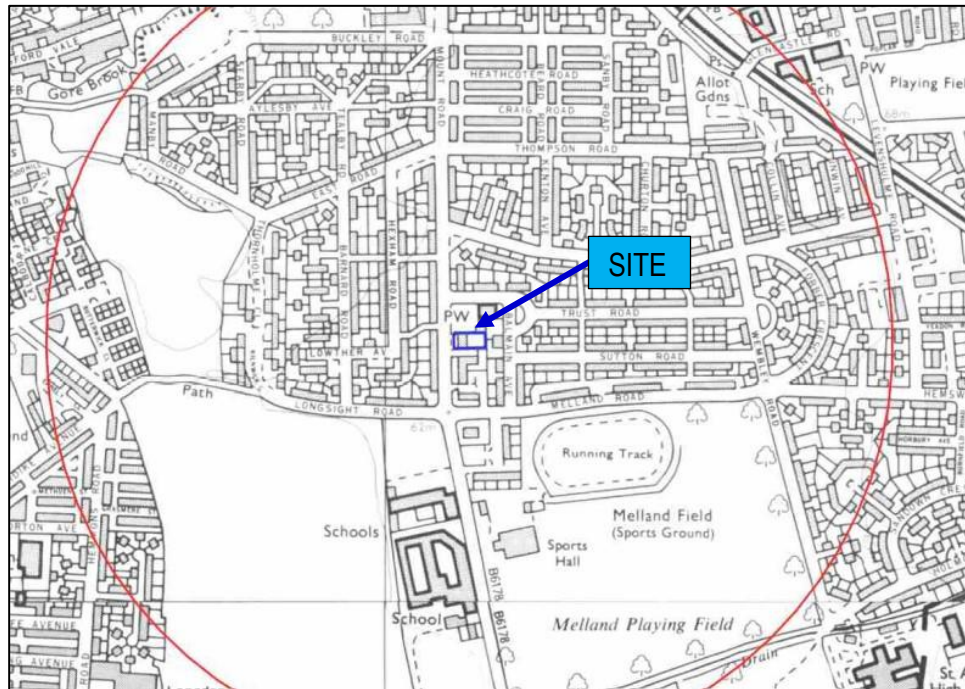


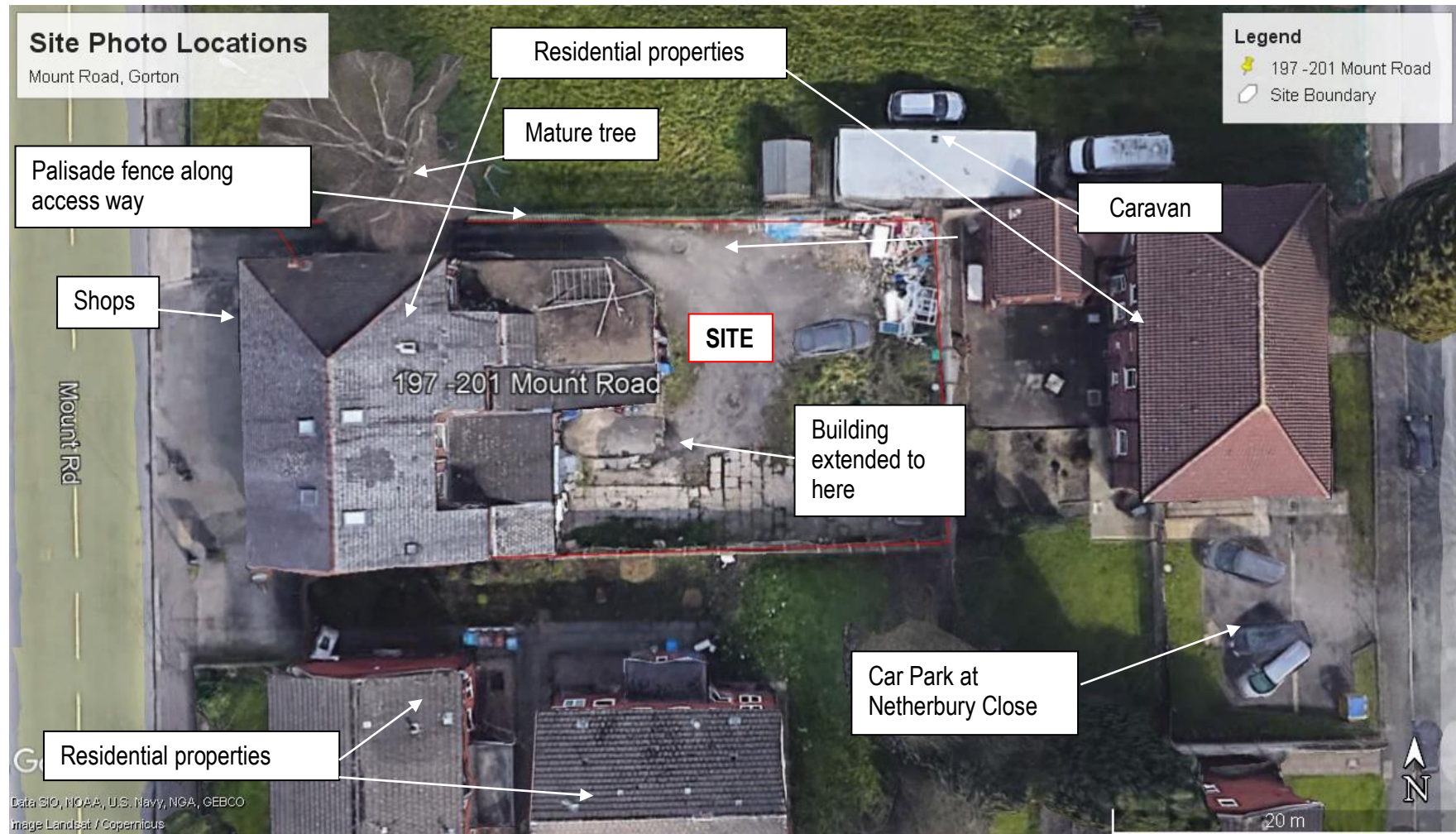
Figure 9 OS Map Extract 2001



5.0 WALKOVER SURVEY

- 5.1 A walkover survey was completed on 14th December 2021. The photographs and notes from this survey are appended to this report as Appendix 2 and Appendix 3 respectively.
- 5.2 The site is currently accessed from Mount Road to the west of the site by a 3m alleyway.
- 5.3 The site is occupied by the shops, apartments and the new extension.
- 5.4 To the rear of the building is an area of (gravel) being prepared for a carparking area with a drain and manhole covers in construction at the north side of the building and a brick wall at the rear.
- 5.5 The site is on predominantly made ground however no contaminated material was noted.
- 5.6 The site is flat lying, gated and surrounded by palisade fencing (north side), prefab concrete fencing (south side) and wooden fencing (east side).
- 5.7 There are trees on the southeast side of the site and small saplings on the northeast corner.
- 5.8 There is a church adjacent to the building to the north, residential buildings to the south and a carpark at Netherbury Close to the south.
- 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 continued residential end use.

Table 3: Consequence, Probability and Risk

Probability	Consequence,	Risk
High Likelihood- There is a pollution linkage and an event either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution	Very High – acute risk to the human health likely to result in significant harm. Risk of severe or irreversible effect on ground/surface water quality. Catastrophic damage to buildings / property.	Very High – there is a high potential that the source-pathway-receptor scenarios may give rise to harm to human health, or the environment and remedial action is likely to be required.
Likely – there is a pollution linkage, and all the elements are present, which means that it is probable an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.	High – Severe or irreversible effect on human health. Temporary severe or irreversible effect on ground/surface water quality. Reduction of water quality rendering groundwater or surface water unfit to drink and/or substantial adverse impact on groundwater dependant environmental receptors.	High – it is likely that the source-pathway-receptor scenarios may give rise to an impact on human health or the environment, which may require remediation and/or control measures to mitigate risks
Low likelihood– there is a pollutant linkage and circumstances are possible for an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term	Moderate – Long term or short-term moderate effect on human health. Moderate effect on ground/surface water quality, reversible with time. Reduced reliability of a supply at a groundwater or surface water abstraction source	Moderate – it is possible that the source-pathway-receptor scenarios may give rise to an impact on human health or the environment, however it is either relatively unlikely that such would be severe, or if any harm were to occur it is more likely that harm would be mild.
Unlikely – there is a pollution linkage, but circumstances are such that it is doubtful that an event would occur even in the very long term.	Low – Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc.) Slight effect on ground/surface water quality, reversible with time. Marginal reduced reliability of a supply at a groundwater or surface water abstraction source.	Low – it is possible that harm could arise at the source, however it is likely that this would at worst be mild.
		Very Low – it is unlikely that the source-pathway-receptor scenarios will give rise to an impact on human health or the environment.

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

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

Potential Sources

- 6.5 Historically the site was rural and then residential. There is very little heavy industry close by, the closest being the brick works and clay pits 200m to the northwest.
- 6.6 The previous planning application in 2018 was approved with conditions, one of which included a gas penetration membrane be installed due to the possibility of ground gas as the site was either within 250m of a registered landfill or near a historical source of land gas.
- 6.7 Potential on-site sources of contamination include ground gas associated with the disruption of made ground during the extension of onsite buildings. Possible unseen asbestos or contamination in the made ground.
- 6.8 Potential off-site sources of contamination are local light industry, the rubbish along the northeast boundary and the proximity to a historical landfill (121m southwest of the site).
- 6.9 There is potential for the presence of contamination associated with the following:
- Areas of Made Ground from on and off-site developments
 - Ground gas and possible asbestos and contamination associated with Made Ground
- 6.10 Contaminants may therefore include heavy metals, asbestos and ground gases (Carbon dioxide, methane.)

Potential Receptors

- 6.11 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

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

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

Table 5: Preliminary Conceptual Model

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
Potential soil contamination E.g., Heavy Metals, PAH, TPH, BTEX and ground gases.	Dermal contact, ingestion and inhalation of soils dust	Current Site Users	Unlikely	Moderate	Low	The site has recently had an extension added and drains and parking are in construction. The site appears to be on made ground which does not appear to contain contaminated material, however without testing this is not conclusive. There is no past site usage that would suggest contamination. The risk is therefore considered to be LOW .
		Adjacent land users	Unlikely	Moderate	Low	Most of the construction work has been carried out. There is adequate site drainage and no evidence of contamination. Therefore, the risk is considered LOW .
		Future land users	Unlikely	Moderate	Low	If the conditions of the planning application have been carried out, a gas membrane should have been fitted therefore the risk is LOW . This assessment is based on the potential for contamination to be present beneath the site.
		Construction Workers	Unlikely	Moderate	Moderate to Low	Construction workers may have been exposed to potentially contaminated soils during construction works, however exposure duration would have been short-term only. The risk to construction workers is considered LOW . Appropriate health and safety measures (in line with CDM and other relevant health and safety guidance) would have reduced the risk.
	Downward vertical migration of leachate to shallow groundwater	Groundwater within the Underlying Aquifer	Unlikely	Moderate	Low	The underlying superficial soils are anticipated to be boulder clay with high to low permeability. There are no abstraction licences within 2km. The groundwater vulnerability is low. The risk to groundwater is therefore considered LOW .
	Lateral migration in surface waters	Surface water	Unlikely	Moderate	Low	There are no streams on site and drains are being constructed. Therefore, the perceived risk to surface waters is LOW .
	Vertical or lateral migration of ground gas	Current Site Users	Unlikely	Moderate	Low	The site has made ground at the surface. The council stipulated that a gas membrane should be fitted due to the proximity of a local landfill site 121m to the southwest. This risk to current site users is therefore LOW .
		Adjacent land users	Unlikely	Moderate	Moderate to Low	Residential properties predominantly surround the site. Areas of made ground are present. There is low potential for radon gas and radon protection measures are not required. The risk to adjacent site users from ground gas is therefore considered LOW .

Source	Pathway	Receptor	Probability	Consequence	Risk	Comment
		Future land users	Unlikely	Moderate	Moderate to Low	The extension was to be fitted with a gas membrane. 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	Moderate to Low	Due to the nature of the construction; construction workers are not likely to have been exposed to ground gas/depleted oxygen conditions and the duration will 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 may be present associated with the made ground albeit unlikely. Asbestos is only harmful when disturbed. The risk to current site users is LOW .
		Adjacent land users	Unlikely	Moderate	Low	Residential properties predominantly surround the site. Disturbance of soil during the construction phase may allow fibres to become airborne. Dust control measures (dampening down) should be implemented as part of good site working practices. Therefore, the risk is considered LOW .
		Future land users	Unlikely	Moderate	Moderate to Low	The proposed development consists of constructing a carpark for the residents. Most of the site will be surfaced in hardstanding. The risk is therefore considered LOW . A contamination assessment of the existing on-site soils would be required to determine the level of risk and necessary mitigation measures.
		Construction Workers	Low Likelihood	Moderate	Moderate to Low	Construction workers may have been exposed to potential asbestos in made ground soils. However, this potential area is small. The risk is considered MODERATE TO LOW . A contamination assessment of the existing on-site soils would be required to determine the level of risk and necessary mitigation measures.

7.0 GEOTECHNICAL HAZARDS ASSOCIATED WITH THE DEVELOPMENT

7.1 In addition to the environmental hazards there are also geotechnical hazards associated with the stability of the ground including load bearing capacity, slope stability and effects of ground mining activities. Local Authorities follow NPPF (2012) which requires that a site 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.
Collapse Soils	Very low risk.
Swelling Clay	Very low risk.
Running Sand	Very low risk.
Ground Dissolution	Negligible risk.
Landslip	Very low risk.
Mining & Quarrying	The closest unspecified ground workings are 141m west. The site is located within a Coal Mining Reporting Area but not within a Development High Risk Area. Therefore, the mining risk is considered moderate to low.
Geotechnical Design Considerations	
Site Clearance	The site does not require clearance
Trees	A couple of trees but the construction has been carried out
Existing Buildings/Obstructions	There were existing buildings that have been added to.
Foundations	The depth and type of proposed foundations would depend on the ground conditions present on site. There appears to be made ground on site. Superficial deposits are Glacial Till

Geotechnical Design Considerations	
Floor Slabs	Again, an intrusive geotechnical investigation would have been 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 an Undifferentiated and Principal aquifer. The highest risk of groundwater flooding on site is recorded as moderate.
Earthworks	The site is flat, and development has already taken place. Drains and a small retaining wall are being constructed.
Slopes	There are no slopes
Retaining Walls	There is a minor brick retaining wall being built to the east.
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 one of the first in the area to become residential, occupying the garden of a row of terraces. Industry built up around the railways and major roads however at a distance which would not be cause for concern regarding potential contaminants.
- 8.2 Potential on-site sources of contamination include ground gas with the made ground and an historical landfill site 121m to the southwest. Also, the slight possibility of asbestos in the made ground on site.
- 8.3 Potential off-site sources of contamination include the claypits 154m south, an historical tank 84m south dated 1933 and the historical landfill site 121m southwest of the site.
- 8.4 The development of the site consisted of an extension to the rear of the existing building to create seven self-contained apartments.
- 8.5 The site is underlain by Glacial deposits, comprising of Devensian Till (Undifferentiated Aquifer). The solid geology comprises the Chester Pebble Beds (Principal Aquifer) comprising of fine to coarse grained, cross bedded sandstone with conglomerates and sporadic siltstones.
- 8.6 The site is not located in a Radon Affected Area, as less than 1% of the properties are above the Action Level.
- 8.7 Given the potential contaminative land uses, the overall risk from soil contamination to end users concluded to be **LOW**.
- 8.8 The risk to controlled waters is concluded to be **LOW** based on the adequate drainage on the flat site and the distance from the nearest surface water body.
- 8.9 The risk from ground gas to end users and construction workers is **LOW** given the extent of Made Ground and potential presence of gas from a historical landfill (121m south west) that closed 43years ago.
- 8.10 The site is not located within a Zone 2 and Zone 3 floodplain. The risk of groundwater flooding is **MODERATE**.

Recommendations

- 8.11 No further recommendations are necessary with respect to the site.

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.: A4506/21	Site: Mount Road, Gorton
Plate 1 Access Route to the rear of building facing west	Plate 2 Area of ground to the south of the building on site facing west
	
Date: 14th December 2021	Date: 14th December 2021
Plate 3 New extension to existing building from centre of site facing west	Plate 4 Viewing east from the rear of the building on site
	
Date: 14th December 2021	Date: 14th December 2021

Earth Environmental & Geotechnical Ltd Tel: 0161 975 6088 Email: info@earthenvironmental.co.uk Web: www.earthenvironmental.co.uk	SITE PHOTOGRAPHS 
Job No.: A4506/21	Site: Mount Road, Gorton
Plate 5 Facing south from the north boundary to rear of new extension	Plate 6 Front of the building looking north, showing access to site
	
Date: 14th December 2021	Date: 14th December 2021
Plate 7 North boundary of the site looking north	Plate 8 Northeast corner of the site looking southwest
	
Date: 14th December 2021	Date: 14th December 2021

Figure 11 Site Walkover Photo Locations



APPENDIX 3

SITE WALKOVER NOTES

WALK OVER SURVEY REPORT

Site: Mount Road, Gorton

Date: 14th December 2021

Job No: A4506/21

Undertaken By: Ashley Graham

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 with shops. residential properties and adjacent to Church Current site is shops and apartments
Evidence of Past Activities	Are there: Any relevant street names in area? Features or relics which indicate history?	Yes /No Yes /No	Church to north Access from Mount Road Parking Netherbury Close
Geographic Setting	Description required for: Low lying flood plain/dry valley/rolling hills etc.		The site is flat urban area
Ground Conditions	Is there any evidence of: Mining, Mine entries Subsidence Landslip/slope erosion Former investigation works	Yes /No Yes /No Yes /No Yes /No	

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	No flat Minor retaining wall being constructed northeast Earthworks being constructed Predominantly made ground
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)		N boundary palisade fence E boundary prefab concrete S boundary is wooden garden fence
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	Trees at southeast boundary and small young trees to northeast
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	All gravel cover

Desk Study features checked during site visit	Feature and Information required	Present	Description / Comments
Site Drainage	Are there any drain covers / soakaways (if yes describe locations) Are there any outfalls/water courses on site (note the condition of water courses in open water courses. discolouration, odour, eutrophication, oily sheen, gas bubbling water, clear or cloudy) Where a watercourse runs alongside or crosses a site are there any differences in visible water quality upstream and downstream of the site?	Yes/No Yes/No Yes/No	There are no nearby streams, and a drain is being constructed to the north and east rear of the building. There are existing manhole covers NW alleyway and at rear of new build.
Electrical Equipment	Are there any electricity sub stations on or adjacent to the site? Are there any electrical transformers, capacitors, pylons etc on site?	Yes/ No	
Buildings	Is there any evidence of asbestos construction materials e.g., roofing, insulation materials. Do any buildings have basements? Do any buildings have a boiler room (if yes, describe fuel type and storage arrangements)?	Yes/No Yes/No Yes/No	New building constructed at the rear of existing shops Unknown Unknown

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
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	Only building materials
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		Access at site entrance 3 m wide Church yard adjacent from building
Site Environs	Are there any local features that could have a harmful influence e.g., landfill, industrial processes, railway land? Are there any sensitive water features/courses near to the site?	Yes/No Yes/No	
Local Knowledge / Anecdotal Evidence			
Site Dimensions	Describe shape of Site in plan and measure dimensions.		

APPENDIX 4

REPORT LIMITATIONS

LIMITATIONS

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

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

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

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

The report was written in 2021 and should be read considering any subsequent changes in legislation, statutory requirements and industry best practices. Ground conditions can also change over time and further investigations, or assessment should be made if there is any significant delay in acting on the findings of this report. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of Earth Environmental & Geotechnical Ltd. In the absence of such written advice of Earth Environmental & Geotechnical Ltd, reliance on the report in the future shall be at the client's own and sole risk. Should Earth Environmental & Geotechnical Ltd be requested to review the report in the future, Earth Environmental & Geotechnical Ltd shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between Earth Environmental & Geotechnical Ltd and the client.

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

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

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

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

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

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

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